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Public Service Innovation Networks (PSINs): Collaborating for Innovation and Value Creation

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**D 6.1.1 Public Service Innovation Networks (PSINs):
Collaborating for Innovation and Value Creation**

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Document description	This deliverable is given over to “Public Service Innovation Networks” (PSINs). It seeks to define and characterize PSINs, from a structural point of view (sectors, actors, interaction, innovation) and a dynamic point of view (emergence, functioning, life cycle, performance) and to understand what distinguishes them from other types of innovation networks.

Executive summary:

Introduction

This report is given over to a particular organizational structure which we denote by the term “Public Service Innovation Network” (PSIN). PSINs are multi-agent collaborative arrangements that bring into play a variable number of public and private agents, especially citizens, in order to co-produce technological and non-technological innovations and ultimately co-create value, in the field of *public services* (sectoral perspective) or *public service* (functional perspective).

This report has three main objectives.

The first objective is to establish a dialogue between “service studies” and “public management studies”, by examining how the innovation issue fits into the different paradigms of public administration (namely Traditional Public Administration, New Public Management and New Public Governance), and how these different paradigms can be linked to the different analytical perspectives generally used in “Service Innovation Studies” to understand innovation (namely assimilation, demarcation and integration).

The second objective is to provide an original mapping of innovation networks, in the context of the service economy, and to account for the tertiarization of this concept, i.e. for the rise of market and non-market services in innovation networks.

The third objective is to provide a more in-depth analysis of PSINs, from a structural and a dynamic point of view and to understand what distinguishes them from other innovation networks, in particular traditional innovation networks (TINs) and public-private innovation networks in services (PPINs).

Method

This report is mainly based on a survey of the literature using SCOPUS and Web of Science databases, and the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta Analyses). We used the following search stream: [“innovation network” OR “innovation collaboration” OR “innovation cooperation” OR “innovation partnership”]. The search was limited to articles, books and book chapters published in English over the period 1990-2018.

Findings

First objective

In the traditional public administration paradigm, the reference is not services, but goods. The purpose is to produce homogeneous quasi-products, by using technical systems and rationalizing production processes. This paradigm falls within the scope of an (industrialist) assimilation perspective. In the new public management paradigm, it is still not the service as such which is the reference, but the market good. Production processes as well as innovation processes do not fall within the scope of a demarcation perspective, but still of an (industrial and market) assimilation

perspective. Finally, in the new public governance paradigm, the reference is the service. “Public service studies” here are explicitly based on service theory, in particular Service-Dominant Logic (SDL). They first fall within the scope of an integrative perspective, and secondly within the scope of a demarcation perspective emphasizing the specificities of public services vis-à-vis general SDL. In both cases, the reference to service theory introduces a broad and open concept of innovation that covers technological aspects as well as a wide variety of non-technological aspects of innovation. It also introduces an interactive and open concept of the dynamics of production and innovation, centred on multi-agent networks, in which the user/citizen occupies or is urged to occupy an essential place as co-producer, co-innovator and ultimately co-creator of value.

Second objective

Our survey of the literature made it possible to identify 5 types of innovation networks, namely: Traditional Innovation Networks (TINs), Public Private Innovation Networks in Services (PPINs), Market Services Innovation Networks (MSINs), Public Service Innovation Networks (PSINs) and Public Service Innovation Networks for Social Innovation (PSINsIs) that reflect the tertiarization of the innovation network concept. These networks types can be distinguished according to following criteria: the types of agents involved in the network, the role played by the public agent, the nature of the targeted innovation and the main sector concerned by the innovation in question. TINs are networks that focus on the manufacturing industry and technological innovation and in which the public administration is not a co-producer of innovation, but a facilitator. PPINs, that were the subject of the European ServPPIN project are systems of service-oriented collaborations, public-private collaborations, open to non-technological innovation. MSINs are innovation networks focused on market services and service innovation. PSINs focus on innovation in public services. The main actors in this type of network are citizens, public sector and third sector organizations. Finally, PSINsIs are a special subcategory of PSINs dedicated to social innovation.

The different types of networks envisaged can be characterized by their degree of visibility, that is to say, their level of recognition by economic analysis. Over the last 30 years, the concept of (traditional) innovation network based on manufacturing industry, especially high-tech R-D intensive industry, has been quite successful and has given rise to a great deal of literature that is exponentially increasing. The extension of innovation networks to services and service innovation has attracted attention from researchers more recently, whatever the type of network considered (PPINs, MSINs, PSINs, PSINsIs). The emergence of the literature on these new types of tertiarized networks can be dated back to the mid-2000s. The literature on PSINs and PSINsIs is the least extensive. It is still in its “infancy”.

These different types of innovation networks are not independent of each other. There is an intersection between TINs and PPINs. This intersection equates to certain PPINs which are focused on technological innovation. PSINsIs are a sub-category of PSINs whose target is social innovation in public services. These two forms of innovation networks (PSINs and PSINsIs) are themselves sub-categories of PPINs.

Third objective

We have tried to define and characterize PSINs, by examining, first of all, *a number of structural variables*: the nature of the actors involved and their interactions, and the forms and modalities of the innovation carried out by the network. PSINs can be described by using a number of typologies, which

can be based on the following criteria: 1) the (sectoral or functional) fields where networks are set up; 2) the type of actors involved; 3) the nature of the innovation provided by the network. A typology of PSINs based on the nature of the actors involved in the network would include the following categories: (1) Networks made up of both public and private agents, (2) Networks consisting only of public agents belonging to different public organizations., (3) Networks consisting only of private agents, working collectively to co-produce an innovation that falls within the scope of public service, not in its sectoral sense but in its functional sense (i.e. services of general interest). The nature of innovation can provide the basis for a fairly simple typology of PSINs that distinguishes: (1) Networks created for social innovation in public services. This is what we call PSINSIs. (2) Networks created for other forms of public service innovations (i.e. non-social public service innovations).

We then shifted the analysis towards *dynamic variables*, describing the modes of emergence and functioning of the networks, and their integration in time and in space. The question of network formation distinguishes *planned* networks from *spontaneous* networks. *Planned or engineered* PSINs are established under the impetus of an initiating agent that will invite other potential members to join the network. In theory, the initiator of the network may be any agent. In reality, however, it seems that in PSINs, the initiating agent is very often the public administration itself. The situation is different for planned PSINSIs which are most often initiated by private agents (citizens, associations and so on). *Spontaneous or emerging* PSINs emerge in a self-organized way because of the convergence of the activities of agents facing a given problem, in a given context (a district, a city, a region, etc.). Here again, although, in theory, the spontaneous emergence may involve any agent, the *spontaneous (self-organized)* networks more often involve citizens (and not government). The spontaneous emergence of this type of network can be explained by the lack of public solutions to a given social problem or the ineffectiveness of the existing solutions.

The modes of *formation* of PSINs lead to a (simplified) distinction between two opposite modes of *functioning*: (1) a vertical or top-down mode of functioning, in which, after the network is established, the initiating agent continues to enjoy a privileged “hierarchical” position: it is the conductor. (2) a horizontal or bottom-up mode of functioning, which favours local interactions and in which responsibilities and leadership are more shared.

PSINs and especially PSINSIs are initially local innovation networks. They organize collaborations on a municipality, neighbourhood or other small scale. This geographical characteristic is of course closely linked to the nature of the innovation that is carried out by the network and the way it is produced (innovation that aims to solve concrete social problems in the immediate living environment of individuals, innovation that involves the people concerned by the problem in the collaboration). However, there appear to be differences in spatial constraints depending on the type of PSIN considered. After all, spontaneous PSINs are more likely to be proximity networks than planned PSINs. Planned PSINs, especially when they are planned by public agents, are less subject to geographical constraints. Depending on the nature of the problem to be solved, the public agent may invite agents located anywhere throughout the national territory or even from abroad. Furthermore, some complex problems can neither be solved by a single actor nor on a single geographical scale (in this case a local scale). These are problems that, even if they manifest locally, arise in regional, national or international terms. This applies, for example, to migrant and refugee issues or environmental issues.

The ultimate goal of PSINs being the co-creation of value, we finally introduced a typology of the worlds of value, which makes it possible to consider a plurality of performance principles at work in PSINs: industrial and technical performance, market and financial performance, domestic or relational performance, social-civic performance, reputational performance and innovation performance. These different concepts of value and corresponding performance are not, of course, independent of each other. They can complement and reinforce or compete and conflict with each other (in the latter case, the creation of one form of value leads to the destruction of another form).

Implications

PSINs constitute an important socio-economic issue now acknowledged by the public authorities at the national and European level. Although PSINs are increasingly taken seriously in contemporary economies, efforts are nevertheless needed to theoretically reinforce this concept.

On the theoretical level, efforts are needed to theoretically reinforce our knowledge of the modes of formation and functioning of these networks. After all, the literature is dominated by case studies and by a concept of PSINs (in particular when they focus on social innovations) as temporary curative arrangements (aimed at overcoming the temporary failure of public services). One way to reinforce the theoretical basis of PSINs might be, not only to analyse them autonomously, but to explicitly include them in the mapping and discussion of innovation systems, whether local, regional, national, social or sectoral.

On the methodological level, a reverse shift from theoretical to empirical focus is required. After all, beyond the theoretical considerations on the plurality of forms of performance that we have outlined in this work, it is necessary to define and build concrete tools for properly measuring PSINs results and performance.

Finally, on the political level, it is necessary to envisage public policies (in particular vertical or specific ones) that would help support the formation, functioning and performance of these networks, by taking into account the diversity of forms of PSINs that we have highlighted in this research.

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List of Terms and Abbreviations

Abbreviation	Definition
PSIN	Public Service(s) Innovation Network
PSINSI	Public Service(s) Innovation Network for Social Innovation

MSIN	Market Services Innovation Network
TIN	Traditional Innovation Network
PPINS	Public Private Innovation Network in Services
IS	Innovation Studies
SIS	Service Innovation Studies
TPA	Traditional Public Administration
NPM	New Public Management
NPG	New Public Governance
ADI	Assimilation, Demarcation, Integration
GDL	Goods-Dominant Logic
SDL	Service-Dominant Logic
PSDL	Public Service-Dominant Logic
PSL	Public Service Logic
MI	Manufacturing Industry
PS	Public Services
MS	Market Services
TS	Third Sector
C	Citizen
SNA	Social Network Analysis
IHIP	Intangibility, Heterogeneity, Inseparability, Perishability
IN	Innovation Network
PSI	Public Service Innovation

Public Service Innovation Networks (PSINs): Collaborating for Innovation and Value Creation

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Introduction

In contemporary economies, innovation is a universal and ubiquitous phenomenon present in every economic sector and every sphere of social life. However, whatever the discipline considered (economics, management, sociology, political science and so on), our analytical and conceptual tools have often been unable to grasp this innovation dynamic in its full magnitude. Thus, entire sectors of our economies (in particular, the service sectors, including non-market services) and essential forms of innovation (non-technological innovations, including social innovations) have long remained marginal in the field of “Innovation Studies”. This innovation or measurement gap may largely be explained by the inertia of our conceptual tools designed in and for manufacturing economies. It reflects, after all, invisible or hidden innovations (NESTA, 2007), which do not fall within the traditional industrial and market indicators such as R&D, patents, and material technologies.

Considerable efforts have been made in recent years to bridge this innovation gap (recognition and measurement gap), taking into account both hidden forms of innovation and forgotten sectors. Thus, a field of “Service Innovation Studies” has enriched the traditional field of “Innovation Studies” that focuses on technological and industrial innovation (Gallouj and Djellal, 2015, 2018; Djellal and Gallouj, 2018). An additional step forward in reducing the innovation gap has been achieved by taking into account the innovation dynamics and the dynamic capabilities in public services (Moore and Hartley, 2008; Windrum and Koch, 2008; Djellal et al., 2013; De Vries et al. 2015; Osborne and Brown, 2013; Miles, 2013; Potts and Kastle, 2010; Fuglsang and Sundbo, 2016; Fuglsang et al., 2014; Piening, 2013; Jordan, 2014; Arundel et al., 2019; Desmarchelier, Djellal and Gallouj, 2019; Gieske, Duijn, and van Buuren, 2019).

Ben Martin (2015) considers this gradual opening (to services and service innovation) of the field of innovation as one of the twenty main challenges in “Innovation Studies”, since their advent, nearly a half-century ago. Djellal and Gallouj (2018) for their part consider this opening as one of the fifteen main advances in “Service Innovation Studies”, since their advent, nearly a quarter century ago. It is also described as “the shift from visible innovation to invisible innovation”. It is parallel to another

fundamental evolution in “Innovation Studies” which is the shift from a linear and closed model of innovation to an interactive and open or network model (Martin, 2015).

This rise of services, of service innovation and of the networked organization of innovation also lies at the heart of the shifts in public administration paradigms (Osborne, 2006, 2010). Indeed, in the *traditional public administration paradigm*, innovation is, for the most part, associated with the industrial rationalization of production processes and the adoption of technical systems, the aim being to provide passive citizens with homogeneous quasi-products. This innovation activity, which excludes the user, is organized in a linear and top-down way. In the *new public management paradigm*, the industrialist perspective remains dominant, and innovation continues to be organized in a linear (non-interactive) way. The main novelty compared to the previous paradigm is the introduction of market management techniques in public services. The *new public governance paradigm*, currently at work in all developed countries, fundamentally changes the perspective of innovation. Indeed, this new paradigm considers public services as services and not as goods, and thus allows a broad and open concept of innovation integrating both technological and non-technological dimensions (new services, new processes, new organizations...). From the point of view of the organization of innovation, this paradigm emphasizes the collaborative dimension, and in particular the participation of citizens in innovation networks (Osborne, 2006, 2010; Voorberg et al., 2015; Mergel, 2018; Crosby et al., 2017; Torfing, 2019). The importance given to networks, whether they be production or innovation networks, also leads to designating this new paradigm as a paradigm of “Networked Governance” (Kelly et al., 2002).

The purpose of this research is, first, to discuss how these different paradigms can be linked to the different analytical perspectives generally used in “Service Innovation Studies” to understand innovation. The purpose is in particular to show how the evolutions of these paradigms and perspectives are reflected, regarding the nature of innovation, by a shift towards a broad and open concept of innovation (including non-technological innovation) and, regarding its mode of organization, by a shift from a linear model of public service innovation to an interactive or collaborative model, in which citizens occupy a central place in the process of innovation and in value co-creation. This model of collaborative or networked innovation is well known and documented in some public services such as health (Djellal and Gallouj, 2007). But, although this is neglected by literature, it tends to diffuse to all services offered by public administration and to the design of some public reforms as well. This networked model seems to be particularly appropriate in the case of public services whose purpose is to solve, through social innovation, thorny social problems, including problems related to elder care, school dropout, migrants or refugees, environment, etc.

This research is organized into three sections.

In the first section, we address the issue of innovation in public services through the prism of the three main paradigms of public administration (i.e. traditional public administration, new public management and new public governance), and of the three main analytical perspectives that structure Service Studies (i.e. assimilation, demarcation and integration). We analyse how the shifts in these paradigms and perspectives converge to highlight, on the one hand, a broad and open concept of innovation (including non-technological innovation) and, on the other hand, interactive and network innovation models.

In the second section, we discuss the concept of innovation networks and the place that is given to services and especially (public) services in them. In other words, this section is dedicated to a consideration of the tertiarization of innovation networks. Its purpose is not to develop a conceptual framework or a new theory, but to provide an original mapping of the innovation network concept, in the context of the service economy. The aim is to show how, in parallel with the shift from visible innovation to invisible innovation, services in general and public services in particular are gradually moving from a peripheral to a central position in the innovation networks. Based on a review of the literature, we discuss how traditional innovation networks can be enriched by other types of networks more focused on services and public services, namely Public-Private Innovation Networks in Services (PPINs), Market Service Innovation Networks (MSINs), Public Service Innovation Networks (PSINs) and Public Service Innovation Networks for Social Innovation (PSINSIs).

The tertiarization of the innovation network concept which is addressed in this second section encompasses both market services and public services. While the definition of *market service* does not pose much problem, the term “public” in its various uses (public sector, public administration, public agent/actor...) and in its relationships with innovation (public sector innovation, public service innovation, public innovation...) deserves some clarifications. According to Flynn (2007, p. 2), the *public sector* is “those parts of the economy that are either in state ownership or under contract to the state, plus those parts that are regulated or subsidized in the public context”. The public sector is composed of *public agents/actors* that consist in both public organizations (including governmental bodies, healthcare and education organizations...) and public enterprises. *Public service* is the service (i.e. a set of use values) which is delivered not only by entities belonging to the public sector, but also to the private sector (for example, NGOs). Public service is therefore somehow synonymous with “service of general interest”. When the focus is on innovation associated with these different terms, *public service innovation* or *public innovation* can be said to go beyond the boundaries of *public sector innovation*, since it also includes the innovation developed within networks where the main actors are citizens and not-for-profit organizations.

Finally, the third section is given over to a more in-depth analysis of PSINs and PSINSIs, which are the main focus of this research. PSINs (and among them PSINSIs), which are very successful within the “new public governance paradigm”, are multi-agent collaborative arrangements that develop within *public services* (sectoral perspective) or *public service* (functional perspective), spontaneously or at the instigation of local, national or European public policies. They bring into play a variable number of public and private agents, especially citizens, in order to co-produce innovations and ultimately contribute to value co-creation. In the third section, our goal is to deepen the definition and description of PSINs, especially in comparison with the other network forms evoked in section 2, namely TINs, PPINs and MSINs and to examine in particular how PSINs are formed and function in order to co-create, more or less efficiently, value in public service(s), through innovation.

1 Innovation in public services in the light of public administration paradigms and service innovation perspectives

Public services have long remained the Cinderella of “Innovation Studies”, the predominant idea being that innovation is peculiar to market sectors and that the term “public innovation” is an oxymoron (Sørensen and Torfing, 2013). However, this observation is not relevant to all public services. After all, as we have already pointed out, it is not disputed, for example, that in our modern economies, public health services are among the most innovative activities or that innovation is consubstantially linked to public research services and to universities. Other exceptions include, for example, public broadcasting services and security and defence services (Nicolaj, 2017; Nicolaj and Lenfle, 2019). Nevertheless, the vast majority of other public services, and in particular administrative public services, have long been considered as hermetically closed to innovation. The literature has provided many explanations for this lack of real or perceived innovativeness, including the lack of competition and the monopoly nature of public services, the fact that the services are provided free of charge, the lack of resources, the Weberian argument of rigidity and inertia of bureaucracies, the difficulty of changing the statutory rights of civil servants, the risk-adverse character of politicians at the head of public administrations whose primary concern is re-election and the nature of the appropriation regimes (Halvorsen et al., 2005; Borins, 2001; Hartley et al., 2013).

The gradual integration of public services (as a field of innovation) into “Service Innovation Studies” and, consequently, more generally, into “Innovation Studies”, is based on a number of arguments that are discussed in literature (Windrum and Koch, 2008; Djellal et al., 2013; Osborne and Brown, 2013). *Some arguments concern the characteristics of the public administrations themselves.* After all, they can make use of considerable budgets and well-educated human resources, they have at their disposal users/citizens more prone to protest, but also to participate than the customers of private companies, and they enjoy a favourable climate for experience and practice transfer and for the diffusion of innovation among public organizations (Rashman and Hartley, 2002). More generally, we see a paradox when it comes to the alleged poor innovativeness of public administrations: after all, how can organizations that value innovation and whose role is to ensure the meta-governance of innovation dynamics, in other words to support the innovation of other economic activities, be insensitive to their own innovation (innovation in the services they offer, the processes and the organizations they implement)? *Other arguments concern the general socio-economic context.* The economic crisis and demographic changes are obvious drivers in the rise of interest in innovation in public services. After all, they encourage the rationalization of production processes in order to reduce the cost of services. Similarly, new social demands are appearing, for example, in the field of elder care or environmental concerns, which are sources of innovations.

The narrowing of the innovation gap in public services can be analysed by comparing, on the one hand, *the different paradigms of public administration* (traditional public administration, new public management, new public governance), which reflect changes in the nature and mode of production of public service and, on the other hand, *the main analytical perspectives* (assimilation, demarcation,

integration) established by the “Service Studies” (Gallouj, 1994, 1998; Coombs and Miles, 2000) to account for different ways of understanding service and innovation in services compared to goods and innovation in manufacturing.

“Service Studies” and “Public Service Studies” which are based on these two sets of paradigms/perspectives are two important and prolific fields of research that, although they share a common essential target (namely services delivery), have developed independently, separated by a border between commercial and non-commercial activities. The distinct scientific communities have long ignored each other, and their research is presented at separate, specialized scientific conferences and scientific journals¹.

The purpose of this first section is to establish a dialogue and reconcile these two groups of paradigms/perspectives, by examining how the innovation issue fits into the different paradigms of public administration, and how these different paradigms can be linked to the different analytical perspectives generally used in “Service Innovation Studies” to understand innovation. The purpose is in particular to show how the evolutions of these paradigms and perspectives are reflected, regarding the nature of innovation, by a shift towards a broad and open concept of innovation (including non-technological innovation) and, regarding its mode of organization, by a shift from a linear model of public service innovation to an interactive or collaborative model, in which citizens occupy a central place in the process of innovation and in value co-creation.

This section is organized into three sub-sections. After a brief review of the ADI (Assimilation, Demarcation, Integration) analytical framework, which structures the “Service Studies” and the “Service Innovation Studies” (sub-section 1.1), we discuss, from the point of view of innovation, how this framework can be linked to the different paradigms of public administration (TPA, NPM, NPG: traditional public administration, new public management, new public governance) (sub-sections 1.2 and 1.3).

