Public sector innovation through collaboration. Explaining antecedents for collaborative innovation

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Introduction

Innovation in the public sector is a topic that has gained increasingly more attention throughout the years. Various reasons have caused a growing demand for innovation in the public sector such as rising expectations about the quality, availability, and effectiveness of public services, and the growing demands for governments to be responsive (Sørensen and Torfing,2012). Additionally, a growing number of public policy tasks involve wicked problems that cannot be solved with more money or standard solutions. Hence, innovation is needed (Koppenjan and Klijn,2010; Sørensen and Torfing,2012).

Public sector innovation literature increasingly asserts that innovative capacity is determined by organizations' ability to engage and set-up collaborative interaction through transversal coordination with other types of government and coproduction with societal actors, like citizens, firms and organized interests (Bommert, 2010; Eggers and Singh, 2009). Collaboration is deemed important to make the innovation a success (Sørensen et al, 2012). Proposals for collaborative innovation are based on the assumption that the access of a wide range of actors, all with the capability to actively participate in the innovation process, will increase the quantity and quality of innovations, especially in dealing with wicked problems (Bommert, 2010). External ideas are internalized and internal knowledge is leveraged.

Although its importance is acknowledged, little is known about how collaborative governance arrangements result in meaningful innovations in services and policies. It is also unclear which organizational and individual conditions foster collaborative innovation and how to design and sustain innovation-enhancing arrangements (the so-called metagovernance).

Research on drivers of innovation usually focuses on one of these levels: network, individual, or organizational. This indicates that drivers for collaboration are present on all these three levels, but still little research is present about the interactions between these levels of conditions and how they work together. Additionally, current insights on conditions for innovation are often based on analysis of public sector innovation without external collaboration (e.g., Verschuere et al., 2014) or on theories on collaboration without a specific link to innovation (e.g., Koppenjan and Klijn, 2010). The consequence is that current research might be empirically tested, but does not fully grasp collaborative innovation. Research that does specifically focus on collaborative innovation is still to a large extent conceptual (e.g., Sørensen,2014). Also, research on collaborative innovation is often based on single case studies which makes determining general causal effects difficult (e.g., Meijer, 2014). Understanding the drivers for collaborative innovation requires a holistic model of the different levels that can be applied in practice in a multiple case study. The aim of this paper is to give an overview of the drivers for collaborative innovation in the current literature and consequently develop a new research model to study collaborative innovation, taking all three levels and its relevant drivers into account. It can serve as a contribution for future research on collaborative innovation, because it presents an overview of the three levels and which drivers should be taken into account when studying collaborative innovation in a holistic way. The possible drivers on

each level will be discussed by theoretically filling in the following model with drivers that are likely to play a role in collaborative innovation.
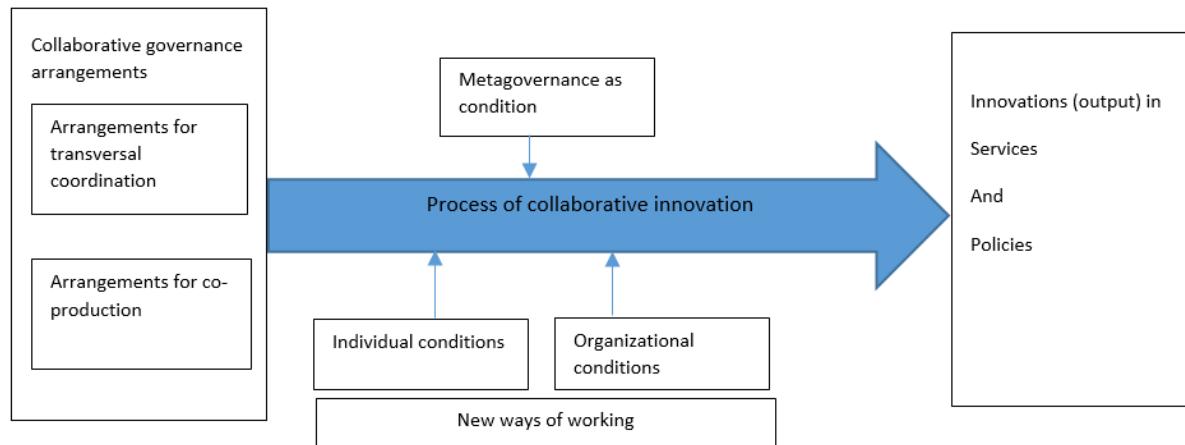
The paper starts with a short conceptualization of innovation, collaboration and the process of collaborative innovation. The section on network conditions concerns the role metagovernance can fulfil in enhancing innovation. Next, the section on individual conditions first deals with the concept of learning, supplemented by literature on traits, relationships and positions as individual conditions of learning. Then, the next section on organizational conditions first gives a general overview of the findings in previous studies. Next, it focuses on four variables being red tape, developmental culture, leadership, and performance contracts. The paper concludes with a discussion on a methodological way to study collaborative innovation with this model and how this model can be a potential contribution to the field.

