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Public service innovation networks (PSINs): an instrument for collaborative innovation and value co-creation in public service(s)¹

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Abstract:

This article is devoted to a new network form that is developing within the New Public Governance paradigm, namely “Public Service Innovation Networks” (PSINs). PSINs are multi-agent collaborative arrangements that develop within public services (sectoral perspective) or within public service (functional perspective), spontaneously or at the instigation of local, national or European public policies. They mobilize a variable number of public and private agents, especially citizens, to co-produce innovations and ultimately contribute to value co-creation. This article aims to deepen the definition and description of PSINs, especially in comparison with other known network forms, and to examine in particular how PSINs are formed and function to co-create, more or less efficiently, value in public service(s) through innovation.

Keywords: public service, network, innovation, value, co-creation, co-production, collaboration

Introduction

Paradigm shifts in the field of public administration, over the past decades, have brought the issue of innovation to the forefront. Initially considered as incongruous in the field of public services, this issue has become central and has been the object of a growing number of studies, particularly at the instigation of the European Commission. As paradigms have shifted, innovation in public services has become a new focus of “Innovation Studies” and “Service Innovation Studies” (SIS), with particular attention paid to both the nature of the innovation and the modalities of its implementation. Thus, in the paradigm of *traditional public administration*, innovation is seen in terms of the industrial rationalization of production processes and the introduction of technical systems aimed at providing citizens with homogeneous quasi-products. This innovation activity is embedded in a top-down, linear organization of innovation, from which the user is, for the most part, excluded. In the *new public management paradigm*, innovation remains linear (non-interactive), and the logic at work is still that of the assimilation of services to goods (industrialization). New public management simply introduces market management techniques into public services. The paradigm of *new public governance* currently favoured in all developed economies fundamentally changes the perspective of innovation, in that it rejects the assimilation of public services to goods but instead considers them as services (demarcation perspective). Thus, by loosening the traditional industrialist, technologist and market biases (which

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characterize the two previous paradigms), this new paradigm transfers into public services management the advances achieved in service economics and management. From the point of view of innovation, the new public governance paradigm fundamentally changes the focus regarding the nature of innovation and its modes of organization. Indeed, in accordance with Service Innovation Studies (SIS), first of all, innovation in public services is defined in a broad and open way in order to encompass both technological and non-technological dimensions (new service, new process, new organization). Secondly, according to the logic of services, the production of public service like innovation in public services are envisaged above all as collaborative activities, which require interactions between multiple agents and first and foremost the citizen. Thus, innovation networks are core components of new public governance, to such an extent that this new paradigm is also sometimes referred to as “networked governance”.

This article is devoted to these collaborative innovation activities, which we denote by the term “Public Service Innovation Networks” (PSINs). PSINs 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 the co-creation of value. Our goal in this article is to deepen the definition and description of PSINs, especially in comparison with other known network forms, including Traditional Innovation Networks (TINs) and Public Private Innovation Networks in Services (PPINSs) (see Gallouj et al., 2013). Our goal is also to examine in particular how PSINs are formed and function in order to co-create, more or less effectively, value in public service(s) through innovation. The article is organized into two 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).

1. PSINs through morphological/structural variables

A PSIN can be described using the following three variables: 1) the actors involved; 2) the interactions between these actors; 3) (the characteristics of) the innovation carried out by the network. The first two variables are topographical, while the third is 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.

1.1 The 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.

• The nature of the actors

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 PSINSIs (that is, PSINs dedicated to social innovation) can be organizations or individuals. Thus, unlike TINs, PSINs and PSINSIs 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., 2013; 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 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. Examples include 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, type 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 al. 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.

- *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. PPINSs 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.

- *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.

1.2 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.

- *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 means²). 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.

- *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 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.

- *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 network³ 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

² We will return to this question in section 2.5.

³ 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.

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.

• *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).

1.3 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.

• *The nature (type) of innovation*

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.

• *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. In the rapid application model, planning does not precede production, as in the traditional linear model (Toivonen, 2010). Once the idea has appeared, it is immediately developed as part of the service delivery. Thus, the service delivery process and the innovation process are mingled (Toivonen et al., 2007). The bricolage innovation model describes change and innovation as the consequence of unplanned on-the-job activities involving trial-and-error and adjustment to random events (Sanger and Levin, 1992; Fuglsang, 2010; Styhre, 2009). Fuglsang and Sorensen (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) can be defined as the interactive process of constructing a (novel) solution to a given 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.

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; Nambisan, 2008; 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.

- *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.

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.