1.1 The three analytical perspectives for addressing “Service Studies” in general and “Service Innovation Studies” in particular

“Service Studies” is a prolific field of research that was built quite naturally in comparison (contrast) with the traditional field of “Goods Studies”. Thus, as the work of Gallouj (1994, 1998, 2010) underlines, some studies consider that services should be treated like goods (assimilation or industrialist approaches), while others consider that they should be addressed in a specific way (demarcation or service-oriented approaches), while still others consider that it is necessary to

¹ Recurrent scientific conferences include the annual RESER conference or the “Frontiers in Service” conference, in the field of Service Studies, and PUBSIC (Innovation in Public Services and Public Policy), Public Management Research Association Annual Conference (PMRC), International Research Society for Public Management (IRSPM) conference in the field of Public Service Studies. Scientific journals in the field of Service Studies include the Journal of Service Research, the Service Industries Journal, the European Review of Service Economics and Management, Service Science... The most significant reviews in the field of public services include the Public Administration Review, Journal of Public Administration Research and Theory, Administration and Society, Policy and Politics, Public Management Review...

develop a synthetic or integrative treatment of all economic activities (synthesis or integration approaches). Although services are an ancestral human activity, economic theory has essentially been built around the analysis of agricultural and manufacturing activities. It can therefore be assumed that, according to a classical methodological positioning, it is the relatively recent conceptual integration of services in economic analysis that explains the emergence of the ADI framework.

This key question (assimilation, differentiation or synthesis?) is central, not just to *the theoretical constructs* (whatever the disciplines, methods, objects, themes), but also the *business strategies* and *public policies* in the field of services. Academic research and (strategy or policy) practices always, consciously or unconsciously, involve the following questions (or answers to these questions): is it appropriate to apply industrial theories, strategies and policies to services? Or should specific theories, strategies and policies be developed for services? Or should integrative theories, strategies and policies be promoted?

Obviously, we cannot provide a complete overview of theoretical analyses and business and policy practices, in light of the ADI questioning framework. We will confine ourselves to applying the framework to the nature of the product and the nature of the innovation.

1.1.1 The ADI framework and the product definition

Debates on the nature of services fundamentally fall within the scope of the ADI framework. This framework can be applied to the founding works of economic thought². But in this paper, we are interested in how it applies to contemporary research (see Table 1).

a) The most fundamental theoretical tool of assimilation (A-type perspective) can probably be said to be the notion of production function. This tool, forged for an industrial and agricultural economy, can easily be applied to services. Thus, to take just one example, Phelps (1995) does not see the slightest difference between automobile production and health production. In both cases, the purpose is to mobilize and combine production factors in order to generate an output. In the case of cars, the production factors include, for example, steel, plastic, labour, etc. In the case of health, the production factors are “medical care”, in other words, a set of activities aimed at restoring or improving health.

However, it is important to point out the fundamental difference between economics and management. Economics considers that services fit into the production function quite easily, while some management scientists consider that changes must be made in order to include services in the production function. This is how we interpret the recommendations made by Levitt (1972) and Shostack (1984), who suggest industrializing services by reducing the degrees of freedom and the complexity of service provision. After all, these strategic norms can be interpreted as paving the way for the elaboration of a service production function in the neoclassical mode, that is to say, in particular, respecting the hypotheses of “nomenclature”, “non-interaction” and “product anonymity”.

² Thus, the specific differences between services and goods (D type perspective) are mentioned, for example, in A. Smith (1776), J.-B. Say (1803), F. Bastiat (1848).

In other words, two different concepts of assimilation can be distinguished: one that consists in ignoring the differences between goods and services (services are goods like any others), and one that acknowledges the existence of these differences and consists in deploying strategies to erase them.

b) Building on Adam Smith's (1776, p. 361) observation that services “vanish at the very instant of their production”, economic literature, from a D-type perspective, this time, makes every effort to isolate the intrinsic characteristics of these activities. Thus, the characteristics of intangibility, heterogeneity (or variability), inseparability (or interactivity) and perishability (or immediacy), which service marketing calls IHIP, have emerged as criteria for providing a positive (and no longer residual) definition of services; in other words, for drawing the boundary between goods and services. Thus, services are said to be intangible (that is to say, abstract entities that cannot be seen, tasted, felt, or heard before purchase), heterogeneous (the nature of the service provided varies depending on many elements: the customer, the staff in contact, the moment when it is provided), inseparable (that is to say, co-produced by a provider and a consumer who are inseparable), perishable (that is to say, immediate, not storable). Such an approach is interesting, in particular because it provides simple criteria for labelling activities. However, important difficulties appear both in the definition of these criteria and in their concrete implementation. After all, although the service is intangible, it may be based to varying degrees on tangible media. Similarly, the co-production of the result is almost non-existent in some service activities (transport or cleaning, for example).

c) Still within a D-type perspective, in order to circumvent the difficulties (in particular the many exceptions) related to the use of intrinsic criteria (without necessarily abandoning them), Hill (1977) formulated a general definition of services, based on the analytical dissociation between the customer and the medium of the service, and the distinction between the service as a process and the service as a result. Thus, for Hill (1977: 318), “a service may be defined as a change in the condition of a person, or a good belonging to some economic unit, which is brought about as a result of the activity of some other economic unit, with the prior agreement of the former person or economic unit”. Through the metaphor of the “ABC service triangle”, Gadrey (1996, see also Gadrey 2000) extends and clarifies this definition by considering the service as a set of processing operations, carried out by the service provider A, on a medium C, linked in various ways (ownership, use, identity) to the customer B. The purpose of these processing operations, which do not lead to the production of a commodity likely *to circulate economically independently of the medium*, is to transform the medium C in various ways. The medium can be material objects or technical systems, codified information, the individual himself or an organization.

d) Contemporary research devoted to the definition of services increasingly falls (implicitly or explicitly) within the scope of an integrative or synthetic perspective (I-type perspective). This integration is based on several findings that reflect the idea that the border between goods and services is blurring, illustrated by the servitization of goods (Vandermerwe and Rada, 1988), the industrialization of services and the rise of product-service systems (Mont, 2002). A number of theoretical constructs integrate goods and services including:

- The functional economy (Stahel, 1997), which defines all products (goods and services) by the function (the service) that they provide. Thus, the object of the economic transaction is not the good or the service, but their use value, their utility.

- The experience economy (Pine and Gilmore, 1999; Sundbo, 2015), which defines a commodity based on the experience it provides to the consumer.
- The “service science” perspective (Maglio and Spohrer, 2008) which defines service (in its generic sense) as a complex object requiring a multidisciplinary approach. Although information technologies occupy a central place in service science, it doesn’t fall within the scope of an assimilation perspective that seeks to industrialize and materialize an initially intangible object. Rather it falls within the scope of an integrative approach in which human beings occupy an equally central place in “complex human-centred service systems”. The association of the term “science” with the term “service” reflects the aspiration to bring more measurement, formalization, systematization, modelling and repeatability into services and service innovation.
- The characteristics-based approach developed by Gallouj and Weinstein (1997) building on the work of Saviotti and Metcalfe (1984). This approach, further developed by a number of other authors (in particular De Vries, 2006; Windrum and Garcia-Goñi, 2008) considers that a product (whether a good or a service) can be described as the supply of a set of service characteristics (final characteristics or use values) through the mobilization by providers and customers of skills and/or technical characteristics (either tangible or intangible).
- The “Service-Dominant Logic” approach (Vargo and Lusch, 2004; Lusch and Vargo, 2006), which defines value by the “value-in-use”, thus erasing the difference between goods and services. In the SDL approach, the value is not embedded in a good or service. All organizations (regardless of their sector of activity) provide a “service offering”, which is likely to create value for the customer. Thus, the service provider does not create and deliver value to its customer, but simply offers a “value proposition”, i.e. a potential, a promise waiting to come to fruition. It is the customer himself who will achieve this potential value by the use he makes of the “service offering”. There is therefore “co-creation of value” by the customer through “resource integration”, consisting of completing and modifying the provider’s “value proposition” using his own resources, such as his life experience. It should be noted that, although it opposes a logic of services to a logic of goods, SDL does not fit into a D-type perspective, but into an I-type. After all, it provides a general framework for understanding value co-creation, which applies to both goods and services. While, contrary to what its name might suggest, the SDL approach is indeed an *integrative approach* to goods and services, we will see that the Public Service-Dominant Logic (PSDL), that is, the application of SDL to public services (Osborne et al., 2013) vacillates between integration and demarcation. The initial idea pursued by the promoters of PSDL (PSDL version 1) was to integrate public services into the general SDL approach. But the most recent research seems to be abandoning this general integration/synthesis perspective in favour, first of all, of a relaxed integration perspective (that is to say, a perspective accounting for some specificities of public services: PSDL version 2), and then, in favour of a real demarcation (de-integration) perspective, namely PSL, Public Service Logic (Osborne, 2018), which emphasizes the differences between public services, on the one hand, and market goods and services, on the other.

Table 1: The ADI analytical framework in Service Studies and Service Innovation Studies

“Service Studies” and “Service Innovation Studies” perspectives	Nature or approach of the product	Nature or approach of the innovation	Examples of theoretical constructions
Assimilation	<ul style="list-style-type: none"> The service is considered as a good Production function Industrialization of the service 	<ul style="list-style-type: none"> Industrialist and technologist perspective Focus on technological innovation 	<ul style="list-style-type: none"> Production function Goods-Dominant Logic (GDL)
Demarcation	<ul style="list-style-type: none"> The service has specificities (intrinsic technical characteristics) which differentiate it from goods Service as operations devoted to “changing the state” of a medium 	<ul style="list-style-type: none"> Service-oriented perspective Innovation in services has specificities It is necessary to also highlight the hidden or invisible forms of innovation (non-technological innovation) 	<ul style="list-style-type: none"> IHIP paradigm Public-Service Dominant Logic 2 (PSDL 2)³ Public Service Logic (PSL)
Integration	<ul style="list-style-type: none"> Everything is a service Servitization of goods Build a unifying model of the product (goods and services) 	<ul style="list-style-type: none"> Synthesis perspective Build a unifying model of innovation in goods and services that encompasses all forms of innovation (technological and non-technological) 	<ul style="list-style-type: none"> Product-Service Systems Characteristics-based approaches Service-Dominant Logic (SDL) Public-Service Dominant Logic 1 (PSDL 1) Functional economy Experience economy Service science

1.1.2 The ADI framework and innovation

Within “Service Studies”, the field of “Service Innovation Studies” has also been built on three⁴ theoretical perspectives that reflect different analytical positions vis-à-vis the traditional field of “(Industrial) Innovation Studies”: assimilation, demarcation and integration (Gallouj, 1994, 1998; Gallouj and Weinstein, 1997; Coombs and Miles 2000; Droege et al., 2009) (see Table 1).

- The *assimilation* perspective is an *industrialist and technologist* perspective. It assumes that innovation is similar in manufacturing and services. It thus addresses innovation in services in the same terms as innovation in manufacturing, focusing on its relationship to technical systems. The

³ PSDL 2 is in reality an intermediate form between Demarcation and Integration. While falling within the integrative perspective that characterizes SDL, it focuses on some specificities of public services. It could thus also be an example of a theoretical construct illustrating the integration perspective.

⁴ A fourth perspective, namely “inversion” (Gallouj, 2010), is not taken into account here. It reflects the active role that knowledge intensive business services play in supporting innovation in their client (service or manufacturing) organizations. These services are not dominated by manufacturing (as they supposedly do in the assimilation perspective), but they may instead be dominant in terms of innovation and knowledge (*inversion* of the balance of power).

assimilation perspective is also a perspective of *subordination* of services to manufacturing in terms of innovation. After all, it considers that, for the most part, the technological innovations at work in services are just adopted from manufacturing sectors.

- The *demarcation* perspective is a *service-oriented and non-technologist* perspective. Without, of course, ignoring technological innovations, it focuses on the specificities of services and service innovation by seeking to identify innovation activities that are invisible to traditional (assimilationist) economic tools (for example R&D expenses, patents).

- Finally, *the integrative perspective aims to synthesize the two previous perspectives* by developing theoretical constructs that are able to take into account both goods and services, technological innovation and non-technological innovation.

As we shall see in the following paragraphs, the analytical focuses that assimilation, demarcation and integration express are implicitly present in the discussions of the three paradigms of public administration.

1.2 The three paradigms of public administration and the product

“Public Service Studies” were built on the basis of three paradigms that reflect different concepts of the favoured *coordination* mode, the *nature of the product*, the mode of *production organization*, and the mode of *performance evaluation*: traditional public administration (TPA), new public management (NPM) and new public governance (NPG). These three paradigms follow one another historically without necessarily excluding one another. They can be paralleled (albeit in a non-homothetic manner) with the ADI analytical framework of Service Studies (see Table 2).

Table 2: The three paradigms of public administration and the corresponding service studies perspectives

Public administration paradigm	Coordination mode, institution	Nature of the product	Production organization mode	Performance evaluation mode	Corresponding Service Studies perspective
Traditional Public Administration (TPA)	<ul style="list-style-type: none"> • The organization, bureaucracy, hierarchy (vertical governance), monopoly • The control of processes 	<ul style="list-style-type: none"> • Standardized services, public service as a “good” or a quasi-product 	<ul style="list-style-type: none"> • Top-down, standardization of tasks, lean management, mechanization • Role of the citizen: the citizen is a passive user/consumer. Citizen is a <u>client</u>. He can nevertheless express his preferences in the political field (election) 	<ul style="list-style-type: none"> • Industrial world: output, productivity, efficiency • Risk: demotivating system of performance measurement. 	<ul style="list-style-type: none"> • Simple assimilation of public service to manufacturing: industrialization • Goods-Dominant Logic

<p>New Public Management (NPM)</p>	<ul style="list-style-type: none"> The market, competition, privatization, contracting in and contracting out (outsourcing) The control of the results 	<ul style="list-style-type: none"> Public service as a “good” or a market quasi-product 	<ul style="list-style-type: none"> Top-down, role of the agents in contact Role of the citizen: The users/citizens are customers who can freely choose the service and establish competition between different public services 	<ul style="list-style-type: none"> Market and financial world: outcomes, costs, revenues (maybe also domestic world: efforts to build customer loyalty) Risk: demotivating performance measurement system 	<ul style="list-style-type: none"> Double assimilation of public service to manufacturing (industrialization) and market (marketisation) Goods-Dominant Logic and Market-Dominant Logic
<p>New Public Governance (NPG)</p>	<ul style="list-style-type: none"> The network, the multi-agent partnership (horizontal governance) Trust and reciprocity 	<ul style="list-style-type: none"> Public service as a service 	<ul style="list-style-type: none"> Collaboration in production (co-production), production networks Role of the citizen: users are co-producers 	<ul style="list-style-type: none"> Multicriteria evaluation: different (complementary or competitive) value systems, Take into account all aspects of performance: different worlds (including that of creativity and innovation), take into account time frames (direct/immediate performance, indirect/mediate performance) 	<ul style="list-style-type: none"> Integration: Public Service-Dominant Logic 1 (PSDL 1). PSDL 1 is a generalization of SDL to public services Integration/Demarcation (demarcative integration): Public-Service Dominant Logic 2 (PSDL 2): Focus on certain specificities of public services in a general context of integration. More advanced Demarcation: Public Service Logic (PSL)

1.2.1 Traditional public administration and product

In the traditional public administration (TPA) paradigm, the favoured *institutions or modes of coordination* are organization, bureaucracy, hierarchy, monopoly and control of processes.

In this traditional perspective, it is the industrial logic or logic of *industrialization/assimilation* that prevails (Goods-Dominant Logic). This logic covers three different and complementary facets in terms of (i) the nature of the product, (ii) work organization, (iii) and performance evaluation.

Public services are considered as *material quasi-products*. In dynamics, assimilation/industrialization thus denotes a productification of the public service. Closely related to the evolution of work organization (see below), this can take two different forms. The first aims to erase the specificities of (public) services, to make them homogeneous quasi-products, freed from the intrinsic technical characteristics of services i.e. intangibility, inseparability and immediacy and their consequences on the nature of the product. Industrialization means, in this case, the renunciation of the treatment of

cases that are not typical cases. The second form of productification aims, in a way, to transform an intangible service into a material good, substituting technical devices that can be used at home for the human relationship, within the general framework of what is called the digital transformation of public services. Thus, public services also fall within the scope of the self-service society, well-described for market services by Gershuny (1978, 1983) and Gershuny and Miles (1983).

In terms of *organization of work*, the assimilation/industrialization of (public) services means the implementation of a Fordist mode of production centred on highly standardized and mechanized processes and highly specialized tasks (division of labour), under the leadership of technostructure specialists whose mission is to design the organization, standardize and control tasks. The products are designed only from the point of view of supply, in the context of a *vertical (top-down) logic*, based on control. The hierarchical leaders of the administration (the technostructure) design standard products that operational staff delivers to citizens considered as *clients*. The latter are passive consumers, who do not intervene in the design and production of these products⁵. So-called service design in public services (which recommends developing service delivery models: “flowcharting”, “blueprinting”) falls within the scope of this facet of industrialization (Shostack, 1984; Lovelock, 1992; Kingman-Brundage, 1992).

In terms of *performance evaluation* criteria, it is productivity, an indicator of the industrial and technical world⁶ (the world of volumes and technical operations) that predominates. This indicator, especially in a public service environment, can be demotivating because it does not take into account or attempts to reduce the efforts made in other worlds of performance, for example, the domestic world (that of interpersonal relations and tailor-made services). This system of performance measurement can be detrimental in terms of innovation dynamics.

1.2.2 New public management and product

In the new public management paradigm (NPM), the central element is the introduction of economic rationalism and market logic into public service. *The market takes precedence over the hierarchy as a mode of coordination*. Some public services are privatized or contracted out, others have to compete with private or public providers for users/citizens, who become *customers*. NPM also promotes the rise of public-private partnerships with the idea that the private actor will exert a beneficial influence on the public actor. It also promotes the establishment of “social enterprises” which are “hybrid organizations”, in which the incumbent public logic faces other institutional logics: market logic essentially, but also logic of civil society (Vickers et al., 2017). In this general perspective, NPM is built on the following three principles: precisely formulated objectives, performance incentive “management contracts” and independent “cost centres” (decentralized budgetary control). NPM

⁵ The area where they can nevertheless, to a certain extent, express their preferences, dissatisfactions and desires is the political field (elections).

⁶ We will return in more detail to this conventionalist approach in terms of worlds of performance, in section 3.2.5.

transposes private sector management techniques to the public sector⁷. Control (of results) remains a central element of this paradigm.

Regarding the *nature of the product*, in the NPM paradigm, public service continues to be addressed as a good (a material quasi-product), but the industrial logic (logic of industrialization/assimilation), still present, is accompanied by a pre-eminent market logic (marketisation). There is therefore a *double assimilation* of public services to industrial goods and market services. But it is the dimension of market assimilation which prevails here.

The *organization of work* remains top-down, even if the agents in contact play a larger role. This paradigm does full justice to the preferences of citizens, who are now considered as “customers”, in particular because they can now freely choose some services and generate competition between different public services, or between public services and private services. However, in this paradigm, co-production of the service by the customer is not really a target.

In terms of *performance evaluation* criteria, outcome measures are preferred over output measures. NPM draws on the market world, i.e. the world of monetary and financial value (whose indicators include costs, returns, value added, revenue). It may also draw, to a certain extent, on indicators of the domestic or relational world (the world of interpersonal relationships based on empathy and trust), insofar as the purpose is also to establish customer loyalty, among customers who are less captive. It should be noted that, again here, as in TPA, performance indicators from the financial world can be demotivating in that they may be in contradiction with other indicators: indicators of the industrial and technical world, indicators of the social-civic world (the world of fairness, justice, inclusion). These contradictions can also be detrimental in terms of innovation.

1.2.3 New public governance and product

The new public governance (NPG) paradigm considers public service not as a product but *as a service*. It is based in particular on service theory, and especially on the so-called Service Dominant Logic – SDL (Vargo and Lusch, 2004; Lusch and Vargo, 2006). SDL applied to public services is called Public Service Dominant Logic – PSDL (Osborne et al., 2013). The concept of product introduced in NPG by PSDL, which we touched upon in section 1.1.1, merits further discussion. Initially, PSDL (PSDL 1) pursued the objective of *integrating* public services with the universal service logic (SDL), which considers that any economic activity (whether it concerns goods or services) is a “service offering”. Later, while continuing to fall within the scope of a general perspective of integration, PSDL (PSDL 2) emphasized certain specificities of public services (reflecting a double demarcation vis-à-vis industry and market services). This could be termed demarcative integration. Today, it would appear that the demarcation of PSDL vis-à-vis SDL is fully embraced. It is even semantically expressed by Osborne's (2018) recent proposal to replace the term PSDL with PSL (Public Service Logic). As the author puts it, “this term maintains the link to service, rather than product-based theory, but distances it from being simply an

⁷ This introduction of the market in public organizations is reflected in the emergence of a new terminology within the administrations: “business plans”, “value added”, “products”, “clients satisfaction”, “reengineering of public services” (Rouillard et al., 2004).

offshoot of SDL". While the idea of demarcating from SDL is interesting, the choice of the term (PSL) is perhaps questionable, since, by its connotation, it seems to hark back to the traditional public administration paradigm.

In new public governance (NPG), the *predominant mode of coordination* is the network (collaboration, partnerships, in particular public-private partnerships), that is to say an association of several public and/or private actors interacting for the co-production of public service and the co-creation of public value (Pestoff et al., 2012). In this context, according to a classic result of service economics and management on which NPG is based, the user/citizen is no longer just a consumer, he becomes a partner and a co-producer of the public service (Alford, 2009; Thomas 2012; Osborne and Strokosch, 2013). Control gives way to trust-based management. Horizontal relations (networks) are more likely to solve problems than vertical relations (hierarchy), if only because public administrations are organized around functions (e.g. housing, health) and not problems (e.g. social exclusion, ecological crisis), which cut across hierarchies (Enjolras, 2010).

Regarding the *production organization modes*, the shift from the NPM paradigm to the NPG paradigm marks the importance of service co-production, value co-creation and the role of the customer/citizen in co-production and co-creation (Osborne, 2006, 2010). Due to the importance of the network form of organization, this new paradigm has been called Networked Governance (Kelly et al., 2002).