Innovation

Although there has been a growing demand for innovation, there is no real consensus about the definition. This section provides a short discussion. Although it may seem obvious to define innovation when studying that subject, this is certainly not always the case. De Vries et al. (2015) have reviewed 181 articles about innovation in the public sector and found that a vast majority of 137 articles (76%) do not provide a definition of innovation. Those articles that did provide a definition often used a quite general definition. However, two main recurring elements were distinguished: first, definitions focus on a perceived novelty and, second, definitions include the first adoption of an idea by a given organization. The definition by Sørensen and Torfing (2012) combines these elements. They define innovation as "an intentional and proactive process that involves the generation, practical adoption and spread of new and creative ideas, which aim to produce a qualitative change in a specific context."

Looking at the definitions of innovation, innovation is not necessarily considered an improvement in all cases (Sørensen and Torfing 2012; Larsen,2014; Meijer,2014). Innovation is a process that rather *aims* to solve a problem. Even if the innovation in practice is not an improvement, it still remains an innovation. This, for example, can occur when an innovation leads to a temporary performance decrease, e.g., operational processes or bugs being ironed out as staff gets used to new way of working. However, if a service improves, it is not always because of an innovation (Hartley, 2005). Improvements without

innovation are, for example, organizations that focus on small incremental changes through continuous improvement methodologies. Next to that, some situations occur when there is neither innovation, nor improvement. Stable environments where no innovation is needed are an example.

Collaboration

We can distinguish two kinds of public sector collaborative innovation: collaborative innovation with internal stakeholders, and collaboration with external stakeholders. When the government collaborates with internal stakeholders this is called transversal coordination. In those cases, the government works together with other departments and agencies within the government level and/or as across governments levels. When government collaborates with external stakeholders, it works together with (groups of) citizens, interest groups, non-profit organizations and/or businesses. When citizens contribute to the workings of a public organization this is a specific type of collaboration called co-production. Brandsen and Honingh (2016) set up three criteria for genuine co-production. Firstly, the collaboration must include a relationship between (groups of) citizens and professional employees of a public organization. Secondly, the citizens in the collaboration should be volunteers. Thirdly, the input of the citizens has to be active (versus passive) and direct to the work of organization. Although Brandsen and Honingh focus on citizens who co-produce by engaging in co-design (of products/services) and co-implementation (of policies), there are multiple other forms of co-production that can be discerned. Bovaird and Löffler (2012), for example, additionally mention co-assessment, co-prioritization, co-planning, co-managing, co-commissioning and co-delivering services. Other authors add co-pricing, co-maintenance, co-promotion and co-distributing services (Frow et al., 2015).

Various authors link co-production to innovation. According to Bommert (2010), the close involvement of citizens in co-production generates solutions responsive to local needs. Research by Frow et al. (2015) points out that co-production can speed up the development of new services or products and that the increase of developing capabilities propels innovation. They also point out that citizens can be a great help for organizations in identifying, organizing and communicating innovative opportunities. Lastly citizens can give organizations access to different resources, such as their networks. Voorberg et al. (2013) mention similar findings and add that co-production can also benefit innovation by increased effectiveness and products/services that enjoy greater customer satisfaction. However, the research on the effects of co-production is underdeveloped. Co-production literature adopts a rather normative point of view when discussing the potential benefit of co-production and there is little empirical work testing those assumptions (Voorberg et al., 2013).

Process of collaborative innovation

Bommert (2010) argues that a relation exists regarding the integration of various actors between the theories concerning networked governance and collaborative innovation. The principal idea of the collaborative innovation process in combination with networked governance is to open the innovation process for a large group of actors, to internalize external ideas and leverage internal knowledge. There are different degrees of working together ranging from cooperative, coordinative to collaborative integration. (Moore, 2008; Keast et.al, 2009; Moore and Skinner, 2011). This is an ascending scale to classify working together based on elements such as amount of commitment and formalization. Collaborative innovation shares the same assumption as the open innovation approach of the private sector that assets of large groups of actors will increase the quantity and quality of innovations (Bommert,2010).

Based on the literature, we see that one of the success factors of innovation in the public sector is 'opening the process' (Bommert,2010; Meijer 2014). This implies letting other actors participate in the innovation process in order to increase the quality and the quantity of the innovations, and internalizing external ideas and leverage the knowledge. In other words, a success factor of innovations in the public sector is if they are made in collaboration with other actors.

