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► To cite this version:

Faridah Djellal, Faïz Gallouj. Taking into account hidden innovation in innovation networks: the role of public-private innovation networks in services. 2015. halshs-01191137

HAL Id: halshs-01191137

<https://shs.hal.science/halshs-01191137>

Preprint submitted on 1 Sep 2015

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Taking into account hidden innovation in innovation networks: the role of public-private innovation networks in services

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Abstract

Public-private innovation networks in services (PPINS) are a new expression of traditional innovation networks (INs) in contemporary service economies. There are a number of ways in which this new expression differs from the other. It differs from it, first of all, by its emphasis on market services and on public and non-market services in the dynamics of innovation. But PPINS differ from INs most of all in the nature of the innovation that is taken into account (which is the subject of the network implementation). This innovation is no longer limited to economic and technological innovation, but also includes non-technological and social innovation - which most often remain invisible to our traditional analytical tools. The purpose of this paper is to examine how PPINS contribute to the implementation of invisible innovations, and thus to the introduction of invisible/hidden innovation within the innovation network tradition. It addresses the following three points: i) the nature of the invisible innovation implemented within PPINS, ii) the invisible innovation organization modes within PPINS, iii) the public policy consequences of the focus on invisible innovation (and corresponding PPINS).

Introduction

For two decades now, the network approach to innovation has been undeniably successful at every level - theoretical, empirical, methodological and political. Despite this achievement, the traditional Innovation Network (IN) concept, especially when addressed through the lenses of the service and sustainable development economy, has a certain number of shortcomings. These weaknesses reflect four closely linked biases: industrial, market, technological and political. Indeed, put simply, one might say that the core of traditional INs most often consists of manufacturing industries generating (science-based) technological innovation within a market rationale, and that public policies are implemented in order to support this core framework. This is not to say that the public-private relationship is not taken into account, or that services are completely excluded from the INs, but rather that they are most often viewed as peripheral support variables which may provide some support in terms of cognitive resources (consultancy, education, research laboratories), financial resources (banks, public and para-public organizations), or regulation and coordination resources (public bodies).

The purpose of this paper is to bring a new and enriching concept to the innovation network tradition – one which, in some ways, loosens the biases of the traditional INs. This new expression of the IN concept is called Public-Private Innovation IN Services (PPINS). There are a number of ways in which it differs from the other: firstly, by dint of its emphasis on

market services and on public and non-market services (and thus on the public-private relationship) in the dynamics of innovation. It is services, rather than industrial companies, that are (or are intended to constitute) the central actors of PPINS. The PPINS concept makes it possible to include previously-excluded actors in the interactive innovation dynamics. Indeed, beyond financial services and consultancy, any type of market service activity, as well as the wide variety of organizations from the so-called third sector can be included. Similarly, any public or quasi-public organization, whatever its level (local, regional, national, or supranational) is eligible for PPINS. However, in PPINS, such an organization intervenes not just as a promoter of innovation, but also as an innovator (or co-innovator) in its own right.

But PPINS differ from INs most of all in the nature of the innovation that is taken into account (which is the subject of the network implementation). This innovation is no longer limited to economic and technological innovation, but also includes non-technological and social innovation - which most often remain invisible to our traditional analytical tools.

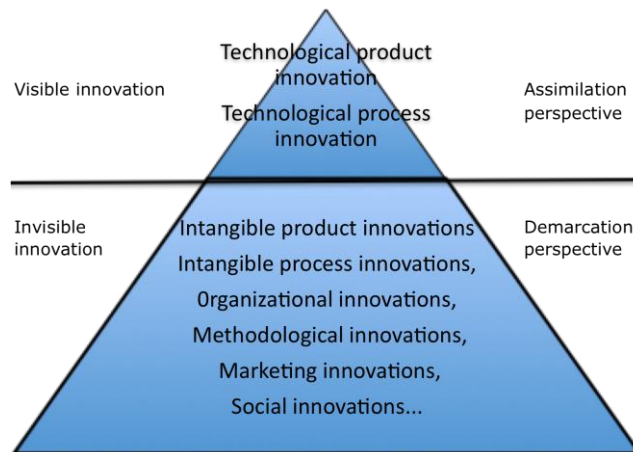
The purpose of this paper is to examine how PPINS contribute to the implementation of invisible innovations, and thus to the introduction of invisible/hidden innovation within the IN tradition. It addresses the following three points, around which the paper is structured: (i) the nature of the invisible innovation implemented within PPINS, (ii) the invisible innovation organization modes within PPINS, and (iii) the public policy consequences of the focus on invisible innovation (and corresponding PPINS).