In terms of *performance*, the NPG paradigm is sensitive to a multi-criteria assessment. This multicriteria evaluation, seeking the right balance between industrial/technical, market/financial and civic criteria, is indeed more likely to do justice to the diversity of institutional logics at work in multi-agent systems. Moreover, whatever the criterion (the evaluation register), in NPG, performance is assessed according to different time frames: short-term performance (linked to output) and long-term performance (linked to the outcome).

1.3 Public administration paradigms and innovation

The different paradigms of public administration, whose main characteristics we have just outlined, raise, in different terms, the question of innovation in public services. Table 3 provides a summary of these terms (which we will develop in the following paragraphs), from the perspective of the *nature* of the innovation and its *modes of organization*. These terms can be compared with the ADI framework of the SIS analytical perspectives. Just as for the analysis of the product, TPA can be linked to industrial assimilation, NPM to industrial and commercial assimilation and NPG first to integration and then to demarcation.

Table 3: Public administration paradigms, innovation and the theoretical perspectives of Service Innovation Studies

Public administration paradigm	Nature of innovation	Organization mode of innovation	Corresponding Innovation perspective	Service Studies
Traditional Administration	<ul style="list-style-type: none"> • Technological and non-technological process innovations... • Organizational innovations... • ... aiming to maintain homogeneous quasi-products • Few new services properly speaking 	<ul style="list-style-type: none"> • Linear model of innovation • Organizational processes and changes are developed by technostructures (sort of R&D-I departments), technological innovations are adopted. • Operational staff provides production • Citizens passively consume the service • Exclusion of citizens (clients) from innovation processes 	<ul style="list-style-type: none"> • Assimilation Industrialization, Technology, Subordination 	
New Public Management	<ul style="list-style-type: none"> • Technological process innovations, • Organizational and managerial innovations • More new services (quasi-products) 	<ul style="list-style-type: none"> • Linear model of innovation (technostructure) • Intrapreneurship, public entrepreneurship • Employee driven innovation • Public Manager as the actor responsible for innovation • Low participation of users in innovation processes, even if they are encouraged to express their preferences 	<ul style="list-style-type: none"> • Double assimilation Industrialization, Marketisation 	
New Public Governance	<ul style="list-style-type: none"> • Broad and open concept of innovation (technological, non-technological including social innovation): product/service innovations, process and organizational innovations, conceptual innovations, strategic innovations, radical changes in rationality, institutional innovations (or governance innovations), administrative innovation, rhetorical innovation... 	<ul style="list-style-type: none"> • Interactive model of innovation, collaborative innovation, innovation networks involving multiple public and/or private actors with varying responsibilities in the innovation process • Role of the public manager: creating favourable conditions for network collaboration (metagovernance) + operational participation • User-driven innovation, citizens as co-innovators 	<ul style="list-style-type: none"> • Integration Public Service Dominant Logic 1 (PSDL 1) • Integration/demarcation Public Service Dominant Logic 2 (PSDL 2) • Demarcation Public Service Logic (PSL) 	

1.3.1 TPA and innovation

It would be tempting to say that the myth of non-innovative public services developed within the framework of the TPA paradigm. Yet innovation is a reality, even in this first paradigm, if only as a consequence of administrative reforms and political changes.

These innovations fall within the scope of a service industrialization trajectory, transforming public service into a homogeneous quasi-product. After all, technological process innovations, especially ICTs (introduced in public services, coming from external suppliers), but also new processes and new organizational modalities, occupy a central place in the TPA paradigm. Innovation is therefore mainly focused on (technological and non-technological) processes and organization with the objective of providing citizens with homogeneous services over the national territory.

The organization model of innovation at work is the traditional linear model. The new processes and the organizational changes are developed by experts in public administration technostructures (playing the role of true R-D-I departments). Operational staff (production agents) and citizens/clients are passive actors, who never or hardly ever take part in innovation processes.

Within the TPA paradigm, innovation seems to fall within the scope of the assimilation perspective of the SIS framework, in that the purpose is to safeguard the industrial character of the public service on the basis, in particular (but not exclusively), of technological process innovations.

1.3.2 NPM and innovation

The NPM paradigm has mixed consequences on innovation in public services (its nature, its modes of organization). It is necessary to distinguish here i) the *theoretical concept* of innovation associated (or associable) with this paradigm and the ii) *real results* in terms of innovation within this paradigm.

i) From a theoretical point of view, looking first at *the nature* of innovation, NPM can be said to fall within the scope of an assimilation perspective as well. However, unlike the TPA paradigm, NPM involves *a double assimilation to manufacturing (industrialization) and market (marketisation)*. But though it results in a more tailored service, the focus on the user/customer does not lead to a diversification of the service offering (an offering that would be tailored to the specific needs of each customer). Process, organizational and managerial innovations still dominate. Secondly, regarding *how innovation is organized*, it can be said that the technostructure continues to play an important role. However, NPM also promotes some forms of public service entrepreneurship and intrapreneurship (Osborne and Gabler, 1993; Roberts and King, 1996). The public entrepreneur deploys a number of problem-solving (i.e. innovation) skills in public organizations. Moreover, by focusing on the need of the user seen as a *customer* to satisfy and not as a passive *client*, and by promoting decentralization strategies, the NPM paradigm also integrates into innovation dynamics the operational staff (employee-driven innovation) and, if not the customers themselves, at least their preferences. The citizen is no longer captive and passive. As a “customer”, he is able to make public services compete with each other and with private providers. By threatening to go elsewhere for the services, he may compel the public agent to adapt or improve the services provided. His preferences

and needs are now better taken into account, which is a source of innovation. But he is not, at this stage, an active agent of the innovation process (as described by the user-driven models). Although his preferences (which he is encouraged to express) are taken into account by the public agent within the innovation process, he does not actually take part in the process himself. *In short, the innovation model inherent to NPM is not based on the creation of multi-stakeholder innovation networks.*

ii) From the point of view of the real outcome (success) of this paradigm in supporting innovation, the results are rather mixed. This paradigm has a number of intrinsic characteristics that can hinder innovation (Sørensen and Torfing, 2013; Hartley et al., 2013). The focus on performance management is at the root of a “culture of zero error”, which is prejudicial to the spirit of innovation. The logic of competition hampers the exchange of information and knowledge, and the transformation of the user/citizen into a customer is not necessarily synonymous with a higher commitment of the customer in the dynamics of innovation.

1.3.3 NPG and innovation

The paradigm of new public governance introduces a significant change in the approach to innovation in public services, from the point of view of its nature, but especially of its mode of organization.

1.3.3.1 The nature of innovation

By considering the public service, no longer as a good (a quasi-product), but as a service, and by building on SDL, as we have already pointed out, NPG falls first within the scope of an *integration perspective* (PSDL 1: simple generalization of SDL to public services) and then within the scope of more or less pronounced *demarcation perspectives*⁸ (PSDL 2, then PSL). Whatever the perspective, NPG takes into account not just technological innovations, but also forms of innovation that were previously invisible when looked at from a strictly industrial and technological focus (assimilation). NPG is based on a broad and open concept of innovation encompassing traditional categories of product/service, process and organizational innovations, as well as specific forms described in recent literature: conceptual innovations, strategic innovations, radical changes in rationality, institutional innovations (or governance innovations), administrative innovation and rhetorical innovation (Mulgan and Albury, 2003; Hartley, 2005; Koch et al., 2005; Windrum and Koch, 2008; Becheikh et al., 2009; Fuglsang, 2010; Miles, 2013).

1.3.3.2 The organizational modes of innovation: the rise of innovation networks in public services

However, as far as its concept of innovation is concerned, NPG’s core focus is on the collaborative and network dimensions (Osborne, 2006, 2010). The network dimension, emphasized in the field of service production and delivery (see section 1.2.3), naturally applies to the field of innovation. NPG therefore reflects the shift from a linear and endogenous concept of innovation processes in public

⁸ It is a double demarcation vis-à-vis industrial and service-oriented approaches.

services to an open, interactive and network-based concept. In these innovation networks (just as in the production networks or partnerships mentioned in section 1.2.3), the citizen is not a passive consumer, but an agent who is particularly useful and active in the innovation process.

In general, the notion of innovation network (IN) can be defined according to two different but complementary perspectives: a morphological/structural perspective and a functional/ontological perspective.

From a *morphological perspective*, the innovation network is a *structure*, a mode of organization, which brings together a certain number of agents and establishes relationships among them in order to co-produce innovation. The number of agents involved is variable and the relations in question are more or less strong and diverse (see § 3.1). The notion of IN covers large-scale meso-economic structures that constitute, in a given field and/or geographical area, a dense tissue of agents often engaged in long-term interactions. But it also includes collaborative innovation relationships (consortia, strategic alliances), that are more limited in space and time and that are established among a smaller number of agents⁹. The innovation networks envisaged in NPG most often fall within this second type of IN.

In the *functional/ontological perspective*, the innovation network, i.e. the inter-organizational collaboration for innovation (just like all networks generally speaking) is a (new) *mode of coordination* between agents which differs from the traditional modes of coordination, namely the hierarchy (integration into the firm) and the market. In terms of innovation, just as in any other field, while the hierarchy is based on reducing transaction costs, and the market on establishing an explicit contract, the network is based on trust, reputation and mutual dependence among selected partners. This trust-based mode of coordination is considered to be more effective and more innovation-friendly than the other two (hierarchy and market) for a number of reasons. After all, the organizational or hierarchical integration (the establishment of an R&D or innovation department) presents the risk of bureaucratization that hinders innovation, a risk very well described by Schumpeter. Second, in the context of market coordination, competition hinders the exchange of information and knowledge, and explicit contracts for complex and uncertain research and innovation products involve an obvious risk in terms of protection of property rights. It should be noted that the benefits of partnerships were already highlighted in NPM, for example by encouraging Public-Private Partnerships (PPPs). However, in the context of NPM, the active ingredient of the partnership is not the partnership itself, but the introduction of the market. The idea is that adding (efficient) private activity to (inefficient) public activity helps to increase the overall performance of the system. In NPG, the active principle of networks is not the market, but the collaboration of heterogeneous agents.

As Podolny and Page (1998) and others (see also Enjolras, 2010) point out, from a structural point of view, there is no difference between hierarchy, market and network. Any organizational form (both hierarchy and market) is thus a network, insofar as it consists of a set of actors/nodes and relations among them (ties). The hierarchy can be considered as a set of nodes in which most of the ties come from and go to a higher order node, whereas the market appears as a set of isolated, unrelated nodes. It is from the point of view of governance (and not structure) that networks are distinguished

⁹ This second (more limited and more microeconomic) expression of IN is often called “multi-agent network”.

from markets and hierarchies. The market is characterized by episodic exchanges, and the hierarchy by enduring exchanges and the existence of a legitimate authority that arbitrates the conflicts among the actors (Podolny and Page, 1998). The network is a form of organization defined as “a collection of actors ($N \geq 2$) that pursue repeated, enduring exchange relations with one another and, at the same time, lack a legitimate organizational authority to arbitrate and resolve disputes that may arise during the exchange” (Podolny and Page, 1998, p. 59). This definition is nonetheless questionable insofar as some networks can be created by and function under the guidance of a conductor-agent, who exercises some legitimate authority (cf. § 3.2)¹⁰.

On the theoretical level, as we shall see in section 2.2, the success of the notion of innovation networks stems in particular from its intermediate position between, on the one hand, broader theoretical frameworks (systemic analyses) and, on the other hand, more basic theoretical constructs (various collaborative relationships). Thus, the innovation network (as a meso-economic structure or as a more limited consortium) is the building block of all the broader concepts of the systemic lineage. Conversely, the concept of innovation network integrates the numerous theoretical advances made in the field of collaborative innovation

¹⁰ From a structural point of view, it should be noted, other arrangements dedicated to value co-creation in public services such as “living labs” are in no way different from PSINs. After all, they are also made up of nodes (agents) and links. Their mode of governance doesn’t either sets them apart from PSINs. After all, living labs can also emerge spontaneously or be planned, and they can function horizontally or vertically. What mainly distinguishes living labs from PSINs is probably their *lifetime*, the *nature of the collaborative innovation activities* achieved, the *number of innovations* concerned. After all, living labs are enduring institutional arrangements primarily aimed at testing numerous and constantly renewed innovations. In a living lab, innovations to be experimented follow each other, while a PSIN is formed to carry out a given innovation, covering the whole set of phases/activities of the innovation process (problem identification, design/development, experimentation, diffusion) or just part of them (e.g. only testing). After successful experimentation and implementation of given innovations, living labs continue their existence, experimenting other innovations. PSINs, for their part, are generally called for other destinies. After all, when the innovation has been implemented, PSINs can become standard production networks in charge of distributing the new service. However, they can also disappear, if all the actors engaged in innovation are no longer involved in its production/delivery.

2 Varieties of innovation networks: towards a tertiarization/servitization of the concept

As we pointed out in the previous section, paradigm shifts in public services also equate shifts in the analytical perspectives for addressing innovation (its nature and modes of organization). The shift from traditional public administration to new public management and then to new public governance is parallel to a shift from (industrial and commercial) assimilation to integration and demarcation and from an endogenous linear innovation model to a collaborative and network innovation model.

The new public governance paradigm, which spreads within most developed economies, assumes that *multi-stakeholder collaboration, i.e. network* is a particularly effective mode of coordination for “producing” innovation in public services (sectoral perspective) or public service (functional perspective). It is this institutional arrangement that we denote here by the term “Public Service Innovation Network” (PSIN). *The concept of PSIN links two terms namely “public service” and “innovation network” in order to express a structural arrangement in which heterogeneous agents collaborate and form a network in order to produce new public services.* But there are other possible relationships between these two terms, which reflect other types of networks. These include traditional innovation networks (TINs) in which public agents play a certain role and public-private innovation networks in services (PPINs), a less well-known configuration which places (market and non-market) services and innovation in (market and non-market) services at the heart of innovation networks, and which, as we shall see, are composed of other categories: Market Service Innovation Networks (MSINs), Public Service Innovation Networks (PSINs), and Public Service Innovation Networks for Social Innovation (PSINs).

In this second section, we compare these different old and new expressions of INs (TINs, PPINs, MSINs, PSINs and PSINs). We analyze how shifting the analytical focus from TINs to PPINs and then to MSINs, PSINs (and PSINs) reflect what we can call a tertiarization of the concept of IN. This tertiarization, which reflects the growing power of services in INs, of course also reflects the broadening of the forms of innovation taken into account (not just technological innovation, but any form of innovation) and the modes of organization of innovation taken into account (not just the formal and linear modes, but also the informal and interactive modes).

This section is organized into four sub-sections. In sub-section 1, we provide a general description of these different expressions of innovation networks, to compare them from a morphological and functional point of view and to identify the relationships among them. The following three-sub-sections are devoted to a more in-depth discussion of TINs, PPINs and MSINs. In section 3, special attention is given over to the most recent and least known expression of innovation networks, namely Public Service Innovation Networks (PSINs).

2.1 A General Description of the Different Expressions of Innovation networks: TINs, PPINs, MSINs, PSINs and PSINs

As we have already pointed out, the notion of innovation network is often defined according to two complementary functional and morphological perspectives. In the functional perspective, the innovation network is defined as a mode of coordination between economic agents, intermediary between market and hierarchy, considered to be more effective than them (Hakansson, 1989; Powell, 1990; Hakansson and Johanson, 1993; Powell and Grodal, 2005), in that it prevents the risk of bureaucratization of innovation that can occur in the hierarchy and the risk of disclosure of strategic secrets that characterizes the market. In the morphological perspective, the innovation network is defined as a structural arrangement for bringing together multiple actors around a common objective, namely innovation (Pyka and Kueppers, 2003; Ahrweiler and Kean, 2013). While hierarchical governance is based on a central authority and market governance is based on contracts, innovation network governance is based on trust, reputation and mutual dependence between selected partners (Möllering, 2001; Sztompka, 1999; Dodgson, 1993; Powell and Grodal, 2005; Kolleck and Bormann, 2014).

The notion of innovation network has been a great success in the literature, a success that is manifested on the theoretical, methodological, empirical and political levels. This success of what are called here traditional innovation networks (TINs), is confirmed, in a way, by its spread to new socio-economic contexts (services in general, market services, public services) and the emergence of new forms of innovation networks, namely the public private innovation networks in services (PPINs) highlighted in the European ServPPIN project (Gallouj et al. 2013)¹¹, the market service innovation networks (MSINs), the public service innovation networks (PSINs) and the public service innovation networks for social innovation (PSINs) discussed in the COVAL European project¹². In this first section, following a presentation of the methodology used for the survey of the literature, we provide an overview, from a morphological (or structural) and functional point of view, of these different forms of innovation networks and the possible relationships among them. We also examine their degree of recognition by economic analysis.

2.1.1 Methodology

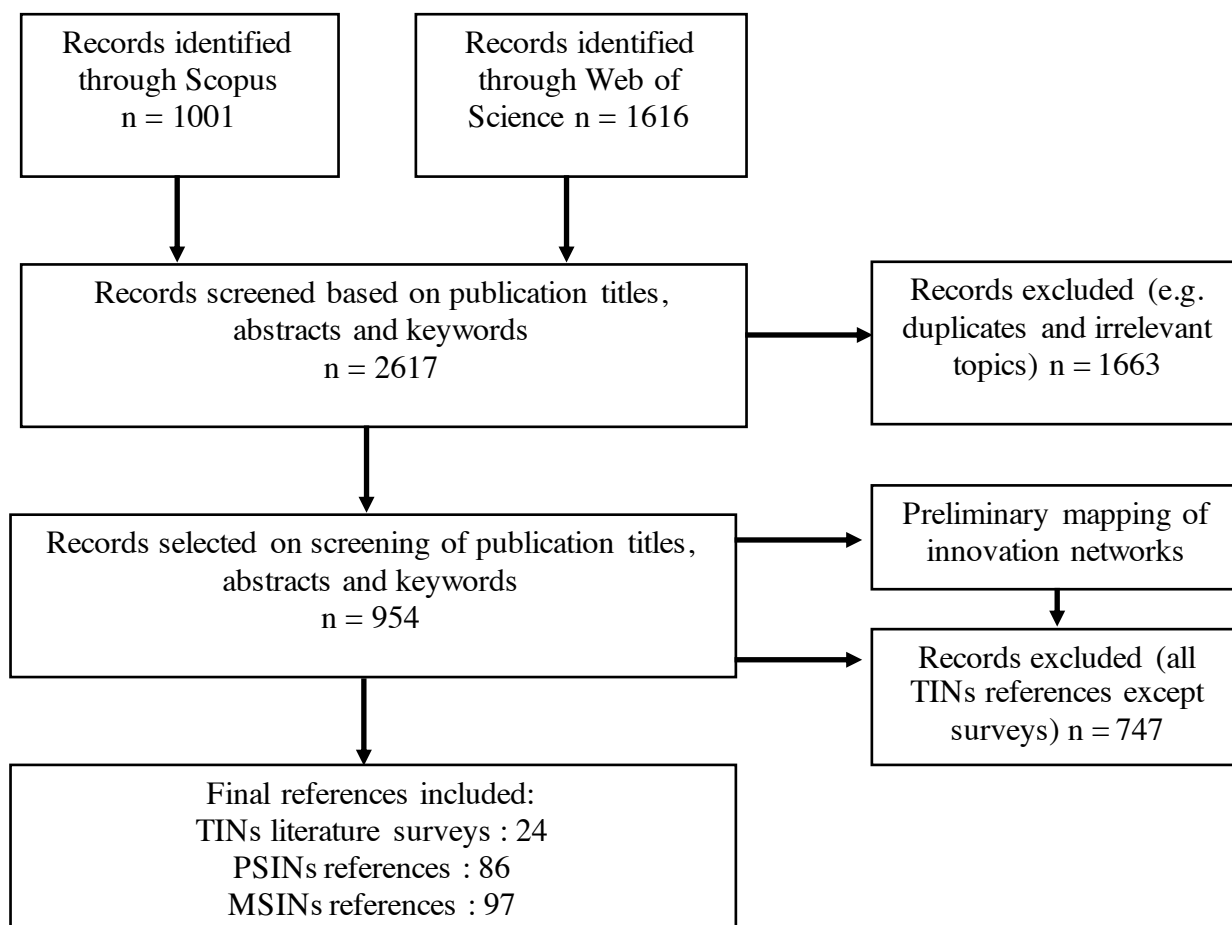
To map innovation networks, we carried out a review of the literature, based on SCOPUS and Web of Science databases, and the PRISMA method (Mohrer et al., 2009). We used the following search stream: ["innovation network" OR "innovation collaboration" OR "innovation cooperation" OR "innovation partnership"]. The search was limited to articles, books and book chapters published in English over the period 1990-2018.

¹¹ ServPPIN: The Contribution of Public and Private Services to European Growth and Welfare, and the Role of Public-Private Innovation Networks, FP7-SSH project 2008-2011.

¹² COVAL: Understanding value co-creation in public services for transforming European public administrations, H2020 project 2017-2020.

The search strategy and the record selection process are presented in Figure 1. Scopus and Web of Science data bases made it possible to identify 2617 references. Screening the titles, abstracts and keywords made it possible to exclude a certain number of them, in particular the duplicates and the publications addressing the innovation network topic in a marginal way or in a way than doesn't fit our mapping objective. This leads to the selection of 954 references.

Figure 1: Diagram of the search strategy and the selection process



We then screened the abstracts (and when needed skimmed through the full text) according to a first simple criterion namely the main sector (manufacturing, market services or public services) concerned by the innovation in the network. This made it possible to identify and quantify the references on traditional (manufacturing-based) innovation networks (TINs) (771), on market services innovation networks (MSINs) (97) and on public service innovation networks (PSINs) (86).

To achieve a more detailed mapping of these innovation networks and identify some of their characteristics, we introduced three other criteria namely: the types of agents involved in the network, the role played by the public agent (when any), the nature of the targeted innovation. To identify these criteria, reading (or at list skimming through) the full texts is necessary. We skimmed

through all the references on servitized networks, while regarding TINs, given the considerable number of references, we can do no more than reading the existing literature surveys (Table 4).