Innovation through collaboration means that a network is present in which the different actors operate, and the outcome of the network is an innovation. A network can be defined in a very simple way as "a set of nodes and the set of ties representing some relationship, or lack of relationship, between the nodes." (Brass et al.,2004). Network literature, however, often refers to a more detailed definition of certain common themes that networks possess, including social interaction (of individuals acting on behalf of their organizations), relationships, connectedness, collaboration, collective action, trust, and cooperation (Provan et al.,2007). Provan et al. (2007:482) define 'whole networks' as: *"a group of three or more organizations connected in ways that facilitate achievement of a common goal."* However, the node is not necessarily always an organization; think for example of a collaborative innovation where local citizens that do not represent an organization are involved. Therefore, it is better to speak about actors in the network.

In the literature, there is often reference made to certain concepts to analyze the networks (Provan et al.,2007; Ingold,2011; Sørensen,2014). Density, for instance, relates to the overall connectedness of actors in the network. Fragmentation and Structural holes are used to see whether all actors are connected with each other's. Governance is the mechanism in which way the network is governed/managed while centralization is the extent to which some actors are considerably more centrally connected than the others.

These characteristics of the network are closely related to certain individual characteristics for innovation. For instance, individual centrality within a network determine the overall network centralization.

Innovation is not something that occurs by mere cooperation in a network, although the structure of the network can certainly play a role in successful outcomes of networks (Provan and Milward,1995; Provan and Sebastian,1998; Koppenjan and Klijn,2010). There is a need of generative mechanisms for innovation.

Generative mechanisms for innovation

Innovation does not happen by just placing some actors in a network. The innovation is driven by generative mechanisms that induce innovation (Skelcher and Torfing, 2010; Sørensen and Torfing, 2012; Stevens and Verhoest,2016a). Studying collaborative innovation does therefore not only mean looking at the relationship between collaboration and innovation, but also to the intermediate processes that facilitate innovation (Skelcher and Torfing, 2010; Sørensen and Torfing, 2012) The study of the processes of collaborative innovation should focus initially on the synergy of empowered actors with different identities, roles, and resources. This is a mechanism where the innovation assets are mobilized at the start of the process. Koppenjan and Klijn (2010) identify different types of resources that an actor is able to add to a network: financial resources, production resources, competencies, knowledge and legitimacy. Competencies and knowledge can be considered conditions at the individual level whereas financial resources can be linked to performance contracts and legitimacy to leadership both at the organizational level. Each organization has certain resources and bringing them together is the starting point of the innovative process. Bringing actors together only, however, does not lead to innovation. As developed in the section on individual conditions, transformative learning need to occur. Critical reflection is "a decisive condition for the development of transformative learning processes that stimulate creative recombinations

of old and new ideas and practices." (Sørensen and Torfing, 2012). Nonetheless, a mere understanding through learning does not create a product. Therefore, commitment and joint ownership is necessary to turn ideas into innovations. Consisting of the active participation in the innovation process, the ability to influence the process and the responsiveness of the other actors, it should overcome resistance towards the implementation (Skelcher & Torfing, 2010).

Now that the main concepts are of this paper are defined, we further explore the conditions that may hinder or foster collaborative innovation, or the innovations that emerge from collaborative processes. Following a multi-level approach, we discuss those conditions at the network, individual, and the organizational level.

Conditions at the network level

The first level that will be discussed in this paper is the network level of innovation. In a perfect world, the three generative mechanisms of innovation would occur by themselves. However, there is no such thing as a perfect world. There are always things that can happen in the network that prevent these mechanisms, like power asymmetries in the network (Sørensen, et. al, 2012). They may prevent certain groups of actors from voicing their opinion and bringing new ideas to the table. Actor importance is thus important in the network, because actors which are seen as very important might silence other actors, which prevents the creation of synergy.

Another important factor that makes collaboration successful is the different insights that are established, and thus creating synergy (Sørensen et. al, 2012). Repeated collaboration in stable and closed networks that have established more or less the same worldview will stifle creativity and reduce innovation because of a lack of synergy and learning. In terms of network structure, a network should be sufficiently dense in order to guarantee access to all actors and the information they possess (Gilsing et al. 2005). Redundant relations are not a big problem since the costs of these outweigh the advantages of the information sharing. However, too dense and stable network decrease the ability for variation in actors and knowledge, thereby not crating synergy and learning.   Having weak ties with the other actors provides other resources and allow actors to break out of the 'groupthink' that closed networks have (Lewis and Ricard, 2014). However, strong ties may foster individual learning processes, essential for collaborative innovation (Bekkers & al., 2013) . This will be discussed in the conditions at the individual level section. It shows that we need to study collaborative innovation at the different levels to fully grasp the impact of this variable.