1. A broad and open concept of innovation

By contrast with traditional INs and systems, which are mainly focused on the implementation of technological (i.e. visible) innovations, PPINS are based on a broader, more open concept of innovation. This opening-up is achieved in various ways, encompassing the nature of innovation and its modes of emergence and development. In general, the PPINS may be devoted to non- technological innovations (invisible to traditional analytical tools) rather than exclusively to technological innovation, as well as to programmed (planned) innovations and emergent (spontaneous) innovations. This general opening-up of innovation generated in PPINS manifests itself particularly in social innovation and public services innovation.

a) PPINS and non-technological innovation: taking into account invisible innovation

PPINS neither ignore technological innovation, nor neglect non-technological (invisible) innovation in its various forms; on the contrary, they even pay special attention to it. From this viewpoint, PPINS contribute to broaden the scope of the concept of IN. In a way, from all the different ways of addressing innovation in services, they reinforce the so-called demarcation (or differentiation) perspective (Gallouj, 2002), which seeks to identify the specificities of innovation in services, in comparison with that of goods.

Figure 1: The Innovation Iceberg

The prevailing technologist and scientific view of innovation within the traditional IN concept only makes it possible to grasp the very tip of the innovation iceberg (Figure 1). This visible part of innovation is the part captured by such traditional indicators as R&D and patents. It is limited to product and process technological innovations.

However, the PPINS concept opens up the possibility of addressing the submerged part of the innovation iceberg, and describes how heterogeneous actors interact in order to produce non-technological innovations that are also characterized by high heterogeneity. Indeed, under the heading of non-technological innovation, a large diversity of forms of innovations is taken into account: (intangible) product or process innovations, organizational innovations, methodological innovations and marketing innovations. Examples of this might include a new insurance contract, financial product, field of expertise in consultancy, training product, mobility concept, format for a restaurant, retail outlet or hotel, leisure or tourism concept, care or cleaning protocol or consulting methodology. Although these non-technological (invisible) innovations are not exclusive to the services sector, they are more frequently found in services than elsewhere, and ‘service innovation studies’ have made considerable efforts to identify them within the context of the so-called demarcation perspective. The non-technological nature of these invisible innovations does not mean that they are not (or cannot be) based on a tangible technology (information, telecommunications or transportation systems, for example), but rather that the innovations and associated technologies are not consubstantial (i.e. one and the same thing) - and that, in some cases, the technology can be dispensed with.

An important expression of invisible innovation, within PPINS, is what is called social innovation. This is often closely linked to services and service innovation (Djellal and Gallouj, 2012). The current success of social innovation can be explained in various ways, including the chronic economic crisis and ageing in developed countries, the failure of development policies, or the rise of sustainable development awareness. However, despite its undeniable theoretical and operational success, the concept of social innovation lacks clarity. Social innovation is designed to solve social problems. It is described as intangible, non-technological, organizational, non-economic, non-market, informal, local, etc.

Taking into account non-technological or invisible innovation (in its various forms), within PPINS is of course closely linked to the central role played by market services, public services and third sector organizations in PPINS.

In order to account for both visible and invisible innovation within PPINS, five types of innovations were identified within the ServPPIN project¹: 1) technological innovations; 2) cognitive service innovations; 3) conceptual innovations; 4) organizational and process innovations; 5) network-based innovations. These five types of innovation are defined and illustrated in Table 1. Only the first type of innovation - which includes the traditional categories of technological product and process innovation - is tangible in nature. The other four types of innovation, covering products, processes and new organizations are intangible in their nature - that is, non-technological. It should be noted that, although organizational and process innovations are different in analytical terms, in practice (and especially in service activities) it is difficult to distinguish between them. This is why they have been allocated to the same category. It should also be noted that *network-based innovation* is a particular form of organizational innovation.