Table 4: Surveys of the literature on traditional innovation networks

• Aarikka-Stenroos and Ritala (2017)	• Breschi and Malerba (2005)
• Ozman (2009)	• DeBresson and Amesse (1991)
• Freeman (1991)	• Meeus and Faber (2006)
• Hoang and Antoncic (2003)	• Aarikka-Stenroos, Sandberg and Lehtimäki (2014)
• Pittaway et al. (2005)	• Trapczynski, Puslecki and Staszko (2018)
• Powell and Grodal (2005)	• Najafian and Colabi (2014)
• Hamdouch (2007)	• Dagnino, Levanti, Mina and Picone (2015)
• Jensen and Nybakk (2013)	• Giuliani (2011)
• Zirulia (2009)	• Hagedoorn, Link and Vonortas (2000)
• Almodovar and Teiweira (2012)	• Woodward, Eylem Yoruk, Bohata, Fonfria Mesa, O'Donnell and Sass (2005)
• Jones, Conway and Steward (1999)	• Noteboom (2006)
• Silva and Guerrini (2018)	• Bergenholtz and Walderstrom (2011)

2.1.2 The Different Forms of Networks from a Morphological and Functional Point of View

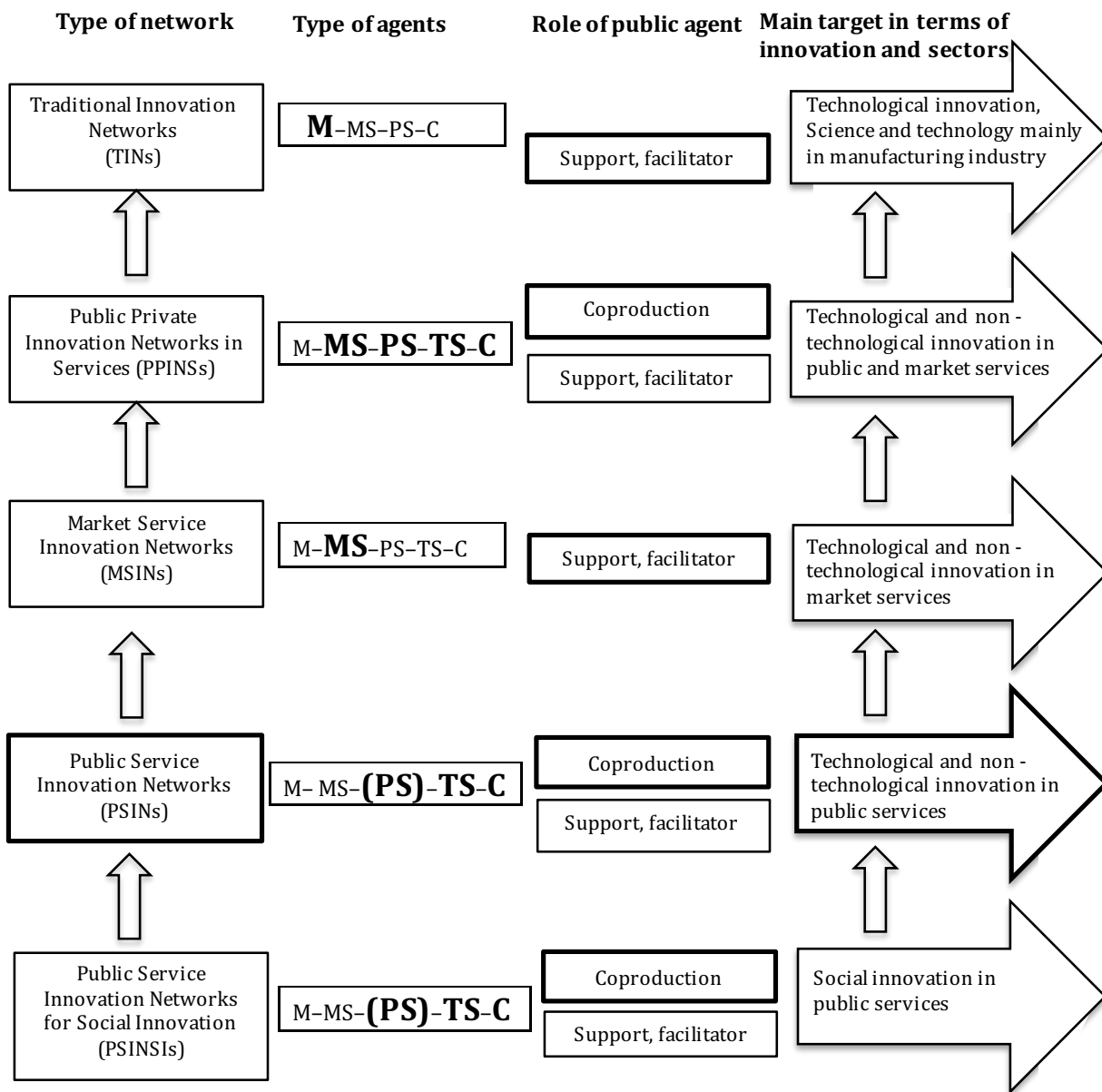
Although the literature gives precise examples of sectors, types of agents, roles of the public agent, types of innovation, we will confine ourselves to provide a simplified framework here (see Figure 2).

The actors involved in the network may belong to the following sectors (Tether, 2002; Corsara et al., 2012; Nieto and Santamarina, 2007; Arranz and Fernandez de Arroyabe, 2008; Windrum, 2014):

- the manufacturing sector (M) and the market services sector (MS), which both encompass firms of various sizes, ranging from SMEs to multinational corporations (Ahrweiler and Keane, 2013), which can be competitors, suppliers, clients to each other.
- the public services sector (PS) bringing together, on the one hand, universities and public research centers, and on the other hand, all other public service organizations (government bodies at different levels – local, regional, national and even international –, public bodies such as hospitals, public enterprises).
- the third sector (TS) consisting of associations, non-governmental organizations (NGOs), voluntary groups, social enterprises, cooperatives and mutual societies.

The network can also involve individuals (C) considered from different facets: individual citizens, users and especially lead users and consumers. In theory, actors belonging to each of these categories (M, MS, PS, TS, C) can play a role, in one way or another, in each of the types of networks. But, in reality, depending on the type of network considered, some of these sectors or agents are predominant in the network. They are represented in bold large letters in Figure 2.

Figure 2: Different types of innovation networks: TINs, PPINs, MSINs, PSINs, PSINSIs



M = Manufacturing. PS = Public Service. MS = Market Service. TS = Third Sector. C = Citizens, Users (Lead-Users), Consumers
 Bold and larger letters reflect the relative importance of the agent in the network

These networks may be set up to achieve different forms of innovation (technological and/or non-technological innovations), different scales of innovation (incremental or radical innovation, simple innovation or complex/architectural innovation) and innovations originating from different sources (adopted innovation or produced innovation). These innovations can be aimed at different sectors (manufacturing industry, market services, public services). Thus, for example, TINs are often high-tech networks (Powell and Grodal, 2005), MSINs are often devoted to service (non-technological)

innovations (Mustak, 2014; Burdon et al., 2015; Nätti et al., 2014), some PSINs (that we call PSINSIs) are targeted towards social innovation.

The public agent (governmental body or any other public organization) can play two different roles, exclusively or jointly, in innovation networks: on the one hand, a role of co-production of the innovation strictly speaking (innovator in its own right) and, on the other hand, a role of support/facilitator of the innovation or the constitution of the network.

On the basis of the main sector concerned by the innovation, and according to the different criteria suggested, our review of the literature makes it possible to sketch the different types of innovation networks, which we briefly define here, and will discuss further in the following paragraphs (see Figure 2).

TINs are networks that focus on the manufacturing industry and technological innovation and in which the public administration is not a co-producer of innovation, but a facilitator. PPINs, that were the subject of the European ServPPIN project are systems of service-oriented collaborations, public-private collaborations, open to non-technological innovation. MSINs are innovation networks focused on market services and service innovation. PSINs focus on innovation in public services. The main actors in this type of network are citizens, public sector and third sector organizations. Finally, PSINSIs are a special subcategory of PSINs dedicated to social innovation.

2.1.3 The Visibility of the Different Types of Networks and the Relationships among them

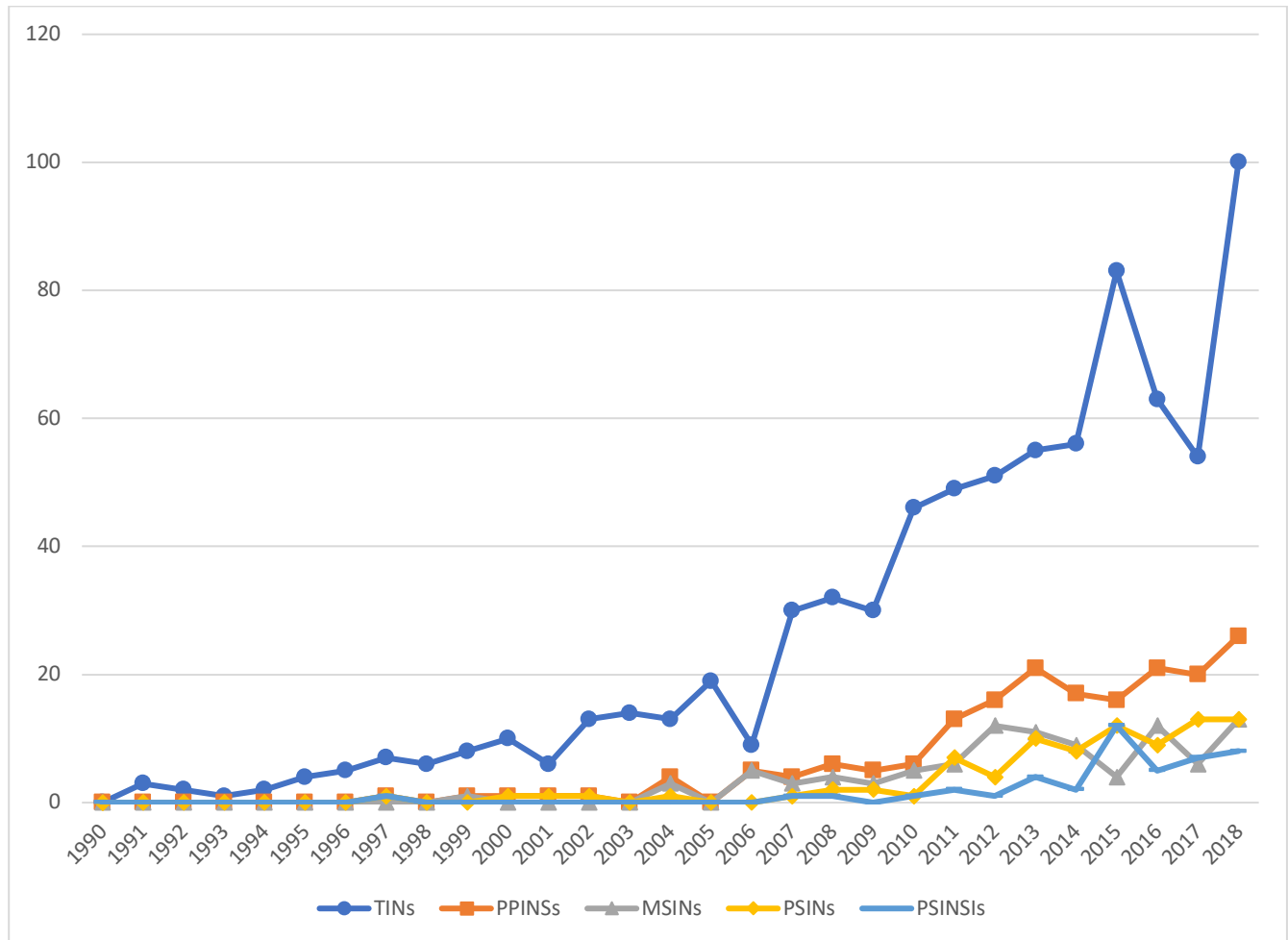
The different types of networks envisaged, which are not independent of each other, can be characterized by their degree of visibility, that is to say, their level of recognition by economic analysis.

Over the last 30 years, the concept of (traditional) innovation network based on manufacturing industry, especially high-tech R-D intensive industry (Powell and Grodal, 2005), has been quite successful and has given rise to a great deal of literature that is exponentially increasing (Figure 3).

The extension of innovation networks to services and service innovation has attracted attention from researchers more recently, whatever the type of network considered (PPINs, MSINs, PSINs, PSINSIs). The emergence of the literature on these new types of tertiarized networks can be dated back to the mid-2000s.

In the European ServPPIN project (Gallouj et al. 2013), the awareness of this conceptual tertiarization emerged in a general way, integrating market and non-market services. However, our review of the literature suggests to distinguish networks focused on market services (MSINs) from networks focused on public services (PSINs and PSINSIs).

Figure 3: Number of annual publications according to types of innovation networks

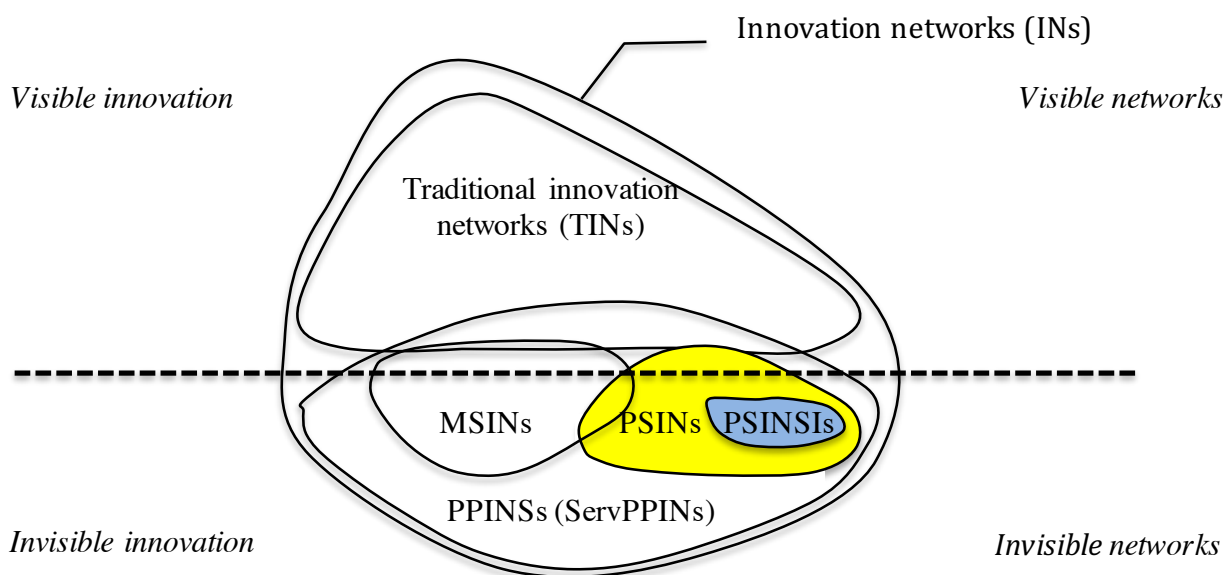


The literature on PSINs and PSINSIs is the least extensive. It is still in its “infancy” (Sørensen and Torfing, 2010). This gap in the literature can be explained by the existence of a certain mistrust vis-à-vis notions (collaboration, partnership, network) which, in the case of immaterial, non-spectacular and frugal innovations, at work in PSINs and PSINSIs, may appear to be mere rhetorical tools (Atkinson, 1999; Hastings, 1996; Lyon, 2013) rather than desirable and effective innovation arrangements. This is not the case for traditional innovation networks, which are taken seriously because they are designed to develop and implement sophisticated R&D-based industrial and technological innovations. Identifying and characterizing PSINs, which is the purpose of the third part of this research, is a way to go beyond the simple rhetoric of cooperation, collaboration or partnership.

To sum up, traditional innovation networks (TINs) can be said to constitute the visible tip of the iceberg of innovation networks (see Figure 4), while the other less known types of innovation networks are the submerged parts. However, the different types of innovation networks are not independent of each other. There is an intersection between TINs and PPINs. This intersection equates to certain PPINs which are focused on technological innovation. These include certain health

innovation networks (Djellal and Gallouj 2007; Li et al., 2018; Windrum and Garçia-Goñi, 2008) and certain public-private multi-agent partnerships devoted to innovative heavy infrastructures (what Rostgaard et al., 2014 calls Public-Private Innovation-PPI). There is also an intersection between MSINs and PSINs. This reflects in particular the ambiguous position of public utilities vis-à-vis market and non-market spheres (privatization, delegation of public service). In our survey of the literature, we have assigned to PSINs the innovation networks involving utilities, while they could be integrated in MSINs. PSINs are a sub-category of PSINs whose target is social innovation in public services. These two forms of innovation networks (PSINs and PSINs) are themselves sub-categories of PPINs.

Figure 4: The innovation network iceberg



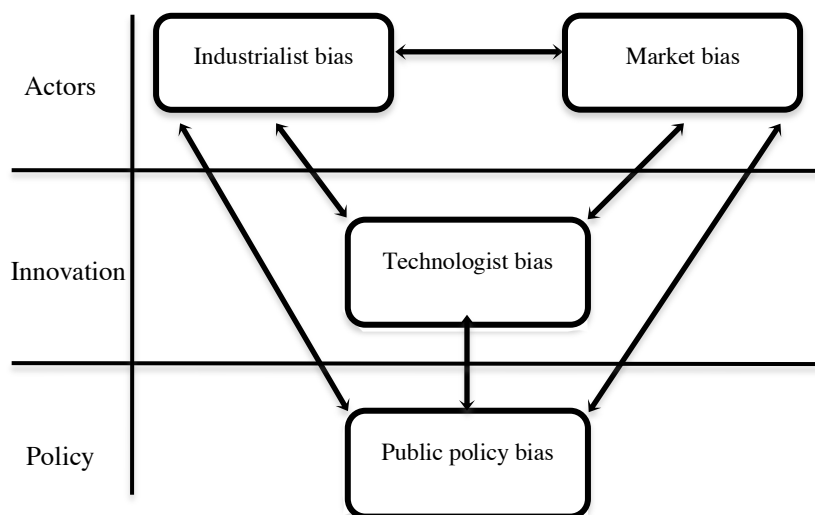
2.2 Traditional Innovation Networks (TINs)

Traditional innovation networks are multiagent collaboration systems, of varying size, dedicated to technological innovation. They have been the subject of an extensive literature (including many reviews: see Table 4), for several decades. The undeniable success of this concept of traditional innovation network can be explained in different ways (Gallouj et al. 2013). It is explained, first of all, theoretically, by its great simplicity and its great heuristic value. After all, an innovation network seems to be nothing more than a set of nodes and links. The strong theoretical scope of this concept is, moreover, reinforced by its ability to be part of concepts that are themselves quite successful, in particular the concepts of innovation systems in their various expressions (local, regional, national systems, sectoral, social systems, innovative milieus, technology districts, technopoles or clusters). Indeed, (innovation) networks constitute the core elements of these concepts (Grabher, 2006; Glückler, 2007; Freeman, 1987; Carlsson and Stankiewicz, 1991; Ahrweiler, 2010). The strong theoretical scope of this concept also owes much to its ability to assimilate itself to other concepts (learning, absorption capacity, scale, scope and agglomeration economies, transaction costs, network externalities, etc.) and other theories: the theories of open innovation (Chesbrough, 2003), employee driven innovation (Kesting and Ulhoi, 2010), virtual users and user-created content (Dahan et al.

Hauser, 2001), innovation communities (Franke and Shah, 2003; Bartl et al., 2004), but above all user-driven innovation (Von Hippel, 1986) which describes users' needs, preferences, experiences and skills as essential factors in innovation dynamics. The success of the traditional innovation network concept is also due to its operational and political use. The notion of innovation network and the associated notion of innovation system, in its various forms, give rise to interesting operational frameworks for mapping innovation dynamics for auditing, performance comparison and benchmarking. The concept of innovation network is also a key component of many public policies supporting innovation at different levels (supra-national, national, regional, local). Thus, the notions of National Systems of Innovation (NSI) and the networks that constitute them remain key components of national and European innovation policies. The notions of regional innovation systems (RIS) and clusters (like innovative milieus or industrial districts in past decades) are today central to local and national policies in many countries, though they may have different names: "skill clusters" in Germany, "competitiveness clusters" in France, "knowledge clusters" and "industrial clusters" in Japan.

However, as theorized and experienced, innovation networks (and also systems), have a number of weaknesses, particularly when viewed from the perspective of a service and sustainable development economy. These weaknesses concern the nature of the stakeholders involved in the network and the nature of the innovation addressed by the collaboration. They reflect three biases (industrialist, market and technologist), which are not independent of each other and which contribute to a fourth bias in terms of public policy (see Figure 5).

Figure 5: The biases characterizing TINs



Traditional innovation networks (TINs) are characterized by an industrial, technological and market bias. After all, the dominant agents within these networks generally belong to the industrial sector (M) and the market sector, and the main targets of the network are technological innovations with a strong scientific and technical R&D dimension (see Figure 2). The pre-eminence of manufacturing firms among TINs leads to say that TINs are "manufacturing innovation networks" (MINs) (as opposed to service innovation networks, whether MSINs or PSINs). The pre-eminence of agents from the

industrial and market sectors does not mean that agents belonging to other sectors are totally absent from these networks, just that their “role” is less important.

Thus, certain market services (MS) can take part in TINs. But the market services concerned are usually limited to Knowledge Intensive Business Services (KIBS): consultants of all types and financial services (investment banks or business angels) (Miozzo et al., 2016; Andreas and Harald, 2008; Bolisani and Scaros, 2009; Smedlund and Toivonen, 2007; Bustinza et al., 2017; Braga et al., 2017; Den Hertog, 2000; Huggins, 2011). These KIBS are not core elements of the network: after all, most generally, they only play a support role in favour of manufacturing firms that are the central agents. Other (peripheral) services which purpose is to support goods can also be mentioned: for example the so-called “services around the product”, i.e. pre-sales, after-sales services (Furrer, 2010).