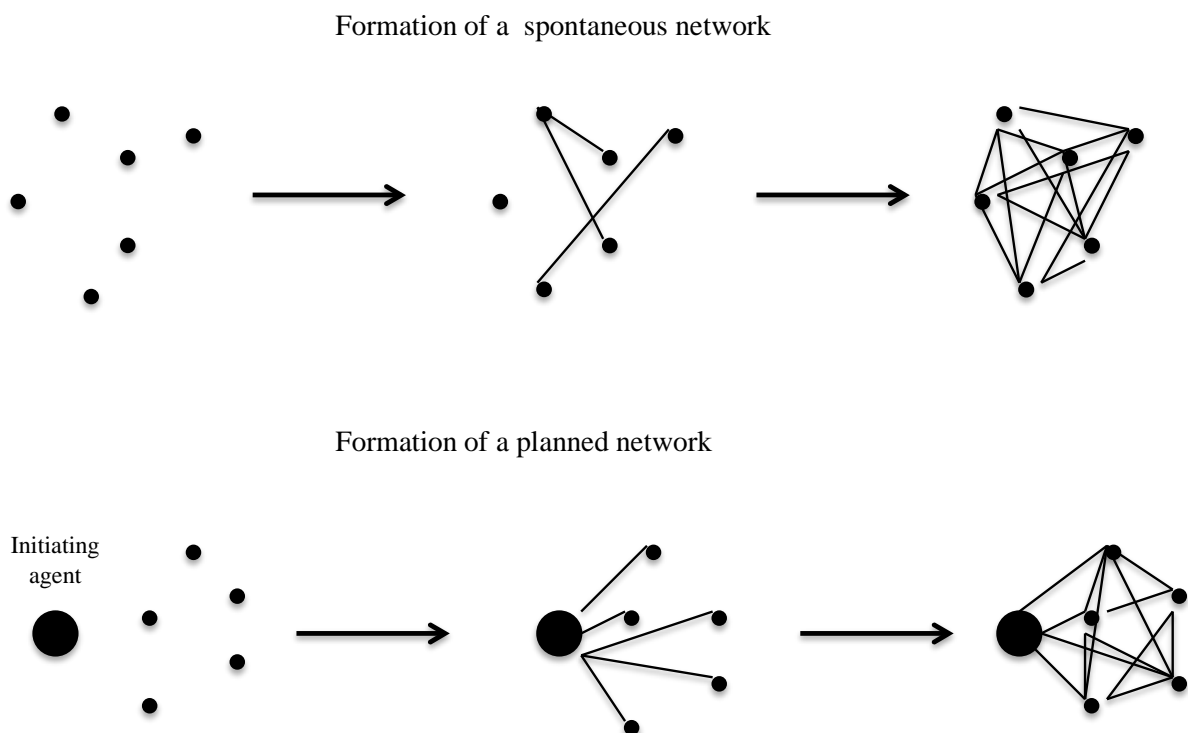
2.1 The mode of formation of the network

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

Planned networks 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.

Spontaneous networks 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 (see Figure 1). *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).

Figure 1: Formation of a spontaneous network and a planned network



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 networks, 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.

2.2 The functioning mode of the network

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

- *Management and governance of PSINs*

The modes of *formation* of the networks lead to consider (in a simplifying way) two different modes of *functioning* (Pyka and Schön, 2009; Sundbo, 2009): a vertical or institutional or top-down mode and a horizontal or bottom-up mode. In the former mode, after the network is formed, the enabling agent continues to hold a central position as the conductor or system integrator. In the latter mode, which is also called “distributed network”, local interactions are favoured and responsibilities and leadership are more shared (“distributed leadership”).

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 2).

- 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, 2006; 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 actors⁴ 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 § 1.3). 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 2 because we did not identify any empirical cases. The fact that the public agent is an operationally involved initiator (“hands-on initiator”) tends to verticalise the network, at least at first⁵.