Table 1: A Typology of Visible and Invisible Innovations in PPINS

Category	Type of innovation	Definition	Examples
Tangible	Technological innovation	Material artefacts (product or process innovations) or services relying heavily on technologies (technology mediated services)	Interactive rehabilitation technologies New non-invasive medical imaging technologies E-tourism innovations New security systems for the use of IT and telephone systems A new method for fertilizer dosage (in advisory services for farmers) Software applications for satellite systems A rail tracking demonstrator
Intangible	Cognitive service innovation	New services having cognitive components	New health education programmes for patients, new training products across various sectors, new areas of expertise in consultancy
	Conceptual innovation	New intangible 'products' (new service formats)	New tourism products, such as fruit festivals and 'allergy-free' tourist experiences
	Organizational and process innovation	New organizational structures, new servuction processes	A methodology for calculating costs, the establishment of a new research organization, a new school of health and a new hospital Research centre for e-tourism and e-travelling A science park
	Network-based innovations	The network as an innovation. Idea that the establishment of a PPINS can itself be regarded as the main purpose of the innovation	An innovative network providing care for elderly people

¹ The servPPIN project is a EU funded project within the FP7. It began in 2008 and ended in 2011. It brought together partners from the different following countries: France, the UK, Spain, Austria, Denmark, Norway, Slovenia and Hungary. The qualitative surveys conducted by the participating partners in the project helped to establish a database of 40 in-depth case studies of ServPPINs in the health, transport, knowledge-intensive services and tourism services. A synthesis of the main results of the ServPPIN project is provided in Gallouj, Rubalcaba, Windrum (2013).

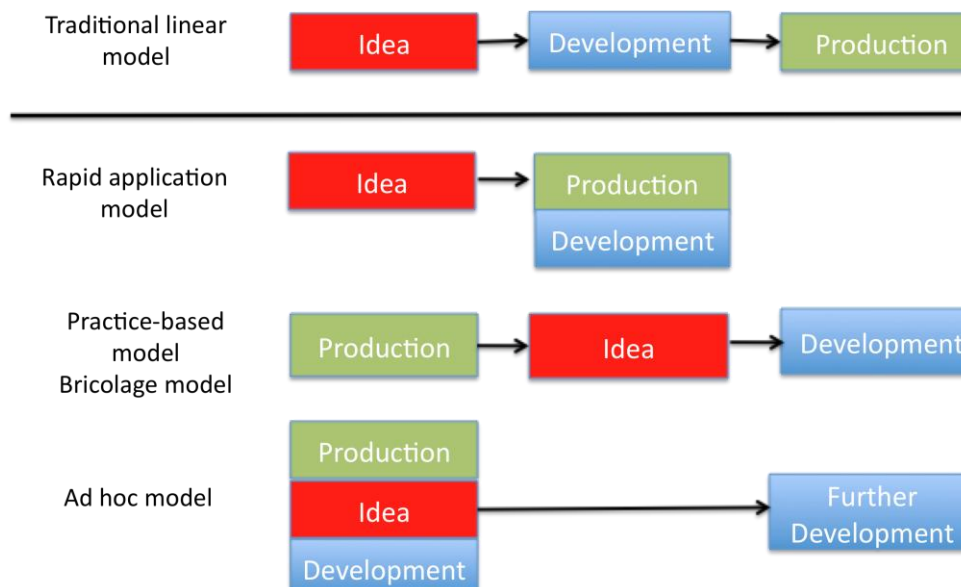
2. Modes of Innovation Organization: predictable and unpredictable innovation

The inclusion of services and non-technological innovation makes it possible for PPINS to cover non-formalized (non-institutionalized), non-programmed, and emergent modes of innovation organization, as well as formalized (programmed, predictable) modes.

