Integrating Open Innovation Platforms in Public Sector Decision Making: Empirical Results from Smart City Research

Jukka Ojasalo and Lassi Tähtinen

> *"A new mode of innovation is emerging that blurs the lines between universities, industry, governments and communities. The challenge is how to execute and govern the new mode."*
>
> Martin Curley
> Vice President at Intel Corporation
> Director of Intel Labs Europe

The purpose of this article is to increase knowledge of integrating an open innovation platform into public sector decision-making processes. Many of the distinctive characteristics of public sector decision-making processes pose a challenge for innovation collaboration with external actors. Often, external actors are not aware of these distinctive characteristics, or they find it very difficult to adapt to them. Particularly SMEs and startups find it difficult to adjust their operation to public sector decision-making processes. The existing literature includes very little knowledge of how such an innovation platform, which is an intermediary between a city and external actors, relates to the city's decision-making processes. Still, this is an important issue considering the prerequisites of the success of an innovation platform. This qualitative explorative study is based on data from in-depth interviews and co-creative multi-actor workshops with participants from city governments and other organizations. It proposes a model of open innovation platform for public sector decision making in a city. The article contributes to the literature dealing with innovation intermediaries as well as public sector decision making in enhancement of innovation. It identifies and introduces three different kinds of relationships that are present and partly interwoven in open innovation platforms and intermediary organizations: governing, sparring, and collaborative. The prosed model shows a practical way of organizing the three types of relationships of an innovation platform with the city's decision making and external actors. The model also helps in combining different decision-making cultures between the public, private, and third sectors in the context of collaborative innovation.

Introduction

Innovation platforms and innovation intermediaries exist to enhance open innovation and collaborative innovation in cities (McPhee et al., 2015). An innovation platform is defined as an approach that systematically facilitates external actors' innovation with the purpose of developing solutions to the platform owners' problems and needs (Ojasalo, 2015a). In the context of cities, the platform owner is typically a city, and thus the innovation platform functions between a city and external actors, and facilitates their collaborative innovation. Collaborative innovation in cities addresses several areas covering improvement of everyday activities and life conditions, creative consumer experiments, experimentation and implementation of new technologies, and creation or recreation of economic opportunities (Leminen & Westerlund, 2015), digital solutions (Tukiainen et al., 2015), sustainable solutions (Oksanen & Hautamäki, 2015), and spatial solutions (Niemi et al., 2015).

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Several research reports refer to the governance and management of open innovation platforms in cities. However, there is a clear research gap, because they do not offer knowledge of how innovation platforms are or could be connected to the public sector decision-making processes in cities. According to Markkula and Kune (2015), the success of such platforms "will be based on the new working culture, and the effect of orchestration concepts developed for mobilizing actors to operate in digitalized open innovation platforms". Ylikoski, Oksanen-Ylikoski, and Hero (2015) refer to a flexible, silo-breaking culture in multi-actor collaborative innovation in smart regions. Tukiainen, Leminen, and Westerlund (2015) argue that cities should act "as orchestrators that connect various parties to create and maintain sustainable ecosystems". Smith, Nuutinen, and Hopkins (2015) report on Espoo City's governance structure for orchestrating the innovation collaboration of a multi-stakeholder network with the regional centres of expertise. In this case, the governance structure includes: i) the management team, which supervises the strategic guidelines, ii) a steering group, which is an advisory group consisting of representatives of key organizations and partners, and iii) working/interest/project groups consisting of all organizations, institutions, and businesses committed to implementation. They also refer to the governance structure of Portland's regional centre of expertise in the United States, which similarly includes governance, programs and events, research and development, outreach and communication, a coordinating committee, a shareholder advisory group, and working groups. Ojasalo (2015b) identified four options, and their pros and cons, for how an open service innovation platform relates to the city administration and how it is governed: i) the innovation platform is subordinated to the central administration of city, ii) each department has its own innovation platform, iii) each department has its own innovation platform plus there is a connecting round table, and iv) the innovation platform is external.