Similarly, even if TINs are dominated by a market logic, public service actors also frequently take part in them. However, here again, as for market services, the public services concerned and, for some of them, their scope for action in terms of innovation are limited. Only two groups of public services are involved: universities and public research laboratories on the one hand, and local, regional or national public administrations on the other (Ahrweiler and Keane, 2013; Etzkovitz and Leydesdorff, 2000). The functions assigned to each of these groups in TINs are well known and documented: for public research bodies in science and technology (research centres, universities), the purpose is *to participate upstream in the production* of technological innovation (basic and applied research), and for public administrations, the purpose is to ensure meta-governance, in other words *to promote an environment conducive to innovation* and to the formation of partnerships (establish a favourable legal environment, provide financial support, encourage industrial firms to work more closely with universities and research centres). It is important to emphasize that the technological and market bias that characterizes traditional innovation networks makes it impossible to consider innovation activity specific to public administrations that would be the fruit of collaboration between different agents. The purpose of the PSINs and PSINSIs we discuss in Section 3 is to account for innovation in public services or for public service innovation strictly speaking and how it can also emerge from networks.

It should be noted that, especially starting from the precursor work of Von Hippel (1986), these (traditional) innovation networks also begin to take into consideration the user (C) and in particular the lead user as a significant actor in innovation dynamics.

TINs do not necessarily bring together all the types of actors envisaged in Figure 2. In particular, Government and public research organizations may be absent. Thus the literature distinguishes two generic types of traditional innovation networks: public-private innovation networks and private-private innovation networks¹³ (Drejer and Jørgensen, 2005; Schilling and Phelps, 2005; Fogelberg and Thorpenberg, 2012; Hagedoorn et al., 2000).

Private-private innovation networks encompass strategic alliances, joint ventures, supply chain arrangements (Hagedoorn, 2002; Powell and Grodal, 2005; Zirulia, 2009; Ahrweiler and Keans, 2013; Caloghirou, 2003; Gulati and al., 2000). However, the triad composed of an industrial firm (producer

¹³ There are also public-public networks, but they are generally research rather than innovation networks.

of innovation), public research (co-producer of innovation) and public administration (promoter of innovation), which is the standard form of TIN, is a public-private network. It has been the subject of many theoretical models. These include, for example, the so-called “triple helix” model (Etzkovic and Leydesdorff, 2000), which describes the processes of knowledge production in hybrid networks involving companies, universities and government agencies. These also include the so-called “mode 2” of knowledge production developed by Gibbons et al. (1994, see also Gibbons 2000) which describes a network of multidisciplinary actors, interacting to find solutions to the technological problems raised by industry. It is the industrial firm that is the centre of these collaborative modes of knowledge production, or which is intended to be their centre, as the life cycle of the network evolves. The analyses of network life cycles illustrate a decline in the participation of public actors over time. The maturity phase of innovation networks is clearly dominated by private industrial firms.

Whatever their form, TINs can be of various size (from a few to a considerable number of actors) and be established at different spatial scales: local, regional, national or even global. Their lifespan is also very variable, which makes it possible to envisage a continuum between innovation networks established for a given transitory project and permanent innovations networks.

The industrial, technological and market biases that characterize TINs, and which interact with each other, lead to a bias in the public policy designed to promote innovation (see Figure 5). Indeed, TINs, whether as a public policy instrument or as a public policy target, mainly promote technological innovation based on R&D and science and technology. The PPINs addressed in the next section help to reduce all four of these biases.

2.3 Public-Private Innovation Networks in Services (PPINs)

PPINs are networks that have begun to interest research more recently (ServPPIN project funded by the European Commission, see Gallouj et al. 2013). They describe collaborations in the field of innovation between public and private service organizations. They should not be confused with public-private partnerships (PPPs). PPPs are generally focused on service production and not on innovation, and their rationale is based on the idea that introducing a market logic is good for performance, whereas in PPINs, what is good for performance is the hybridization of knowledge and skills. Finally, PPPs are formalized in contracts while PPINs are more flexible structural arrangements.

In this new type of innovation network, the dominant agents belong to market services (MS) and non-market services (PS and TS) (see Figure 2). In addition, a new target appears alongside technological innovation, namely non-technological innovation which is given great importance. Thus, PPINs bypass the technological, industrial and market biases of TINs that we have outlined previously.

- PPINs correct the industrial bias of traditional INs by giving *a central place to market services (MS)*. The status of services is raised both in terms of the nature of the services concerned and their function/place in the innovation process. *First of all*, in PPINs, not just KIBS and financial services, but

any service activity can be part of the innovation network. The PPINSs database¹⁴ of the ServPPIN project provides the following examples: consultants, a TV channel, travel agencies and tour operators, private elder care services, transport companies, etc. *Second*, in PPINSs, these services no longer occupy a peripheral position in the innovation network, but rather a central one. They are now the key actors, the nodes of the networks and the main actors of innovation, which itself is broader in nature, since it includes the different forms of so-called invisible innovation (see Figure 6).

- PPINSs also correct the market bias of TINs by giving *a central place to public and non-market services* and to public-private collaboration in the network. Thus, a wide range of organizations belonging to the public sector (PS), but also to the semi-public and the so-called third sector (TS) (associations, non-governmental organizations, etc.) take part and occupy an important place in the network. The PPINSs database of the ServPPIN project provides the following examples of public and non-market services (PS and TS) (Djellal and Gallouj, 2013): the Red Cross, a municipality, a development agency, a chamber of commerce and industry, a tourism union, a transport union, the institutions of the labour market (collaboration between employers and unions), a health regulation agency, a federal state government, a foundation and so on. The new public actors involved also include research networks in human and social sciences.

- One of the key characteristics of PPINSs that distinguishes them from TINs is that any public service activity/organization, and not just public research organizations (universities, research laboratories), can perform a co-innovation activity strictly speaking. As in the case of services, PPINSs thus make it possible to include non-technological forms of innovation in networks. They also make it possible to account for an area of innovation that is still largely under-exploited, namely innovation in public services (Windrum and Koch, 2008; Djellal et al., 2013; Fuglsang et al., 2014; Moore and Hartley, 2008; Osborne and Brown, 2013; Jordan 2014; Arundel et al. 2019).

Thus, while TINs are focused, for the most part, on technological innovation, PPINSs are based on a broader and open concept of innovation that includes both visible (technological) innovations and invisible (non-technological) innovations, systematic (planned) innovations and non-systematic (unplanned or emerging) innovations (see Figure 6).

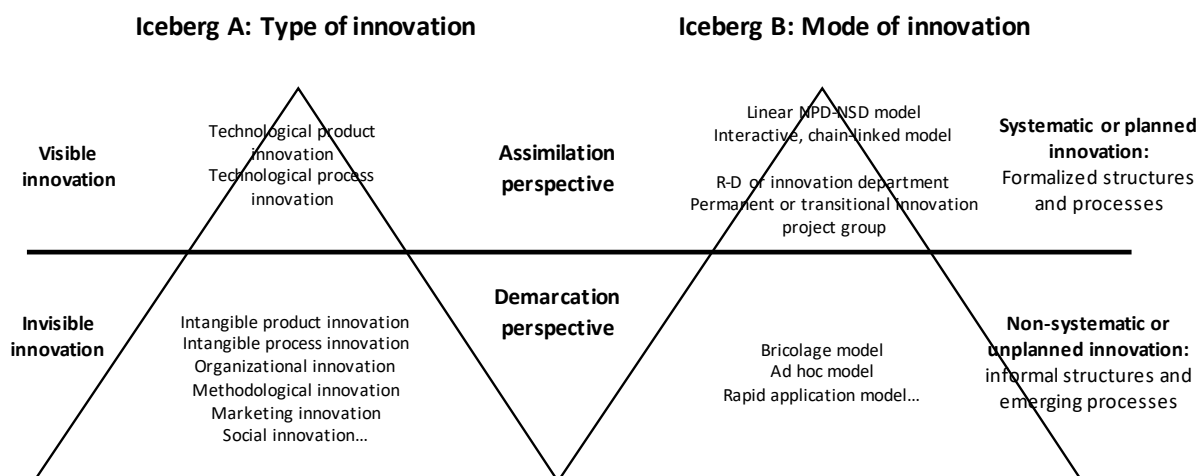
Visible innovations are those that are perceived by traditional analytical tools, such as R&D and patents. They reflect a technologist and assimilationist conception of innovation in services, which renders much of the innovation dynamics in services invisible (Gallouj, 2002). Invisible innovations are a heterogeneous category, often grouped under the term non-technological innovations. They can take different forms: organizational, social, marketing, and so on. They reflect a service-oriented or demarcative conception of innovation in services (Gallouj, 2002) (Iceberg A in Figure 6).

Systematic or planned innovations are incorporated into well-identified and formalized structures (for example, R&D or innovation departments, permanent or transitional innovation project groups and so on) and into well-established, more or less complex, stage-gate processes (linear NPD-NSD models) or interactive, chain-linked models as described by Kline and Rosenberg (Kline and Rosenberg 1986).

¹⁴ This database comprises 40 in-depth case studies of PPINSs conducted (by means of interview-based qualitative surveys) by project participants in the following countries: France, the UK, Spain, Austria, Denmark, Norway, Slovenia and Hungary. The case studies cover health, transport, knowledge-intensive services and tourist services.

These models are the application to services of traditional (manufacturing) innovation models. They therefore reflect an assimilation view of innovation organization modes, and they are included in the visible tip of Iceberg B in Figure 6. Non-systematic, unprogrammed or non-planned innovations are embedded into informal and loosely coupled structures and in “emerging” spontaneous processes. Within this general category, the literature distinguishes several types of innovation models that were for many years underestimated (submerged part of Iceberg B): bricolage model (Fuglsang, 2010), ad hoc or a posteriori recognition model (Gallouj, 2002), rapid application model (Toivonen, 2010) and so on. In the *bricolage* or *tinkering* model, innovation is the result 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; Styhre, 2009; Fuglsang, 2010). Fuglsang and Sørensen (2011) point to the importance of “capability of bricolage” in the activity of in-home caregivers for the elderly, who have to “solve unexpected problems with available resources”. *Ad hoc* innovation (Gallouj and Weinstein, 1997) is described as the process of co-construction with the customer of a (novel) solution to a problem. This process, which requires the participation of the customer/user/citizen himself/herself, is described as ad hoc because it is “unprogrammed” or “emerging”, which means that it merges with the service provision process from which it can be dissociated only a posteriori. Ad hoc innovation is recognized as such only after the fact. In the *rapid application* model, finally, once the idea has emerged, it is immediately developed as the service in question is being provided. Planning does not precede production. The service provision process and the innovation process are one and the same (Toivonen et al., 2007).

Figure 6: The service innovation icebergs



2.4 Market Service Innovation Networks (MSINs)

Although research on innovation in services has experienced an undeniable growth in recent years, research on innovation networks in services (MSINs) is still limited. MSINs represent only 10 % (97 out of a total of 954) of the references selected in our survey. In contemporary service-dominated

economies, and regarding activities that are supposed to be characterized by co-production (especially with the customer), the small number of references on innovation networks is paradoxical. Anyhow, our review of the literature (see Figure 3) illustrates a growing interest for MSINs since the mid-2000s.

MSINs are innovation networks established around dominating service firms (MS) (see Figure 2), in order to implement service innovations, whether technological or non-technological (Syson and Perks, 2004; Dooley and O'Sullivan, 2007; Agarwal and Selen, 2009; Tether and Tajar, 2008; Agarwal et al., 2011; Kandampully, 2002; Mustak, 2013; Mention, 2011; Nattti et al., 2014).

As already pointed out above, individual consumers (C) are often discussed in the literature as co-producers of the service. Interactivity (or inseparability) that's to say the fact that services are co-produced by a provider and a consumer who are inseparable is one of the main technical characteristics of services. This consumer is also sometimes seen as a co-innovator. However, co-production and co-innovation are most often considered in the context of bilateral (dyadic) rather than multi-party relationships. That's why, while the actor "C" is included in the simplified representation of MSINs (Figure 2), it is not in bold and enlarged letters.

Our review of the literature made it possible to identify the existence of such networks, particularly in the following sectors: tourism (Sundbo et al., 2007; Kofler et al., 2018; Høegh-Guldberg et al., 2018; Brandão et al., 2018; Zach and Hill, 2017; Booyens and Rogerson, 2017), retailing (Cox and Mowatt, 2004; Hidalgo and D'Alvino, 2014), financial services (for example, strategic alliance between banks and fintechs), mobile services (Heikkinen and Still, 2008; De Reuver and Bouwman, 2012), transportation/logistics (Steinicke et al., 2011), ICT services (Zhao et al., 2010; Kim et al., 2015), engineering services (Burdon et al., 2015), cultural industry (Lin, 2014), restaurants (Cho et al., 2018), exhibition industry (Dawson et al., 2014), etc. It should be noted that knowledge intensive business services, which are support agents for manufacturing firms in TINs, can be the main players in MSINs (Zhao et al., 2010; Burdon et al., 2015).

When they are focused on technological innovations, MSINs differ little from TINs. They can encompass traditional technological alliances and even the triple helix model associating university, administration and service firms. This similarity is reflected by the overlap between MSINs and TINs in Figure 4. However, MSINs are most often private-private partnerships, especially cooperation between service firms (Steinicke et al., 2011; Burdon et al., 2015) or between service firms and KIBS. Symmetrically to service firms role in TINs, when manufacturing firms are included in MSINs, they play a peripheral role, for example, as suppliers.

When the innovations in question are non-technological (new services), the multi-agent collaboration within PSINs and particularly the horizontal (intra-industry) collaboration, can raise serious problems of protection of innovation (Hurmelinna-Laukkanen and Ritala, 2010; Ritala et al., 2009).

The distinction between TINs based on manufacturing industry and technological innovation and MSINs based on market services and service innovation falls within the scope of what services studies call the demarcation (as opposed to the assimilation) perspective (Gallouj, 2002). However, in a context of blurring boundaries between goods and services, an integration perspective has been

emerging. This seeks to develop unifying theoretical models for goods and services, innovation in manufacturing, and innovation in services (Gallouj and Weinstein, 1997; de Vries, 2006; Windrum and Garcia-Goñi, 2008; Lusch and Vargo, 2006). The Product-Service Systems (SPS) approach, which reflects the rise of integrated “product-service” offerings (Mont, 2002; Bryson, 2010; Paschou et al., 2018) falls within the scope of these integrative models. SPS reflects a certain hybridization of TINs and MSINs, since the construction of the SPS requires a balanced participation of manufacturing and service firms in the production and innovation network. In an SPS, the competitive advantage of the manufacturing firm may spring from the innovation activity of its partner service firms (Gebauer et al., 2008; Kindström and Kowalkowski, 2009; Spring and Araujao, 2013; Feng and Sivakumar, 2016).

3 PSINS at the heart of collaborative innovation in public services

The latest application of the concept of innovation network is to public services themselves and collaborative innovation in public services. We call these new kinds of innovation networks Public Service Innovation Networks (PSINs). In our review of the literature, we have identified 87 references on PSINs and underlined their steady growth since the mid-2000s.

PSINs, which are very successful within the “new public governance paradigm”, are collaborative arrangements implemented in public services in order to create value through a process of co-innovation.

As Figure 2 (section 2) illustrates, although any type of public and private actor can be part of PSINs, the main actors generally belong to the following three groups: public services (PS), third sector (TS) and individual citizens (C). A key element in PSINs is that *the target of collaborative innovation is the public service itself*. It is the public service that is the subject of innovation. If when it is present, the public actor plays a central role in PSINs, it should nevertheless be noted that it may happen in certain cases for the public actor to be absent from the PSINs throughout their life cycle or at certain periods of the life cycle (This is what we express by putting PS into brackets in the figure, while keeping bold and enlarged letters). The explanation of this paradox, as already stated, is that PSINs are concerned with both innovation *in* public services as an activity or sector and with public service innovation with public service viewed as a function of general interest even beyond public sectors. In such conditions, an innovation of general interest can be provided by a network of private (market or non-market) actors, specifically because the public actor has been failing on a given “market”, either because it has withdrawn from or does not have the resources or the desire to serve that market. This failure or lack of interest of the public actor is not uncommon in the particular case of PSINs centred on the resolution of wicked social problems and promoters of social innovation, networks that we call PSINSIs.

In the previous section, we compared, in a general structural and chronological perspective, PSINs with other expressions of INs. The purpose of section 3 is to deepen the definition and description of PSINs. Our intention is to penetrate the ‘black box’ of PSINs in order to understand how they are formed and operated in order to produce innovation and co-create value in public services. This section is therefore organized into two sub-sections: Section 1 examines the concept of PSINs from a morphological or structural point of view, and Section 2 from a dynamic point of view (formation and functioning, evolution in space and time, assessment).

3.1 PSINs through morphological/structural variables

A PSIN can be described using the following four variables: 1) the (sectoral or functional) fields/areas where networks are set up; 2) the actors involved; 3) the interactions between these actors; 4) (the characteristics of) the innovation carried out by the network. The first two variables are

topographical, while the third is functional. Variables 2 and 3 are topographical, while variables 1 and 3 are functional. On the basis of a review of the theoretical and empirical literature, we discuss each of these variables, striving to identify what can distinguish PSINs from other types of networks.

3.1.1 PSINs according to the fields where they are set up

The fields where PSINs are set up can be addressed in different ways: for example, through accountancy-based typologies of public service activities or through typologies that reflect the major problems or social needs of the moment.

In accountancy-based typologies, a distinction can be made, for example, between the following sub-sectors:

- sovereign public services (order and security),
- public services regulating private activities,
- public health and social protection services,
- educational and cultural public services,
- industrial and commercial public services.

This typology can be simplified by distinguishing between general services, social services and utilities. PSINs can be created in any one of these categories, as illustrated by the following references identified in our survey of the literature: for general services (Faerman et al., 2001), for social services (Kaminski, 2016; Windrum, 2014; Kolleck, 2014; Mandel and Keast, 2013), for utilities (Schmidt et al., 2018; Kolloch and Reck, 2017; Compagnucci and Spigarelli, 2018; Shaw and Burgess, 2013). However, it should be noted that social services constitute a particularly favourable ground for PSINs set up for the implementation of social innovation (i.e. PSINSIs).

In typologies that reflect major social problems or needs, a distinction can be made, for example, between: health (Windrum, 2014; Mandel and Keast, 2013; Andersson et al., 2012), ageing (Pekkarinen and Harmaakorpi, 2006; Sørensen and Torfing, 2017; Grudinschi et al., 2013); education (Kolleck, 2014), transportation and mobility (Cahoon et al., 2013), employment (Kallio and Lappalainen, 2015; Rangel and Galende, 2010), security (Mandel and Keast 2013), endangered childhood (Leonardo et al., 2018; Mulroy and Shay, 1997) and so on. All these major social problems or needs can be the subject of PSINs or PSINSIs. For example, the Danish CLIPS project presents 14 case studies of collaborative public service innovation related to crime prevention in a local environment (Sørensen and Torfing, 2013). Social problems at the origin of PSINs include what the literature calls “wicked problems”. Wicked problems are complex, multiform, systemic and often conflicting problems, which cannot be solved by a single actor, but which require multi-stakeholder collaboration. They include problems related to caring for an aging population (in terms of health, housing, mobility and so on), the decay of certain suburbs, environmental degradation, caring for refugees and so on. Regardless of the field of activity, PSINs are concerned by wicked problems, but PSINSIs centred on social innovation are even more focused on these problems. It is this focus on solving major social problems through social innovation that defines PSINSIs and distinguishes them from PSINs in general.

However, whether wicked or not, “problems” shouldn’t necessarily be given a negative and reactive meaning (in this case social difficulties). As Milan Kubr (1988) suggests (in the context of consulting, it is true), though there are “corrective” problems, there are also “progressive” and “creative” problems. In the former case, innovation is a therapy undertaken to correct a difficult situation. In the second case, it is a matter of improving a given situation that is not yet bad, but which is expected to deteriorate over time. In the third case, it involves designing a totally new and better solution, without there being any real problem to be solved a priori.

If they can be analytically broken down into broad, distinct categories, major social problems are in reality interconnected and should be addressed in a comprehensive way. Thus some PSINSs are developing to provide innovative solutions to social situations involving simultaneously several problems, for example, youth unemployment, long-term unemployment, education and security (Kallio and Lappalainen, 2015). The literature on PSINs also includes references on smart cities, which seek to innovatively solve multiple urban problems by mobilizing multiple actors (Angelidou, 2017; Lytras and Visvizi, 2018; Cardullo and Kitchin, 2018; Ratten, 2017).

3.1.2 PSINs according to the type of actors Involved

Not all multi-stakeholder collaborations for innovation are innovation networks, but all innovation networks are made up of a number of actors. These actors, in varying numbers, are different in nature (belong to different categories) and occupy different places in the network.

3.1.2.1 The nature of the actors

As we noted in section 2, In traditional innovation networks (TINs), the main actors belong to the triad manufacturing firms, public administrations and research organizations, with manufacturing firms being or likely to be the main nodes of the network. In so-called Public Private Innovation Networks in Services or PPINSs (Gallouj et al., 2013), market service firms, public administrations and third sector organizations occupy a prominent place. PSINs for their part involve *public actors* (public administrations at the national, regional or local level) and *private actors* (including business actors i.e. private firms, NGOs, associations, foundations, social enterprises, individual service consumers/users and individual citizens). The nature of the actors involved in innovation networks and PSINs can be distinguished according to several levels of analysis: the *sector* of activity of the organization (public/private, market/non-market, manufacturing/service), the type of *organization* (a firm, an association, a mutual insurance company, a foundation), the status of the *individual* (a basic employee, a public manager, a citizen, a user, an elected politician). The nodes of PSINs and among them PSINSs (that is, PSINs dedicated to social innovation) can be organizations or individuals. Thus, unlike TINs, PSINs and PSINSs are sometimes (often) multi-agent/individual rather than multi-organizational collaborations.