The innovation dynamic is planned and predictable when it is achieved within clearly identified structures (e.g. R&D departments, permanent or temporary innovation project groups) and according to previously established (most often linear) processes. The extension of New Product Development (NPD) methodologies to services falls within this perspective. Indeed, what is called New Service Development (NSD) consists of creating new services according to planned and systematic processes, just as NPD does (Scheuing et Johnson, 1989).

However, service innovation studies have emphasized the importance of more flexible (looser) innovation dynamics and structures, which are either not programmed, or less programmed, and not predictable, or less predictable (Toivonen et al. 2007; Sundbo and Gallouj, 1999). The literature describes several flexible and informal modes of organizing innovation in services: the bricolage innovation model, practice-based model, ad hoc innovation model and rapid application model. Comparing these to the traditional linear model of innovation, we can account for these different models (see Figure 2) depending on how different steps or activities (namely conception of the idea, development and production) are articulated over time.

Figure 2: The Organization of Innovation in Services: linear and the loosely-coupled modes



In the rapid application model (Toivonen et al. 2007), the service provision process (production) and innovation process (development) coincide. Once an idea has emerged, it is immediately developed even as the service in question is being provided.

In the practice-based model (Toivonen et al. 2007) and the bricolage model (Fuglsang, 2010), production precedes the idea, and development is the ultimate phase. The practice-based model consists of identifying changes in service practices, 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’.

In the case of ad hoc innovation (Gallouj and Weinstein, 1997), the different activities of idea conception, development and production are one and the same thing. The ad hoc innovation model can be described as the process of building a (novel) solution to a problem of the client firm, with the participation of the latter (co-construction). This process is described as ‘non-programmed’ or ‘emerging’, meaning that the protagonists do not, a priori, interact with the target set to produce innovation. Rather, innovation may randomly ‘emerge’ out of the service provision process, with the result of this process being recognized and designated as innovation only retrospectively. This is why Toivonen et al. (2007) describe it as the “model of a posteriori recognition”. The ad hoc innovation model cannot be reduced to mere learning phenomena because new solutions are produced (innovations for the client firm) - and those solutions are, in part at least, recorded in the service provider’s organizational memory, through a development process conducted at the end of the service provision, once the solution produced is recognized as an innovation worthy, in some respects, of being reproduced. The very nature of this activity raises some difficult theoretical questions concerning the conditions and modes of its appropriation.

Like INs, PPINS can be devoted to technological innovation. However, our focus in this paper is not on PPINS of this variety (cf. Gallouj et al., 2013), but rather on those dedicated to invisible innovation.

PPINS set up to produce non-technological innovation bring together heterogeneous actors interacting to produce non-technological innovations (new intangible products and new methods, as well as, more generally, new intangible processes, organizations, and social innovations, etc.). These PPINS are characterized by: the intangibility of the innovations produced, the important role played by tacit knowledge and technologies, and the high number and diversity of the actors involved. Relationships formed within such networks are difficult to formalize in an explicit contract.

Agents involved in PPINS co-producing non-technological innovation frequently (though not exclusively) adopt unplanned, emerging innovation models, in keeping with the local dynamics of innovation and learning: using innovation processes based on *bricolage* (Fuglsang, 2010), ad hoc (or a posteriori) recognition models (Gallouj, 2002) or rapid application models (Toivonen et al. 2010).

The health and medical-social sector provides numerous (and sometimes old) examples of partnerships established in order to form innovative care networks. Examples include networks in the fields of elderly care, HIV, diabetes, obesity, cancer, hepatitis C, precariousness and the perinatal period. The ServPPIN project database also provides other examples. One of many examples is Denmark’s ‘New Vocational Training System’, set up by

trade unions, employers' associations, the Ministry of Education, schools and private service firms to draw up new (basic) training programmes for employees in service industries.

3. Taking invisible innovation into account in order to reduce the policy gap - as well as the innovation and performance gaps

The public policy bias associated with traditional INs and systems is a mainly mechanical consequence of various other biases (and in particular, the technologist and industrialist biases).