Moreover, the existing governance and management structures of innovation platforms have several problems and shortcomings. According to Tukiainen and Sutinen (2015), they are based on bureaucratic administration and decision making, and governance or professional silos. The administrative structures are not customer-, action-, or process-based. Consequently, they are not interoperable with other cities or with companies, meaning that they are unable to reuse the other cities' innovation capability. Moreover, cities are unable to effectively utilize citizens' contributions or new emerging technologies such as digitalization. Ahonen and colleagues found that a city may have the basic infrastructure for innovation collaboration and experimentation with external actors, while not being very active. Hämäläinen (2015) argues that cities have to deal with "wicked problems", which cause several challenges for the governance of regional innovation ecosystems. The key challenges are caused by multiple stakeholders (their frames, values, and goals), lack of shared and holistic understanding of the problem, coordination difficulties, complexity gaps, and path dependence. Consequently, new governance solutions are required that include "participation, interaction, and cooperation among stakeholders; collective learning processes; coordination by mutual adjustment and clear systemic direction, decentralization, diversity, and experimentation; and effective measures to overcome system rigidities and development bottlenecks" (Hämäläinen, 2015). In general, the nature of decision making in public administration, such as city government, and private organizations is notably different (Nutt, 2006). Private companies have smoother decision-making processes whereas public sector organizations experience more turbulence, interruptions, recycles, and conflict (Perry & Rainey, 1988; Rainey et al., 1976; Ring & Perry, 1985).

In conclusion, the importance of facilitating effective and efficient governance of open innovation platforms for cities is recognized. Also, several difficult challenges have been identified in this context. Some guidelines and approaches have been introduced; however, these approaches do not explicitly address the different types of relationships between an innovation platform and city administration. Moreover, the existing approaches recognize the problem of silos in city organizations but give only vague ideas of how to overcome this problem in the governance of open innovation platforms. Moreover, they do not make a distinction between permanent and project-specific roles of persons and organizations involved in the activity of an innovation platform.

Thus, clearly, the existing knowledge of how innovation platforms can relate to public sector decision making in a city is scarce. Indeed, there is an evident need to increase knowledge in this area as well as to provide pragmatic approaches. The present study addresses this knowledge gap. It aims to increase knowledge of how an open innovation platform addressing a city's needs can relate to the public sector decision-making processes of the city and propose a model for real-world application in this context.

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The rest of this article is organized as follows. First, based on the literature introduced already, we discuss innovation intermediaries and platforms, as well as the special characteristics of public sector decision-making processes. Then, we describe the methodology used for this research. Next, based on the current empirical study, we propose a model of an open innovation platform and public sector decision making in a city. Finally, we offer conclusions.

Innovation Intermediaries and Platforms

The innovative ideas and solutions to the problems of government and city halls can be provided both internally and externally through collaboration within the public sector and with other organizations (Fung & Weil, 2010). This external knowledge space can be supported by public sector open innovation intermediaries (Bakici et al., 2013). The concept of "innovation intermediary" is used in the scientific literature and has been defined by several authors. However, the closely related term "innovation platform" is widely used by practitioners, particularly in public government (including the European Union), regional bodies, and cities. Despite the frequent use of these terms in various contexts, their meanings remain rather vague. In this section, both these concepts are discussed more closely based on the existing literature.

Innovation Intermediaries

In discussing innovation intermediaries, Bakici, Almirall, and Wareham (2013) identify three related roles, which they define as follows:

1. An *intermediary* is a third party, a firm or a person that acts as a mediator and offers intermediation services between two other parties (Braun, 1993; Gassmann et al., 2011; Seaton & Cordey-Hayes, 1993; Stankiewicz, 1995; Stewart & Hyysalo, 2008; Watkins & Horley, 1986). Intermediaries may be private organizations, individuals, experts, or advisors in the form of retailers, distributors, wholesalers, platforms, media companies, agencies, and financial institutions (Aoki, 2001; Howells, 2006).

2. A *knowledge broker* is an organization that spans multiple markets and technology domains and innovates by brokering knowledge from where it is known to where it is not (Hargadon, 1998; Hinloopen, 2004; Hussler et al., 2010; Ramirez & Dickens, 2010; Verona et al., 2006).

3. An *innovation intermediary* is an organization that acts as an agent or broker in any aspect of the innovation process between two or more parties (Howells, 1999; Klerkx and Leeuwis, 2009; Lichtenthaler & Ernst, 2008; Nambisan et al., 2012; Sieg et al., 2010; Tran et al., 2011).