Metagovernance

There are different ways to manage the network and to get successful outcomes (Koppenjan and Klijn,2010; Stevens and Verhoest, 2016b). This management is often referred to as 'metagovernance'. Metagovernance can be defined as: "A way of enhancing coordinated governance in a fragmented political system based on a high degree of autonomy for a plurality of self-governing networks and institutions." (Sørensen,2006:100). Examples of types of networks include shared governance (multiple actors manage the network), lead governance (one actor manages the network) and network administrative governance (one actor manages the network and is specially created for that task) (Provan et al.,2007). Larsen (2014) argues that the lead actor in these networks should be embedded in the public sector when dealing with a network that aims to come to public sector innovation. No empirical research specifically focused on the metagovernance that stimulate the creation of the occurrence of the three generative mechanisms for innovation has been done yet. However, there are certain strategies described in the literature that can be applied in order to take away some of the unwanted practices in networks and prevent innovation (Klijn et

al., 2010). Klijn et al. (2010) identified four common strategies the lead actor, also called 'metagoverner', can apply. First, he or she can introduce process rules. These include for instance rules for entrance into or exit from the process, conflict regulating rules, rules that specify the interests of actors or veto possibilities and rules that inform actors about the availability of information about decision-making moments. Second, he or she can arrange the structure for interaction, consultation and deliberation, creating therefore new ad hoc organizational arrangement. Third, the metagoverner can adopt strategies to explore contents. He or she can search for goal congruency, create variation in solutions, influence (and explicate) perceptions, manage and collect information and research and create variation through creative competition. Fourth, the metagoverner has to connect strategies. Actors in the network need to be connected in order to prevent 'structural holes' (Sørensen, et. al, 2012). These strategies for the metagoverner are similar to the behavior of a transformational leader at the organizational level (García-Morales, 2012). The prevenention of structural holes at both levels is crucial, those holes emerge if there is a lack of homophily in the network so that people feel that the other actors are too different from themselves, which hinder learning processes at all three levels. To do so, he or she can amongst others selectively (de)activate some actor, mobilize resources, initiate new series of interactions, build coalition , mediate, appoint process managers, remove obstacles to co-operation and creating incentives for co-operation.

Conditions at the individual level

The second level for collaborative innovation is the individual level. Transformative and mutual learning are key processes of collaborative innovation (Sørensen & Torfing, 2012; Sørensen & Torfing, 2016). The creative recombination of old and new ideas and practices leads to an improved understanding of problems and to the generation of new solutions. Crucial in this context is the learning ability of the actors involved, depending on individual's characteristics and relationships (Gieske & al., 2016). This section offers a brief overview on how collaborative innovation can be fostered by individual and collective learning, as well as the individual conditions of supporting learning.

Learning and collaborative innovation

Collaborative innovation is a learning-based practice relying on the co-construction of new understandings and solutions through extensive exchanges of knowledge competences and ideas (Sørensen & Torfing, 2016). Through the generation and diffusion of new ideas, the collaboration between actors from different backgrounds leads to a shared and improved understanding of the problem at stake, fostering the generation of creative solutions. Collaborative innovation can then be thought of as a specific kind of collective learning process (Heikkila & Gerlak, 2013). This collective learning at the individual level can be supported by the developmental culture at the organizational level (Chang & Lee, 2007).

Innovative networks are engaged in information sharing activities in order to create a collective product that should somewhat break with existing practices. While all collaborative innovations result from collective learning processes, the reverse is not true. Collaborative innovation aims at something new while collective learning, as such, does not necessarily lead to any change in understandings or practices. In fact, some individuals tend to systematically ignore standpoint-inconsistent information, which prevents new evidence to contribute to innovation (Kahan, 2013).

Hence, the success of collaborative innovation is closely related to capacity and willingness of individual participants to link and exchange ideas and experiences (Bekkers & al., 2013). This capacity and willingness can also be associated with an individual's position in the network. Brokers, who connect individuals who

are not otherwise connected, facilitate collaborative innovation at the individual as well as the network level (Howlett & al., 2015). We will elaborate on this in the following sections.

Individuals should be able to reflect on new information and to adjust their way of thinking and practices (Gieske & al., 2016). Innovation is therefore dependent on learning processes taking place at the individual level. According to Heikkila and Gerlak, (2013), individual learning includes the acquisition of information and its translation, understood as interpretation. This leads to the acquisition of new knowledge, for example a better understanding of the issue at stake or the actors that involved in the collaboration, which might in turn influence individual opinions, which can be understood as alterations in preferences regarding specific issues (Heikkila & Gerlak, 2013; Leach et al., 2014). Both have a key role for innovation. Knowledge acquisition conducts to an improved understanding of the problem at hand, fostering the generation of new ideas, while changes and ultimately convergences of individuals' opinions foster collective action and the adoption of the innovation (Leach & al., 2014; Huijboom, 2010; Sørensen & Torfing, 2016). Here communication and a developmental culture at the organizational level plays an important role as well (Gieske, van Buuren, & Bekkers, 2016).