The IN is more than just an instrument of economic theory; it is also an important challenge for public policy. In terms of public policy, however, INs can be considered from two different and complementary angles: the network as an instrument of public policy and the network as an object (target) of public policy. Indeed, first and foremost, the IN is an instrument of public policy in and of itself. Its implementation and the shape it takes (for example, the recently-formed clusters and 'competitiveness poles') are a particular variant of public policy in support of innovation. But then within the existing network (or cluster), other more fundamental actions in support of innovation can also be considered (for example, research tax credit).

Whichever perspective is favoured (establishment and strengthening of the network as a public policy action, or the network as a place where other innovation-enhancing basic actions are implemented), the technologist, industrialist and market biases give rise to a three-fold gap: in innovation, performance and public policy (Djellal and Gallouj 2010).

The aforementioned innovation gap reflects the exclusion of non-technological innovation from the analysis (regardless of whether this innovation concerns products, processes or organization). In traditional INs, this gap can be explained directly, by the focus on technological innovation, as well as indirectly, by the exclusion (or 'relegation' towards the network periphery) of market service activities, and the neglect of innovation (especially social innovation) in public administration and the third sector.

The performance gap reflects a focus on industrial and market performance (growth, productivity, turnover, monetary wealth) at the expense of other performance dimensions (social, environmental, civic, reputational, etc.). In traditional INs, this performance gap is explained by market bias, which places the market transaction and market actors at the heart of the IN. It is also explained by industrial bias, which leads to neglect the challenges raised by services with regard to productivity and performance definition and measurement (Djellal and Gallouj, 2010).

These innovation and performance gaps underlie a public policy gap, which reflects the ignorance or underestimation by public policy of a number of relationships between innovation and performance (cf. Figure 2). Indeed, public policies supporting innovation in networks, and networks as a public policy instrument, are exclusively focused on the relationship 1 linking technological innovation (mainly originating in industry) to economic performance (growth and productivity). In this context, public bodies essentially serve to implement policy actions that are intended to promote R&D and technological innovation as drivers of growth and productivity - and industrial firms (and hi-tech firms in particular) are

the preferred target. Yet in contemporary economies dominated by services and aspiring to sustainable development, technologist and industrialist policies continue to prevail.

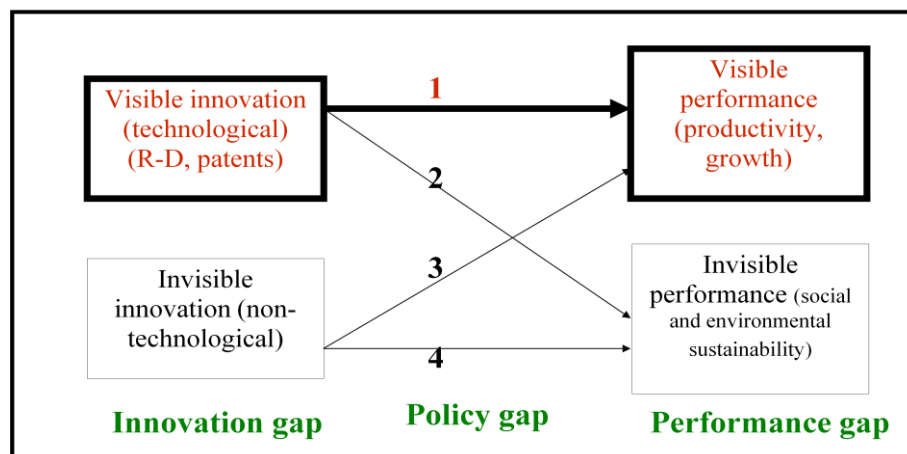
However, other important causal relationships are at work and must be taken into consideration (in terms of public policy aimed at promoting innovation):

- Relationship 2, which links visible (technological) innovation to invisible performance, reflects the idea that beyond its economic benefits, technological innovation can lead to social, civic and ecological benefits. Thus, technological innovations providing solutions to the problems of the elderly (such as domestic robots, smart housing, or remote monitoring) contribute both to creating growth and solving important social problems in ageing services societies.

- Relationship 3, between invisible innovation and visible performance means that non-technological innovation is also a source of growth.