Bakikici and colleagues (2013) describe the function and role of public sector innovation intermediaries. A public sector innovation intermediary is positioned between a city and public/private organizations to enhance their innovation collaboration and the innovativeness of the city in general. The collaboration makes it possible to accomplish objectives that neither entity is able to achieve alone. Public sector innovation intermediaries have a significant role as key enablers in the innovation strategy of city halls. They build networks of organizations and then attract all the project ideas from these networks. City halls are at a distance from the latest technologies, developments, and innovative ideas, as well as the demands for new services and products. Innovation intermediaries reduce the cognitive distance by bridging various actors. They collaborate with other public and private organizations, citizens, and universities to promote innovation and economic development based on a range of sectors. They also participate in grassroots innovation projects and execute programs. Often, the projects involve SMEs and startups.

Innovation intermediaries and platforms are needed because the systemic setting for innovation runs only with the necessary intermediaries in place to make the interactions and matching of partners possible (Katzy et al., 2013). They help to minimize asymmetric information between actors related to innovation on the market (cf. Spulber, 1999). In many cases, it has become a public priority to encourage innovation intermediaries to provide support to companies – especially SMEs, who often have limited resources. For example, SMEs often face great barriers to participation in the European Union's R&D programmes, such as administrative, financial, internal, and external barriers (Gilmore et al., 2013). Innovation intermediaries are often strongly publicly funded and have a non-profit structure. However, there are some examples of innovation intermediaries that have a commercial structure and operate on the basis of reward fees that they receive in exchange for deals negotiated between customers and knowledge or technology suppliers (Katzy et al., 2013). Both innovation intermediaries and platforms typically utilize ideas related to open innovation (Ches-

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brough, 2003), innovation networks (Ojasalo, 2008), public–private partnership (Abadie et al., 2004), and technology transfer (Bessant & Rush, 1995).

According to Katzy and colleagues (2013), innovation intermediaries have three strategic capabilities: i) innovation process management capability – innovation partners need continuous support for collaboration and process management, ii) matchmaking capability – this is needed in the early, development, and late stages of the innovation process, and iii) valuation and portfolio management capability – this refers to the capability of the intermediary to translate the combined value of a portfolio of individual deals into individual benefits of the stakeholder in several ways. Various living labs, such as those driven by utilizers, enablers, providers, or users (Leminen et al., 2012), are examples of innovation intermediaries.

Innovation Platforms

The concepts of "innovation intermediaries" and "innovation platforms" are closely related. The function of innovation platforms are based on the fact that networks are loci of innovation given that collaboration favours access to a broad set of complementary technological competencies and becomes an opportunity to recombine existing resources held by individual firms into new knowledge (Patrucco, 2011). Indeed innovation platforms utilize the basic advantage of networks. Through networks, an actor may have an access to resources that it does not possess internally (Ojasalo, 2004). In the case of innovation, knowledge and capabilities are the most important resources. Thus, innovation networks (Ojasalo, 2008, 2012) are all about knowledge creation and governance for economic value through interaction in networks.

Patrucco (2011) describes the evolutionary phases of institutional change in the organization of knowledge and innovation in the automotive industry, moving from isolated in-house innovation into innovation platforms:

1. *The firm* (1970s): characterized by vertical integration of production, internal accumulation of R&D, internal accumulation of capabilities in the design, and internal accumulation of capabilities in technology design. Innovation took place in isolation.

2. *The centralized network* (1980s): based on outsourcing of components production, central coordination of suppliers by the focal actor in the network, and exclusive supply from small suppliers to the focal actor. Innovation had an ex-ante and top-down nature, and it was undertaken by the focal actor, in other words, the central actor of the network.

3. *Decomposed organization* (1990s): suppliers benefit from economies of specialization and learning, first-tier suppliers emerge as innovators at the local and international levels, outsourcing of components production, outsourcing of design in both components and modules, and modular product and system architecture design. Innovation is based on outsourcing of R&D and design as well as bottom-up (supplier-driven) innovative process.