The individual ability to learn is determined by several decisive conditions (Gieske & al., 2016, Lewis & al., 2014). Those conditions include individual traits as well as relationships and position within the innovative network. Relationships refer to the nature of interactions between the one participant and the others whereas position refers to his or her localization within the network. Both are, to some extent, influenced by individual traits, loosely referring to personality. The three factors are developed hereafter.

Traits, relationship and position as individual conditions of learning

Individual traits

Individual traits include skills, resources, perception, attitudes and motivation. Bommert (2010) stresses the importance of innovation assets. Those may be intangible, such as skills and expertise, or tangible, i.e. money. Risk-taking individuals are also essential for the innovation process. O'Leary (2012) draws an impressive list of skills related to collaborative performance. He includes, amongst others, interpersonal skills, such as being a good communicator and listener and individual attributes, with a high importance of openness and self-confidence, along with technical expertise. Previous experience in collaborative arrangements is critical for Sørensen and Torfing (2016). According to the findings of Leach and al. (2014), the duration of participation in a collaborative arrangement has a positive effect on learning, while technical expertise turns out to be detrimental, because experts are reluctant to admit they are wrong (Kahneman, 2011).

The authors also highlight the influence of individual perceptions and attitudes. A positive perception about the fairness of the collaborative process is highly correlated to individual learning products, i.e. acquisition of knowledge and changes in understandings. Similarly, a positive relation exist between a positive attitude toward consensus-based decision-making and the acquisition of new knowledge.

Public Service Motivation, referring to "an individual's orientation to delivering services to people with a purpose to do good for others and society" (Perry and Hondgehem, 2008) is another important factor. According to Hatmaker (2015), it plays a key role in new employees' tendency to engage in relations and make efforts to learn how to become an effective organizational member. It also partially determines community-based motivation, which explain citizen engagement in co-production (Van Eijk & Steen, 2014).The findings can be applied to collaborative innovation. Actors with higher level of public service

motivation are expected to be motivated and more actively engaged in the process, increasing therefore their chance to acquire new information.

Individual relations

Studying relationships involves being interested in the characteristics and the quality of the connections between individuals within a network. In this regard, trust is a major variable, affecting individual willingness to share information and, doing so, to increase one's vulnerability to others' use of this information (Gubbins & Maccurtain, 2008; Levin & Cross, 2004; Klijn, Edelenboos & Steijn, 2010, Bekkers & al., 2013; Huijboom, 2010). Trust is a tridimensional concept including trust propensity, trustworthiness and trust itself (Mayer, Davis & Schoorman, 1995). Trust propensity refers to a disposal willingness to rely on others (Colquitt et al., 2007). Trustworthiness refers to the trustor perception of the ability, benevolence and integrity of a trustee. Somebody is perceived as trustworthy if he or she seems to be competent, to care about the interests of the others and to be honest. Trustworthy individuals have greater chance to acquire information, and therefore to learn. Finally, trust is defined as "a stable and positive expectation that actor A has (or predicts he has) of the intentions and motives of actor B in refraining from opportunistic behavior, even if the opportunity arises" Klijn & al. (2010). High trust involves a trustor's vulnerability to the trustee's willingness and capacity to behave according to the estimation. The presence of interpersonal trust supports the collaborative innovation process by fostering individual willingness to share information and change their understanding of a problem (Leach & al., 2014). It also stimulates risky and innovative choices by reducing uncertainty (Klijn & al, 2010).

The intensity of the relationship between two individuals, grasped by the concept of strong and weak ties, is a second important factor (Bekkers & al., 2013; Gieske & al., 2016; Sørensen & Torfing, 2011). The distinction between weak and strong ties is build according the "the amount of time, the emotional intensity, the intimacy and the reciprocal services characterizing the tie" (Newig et al, 2010). One the one hand, strong ties support trust, which as mentioned above, is beneficial for learning and innovation. On the other hand, weak ties are opportunities for new perspectives and provide access to new information, which also fosters learning. According to Huijboom (2010), therefore, the relative importance of weak against strong ties depends on the level of uncertainty and the phase of the innovation cycle. For Newig et al. (2010), the perfect combination is a set of small groups sharing strong ties interlinked through weak ties.