Because they are different in nature, the actors of the network can obey different “institutional logics”: public, private/market, private/non-profit (Friedland and Alford, 1991; Thornton et al., 2012; Vickers et al., 2017). The network is thus a “hybrid organization” (Vickers et al., 2017; Battilana and

Lee, 2014; Billis, 2010) where different complementary or competing institutional logics interact. However, the organizations that constitute the network are also hybrid organizations, just like the individual himself/herself, who is at the same time citizen, consumer and producer. This plurality of institutional logics, expressed at different levels, is both a positive and negative factor for collaboration. We will come back to this in section 3.2.2.

3.1.2.2 The role of citizens

The role of citizens as important actors in value co-creation and collaborative innovation in public services, that is, in PSINs (and even more in PSINSIs) is often emphasized for most PSINs identified in the literature (Agger and Hedensted Lund, 2017). When analysing PSINs, especially in terms of social innovation, it is useful to distinguish three types of citizens, depending on how they are affected by the problem that gives rise to the innovation implemented by the network:

- Type 1: the citizen is directly affected by the problem that is the object of the innovation. Examples include the dependent elderly people, drug addicts, early school leavers, refugees, homeless people, and so on.
- Type 2: the citizen is indirectly affected by the problem. This type mainly includes relatives and family of type 1 citizens.
- Type 3: the citizen is neither directly nor indirectly affected by the problem, but he/she is sensitive to it by empathy and solidarity or for ideological, philosophical or political reasons.

These three types of citizens can take part in the innovation process in different ways. Given their vulnerability and lack of resources, type 1 citizens, rarely (or passively) take part in the collaborative innovation process in the network. However, types 2 and 3 citizens can take part in all stages of the innovation process, individually or collectively (as part of third sector organizations).

The literature considers that the participation of citizens in public innovation networks may lead to a selection bias, thought to be potentially prejudicial to innovation (Fung, 2003; Carpini et al., 2013; Agger et Hedensted Lund, 2017). The concern is that it is always the same (or the same types of) citizens (that Fung (2003) calls the “usual suspects”) that take part in the innovation processes, namely the most resourceful citizens. The knowledge and preferences of other citizens (the least resourceful) are likely to be excluded, which is detrimental to innovation. Although the “usual suspects” can be sources of innovation, they can also be relatively conservative and contribute to locked-in innovation trajectories and “competency traps” (Levitt and March, 1988).

3.1.2.3 The number of actors

The number of actors involved in the network can of course vary greatly. It might nevertheless be assumed that TINs are generally used as a meso-economic level concept that fit into (local, regional, national, global) innovation systems, which can bring together a large number of actors. PPINs mobilize relatively fewer actors and PSINs for their part are a microeconomic level unit, which can be limited to a small number of actors. A general idea that comes up frequently in the literature is that the capacity for innovation increases with the number and diversity of actors involved in a network (Franke and Shah, 2003; Ansell and Torfing, 2014; Bland et al., 2010; Agger and Hedensted Lund,

2017). While this hypothesis may be well-founded for TINs oriented towards complex, highly R&D-intensive technological innovations, it is not clear that the same is true for PSINs.

3.1.2.4 The importance, influence and power of the actors

It is obvious that all actors do not play the same role, or occupy the same place, or have the same influence and power in a network. There are some actors who play the role of mediators, linchpins between different actors, facilitate mediation and “translation” (Callon, 1986), exert leadership, and so on. Social Network Analysis (SNA) provides useful and well known tools to measure the level of influence, importance and power of a given actor. The most important of these tools is the measurement of the centrality of the actor. SNA distinguishes several different types of centrality indicators, in particular:

- Degree centrality, which measures the number of direct links connecting a node/actor to neighbouring nodes/actors. In the field of innovation networks, it reflects the ability of a given actor to gain access to external knowledge (Schön and Pyka, 2012).
- Closeness centrality, which accounts for the geodesic distance (shortest path) to reach an actor/node. The importance of the actor is therefore expressed by its proximity to all other actors, reflecting its higher capacity to receive or distribute information.
- Betweenness centrality, which measures the importance of an actor through the number of times it acts as an intermediary in the relationship between other actors.

In a discussion of network topology/morphology, it is the distribution of these indicators among agents that is important. This distribution provides information on the growth patterns of the network and its solidity/vulnerability, and therefore its ability to last over time (Barabasi and Albert, 1999).

As we have just seen, the importance of an actor is closely linked to the quantity and quality of its interactions with other actors. We discuss this question of interactions between actors in more detail below (section 3.2.2).

3.1.2.5 A typology of PSINs according to the Type of Actors Involved

A typology of PSINs based on the nature of the actors involved in the network can be envisaged. Such a typology would include the following categories:

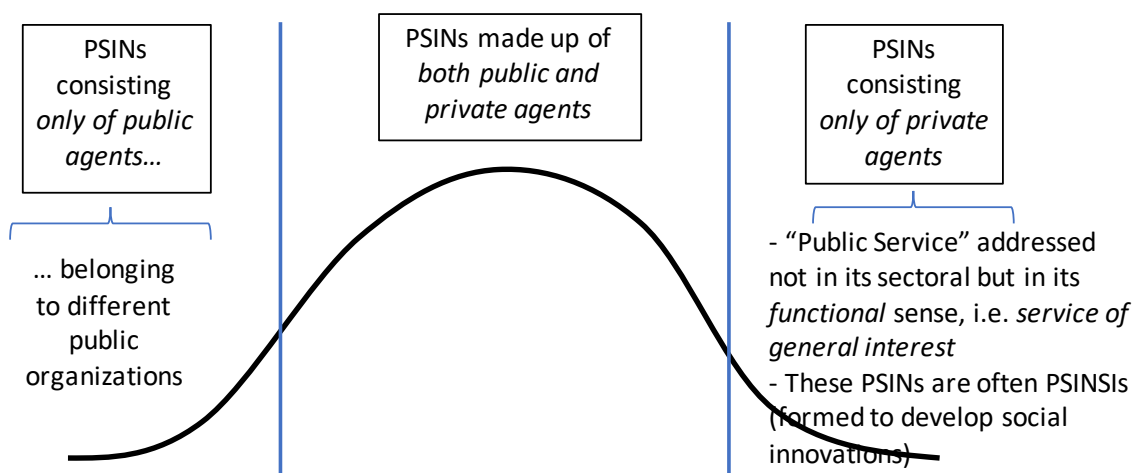
(1) Networks made up of both public and private agents (Kallio and Lappalainen, 2015; Brown and Keast, 2003; Jamali et al., 2011; Bland et al., 2010; Rostgaard et al., 2014). This first group can itself be broken down into different sub-types, in particular by dividing the category of private actors into market private actors (companies, consultants) and non-market private actors (associations, citizens, and so on). The triple helix configuration (university-industry-government network focused on technological innovation) which is the canonical form of TINs is also present in this first group. The references identified relate in particular to public utilities, for example the water sector (Compagnucci and Spigarelli, 2018) and health services (Li et al., 2018). By analogy with this traditional triple helix, we identify here a “social triple helix”, composed of the university, government bodies and citizens

(independent individuals or represented by third sector organizations) (Shindler, 2017). This “social triple helix” is different from the traditional triple helix by one actor (the citizen or the third sector organization instead of the firm), and by the nature of the innovation that is pursued (social and service innovation instead of technological innovation).

(2) Networks consisting only of public agents belonging to different public organizations. It is necessary to distinguish, on the one hand, the relationships between different levels of the same administration, which do not constitute a network strictly speaking (since these relationships remain embedded in a given hierarchy: a given administration being the equivalent of a company, which can be broken down at different geographical levels), and, on the other hand, the relationships between different public organizations, which do involve a networked structure. Such networks are more often formed in the context of non-social public service innovations (PSIs) rather than social PSIs. They may seek economies of scale when they involve public actors who deliver the same services in different geographical areas (for example, waste processing) or when they involve public actors which deliver different but complementary services, e.g. health and social care or police, fire and housing (Entwistle, 2014).

(3) Networks consisting only of private agents, working collectively to co-produce an innovation that falls within the scope of public service, not in its sectoral sense but in its functional sense (i.e. services of general interest). Private agents can be market agents (firms) or non-market agents (citizens, associations) (Sanzo et al., 2015). As already mentioned above, this configuration is a public service innovation network but not an innovation network *in* public services. These networks are more often formed to develop social innovations strictly speaking. They are therefore PSINSIs.

Figure 7: A typology of PSINs based on the type of actors



The distribution of these different types of networks follows a Gaussian law (see Figure 7), in which the dominant form is the first one (networks made up of both public and private agents). Although, this is not statistically significant, it can be noted that, in the Danish CLIPS project mentioned above (Sørensen and Torfing, 2013), from the 14 cases of PSINs (or more precisely of PSINSISs) envisaged, 6

belong to the first category, 4 to the second and 4 to the third. Taking the public organization as a point of reference, these three types of networks might be called, respectively, hybrid PSINs, endogenous PSINs and exogenous PSINs.

3.1.3 Interactions between actors

In an innovation network, the function of the economic agents involved is to interact with others, within the innovation process. Interaction can be defined, generally speaking, as a process of exchange of information, knowledge, civility and task achievement (Gallouj and Weinstein, 1997). But this interaction can take different forms, vary in intensity and involve a variable number of actors, be enshrined in a particular temporality, introduce a hierarchy between agents and rely on special tools. Social network analysis provides valuable tools for describing, mapping and measuring these interactions (see also previous point). It is important to note that, in the case of social innovation, interaction (especially with the citizen) is consubstantial with innovation. It is not just a form of innovation production, but an important result of innovation.

3.1.3.1 The nature of the interaction

The literature uses many different terms or concepts to define this interaction between agents within a network: cooperation, coordination, collaboration, partnership, and so on. These different terminologies are often used as synonyms. But in some cases, efforts are made to differentiate them and designate different modes of interaction.

Keast et al. (2007) consider that the first three terms (the “3Cs”) are not interchangeable, but have different content and objectives, and increasing levels of connection, which reflect a connectivity (or integration) continuum (cooperation --> coordination --> collaboration). *Cooperation* is a simple mechanism for the exchange of information and knowledge. *Coordination* is an (intermediary) mechanism for linking actions, and achieving coherence, which makes it possible to create synergies and to avoid repetitions/redundancies in a process. *Collaboration* is a higher level of interaction that goes beyond simply exchanging information/knowledge, pooling resources and avoiding redundancies. It is a strong and enduring commitment to jointly develop solutions to shared problems. In other words, cooperation is a communication mechanism, coordination a regulatory mechanism and collaboration an operational mechanism.

If it is accepted, this distinction, calls for a number of comments. These three modes of interaction are, of course, at work in all networks, especially PSINs. They are not independent of each other. Cooperation and coordination, as defined, are necessary but not sufficient, conditions for the establishment and proper functioning of an innovation network and in particular a PSIN. The collaboration mechanism for its part incorporates the other two mechanisms i.e. cooperation and coordination. After all, by getting involved in the concrete achievement of innovation tasks (collaboration), the agents necessarily exchange information and knowledge (cooperation) and establish a division of tasks (coordination). Collaboration is the central element of PSINs. It is therefore collaboration that makes the network.

Collaboration often has the connotation of a consensual and peaceable relationship, undoubtedly because it is implicitly viewed in opposition to another form of interaction: competition. If this were the case, it would be detrimental to innovation. After all, conflict/opposition are drivers of innovation, while reaching a consensus consumes resources and most often results in incremental innovations, after getting everyone to agree on the lowest common denominator (Sørensen and Torfing, 2013). Collaboration thus benefits from being considered, not as a consensual relationship, but as a process organizing and managing conflicts, oppositions and differences, in order to catalyse creativity and generate innovative solutions.

When it comes to collaborating in the field of innovation, other terms (from different research traditions: service economics and management, innovation economics and management, design thinking and participatory design) are also frequently used. These include co-production (of innovation), co-creation and co-innovation to express the idea of collaboration to innovate, and co-initiation, co-design and co-implementation to describe collaboration at a particular stage of the innovation process (Agger and Hedensted Lund, 2017).

The literature provides a discussion of the distinction between co-production and co-creation in services in general and public services in particular. Thus, in their systematic review of the literature on co-production and co-creation with citizens in public innovation, Voorberg et al. (2015) point out that, in most cases, co-production and co-creation are used as interchangeable concepts. Both encompass the different activities of the citizen: the citizen as co-implementer (he/she carries out certain public service implementation tasks in place of the provider); co-designer (the citizen participates in the design of the content and delivery process of the service, but public administration is the leader); initiator (it is the citizen who initiates the new public service and defines its characteristics, and the public administration is the follower). On the basis of this observation, for the sake of clarification, Voorberg et al. (2015) use the term co-production for the (co-)implementation activity of the citizen and the term co-creation for his/her involvement in co-design and (co-)initiation activities.

Some authors use the concept of co-production only to describe the participation of the *direct* user/consumer/customer/client in the production/delivery of the service (Pestoff et al., 2006), while others give it a broader meaning, integrating the *indirect* participation of other individual or collective actors, for example the family or an association (Alford, 2014; Bovaird, 2007; Sicilia et al., 2016).

In a report entitled “Together to improve public services: partnership with citizens and civil society”, OECD (2014, p. 17) defines co-production as “the direct involvement of individual users and groups of citizens in the planning and delivery of public services”. According to OECD (2014, p. 17, Politt et al., 2006), this is a generic term that encompasses various other activities/concepts that “reflect the different stages and types of citizen involvement and input”: co-design, co-creation, co-delivery, co-management, co-decision, co-evaluation and co-review. Thus, in this definition, co-creation is a component of co-production, while in others, co-creation is the higher level concept encompassing co-production.

The literature also proposes typologies of co-production. For example, Loeffler (2009) distinguishes between *substitutive* co-production and *complementary* co-production. In the former case, an agent

(for example, a citizen or user) performs a task that was previously performed by someone else (for example, a public official). In the latter case, an agent (the citizen) performs a new activity, complementary to that of the other agent (the public official).

Beyond the difficulty in accurately defining co-production and co-creation, another difficulty is added when considering the target of these two activities.

When the term co-production is used alone, as is often the case in service economics, it refers to the operational process of production of the service, in which the customer is often involved in a natural or compulsory way. For example, a student co-produces the education service by attending classes and learning lessons. The citizen co-produces the “crime prevention” service by being vigilant and reporting any suspicious event to the police. Although the idea of co-production aims to differentiate services from goods, the industrial connotation of this concept (if only semantically) is obvious. This has led some service marketing scholars to replace the term production by *servuction* (Eiglier and Langeard, 1987). Similarly, when the term co-creation is used alone, it often refers to the idea of contributing to the innovation activity (creation referring to creativity).

However, the terms co-production and co-creation are often used in conjunction with the target of the activity, for example, innovation or value (co-production/co-creation of value or innovation). Reference is thus often made to *value co-production* and *value co-creation* (without actually defining what value means¹⁵). Some authors use these two terms as synonyms (Gebauer et al., 2010). Others (Lusch and Vargo, 2006) substitute value co-creation for value co-production, rejecting the latter term to the extent that it reflects a Goods-Dominant Logic (GDL) conception of value generation. Yet others see co-production as a dimension/channel of value co-creation (Hardyman et al., 2015), just like co-innovation.

3.1.3.2 The intensity of the interaction

The question of the intensity of the interaction between two agents is difficult to approach and measure because it can be addressed according to at least three perspectives.

First of all, it can be addressed *through the nature of the activities carried out* in the interaction. We have already implicitly addressed this issue in the previous discussion of the nature of the interaction. After all, some forms of interaction are, by nature, more intense than others. Thus, in the distinction established by Keast et al. (2007), cooperation is the least intense mode of interaction, since it is limited to a simple exchange of information, whereas collaboration is the most intense, since it implements richer activities and supposes a greater and more lasting commitment of the stakeholders.

Secondly, it can be addressed *through a temporal dimension*. The interactions within the network are, after all, embedded in different temporal patterns. PSINs may be interaction/collaboration systems that are temporary/short-term or permanent/long-term (such as R&D departments). Whether the networks are temporary or permanent, the interactions can be either continuous (full-time work of

¹⁵ We will return to this question in section 3.2.5.

actors) or sporadic (part-time work). Thus, Pestoff and Brandsen (2008, see also Pestoff, 2009) distinguish three types of interactions between public authorities and citizens, according to a growing time scale: i) sporadic and distant, ii) intermittent and/or short-term, iii) intensive and/or enduring.

Finally, it can be addressed *by the formal or informal nature of the relationship*. Mention can be made here of the distinction between weak and strong ties made by Granovetter (1973). According to Granovetter, the strength of ties in a network is not synonymous with performance. On the contrary, weak ties are likely to be more efficient because they make it possible to connect a given agent embedded in a given network to other agents involved in other networks.

3.1.3.3 The number of interactions and network density

PSINs are generally characterized by a relatively small number of interactions (number of total links), at least in comparison with traditional innovation networks, which are part of innovation systems at different geographical levels. This is of course linked to the relatively small number of agents involved (see previous point). But, beyond this general observation, there is a great variability in the number of interactions, depending on the PSINs considered.

The density of the interactions or of the network¹⁶ reflects the number of links between the different nodes of the network. In SNA, it is measured by the ratio of the number of links established to the number of possible links in a network. The density of the network provides elements of interpretation on the speed of circulation of information and knowledge flows in the network, a speed which is also measured by the average shortest path length (Newman, 2003).

The literature on TINs argues that interactions are more frequent when knowledge is poorly codified or tacit. This is the case, for example, in the field of biotechnology. Extrapolating this argument to PSINs, which are established in knowledge and innovation fields that are hardly visible and poorly codified in their form and content, one can assume that they are characterized by a higher relative density of links (a high ratio of the number of links to the number of actors), even though, in view of lesser availability of financial resources, there are likely to be fewer actors in PSINs.

3.1.3.4 The instruments of interaction

ICTs, online public services and social media are increasingly common instruments of interaction. The major public changes that are illustrated by revolutions (see the experience of the Arab Spring) are nowadays increasingly based on social media. The possibility of connecting has significantly increased the ability of citizens to get involved, give their opinions and express their “voice” in Hirschman’s sense (Hirschman, 1970).

¹⁶ The characteristics of the actors (individual perspective) and the characteristics of the network as a whole (network perspective) should not be confused here and elsewhere.

3.1.4 Innovation in the network

The innovation that is the purpose of the network can be considered from the angle of its nature, its process and its mode of organization and its appropriation regime.

3.1.4.1 The nature (type) of innovation

As we pointed out in section 2, Traditional innovation networks (TINs) are characterized by a technological bias. After all, their main purpose is the production of technological innovation. PPINs break away from this bias, insofar as, without neglecting technological innovations, they also take seriously the production of non-technological innovation in the networks (Gallouj et al., 2013). PSINs, for their part, while they fall within the scope of the same open perspective (in theory encompassing technological innovation and non-technological innovation), are actually putting more emphasis on non-technological innovation in all its forms: a new service, a new process, a new delivery mode, a new organization, a new public reform, a new public policy and so on. Whatever their type, these different innovations can be classified according to their degree of novelty. Thus, the traditional distinctions between incremental innovation and radical innovation or between innovation adopted (by PSINs) and innovation designed/produced (by them) apply to public service innovations.

Generic and longstanding examples of innovation in public services illustrating the diversity of forms include the following (Sørensen and Torfing, 2013):

- new policy areas (preventive care, active employment policy and climate change mitigation);
- new services (online education, digital services, neighbourhood renewal programs, new elder care services);
- new managerial systems (elaborate systems of performance management, performance-related wage-systems and quasi-markets);
- new organizational modes (one-stop service agencies, public-private partnerships).

The network itself, it should be noted, can be considered not only as a mode of innovation, but as a form of innovation strictly speaking. This is what Gallouj et al. (2013) call *network innovation*. Network innovation is thus a particular case of organizational innovation, in which the development of the network is itself the innovative object (the goal of the innovation process). An example is the case of an innovative care network initiated by a third-sector organization for the care of the elderly.

Among the innovations developed within PSINs, social innovation occupies an important place. It is incidentally the only object of the sub-category of PSINs that we called PSINSIs. Social innovation can cut across all the categories mentioned above, insofar as it may concern a new service, a new process, a new organization, a new reform, a new social model (as opposed to a business model) or a mix of them. Whatever its form, social innovation is social “in its ends and means”, according to a now standard definition attributed to the European Commission (European Commission 2013). Given the particular nature of public services and their purposes, some authors have no hesitation in considering all public innovations as social innovations, or even in considering these two categories as synonyms (Sørensen and Torfing, 2013; Bekkers et al., 2014). In our opinion, this is neither correct nor helpful. These two sets intersect, but they are not identical. After all, the scope of social innovation goes far beyond public innovation and the scope of public innovation far beyond social innovation

alone. Not all public service innovations are social innovations and not all social innovations are public service innovations. PSINs are dedicated to all forms of public service innovation, and social innovation is just one form among others, which can go beyond the scope of public service. For example, a network that is formed to facilitate the implementation of an electronic service in the administration (for example an online tax system) has no (or little) reason to be considered as involving a social innovation. The same applies to a network of municipalities, chambers of commerce and private stakeholders set up to improve the efficiency and usability of business support services (OECD 2014). Many other examples of these types of PSINs (not focused on social innovation) can be found in the field of general public services and support services for economic activities.

The nature of innovation can provide the basis for a fairly simple typology of PSINs that distinguishes:

- (1) Networks created for social innovation in public services. This is what we call PSINSIs (see Figures 2 and 4 in section 2). (Kallio and Lappalainen, 2015; Rubalcaba et al., 2013; Leonardo et al., 2018; Voltan and De Fuentes, 2016; Moore and Westley, 2011 ; Windrum et al., 2016; Ziegler, 2017).
- (2) Networks created for other forms of public service innovations (i.e. non-social public service innovations). In the latter group, we can distinguish between networks built for service innovations and networks built for policy innovations (Faerman et al., 2001).