4. *The innovation platform* (2001–): in-sourcing of innovative and value adding activities, acquisition of external resources built in the previous phase, vertical cooperation between the focal actor and its suppliers, horizontal cooperation between the focal actor and its suppliers, horizontal cooperation between the focal actor and its suppliers, and internal to the focal actor product and system architecture design. Innovation includes integration of top-down and bottom-up processes, as well as co-design and co-innovation.

The literature includes a handful of definitions for innovation platforms or platform organizations in general. The European Commission (2004) refers to "technology platforms" in its common research agenda, but its characterization seems not to refer merely to a technical solution, but rather to a means of facilitating the emergence and effectiveness of multi-stakeholder innovation networks in which stakeholders are united around "a common vision and approach for the development of the technologies concerned" (European Commission, 2004). In this context, technology platforms are seen as a way of making public–private partnerships more effective by bringing together public sector research, industry, financial institutions, users, regulatory authorities, and policy makers. Furthermore, "technology platforms provide important forums in which stakeholders can formulate their views and provide policy-makers with advice on ways to develop coherent and effective policies and programmes to tackle the challenges in the technological areas concerned" (European Commission, 2004). Also, the participation of SMEs is emphasized.

Consoli and Patrucco (2008) define "innovation platforms" as systemic infrastructures for the organization and coordination of distributed innovation processes

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that feature high degrees of complexity. The creation of an innovation platform consists of the design and establishment of architectures for interorganizational coordination of information and knowledge, and the extent of exchange across organizations. The design of an innovation platform determines the objectives for the creation and the use of knowledge beforehand but evaluates (and eventually adapts) them afterward. Patrucco (2011) defines innovation platforms as "directed networks, that is, networks where interactions do not emerge and evolve spontaneously, such as in traditional clusters and districts, but where key nodes have a driving effect on the behaviours of the other actors and shape the evolution of the system and its aggregate performance". Patrucco (2011) also characterizes them as organizational innovations themselves and forms of knowledge governance.

In the context of developing a smart city, "innovation platforms" are also called "participation platforms", referring to something through which governments, businesses, and citizens can communicate and work together, and track the evolution of the city. They are typically driven by local municipalities on behalf of platform users and reflect the full range of city actors, including individuals, civil society groups, small businesses in the retail service, and manufacturing sectors and larger businesses established in the city (Manville et al., 2014).

Ojasalo (2015a, 2015b) empirically examined open innovation and innovation networks in smart cities and positioned an "innovation platform" as an approach that systematically attracts, facilitates, and orchestrates innovation with external actors with the goal of developing solutions to the platform owners' own problems and needs.

An innovation platform is primarily a way to organize, rather than being a virtual or physical space, even though it may be means used to facilitate the innovation of external organizations. Indeed, both Consoli and Patrucco (2008), as well as Ojasalo (2015a, 2015b), emphasized that innovation platforms are *not* technological platforms, but rather strategic approaches to building, organizing, and enhancing innovation networks. Indeed, an innovation platform differs from a technological platform. The latter refers to ICT-based innovations like virtual networks, and the associated infrastructures, and interfaces and standards (Gawer and Cusumano, 2002). Technology platforms facilitate interoperability and coordination between different firms and technologies (Console, 2005) as well as scientific clusters (Robinson et al., 2007). Consoli and Patrucco (2008) further clarify the difference between the concepts, as follows: "Innovation platforms are strategic organizational vehicles for coordinating specialized agents. ICTs and virtual networks are thus instrumental and yet subsidiary elements. Common to both technology and innovation platforms is the notion of directed and coordinated organization as opposed to 'spontaneous' organization typical of market processes."

Methodology

This article stems from a two-year research project on open innovation platforms in smart cities. The overall project addresses several objectives, but the one that is relevant to this article seeks to understand how an open innovation platform can relate to the public sector decision-making processes in a city. The research method is qualitative and is based on data from in-depth interviews and co-creative workshops (Gummesson, 2000). The interviews lasted between one and three hours and were audio recorded and transcribed for later analysis. Also, drawings made by interviewees during the interviews were photographed, collected, and interpreted in the analysis.