- Relationship 4 establishes a link between the invisible components of innovation and performance. Non-technological innovations - and social innovations in particular - are thus essential sources of socio-economic or ecological sustainability. These innovations include experiences within so-called ethical finance (e.g. micro-credit to address the problem of financial exclusion), some forms of fair trade and sustainable tourism, and numerous innovative initiatives in the field of social inclusion, early childhood, and elderly care.

Figure 3: Innovation Gap, Performance Gap And Policy Gap (Source: Djellal and Gallouj, 2010)



In theory, insofar as they give a central place to non-technological innovation (service and social innovation), PPINS, as an instrument of public innovation policy, contribute - to some extent - to loosen the technologist bias of traditional public policies associated with INs.

However, empirical investigations can help qualify this conclusion. Indeed, examination of some national experiences, and the work carried out within the ServPPIN project (Gallouj et al. 2013), shows that, where they are interested in services within INs, public authorities tend to favour (support) PPINS that were set up to produce technological innovation. These PPINS are those which, from their purpose perspective, most closely resemble traditional INs, that is, they have been designed to produce technological innovations. The difference between this type of PPINS and traditional INs lies in the central position given to market services (other than those traditionally included in INs, namely financial services and consulting) in this technological innovation dynamic. In other words, to services-focused

networks, public authorities simply apply existing policies (that were designed for traditional INs). This is aptly illustrated, for example, in the case of competitiveness poles or clusters strategies, particularly in France. Under the aegis of public authorities, a number of competitiveness poles (clusters) were admittedly initiated in service sectors (such as health, transport and retailing), thus reducing the industrial bias we denounced above. However, the technologist bias remains in place, insofar as these sectors and networks are only considered in terms of their high-tech components.

Similarly, examination of the ServPPIN project case studies reveals that it is often in PPINS set up to produce predominantly technological innovations that institutional factors are mentioned as a key factor in the development of PPINS. These institutional factors may operate directly (where their explicit purpose is to set up networks) or indirectly. The ServPPIN project database provides several examples, in various countries. In France, for example, Geowine (a system for tracing the origin of wines) and Farmstar (a new method for dosing fertilizers) were influenced by European environmental regulations (Labarthe et al., 2013). These regulations created a need for knowledge among farmers that would enable them to adapt their practice to new environmental constraints. We might also mention the Segur case in Spain, which was set up as part of a national programme of support for cooperation in the area of Research-Development-Innovation between private sector, universities and research centres (the CENIT programme). This PPINS was set up to develop new security systems for the use of IT and telecommunications systems.

Overall, despite advances at the theoretical level, progress remains to be achieved in public policy terms that will further fill the public policy gap (and innovation gap) affecting both the traditional IN concept and the PPINS concept. This means that we need a policy designed to support those PPINS that are not, strictly-speaking, technological (in the terminology we have adopted, this refers in particular to PPINS that were set up to co-produce non-technological innovations). Policies supporting such PPINS are linked to policies of first acknowledging, then supporting, forms of innovation that are non-technological or specific to services and non-market activities.

Conclusion

We have sought, in this work, to account for a form of expression of INs (PPINS) that is currently developing in service and sustainable development economies. Yet although this way of organizing interaction between heterogeneous actors to generate innovation is developing, it is not new as a social reality. Its discovery - or its social construction - is closely linked to the rise of the innovation issue in our economies, and especially to the renewed interest in non-technological innovation (invisible innovation) within market and non-market services and for social innovation.

Highlighting invisible innovation thus also leads to highlighting invisible or neglected innovation actors. These actors include market service providers, whose innovation efforts, though acknowledged in recent literature, continue to be underestimated. They also include public services at every level (but particularly at local level), which not only support the innovation efforts of other economic agents, but also co-produce new public services products and processes. Lastly, they include the whole set of organizations belonging to the so-called third sector (foundations, associations, NGOs), which play a fundamental role in social innovation. This twin highlight - on hidden innovation and hidden actors - also raises a series of theoretical, methodological and managerial issues, which offer promising avenues of

research for the future. These include cultural conflict problems between market and non-market agents, innovation appropriation regime issues, and performance definition and measurement issues.

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