A third relational factor influencing individual learning processes is the degree of homophily between two individuals. Homophily, also referred to as homogeneity, depends on the extent to which two individuals share similar attributes such as educational background, organizational membership, beliefs, etc. (Newig et al., 2010; Huijboom. 2010). Homophily is somewhat linked to the concept of cognitive distance developed by Noteboom et al. (2007), which is the difference of values and perception between people. The smallest the cognitive distance, the more homophilous people are. The effect of homophily on learning again is ambiguous. On the one hand, individuals with similar belief and background are more incline to discuss together (Meijer, 2014). Homophily also facilitates information transfer and interpretation and therefore fosters knowledge acquisition (Newig & al., 2010; Noteboom et al., 2007; Weible, 2008). On the other hand, it strengths group closure to new information and impedes the emergence of new ideas (Newig & al., 2010; Noteboom et al., 2007). Moreover, changes in opinions are less likely to occur if participants only interact with look-alike colleagues (Huijboom, 2010; Newig & al. 2010). In his cross-case study of ICT innovation, Huijboom (2010) finds that heterogeneity facilitates the adoption of innovation, more than homophily. Noteboom et al. (2007) found an inverted U shape effect of cognitive distance on innovation

performance. He found larger cognitive distance - or heterophily - between two firm to be positively related to innovation until a breakpoint after which the distance hinders the innovation process.

Individual position

Last but not least, individual positions concern the localization of an individual within the whole network (Lewis & al., 2014). This affects individual learning capacity by limiting or expand information accessibility. Prestige and brokerage are central in existing studies (Lewis & Ricard, 2014). Prestige refers to the number of links an individual receives in the network, representing the amount of information he or she has access to. Brokerage is a measure of who's connecting otherwise disconnected actors (Howlett & al., 2015). When linking different groups or heterogeneous people, it indicates the diversity of information received by the broker. Considine & Lewis (2007) found that prestige is positively related to the innovator status of an individual. In turn, brokers acting as bridges can positively influence the innovation process (Huijboom, 2010). However, to our knowledge, there is no study clearly assessing the influence of those positions on the individual ability to learn.

As can be seen, different drivers and barriers on the individual level are important for collaborative innovation. But this is only one level of the multiple levels that are present in collaborative innovation; organizational conditions are as much as important for collaborative innovation.

Conditions at the organizational level

Since the field of study in collaborative innovation is fairly new in public administration research, there have only been few studies conducted into organizational conditions for collaborative innovation (Bekkers et al, 2013). The results generally match the drivers and barriers for public sector innovation (Windrum & Koch, 2008). Although the current studies on the organizational conditions for (collaborative) innovation strongly vary in their scope and depth, the results can be divided into two categories: cultural and structural drivers and barriers.

With regard to cultural conditions, communication is a first important barrier as discussed at the individual level. When ideas and information are not successfully communicated or shared within an organization this halters an organization's abilities to engage in collaborative innovation. Successful communication, however, presents as a driver (Tuurnas, 2015). Secondly trust and empathy among public sector employees and between those employees and external stakeholders is important for successful collaboration at the basis of innovation (Greer & Lei, 2012). An environment with trust and empathy can stimulate employees to take a chance on innovative ideas, fostering collaborative innovation. A risk-aversive culture on the other hand is a barrier to collaborative innovation since there is a resistance to try out innovative ideas (Bommert, 2010; Tuurnas, 2015). As discussed before, both trust and risk-averseness are important at the individual level as well, additionally they also play a role at the network level as we will elaborate on in the next section. Another condition, performance pressure experienced by the organization, has a double effect on collaborative innovation. It can be a driver because collaborative innovation can grant an organization a competitive edge in terms of increased efficiency or effectiveness. Yet on the other hand it can be a barrier when the start-up costs of an innovative idea cannot be overcome by the pressure to perform competitively at all times (Albury, 2005). Next, leadership can function as an important driver or barrier too, depending on how well a leader can identify a need for change and set out a vision to steer the organization in a new direction if need be (Sørensen & Torfing, 2011; Mittal & Dhar, 2015). Of all leadership styles transformational leadership especially spurs on innovation. It does so because the leadership style promotes a learning environment more adaptive to new ideas and to collaborations. The right kind of leadership with regard to a leader's personal qualities and his position as metagoverner is important at the

individual as well as the network level in addition to the organizational level (García-Morales, Jiménez-Barrionuevo & Gutiérrez-Gutiérrez, 2010).