The 65 interviewees came from Finland (49), Spain (5), Netherlands (2), China (3), Italy (2), Denmark (1), the United States (2), and Australia (1). The interviewees represented city governments, private companies, third sector organizations, innovation intermediaries, as well as research institutions. The interviewees selected from city government had experience or expertise in innovation, urban development, and collaboration with private or third sector organizations. Interviewees selected from the private sector had experience or expertise in collaboration with cities. Similarly, interviewees from the third sector had experience or expertise in collaboration with cities. Interviewees from innovation intermediaries had experience or expertise in living labs or facilitation of collaborative innovation networks. The researchers interviewed were academics who have examined innovation intermediaries or urban development.

In addition to in-depth interviews, we collected material from four co-creative workshops addressing innovation collaboration between cities and external actors. The data from the workshops includes transcriptions, notes, photos of written and drawn material, as well as written summaries of the main conclusions of the work-

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shops. The data were analyzed by open coding and selective coding, following a grounded theory method (Glaser, 1978). The purpose of the "open coding" or initial coding in this study was to discover a potential initial solution to be proposed for the existing knowledge gap, in other words, how to connect a city government and external actors for innovation collaboration. We identified a potential to propose an open innovation platform that contains an intermediary round table as a key element. With this initial idea or interpretation in mind, the focus shifted to "selective coding", which included finding empirical clues from the material in hand to determine the nature and structure of a proposed innovation platform model, as will be described in the next section.

An Open Innovation Platform for Public Sector Decision Making in a City

Based on the analysis of the data from the interviews and workshops in the current empirical study, we propose a model illustrating an approach for linking an open innovation platform in public sector decision making of a city (Figure 1). The model includes three main actor blocks – the city government, external actors, and the open innovation platform – and three types of relationships between them. The city government is simplified in the model to consist of only the central government and the city departments (e.g., health and well-being, education, real estate, culture). The open innovation platform facilitates and enables collaborative innovation between the city and external actors. External actors refer to private companies, third sector organizations, research institutions, citizens, as well as other cities.

The city is the sole platform owner or at least one of the main owners, and it has the main power in the innovation platform's decision making. Most of the platform's budget comes from the city and other public sources (Ojasalo, 2016), but the innovation platform still acts as an independent, self-organizing mechanism. Therefore, its activities should be transparent. And, it needs an effective information-transfer mechanism for sharing and gathering information from the city government's internal and external environments in order to facilitate and enhance collaborative innovation. In the model, we refer to this information transfer mechanism