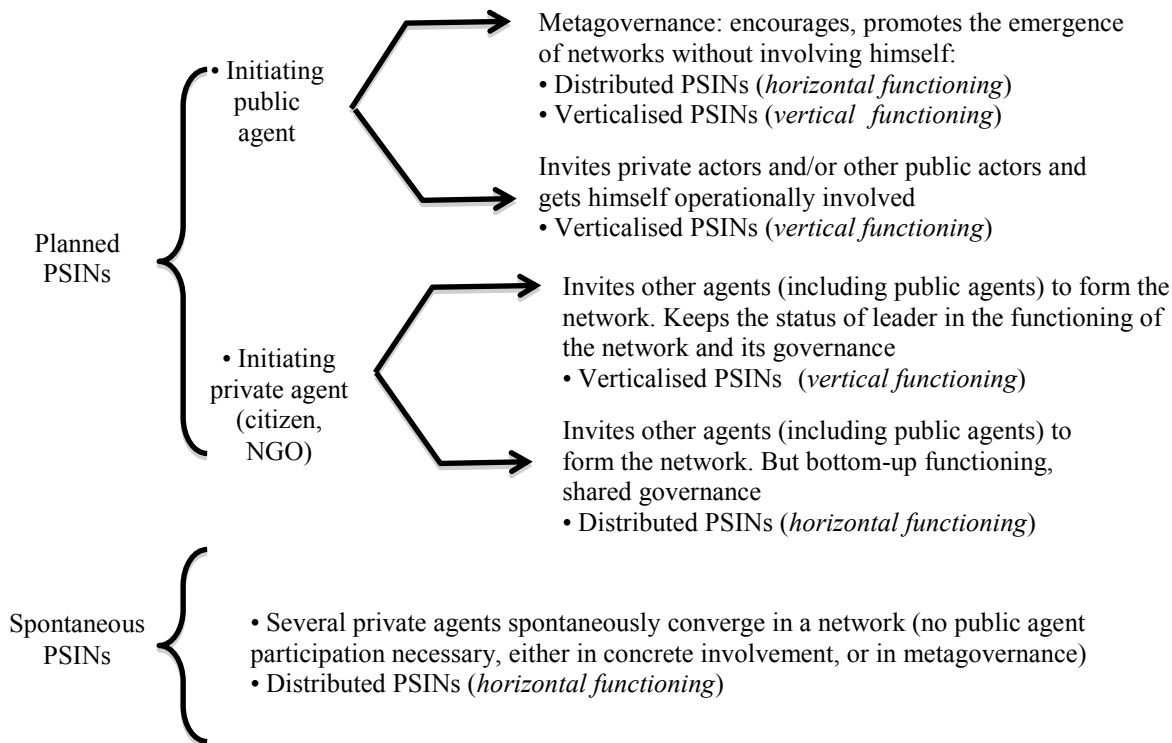
In the same way, when the initiator is a private agent (mainly citizens or NGOs), two configurations are also identified. In the first configuration, the initiating private agent invites other agents including public agents to join him to form a network. But he remains leader in the functioning and governance 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, (§ 1.3), it may be said that these networks are substitutive rather than complementary PSINs.

⁴ The collaboration of exclusively public actors can be considered as a PSIN when the different public actors belong to different public organizations.

⁵ Of course this situation can change over time.

Figure 2: 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 § 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.

• *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 in charge”).

Djellal and Gallouj (2013), in their paper on PPINSs, 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., 2013; 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 PSINSs. 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 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, 2017) and consequently to PSINs, which are our focus here. This matrix, 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.

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. 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.

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 2.1.

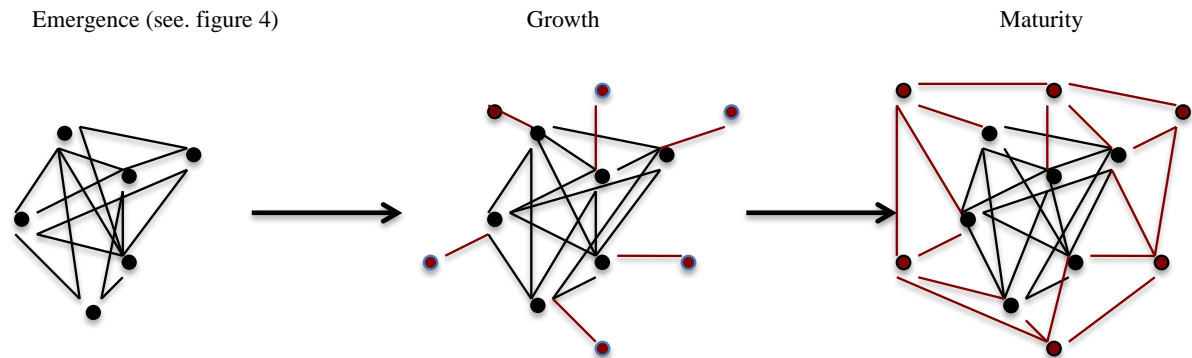
In the *growth stage*, the number and variety of actors involved in the network increases. This increase can be achieved by two different mechanisms (see Figure 3): i) in the planned network, it can be achieved by the invitation of new actors by the key actor, ii) in the spontaneous network, by a snowball 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).

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 3). 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.