With regard to structural conditions, connectivity and integration within an organizational structure are a first driver to collaborative innovation, here we see another link with conditions at the network level. Connectivity and integration nurture the sharing of innovative ideas and allows actors with different backgrounds to develop those together (Verschuere, Brandsen, & Pestoff 2012; Gieske, van Buuren, & Bekkers, 2016). A strong power asymmetry has the opposite effect and presents a barrier to organizational innovation. In organizations where power play is important, the chances of people with different backgrounds working together decreases. People are less likely to voice innovative ideas then too, which hampers collaborative innovation (Sørensen & Torfing, 2011). We can link this phenomenon to the concept of structural holes we discuss as a network condition later on. The level of flexibility of an organization is important as well in that respect. If an organization is flexible and adaptive and has the structural means to adjust to a new way of providing a service or to include new stakeholders, collaborative innovation stands a greater chance (Verschuere, Brandsen, & Pestoff, 2012). Therefore a strong bureaucracy with high levels of red tape is an barrier to collaborative innovation. Defined as burdensome rules and procedures, various authors point out how red tape hampers innovation. It is shown to make introducing change in organizations more difficult because of lesser flexibility (Mandell & Steelman, 2003; Li & Feeney, 2014). Additionally the length of an organization's budget- and planning timelines , can be a driver or barrier to collaborative innovation. These partly determine if an organization can fit the introduction of an innovation into its planning and budget. When budgets are allocated for a longer period of time for instance, there might be room to overcome the start-up costs of introducing an innovation within that timeframe (Albury, 2005). Apart from that, the size of the budget can limit or maximize the possibility to engage in collaborative innovation (Bovaird & Löffler, 2012). Lastly the size of the organization itself can be a driver or barrier for collaborative innovation. Big organizations may be better equipped to absorb failure, reducing the risks of introducing something new; yet small organizations are generally more flexible and thus more adaptive to engage in collaborative innovation in the first place (Damanpour, 1992; Sørensen & Torfing, 2011).

Hence as presented here, over a dozen drivers and barriers were described this far in the literature. Since this is too big a focus for further research, we opt to focus on a limited number of variables that are central in the literature, show specific relevance in a public sector context, and bring together different drivers and barriers. The first variable we include in that respect is red tape, which can be linked to above mentioned drivers and barriers such as bureaucracy, connectivity and integration as well as risk-aversive behaviour. Secondly we include performance contracts, since these are connected to competitive pressure, performance indicators, and budget & planning horizons. A third variable that will be studied with regard to organizational conditions is leadership. Transformational leadership especially can be linked to communication, trust, integration, and flexibility. In addition to these we add a fourth variable, developmental culture, in our overview because literature discusses this latter as an important variable mediating the relationship between the three variables discussed (especially red tape) and innovation.

Red tape
The variable red tape is included in the research because of its relevance in the innovation literature and its under researched nature in a collaborative innovation context. We define red tape as "burdensome rules and procedures that negatively affect performance" (cf. Bozeman, 1993). Red tape is known to slow down

change and thus an organization's ability to innovate (Burden et al., 2012). Research has also shown that red tape may hamper communication. This is often supplemented by risk-aversive government officials being discouraged by the administrative burden and therefore less willing to engage in collaborative innovation (Albury, 2005; Sørensen & Torfing, 2011; Bovaird, T. & Löffler).

Developmental culture

Developmental culture is defined as a culture that promotes learning, adaptation, and innovation in organizations that are part of the collaboration. It is linked to concepts like trust and empathy (Chen & Williams, 2007). This variable is included in the study since the literature points out that it mediates the negative effects red tape can have on (collaborative) innovation (Pandey, Coursey & Moynihan, 2007). The focus on flexibility and adaptability in an organization brought about by a developmental culture can compensate for the bureaucratic resistance to new initiatives caused by red tape (Burden et al., 2012). In addition to that developmental culture can be linked to leadership, as it increases the positive effects transformational leadership has on innovation (Jung et al., 2003).

Leadership

Leadership is proven to be an important variable in studies with regard to collaborative innovation and performance. Because the field of collaborative innovation is still developing, most studies focus on its relationship with innovation, however. In particular different studies focus on the type of leadership required to have the best outcomes with regard to innovation. In those studies transactional leadership and transformational leadership are often compared. Transformational leadership turns out to be most optimal for fostering innovation, since transformational leaders are better equipped to handle change and set out new visions for an organization. They focus on motivating employees and collaborating with them wile transactional leaders use disciplinary power and incentives instead (García-Morales, 2012). Jung and Chow (2003) found a positive and significant relationship between transformational leadership and empowerment as well as support for innovation.

Performance contracts

The nature of performance contracts is important as a variable in innovation research because it reveals the way an organization is steered with regard to incentives and priorities. Performance contracts are mostly studied in research on the private sector, although recently more attention is given to the public sector in this regard as well (de Visscher et al., 2012). Research shows that the variable can be approached both qualitatively and quantitatively.