Our review of the literature made it possible to identify 37 references on PSINSIs among the 86 references on PSINs. However, it should be acknowledged that the distinction between PSINs and PSINSIs is basically dependent on the definition of (and the boundaries fixed to) this complex and difficult-to-grasp object that is social innovation.

3.1.4.2 The innovation process: a non-linear or open innovation model

The NPG paradigm, in which networks occupy a central place in the production of public value and public innovation, falls within the scope of an evolutionary and neo-Schumpeterian perspective of innovation, but also within the broader perspective of complex adaptive systems (Holland and Miller, 1991). Thus, innovation is not only considered as a definitively constituted result, but as a non-linear, interactive or open and path-dependent process. This innovation carried out by the network is embedded in a set of interrelated activities, a more or less explicit process that is traditionally described by the following steps/activities that may overlap, be performed in parallel, allow feedback, etc.:

- Identification/initiation: this activity consists of becoming aware of a problem to be solved, a need to be satisfied or a challenge to be met and deciding to initiate an innovation process to cope with it.
- Development/design: this is a creative activity that consists in generating new ideas to solve the problem in question.
- Experimentation: the selection and testing of a solution.
- Implementation: the execution of the solution within the organization.
- Dissemination: this activity aims to scale up the chosen solution, within the organization itself or beyond it.

The innovation model at work in PSINs (and PSINSIs) is a highly non-linear or open model. It is opposed to the traditional linear model which assumes a sequential (and specialized) organization of

the innovation process, greatly limiting the interactions and feedback between the R&D, production and marketing phases. In management sciences, this linear model is illustrated by a well-established theoretical tradition that considers the production of new goods or services according to the New Product (or New Service) Development methodology, which implements planned and systematic processes. The open innovation perspective includes a number of unplanned or emerging models, which have been observed in market services, but which apply to public services, for example, the rapid application model, bricolage innovation and ad hoc innovation, which we defined and discussed in section 2.3 (see figure 6).

Finally, non-linearity is a shared characteristic of highly complex and dynamic innovative processes related to the most advanced fields of Science and Technology (and implemented in traditional innovation networks – TINs) and less dramatic social processes falling within the scope of Human and Social Sciences (and implemented in PSINs and PSINSIs).

The literature is unanimous in concluding that the collaboration/interaction between agents is able to reinforce each of the activities/stages of the innovation process (Roberts and Bradley, 1991; Roberts and King, 1996; Hartley, 2005; Eggers and Singh 2009; Bommert 2010; Sørensen and Torfing, 2013). Thus, the *identification of the problem* is facilitated by pooling the experiences and skills of multiple public and private agents. The *development of new ideas* is fertilized/catalysed by the confrontation of opinions and perspectives of different actors. *Experimentation* of innovation is facilitated when the partners are interested stakeholders in a jointly developed solution. Such partners are undoubtedly reliable ambassadors for this innovation and promoters of its *diffusion*.

Another interesting point is the extent to which different categories of actors in the network are involved at different stages of the innovation process. Empirical investigations identify different levels of involvement of different actors in each activity, according to their public or private status (Sørensen and Torfing, 2010). By focusing on innovation in public services related to crime prevention in a local context, the Danish CLIPS project (Sørensen and Torfing, 2013) emphasizes that private stakeholders are more involved in collaboration at the implementation stage of the solution than at the initiation and design stages. It also points out that the end user (here “at risk youth”) rarely comes into play in the project because the associations are the key nodes of the network.

3.1.4.3 Appropriation of the results of an innovation resulting from a collaborative process

In innovation networks, the difficult question of the appropriation regimes for co-produced innovation no longer arises at a bilateral level, but at a multilateral level, which of course increases the problems of leakage and coordination.

However, in PSINs, given the nature of the innovation in question (namely a public service innovation (PSI), whether it is a social innovation or not), traditional appropriation does not apply. After all, unlike economic innovation, which the innovators strive to personally appropriate and protect against imitation by competitors, public service innovators and social innovators are eager to see their innovation imitated. An indicator of the success of such innovations is even their ability to be scaled up and adopted by other organizations.

3.2 PSINs through dynamic variables

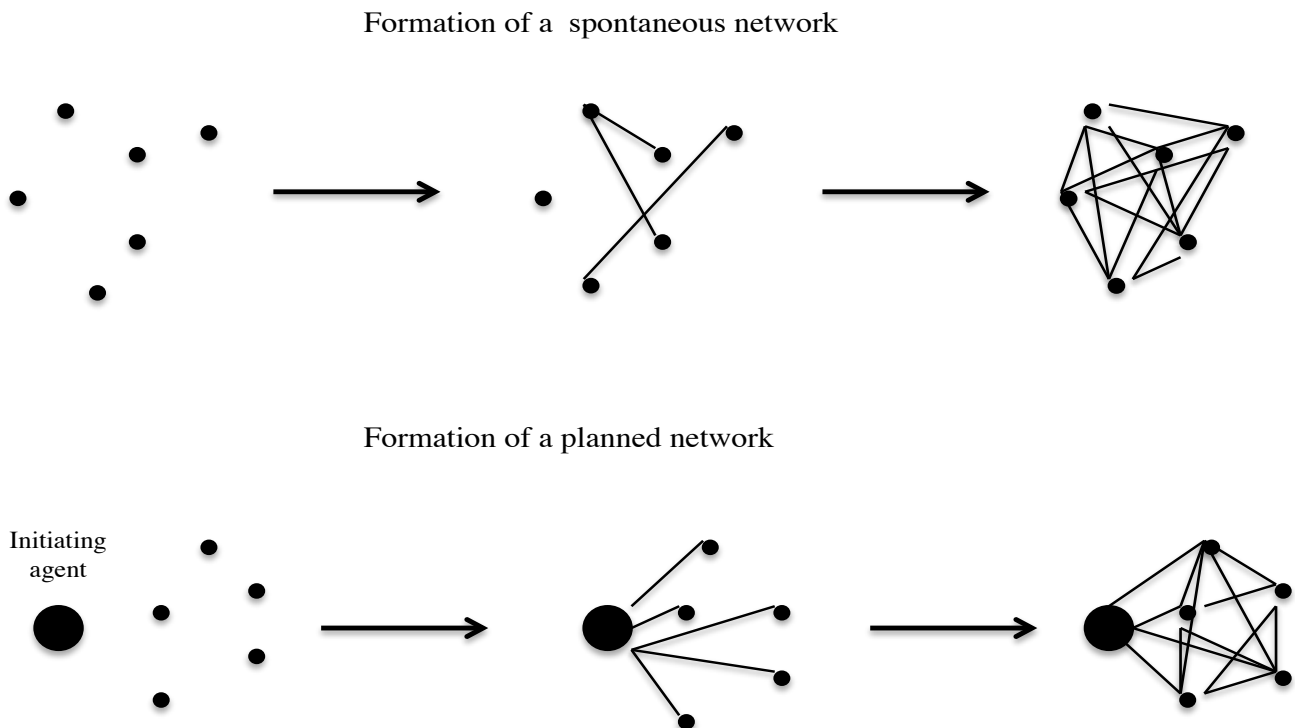
The dynamic variables describe the network in action (in space and time) and its results. The following variables are considered: 1) the mode of formation of the network, 2) its mode of functioning, 3) its integration in time (its life cycle), 4) its integration in space (the geography of PSINs), 5) the assessment of its performance.

3.2.1 The mode of formation of the network

Regarding network formation, the literature generally distinguishes *planned* or *engineered* networks from *spontaneous* or *emergent* networks (Powell and Grodal, 2005; Doz et al., 2000; Schön and Pyka, 2012; Green et al., 2013).

Planned networks (see Figure 8) are formed under the impetus of an initiating or enabling agent (in theory, any type of agent: individual, public organization, private firm, NGOs, etc.) who will invite other potential stakeholders to join the network. In this kind of network formation, the initiating actor invites actors he himself knows and whom he expects to bring useful skills for carrying out the innovation project. However, the invited actors do not necessarily know each other.

Figure 8: Formation of a spontaneous network and a planned network



Spontaneous networks (see Figure 8) emerge in a self-organized way from the convergence of the initially non-coordinated activities of different agents facing a given problem, on a given territory (a district, a city, a region, etc.). The initiation of the network probably takes place between agents who already know each other, in one way or another. *Self-organization* is a principle inspired by the natural and physical sciences (Von Bertalanffy, 1968; Prigogine and Stengers, 1984), which describes the intrinsic capacity of the elements that make up a system to organize themselves, to create order and adjust, spontaneously. The principles that underlie self-organization are *local interaction* (that is to say between the basic elements making up the system), *non-linearity* (the existence of feedback loops in the exchanges), *thermodynamic openness* (the exchange with the environment) and *emergence*, i.e. the fact that a higher order level may spontaneously arise from interactions at lower levels (Forrest and Jones, 1994; Pyka and Windrum, 2000).

The works devoted to PSINs have a different vision of this distinction between planned networks and spontaneous networks, which reflects the concern to move beyond the simple definition of the universe of theoretical possibilities, to be in line with the empirical reality. After all, they generally consider that *spontaneous* (self-organized) networks are networks involving citizens (not government). In PSINs, “self-organization” or “self-governance” often denotes the emergence of a convergent collective action among private agents, without government participation (Bekkers et al. 2014). Such networks emerge spontaneously in order to address given social problems for which public solutions are lacking or ineffective. *Planned* PSINs, on the other hand, are often initiated by the public administration itself. Although the prevalence of these configurations would probably be confirmed by statistical analyses, the fact remains that others are possible. Thus, the empirical literature also provides examples of PSINs planned by private actors (citizens, associations and so on). These are the most frequent in the case of social innovation (PSINSIs).

3.2.2 The functioning mode of the network

We focus here on the way PSINs are managed and governed, once formed and on the factors that may hinder their proper functioning.

3.2.2.1 Management and governance of PSINs

The modes of *formation* of PSINs lead to a (simplified) distinction between two opposite modes of *functioning* (Dhanaraj and Parkhe, 2006; Jarillo, 1988; Doz et al., 2000; Hurmelinna-Laukkanen and Sätti, 2018; Pyka and Schön, 2009; Sundbo, 2009; Ferraro and Iovanella, 2015):

- a vertical or institutional or top-down mode of functioning, in which, after the network is established, the initiating agent continues to hold a privileged “hierarchical” position: it is the conductor, the hub actor or the system integrator.
- a horizontal or bottom-up mode of functioning, which favours local interactions and in which responsibilities and leadership are more shared. The terms “distributed networks” or “distributed leadership” (as opposed to traditional entrepreneurial (heroic) leadership) are used to describe this second mode of functioning. However, horizontal networks are not homogeneous. Brown and Keast (2003) and Keast et al. (2007) propose to distinguish three different types of networks according to a growing degree of connectivity and reciprocal commitment regarding the exchange of information and knowledge: cooperative networks, coordinative networks and collaborative networks.

These two modes of functioning apply to networks established to develop innovations in public services as activities/sectors or in the public service as a function (PSINs). In vertically functioning PSINs, the conductor may be the public administration or a private agent. The public administration may be absent from those functioning horizontally (in this case, the PSIN, very often, replaces a failing public administration).

A review of the case studies in the literature reveals a number of real (and no longer theoretical) configurations of PSINs, characterized by different modes of formation and functioning (see Figure 6).

- Thus, **so-called planned networks** can be planned by a public agent or a private agent (citizen, NGO, etc.). When the initiator is a public agent, two different configurations are identified, which refer to different modes of functioning.

In the first configuration, the initiating public agent encourages and promotes the emergence of the network, without becoming concretely involved himself. Without directly participating in the network, he ensures what is known as governance of governance or metagovernance (Bekkers et al., 2014; Sørensen and Torfing, 2010), which strives to establish the favourable general conditions for the formation and functioning of the network. The public actor creates all the conditions conducive to the interaction between the different actors engaged in the network, by elaborating a “political, institutional and discursive framework for collaborative innovation” (Torfing, 2010, p. 12), in other words, a collaborative innovation-friendly ecosystem. He plays the role of “civic enabler” of the collaboration (Sirianni, 2009). This first configuration may encompass two different types of PSINs: distributed PSINs, which function according to a bottom-up, local logic, and verticalised PSINs in which a given private actor takes the lead over the others and plays the role of conductor.

In the second configuration, the initiating public agent surrounds himself with private actors and/or other public actors¹⁷ and gets involved in the network himself. The network functions vertically, with the initiating public agent continuing to play the role of conductor in the functioning of the network (i.e. the development of innovation). It should be noted that public organizations can involve other stakeholders (especially citizens) at different moments in the innovation process and for different tasks (see § 3.1.4.2). They can, for example, involve them in the co-design of the innovation or handle the design themselves, and mobilize the other actors (the citizens) only during the implementation phase in order to test the new service and suggest improvements. A functioning mode, in which the initiating public agent, himself operationally involved in the network, would let it function horizontally straightaway is theoretically conceivable. We did not include this configuration in Figure 6 because we did not identify any empirical cases. The fact that the public agent is an operationally involved initiator (“hands-on initiator”) tends to verticalize the network, at least at first¹⁸.

In the same way, when the initiator is a private agent (mainly citizens or NGOs), two configurations are also identified. In the first configuration, the initiating private agent invites other agents including

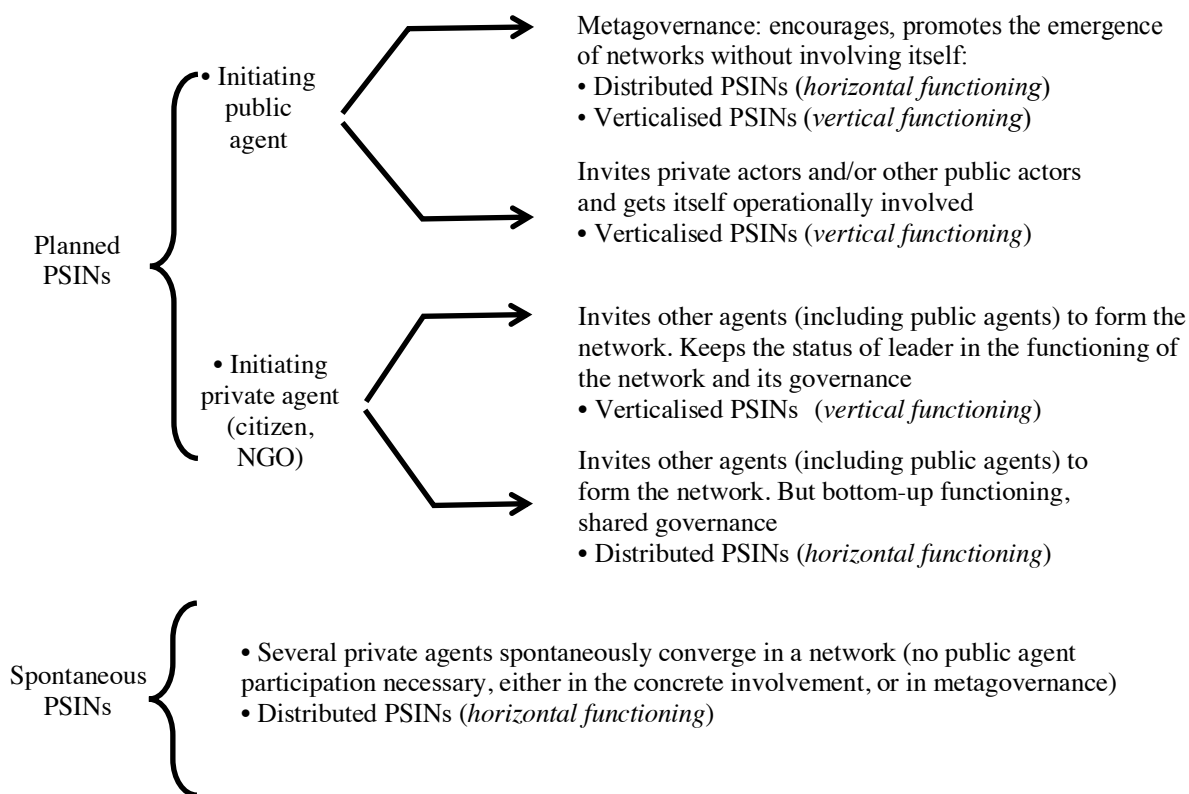
¹⁷ The collaboration of exclusively public actors can be considered as a PSIN when the different public actors belong to different public organizations.

¹⁸ Of course this situation can change over time.

public agents to join him to form a network. But he remains leader in the functioning and governance of the network (vertical functioning and governance). In the second configuration, he also invites other agents (including public agents), but the interaction and functioning are from the outset carried out according to a democratic mode of distributed governance (horizontal functioning).

- Regarding **spontaneous networks**, agents spontaneously converge to build them without necessarily including public agents, and this is not necessarily the consequence of public metagovernance. PSINs, in this case, are distributed PSINs (horizontal functioning). Private actors, in particular citizens, who are the collective promoters of such networks, ensure their distributed governance. These situations arise when private agents replace the public service organizations that are unable to deal with a given problem, for various reasons (lack of resources, lack of skills, politically sensitive subject, etc.). Using the distinction previously established between complementary and substitutive co-production, (§ 3.1.3.1), it may be said that these networks are substitutive rather than complementary PSINs.

Figure 9: Modes of formation and modes of functioning of PSINs



This mapping of PSINs gives rise to a number of remarks:

- Planned PSINs (whether initiated by a public or private agent) are not necessarily PSINs whose functioning is verticalised. They can function from the outset in a distributed way.
- It is necessary to distinguish *de facto* horizontality (the network is made up of entities or individuals, which claim from the outset their autonomy or which are from the outset autonomous) from *constructed* horizontality, when a dominant entity (often the public administration) strives to

establish horizontal relationships through employee empowerment and collaborations with stakeholders (because it considers such a configuration more effective in terms of collaboration or mission achievement).

- In PSINs which concern social innovation (PSINSIs), the functioning and leadership seem to be mostly horizontal.

- The functioning modes are not fixed. They can evolve over time (see § 3.2.3 about the life cycle of PSINs). For example, planned networks, initiated and governed by public administration, can evolve into self-organized networks. Conversely, spontaneous networks, formed without public administration, can and often do include it, at a given moment, whether as a standard member or as a conductor.

3.2.2.2 Obstacles to the functioning of innovation networks and the linkage of institutional logics

The NPG paradigm and the literature on innovation networks in general highlight the benefits of networking for innovation. But there are fewer works that identify the problems posed by networks. Bland et al. (2010) identify three barriers to networked innovation: 1) the diversity of inputs (information, knowledge, expertise) of the various actors in the network, which can be the source of a communication breakdown; 2) conflicting goals resulting from the diverse interests of the actors, 3) coordination problems can blur the division of responsibilities (“no one’s in charge”).

Djellal and Gallouj (2013), in their paper on PPINs, emphasize that the main challenge faced by this type of network is a meta-challenge, insofar as it encompasses most of the others. It is the opposition of so-called “cultures” which designate a complex set of institutional and organizational arrangements, contradictory conceptions of products, services, missions and performance (definition and assessment). Conflicting managerial and/or organizational “cultures” are a classic barrier to collaboration between public and private organizations.

In the same way, a PSIN links different “cultures” or “institutional logics” belonging to the public/State sector, private/market sector and non-profit/civil society (Vickers et al. 2017). Institutional logics can be defined as a set of beliefs, assumptions, values, norms, rules, goals and practices that structure the cognition and behaviour of individuals and organizations (Friedland and Alford 1991; Thornton and Ocasio 1999; Thornton et al., 2012; Besharov and Smith 2014). Although the term “hybrid organization” is generally used to describe organizations (hierarchies) linking different types of institutional logics such as social enterprises, hospitals, universities, micro-finance companies, etc. (see Vickers et al., 2017; Battilana and Lee, 2014; Billis, 2010), it can be applied without difficulty to PSINs and PSINSIs. The networks are based on the assumption that the diversity of the institutional logics at work is a source of innovation through cross-fertilization of different knowledge and skills. But this diversity can also be a source of conflicts and barriers to innovation. The question is therefore how to link these different institutional logics (norms, objectives, preferences, practices) in order to make them favourable to public service innovation. In other words, the question is to understand how the tensions are solved and the compatibilities and compromises are built. This question of the interaction of institutional logics is related to the question of performance assessment, which we will discuss in section 3.2.5.

Besharov and Smith (2014) have put forward a matrix of institutional logics in organizations that applies without problem to cross-sector collaborative partnerships (Voltan and De Fuentes, 2016) and consequently to PSINs, which are our focus here. This matrix (see table 5), which seeks to account for the heterogeneity of institutional logics within organizations and to identify the levels of conflict between institutional logics, combines two variables: the degree of logic compatibility and the degree of logic centrality. Compatibility reflects the coherence between institutional logics and the way in which they reinforce themselves within organizational actions. Centrality reflects the domination of one logic over others. It is defined as “the degree to which multiple logics are each treated as equally valid and relevant to organizational functioning” (Besharov and Smith, 2014, p. 367). Centrality is high when several institutional logics play an important role, and it is low when one logic dominates.

Table 5: Types of logic multiplicity within organizations

		Degree of compatibility	
		Low Logics provide contradictory prescriptions for action	High Logics provide compatible prescriptions for action
Degree of centrality	High Multiple logics are core to organizational functioning	Contested <i>Extensive conflict</i>	Aligned <i>Minimal conflict</i>
	Low One logic is core to organizational functioning; other logics are peripheral	Estranged <i>Moderate conflict</i>	Dominant <i>No conflict</i>

Source: Besharov and Smith (2014, p. 371).