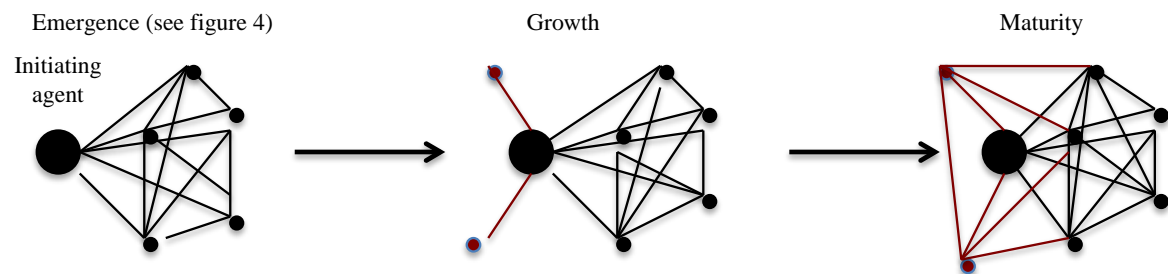
In the *decline stage*, the network disappears, having accomplished its mission(s) or because the solution it proposes is no longer suitable or has been supplanted by competing, better solutions or even because what was initially an innovation network is transformed into a simple service delivery network.

Figure 3: The life cycle of spontaneous and planned innovation networks

Spontaneous innovation network



Planned innovation network



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.

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.

• *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 4).

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.

- *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.

• *Interactions between different worlds of value/performance*

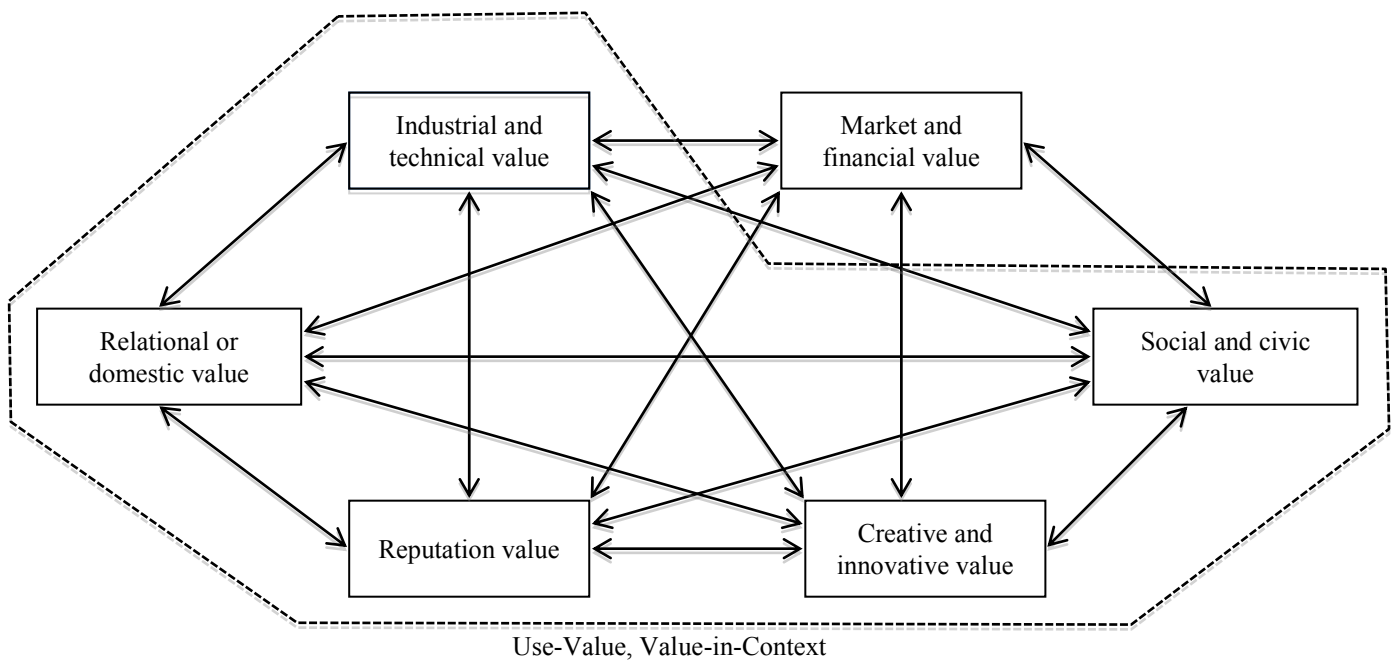
These different concepts of value and corresponding performance are not, of course, independent of each other (see Figure 4). They can complement and reinforce or compete and conflict with each other (in the latter case, the creation of one form of value leads to the destruction of another form).

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 (§ 2.2).

Figure 4: The different dimensions of public value and their interactions



Conclusion

This structural arrangement that we call “Public service innovation network” (PSIN) is a 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). After all, PSINs mobilize a diversity of public and private agents, especially citizens, collaborating to co-create value by co-producing innovations in the field of public services (sector) or public service (function), whatever the nature of the innovation. PSINs may simultaneously be considered as forms of innovation, innovation organizational modes, instruments for public policy (especially at local level) and palliative solutions for deprived and weakened public services. They occupy an important place within the New Public Governance paradigm.

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

Although PSINs are increasingly taken seriously in contemporary economies, efforts are nevertheless needed to theoretically reinforce this concept. 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).

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