Examples of relevant aspects in performance contracts for this kind of research are the nature of targets and deadlines the organization is bound by, in terms of the level of details they include. Connected to that, another important factor is the timespan of planning and budgets the organization is tied to (Hondeghem, Van Dorpe, 2012). A different question concerns the way the actors bound by these contracts are evaluated and how much importance is given to these evaluations (Skorkjær et al, 2011). Research additionally tries to grasp how the output of the organization is viewed and whether the process for obtaining results is seen as important versus focus being (solely on) the results themselves. Incentives to collaborate or innovate will be discussed as well. Other questions in research are about the organization's ability to absorb start-up costs of an innovation and about the political pressure exerted over the organizations (Behn & Kant, 1999). These questions are all meant to find out if the performance contracts facilitate or halter the ability and willingness to engage in collaborative innovation.

All these drivers seem to explain innovation quite well. Why the need to take everything all together?

Discussion

As outlined in this paper we distinguish three levels of conditions for collaborative innovation: individual conditions, organizational conditions and network conditions. The most important conditions on the individual level are individual characteristics (skills, past experiences…), the relationships of an individual or an individual's connections within the network, its position within the network and the individual's learning process. Important organizational conditions are the level of red tape within an organization, the presence of a developmental culture (promotes learning, adaptation, and innovation), the leadership style in the organization and the nature of the performance contract the organization is bound to. Notable here is how learning is an individual process as well as indirectly an organizational cultural attribute.

With regard to network conditions, important factors are the strength of ties in the network, the density and the presence of power asymmetry. Note that these levels overlap and supplement one another, and thus should all be taken into account alongside one another when considering a comprehensive overview. For instance, interpersonal trust at the individual level can be facilitated by a culture of trust at the level of the organization, and fosters network-level processes for collaborative innovation like synergy and commitment. Transformational learning at network level is largely determined by how individuals learn and the conditions of individual learning. The structural holes and the strength of ties can be linked to the variable 'relationships' at the individual level. They determine for instance whether an individual is a broker or not. Power asymmetries in the network may relate to the type of leadership at the organizational level. Communication between actors in a network is also key to successful relationships at the individual level and, at the same time, is required for transformational leadership at the organizational level.

Applying the model

This shows that collaborative innovation is a concept that needs more development and more systematic explanatory empirical study. We now have theoretically substantiated the proposed research model[1] that was presented at the start of this paper. This model can help to create a more complete picture of the antecedents for collaborative innovation.

The model presents three different levels where antecedents of innovation can be present. But as the theory suggests, the conditions are not limited to one level, and thus, without taking all these into account, it is hardly possible to study the dynamics of collaborative innovation completely. To study these conditions and demonstrate causality and interaction effects, we argue that multiple cases of collaborative innovation need to be studied in depth, instead of relying on single case studies that are dominant in the field. These multiple cases preferably include cases which are successful in bringing about an innovation, and cases which are less successful (Stevens and Verhoest, 2016b). Moreover, in order to study to which extent processes and conditions of collaborative innovation are similar for different kinds of innovations, a multiple case study design should optimally compare cases focusing on service innovations, policy innovations and process innovations. In order to study the model in full, cases should involve a network of public actors from different policy areas and government levels, as well as private sector actors (citizens, non-profit actors or/and profit actors) which meet in a certain arena where they interact. This arena for

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[1] This model will be empirically tested in the Belgian Public Sector through Innovation (PSI-CO) project.

interaction would allow for transversal coordination and coproduction (Stevens et al, 2016b). This arena can be real-life meetings or virtual platforms in which the collaborative network partners gather based on a shared sense of synergy, collectively learn and formulate commitment towards the implementation of the innovation. Crucial is to delineate the time episode in which the collaborative arrangement aimed to create an innovation, as defining a clear time frame helps respondents and interviewees to focus their answers and to avoid confusion.

These cases can be examined both by using qualitative methods as quantitative methods. One promising way to grasp conditions at all levels is to gather data from the individual representatives active in these arenas for interaction, and ask them about their individual conditions, their perception of the features of the organization they represent, and their relationships with other representatives and perception of network processes and meta-governance. Social network analysis (SNA) can be used to uncover network interactions, allowing to examine network and individual conditions (Ingold,2011). In turn, follow up interviews with the same representatives unveil motivations of interactions and behavior in the collaborative process as SNA survey questions provide information about the interactions, but not so much why certain actors interacted with each other. Interviews can also be used to dissect the actions of the metagoverner and how this fosters collaborative innovation processes. This way, it gives a broad understanding of the innovative project and the interactions that happened in the collaborative arrangement.

Applying this model will contribute to our understanding of how all three levels are connected in terms of conditions for collaborative innovation. It will uncover how relevant drivers and barriers across the different levels interact with each other and, as such, can provide a valuable contribution to the evolving field of collaborative innovation.

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