The logic compatibility-centrality matrix makes it possible to highlight four ideal-types of organizations (for us, PSINs), namely “contested”, “estranged”, “aligned” and “dominant”, reflecting different levels of conflict (see table 5). The *contested* PSIN is characterized by a low degree of compatibility of institutional logics, a high degree of centrality and therefore a high level of conflict. The *estranged* PSIN, locus of a moderate conflict level, is characterized by a low degree of compatibility and a high degree of centrality. The *aligned* PSIN is characterized by a low level of conflict related to high levels of both compatibility and centrality. Finally, conflict is absent from the *dominant* PSIN, characterized by a high degree of compatibility and a low degree of centrality. This matrix should not give a fixed picture of the configurations and their level of conflict. Conflicting PSINs (contested and estranged PSINs) can be successful in terms of innovation, and non-conflicting PSINs (aligned or dominant PSINs) can be failures. It is therefore important to consider how these more or less conflicting interactions of institutional logics are managed.

3.2.3 The integration of the network in the time frame (its life cycle)

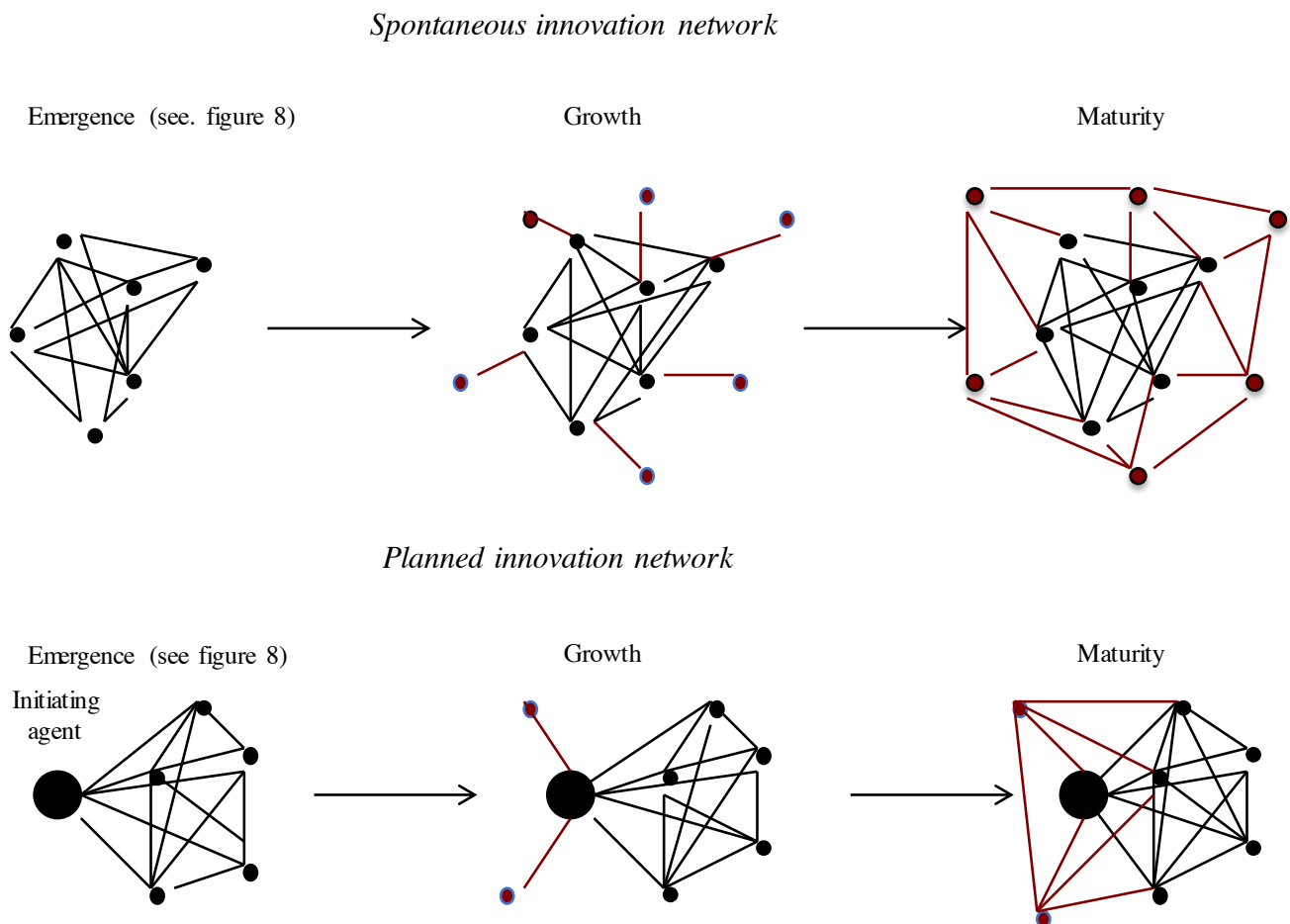
Innovation networks and in particular PSINs are not static. They evolve over time. They are born, reach maturity and can disappear. The number of actors, the nature of the interactions, the functioning, mode of management and governance, etc. change over time. Schön and Pyka (2012)

(see also Green et al., 2013) consider that the industry life cycle concept can be transposed to networks.

The *emergence stage* which corresponds to network formation can be achieved spontaneously by self-organization or be planned by a particular actor (initiator, enabler), as noted in section 3.2.1.

In the *growth stage*, the number and variety of actors involved in the network increases. This increase can be achieved by two different mechanisms (see Figure 10): i) in the planned network, it can be achieved by the invitation of new actors by the key actor, ii) in the spontaneous network, by a snowball mechanism in which the last entrant, himself invited by the previous entrant, invites new entrants, and so on. It is the first mechanism that seems the most likely in PSINs initiated by a public actor. But, of course, these two mechanisms are only ideal-types, which can mingle with one another (hybridize). For example, in the last case mentioned, there is no reason why other actors than the public actor could not invite other members. There is also no reason why an actor established for some time cannot invite someone else and no reason why new stakeholders cannot spontaneously join the networks (without the invitation of a member).

Figure 10: The life cycle of spontaneous and planned innovation networks



In the *maturity stage*, new entrants (irrespective of the inviting entity) have established relationships with each other. Interactions, flows of information and knowledge and learning processes are at their peak. The density of the network is high (see Figure 10). The network no longer functions according to a mode of exploration, but rather according to a mode of exploitation. It is no longer seeking radical innovation, but it confines itself to incremental improvements. It should be noted that at this stage, in certain cases of planned innovation networks, the initiating agent (in particular, if it is a public agent) may withdraw from the network or reduce its involvement. There is then a shift from a vertical PSIN to a distributed or horizontal PSIN.

In the *decline stage*, the network disappears, having accomplished its mission(s) or because the solution it proposes is no longer suitable or has been supplanted by competing, better solutions or even because what was initially an innovation network is transformed into a simple service delivery network.

3.2.4 The integration of the network in space (the geography of PSINs)

PSINs and especially PSINSIs are initially local innovation networks. They organize collaborations on a municipality, neighbourhood or other small scale. This geographical characteristic is of course closely linked to the nature of the innovation that is carried out by the network and the way it is produced (innovation that aims to solve concrete social problems in the immediate living environment of individuals, innovation that involves the people concerned by the problem in the collaboration). PSINs and PSINSIs seem to require proximity, even if the use of ICTs (Internet, social media) somewhat lessens this requirement.

However, there appear to be differences in spatial constraints depending on the type of PSIN considered. After all, spontaneous PSINs are more likely to be proximity networks than planned PSINs. As Green et al. (2013, p. 123) note “since the spontaneous network (S1) emerges due to some sort of external pressure and the resulting shared interest among a specified group of actors (for example, from the same industry or region) there is a high probability that many of the participating actors already know each other”. Planned PSINs, especially when they are planned by public agents, are less subject to geographical constraints. Depending on the nature of the problem to be solved, the public agent may invite agents located anywhere throughout the national territory or even from abroad.

Furthermore, some complex problems can neither be solved by a single actor nor on a single geographical scale (in this case a local scale). These are problems that, even if they manifest locally, arise in regional, national or international terms. This applies, for example, to migrant and refugee issues or environmental issues. Some PSINs may therefore be considered at higher spatial/geographical levels than the local level.

From the point of view of the spatial dynamics of networks, the behaviours of PSINs (as structural arrangements established to develop an innovation) should not be confused with those of *production/distribution networks* in charge of the more routine delivery of the innovative solution, once the PSIN has been developed. In the latter case, the network can spread geographically through replication/duplication by other actors, franchising, new legal forms, etc.

3.2.5 Assessing network performance

The last characteristic of networks that we address is, as it should be, their performance. PSINs are innovation networks, and therefore their performance is closely linked to the success of the innovation for which they were formed. However, as we shall see later, the success of a PSIN cannot be reduced to the success of the public service innovation (PSI) it carries out. A PSIN may create value and be, in a way, a success, even if the PSI is a failure. This paradox refers to how success and performance are defined and assessed.

Our proposal is to define the success of a PSIN (its performance) by its *ability to create value*. But though value is systematically designated as the ultimate goal of any socio-economic activity, it also poses thorny definition problems. This is why many studies devoted to value creation address value as a postulate. For our part, we view value as a multi-faceted category that can fit into different “worlds” (systems), which reflect different dimensions of performance, and which are not independent of each other, in that they have complementary or conflictual relationships.

3.2.5.1 The worlds of value

To address the notion of value, we propose to rely, freely speaking (that is to say, by using it as a simple heuristic tool), on a conventionalist approach of socio-economic activities, which distinguishes different forms of legitimacy, different registers of justification or categories (or worlds) of “worth” (Boltanski and Thévenot, 1991). We distinguish the following different worlds (systems of definition, legitimization and measurement) of value: 1) the market and financial world, 2) the industrial and technical world, 3) the relational or domestic world, 4) the social-civic world, 5) the opinion/reputation world, 6) the creation/inspiration/innovation world. The last five worlds mentioned can be said to reflect the different dimensions of value-in-use and value-in-context (Figure 11).

In the industrial and technical world, the main criteria for defining and evaluating outputs (products or services) are volumes, traffic and technical operations. The industrial and technical value is measured by the quality, reliability and functionality of the new product or service.

In the market and financial world, the output is envisaged in terms of monetary and financial value and operations. Market value does not directly apply to social innovation and innovation in public services. PSI (including social innovations) cannot be evaluated by the usual market mechanisms (economic success, profit made by the innovator). Nevertheless, in this type of innovation, the market value is not absent. It is present indirectly, if not in terms of prices (which are irrelevant), at least in terms of costs. It is also present indirectly in the very objective of some social innovations and the corresponding PSINs: for example, social innovations and PSINs aiming to re-introduce long-term job seekers into the labour market, in other words, to provide them with income, PSINs focused on social innovations aimed at saving energy or preserving the environment or health, and so on.

The social-civic world and social-civic value assess results in terms of fairness, justice, inclusion, social solidarity especially with respect to disadvantaged people and environmental protection. Social-civic

value is essential for social innovation, and even more so if it occurs in public services. It should be noted that social-civic value is not synonymous with public value. Indeed, in our analysis, public value is an all-encompassing category, which includes all the other dimensions of value discussed here.

The relational or domestic world values interpersonal relationships, empathy and trust relationships reinforced over time, and places a strong focus on the quality of relationships when assessing output. The relational or domestic value reflects the (geographical and human) proximity to the user/citizen.

The world of reputation and reputational value are based on the brand image of an organization, community or territory. When, through social innovation, a given organizational form (a company, or a PSIN or a PSINSI) contributes to the health and well-being of its employees or citizens, to the future of the planet, etc., it (co-)creates reputational value.

The world of innovation values creativity, inspiration, experimentation and knowledge. Feller (1981) considers innovation in the public sector as “conspicuous production”. The idea is that, in a field where it is difficult to measure performance, innovation values the public agent and makes his/her public service activity visible. However, a PSIN can generate so-called creative/innovative value, even if the innovation that it is supposed to develop is a failure from the point of view of other dimensions of value (in particular industrial and technical value and market and financial value). After all, the formation and existence of the network give a positive and rewarding image (an innovative, creative image) of the community or the organization that implements it. These communities or organizations are viewed as dynamic, resilient, enterprising and creative. Even if it is not based on the same drivers, creative/innovative value appears here, in its ultimate result, to be closely related to reputational value.

This discussion of value raises a number of interesting questions.

- The first is the distinction between *value* and *value added*. After all, there is a temptation to apply the concept of value added to all the concepts of value mentioned above (civic value added, domestic value added, etc.). But in reality, this concept has a strong industrial connotation (the value added is the difference between production and intermediate consumption), which reduces its transposition to the other dimensions of value to a metaphorical dimension.
- The literature on value (especially in the context of the so-called Service Dominant Logic, as we have already noted) is concerned with how value is created and especially co-created. The question that should be asked is whether the different conceptions of value have identical relations with the process of co-creation. For example, it can be asked whether, because they reflect a certain intensity of real links (fidelity) or virtual/emotional links (empathy) between the citizen and the public agent, relational and domestic value and social-civic value are not more likely to be co-created than industrial value.

3.2.5.2 From the various worlds of value to the various concepts of performance

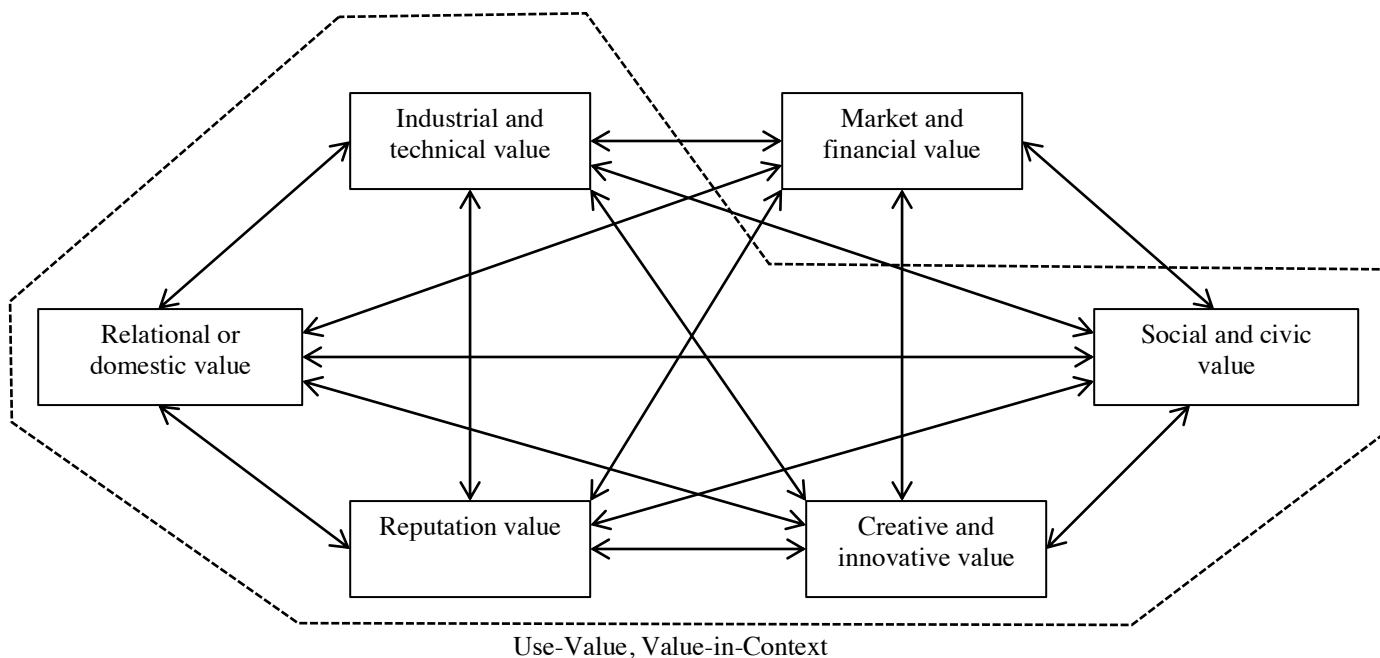
Different concepts of performance are associated with these different worlds/concepts of value: industrial and technical performance, market and financial performance, domestic or relational performance, social-civic performance, reputational performance and innovation performance. The

industrial and technical performance of the PSIN can be measured, for example, in terms of efficiency and productivity associated with innovation, in terms of volume and sustainability of the jobs created or in terms of economic development (especially at the local level). Civic, relational, reputational and innovation performances can also be somehow quantified (Djellal and Gallouj, 2013), perhaps by measuring the time spent in a given relationship within a given value world, or by measuring some elementary activities undertaken within the relationship or associated with it. For example, indicators of relational performance include better user satisfaction and less user turn-over; the amount of time devoted to vulnerable users is an indicator of social-civic performance; the number of innovative solutions introduced or diffused and scaled up is an indicator of innovation performance, and so on.

3.2.5.3 Interactions between different worlds of value/performance

These different concepts of value and corresponding performance are not, of course, independent of each other (see Figure 11). They can complement and reinforce or compete and conflict with each other (in the latter case, the creation of one form of value leads to the destruction of another form).

Figure 11: The different dimensions of public value and their interactions



For example, the (co)creation of industrial and technical value (and performance) positively affects market and financial value (and performance). Similarly, an improvement in relational performance (reflected, for example, by an increase in user loyalty) can have a positive influence on market performance. As we have already pointed out, an improvement in creative/innovative performance positively affects reputation performance.

These different types of performance may also be negatively related, as they may conflict with each other. For example, good civic performance (a significant amount of time given to users in difficulty) may worsen productivity (technical performance). Likewise, an improvement in civic performance worsens market performance. In general, social and civic value and performance are most often at odds with market and financial value and performance and industrial and technical value and performance.

These interactions between the different concepts of value and performance are closely related to the interactions between the different institutional logics that we discussed above (§ 3.2.2.2).

Conclusion

Recognition of the importance of collaborative innovation occupies a key place in Innovation Studies. Thus, in the list of the twenty main advances in this field, over the last fifty years, established by Ben Martin (2015), four explicitly concern the collaborative and network nature of research and innovation. Martin states these advances in the following terms: 1) From the linear model to an interactive “chain-link” model; 2) From individual actors to systems of innovation; 3) From closed to open innovation; 4) From “Mode 1” to “Mode 2”.

The advances discussed by Martin mainly concern collaborations and networks whose key actors are manufacturing firms and whose main purpose is technological innovation, based on scientific and technical research. For the most part, market services are absent from this type of collaboration, and public services are only present through research laboratories and universities and certain regulatory (metagovernance) activities targeting innovation and networks. In this traditional collaborative arrangement, non-technological innovation (new services, new organizations, new methods, etc.) is not considered as being the possible target of a network activity.

However, collaboration and networks are also at work in the field of *services in general*, and they may focus on non-technological innovations, as was extensively analysed, from a theoretical and empirical view point, in the ServPPIN European project (Gallouj et al., 2013). Our review of the literature made it possible to confirm the existence and the rise of these tertiarized forms of innovation networks, but also to distinguish between networks based on market services (MSINs) and networks based on public service(s) (PSINs).

Collaborative innovation and innovation networks are also increasingly at work in the field of *public services* themselves (or of *public service* as a function of general interest beyond public sectors strictly speaking), as the paradigm of “new public management” gives way to the paradigm of “new public governance”, and as the perspective of assimilation (to industrial goods, then to market services), gives way to a perspective of integration (through the Public Service-Dominant Logic — PSDL) and demarcation (through the Public Service Logic — PSL). The rise of this type of network (in the field of public services or public service) can be explained by economic and social reasons: the limited resources of public administrations to carry out (or carry out on their own) certain existing public service activities (or new/potential and necessary ones), and the complex and multifaceted nature of “wicked” social problems which, by their nature, cannot be solved (or not satisfactorily) by the activity of a single actor.

We have called PSIN (Public Service Innovation Network) this new form of expression of innovation networks, which takes seriously innovation in public services or in public service, the participation of citizens and third sector organizations and the intangible forms of innovation (invisible innovation). However, PSINs shouldn't be seen only as innovation organizational modes. They may simultaneously be considered as forms of innovation (the so-called network innovation), instruments for public policy (especially at local level) and palliative solutions for deprived and weakened public services.

We have attempted in this work to understand what distinguishes PSINs from other innovation networks and especially traditional innovation networks (TINs), public-private innovation networks in

services (PPINs) and Market Service Innovation Networks (MSINs). In order to achieve this objective, we first used a simplified framework associating following variables: the types of agents involved in the network, the role played by public administration, the nature of the targeted innovation and the main sector concerned by the innovation in question. To summarize the results, the shift from TINs to PPINs and MSINs and then to PSINs and PSINs can be said to reflect the rise of services and non-market activities (the tertiarization of the concept of innovation network) and therefore of invisible innovation (including social innovation), and non-planned and emergent innovation.

We then, tried to define and characterize PSINs, more precisely, by examining, first of all, a number of structural variables: the public sub-sectors or activities where PSINs are established, the nature of the actors involved and their interactions, and the forms and modalities of the innovation carried out by the network. We then shifted the analysis towards dynamic variables, describing the modes of emergence and functioning of the networks, and their integration in time and in space. The ultimate goal of PSINs being the co-creation of value, we finally introduced a typology of the worlds of value, which makes it possible to consider a plurality of (competing or complementary) performance principles at work in PSINs.

PSINs constitute an important socio-economic issue now acknowledged by the public authorities at the national and European level. Although PSINs are increasingly taken seriously in contemporary economies, efforts are nevertheless needed to theoretically reinforce this concept.

On the theoretical level, efforts are needed to theoretically reinforce our knowledge of the modes of formation and functioning of these networks. After all, the literature is dominated by case studies and by a concept of PSINs (in particular when they focus on social innovations) as temporary curative arrangements (aimed at overcoming the temporary failure of public services). One way to reinforce the theoretical basis of PSINs might be, not only to analyse them autonomously, but to explicitly include them in the mapping and discussion of innovation systems, whether local, regional, national, social or sectoral.

On the methodological level, a reverse shift from theoretical to empirical focus is required. After all, beyond the theoretical considerations on the plurality of forms of performance that we have outlined in this work, it is necessary to define and build concrete tools for properly measuring PSINs results and performance.

Finally, on the political level, it is necessary to envisage public policies (in particular vertical or specific ones) that would help support the formation, functioning and performance of these networks, by taking into account the diversity of forms of PSINs that we have highlighted in this research.

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