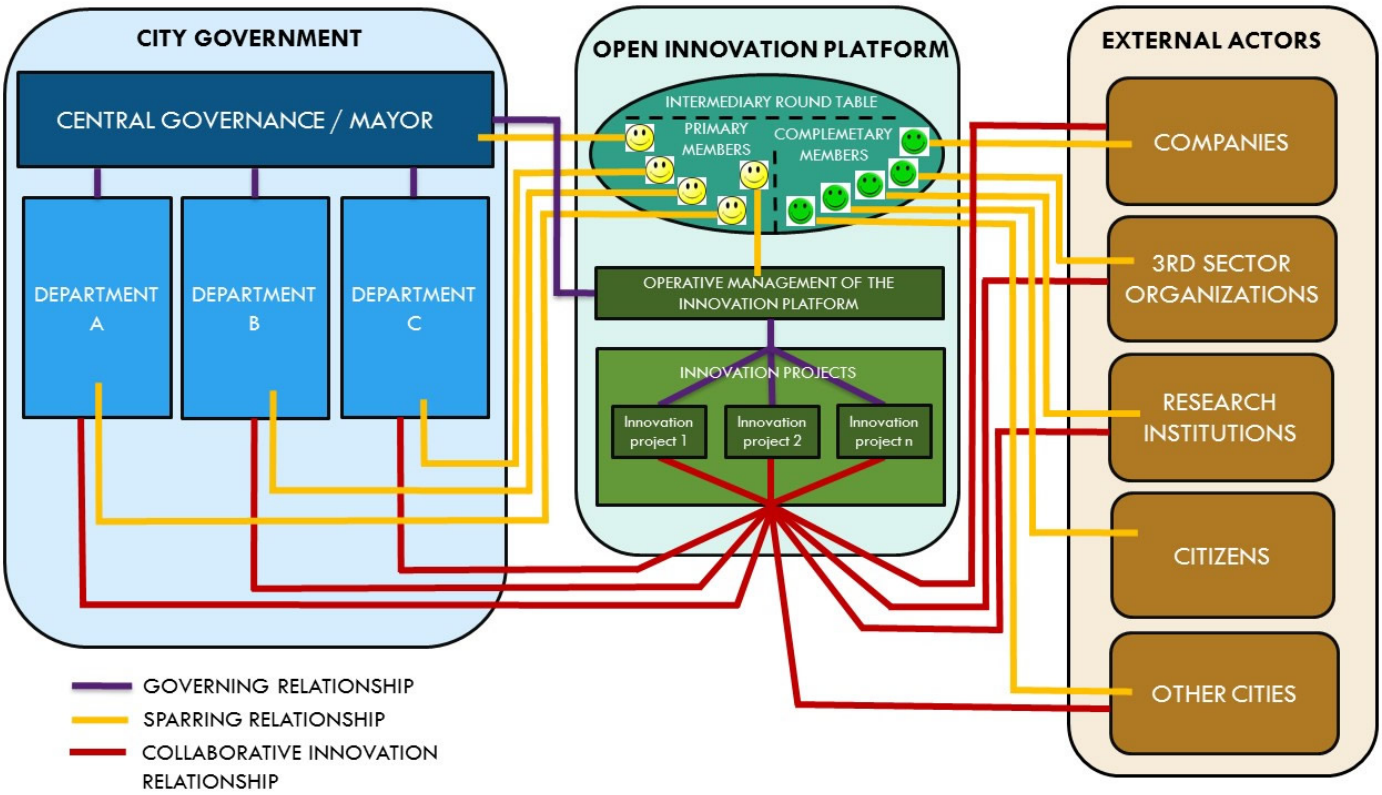

Figure 1. Model of an open innovation platform for public sector decision making in a city

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as an intermediary round table. The intermediary round table includes primary members and complementary members. The primary members are carefully selected city personnel who come from the city departments and possibly the central government. They intermediate information between their own departments and the innovation platform. They also interpret the information and communicate it in the way that it is usable at the both arenas. Primary members have long-term involvement in the intermediary round table.

The intermediary round table also has complementary members. Their involvement is usually case- or project-specific, and they are invited by the primary members. For example, the innovation platform may be a city hospital that allows companies from the health and well-being industry to develop and test their products and services in an authentic real-life context in the hospital environment. The permanent members of the intermediary round table come from the city government, particularly from the health and well-being department. In addition, different complementary members are also invited, depending on the need, to participate in different meetings to bring valuable, case-specific insights.

The model includes three types of relationships between the actors: governing relationships, sparring relationships, and collaborative innovation relationships. Governing relationships are based on formal coercive power. Its justification is grounded on the democratic system, legislation, and rules of city government. A governing relationship exists between the mayor's office and the different city departments subordinate to it. A governing relationship also exists between the mayor's office and the innovation platform.

Earlier research has examined four options for how the innovation platform may relate to the decision-making processes of the city government (Ojasalo, 2015b). First, the innovation platform can be subordinate to the central government of the city. Second, one or several of the city departments may have their own innovation platform(s), which are subordinate to them. Third, a connecting entity is added to the previous option within the city government. The purpose of this connecting entity is to share ideas, practices, and visions of the service innovation of each department's innovation platform. Fourth, the innovation platform is externalized so that a governing relationship does not exist with the city or it is weak. All these options are possible and they each have their advantages and disadvantages.

On the whole, the empirical material of this study suggests that the first option is the most suitable and the fourth one is the least suitable. Thus, our model is based on the first option: having the innovation platform subordinate to the city's central government. The main reason for why this option seems to be the best one, based on our empirical material, is that the open innovation platform requires a mandate to efficiently affect the city government and its practices. Therefore, it should be subordinate to central government and the mayor of the city. Even though the platform is subordinate to the mayor's office, the hierarchy should not interfere with the innovation platform's activities through a strong commanding policy. Our empirical material suggests that the mayor should act as the sponsor of the innovation platform and bear the overall responsibility, but that the intermediary round table should be responsible for the platform's strategic management and the platform director or coordinator should be responsible for the operational management of the platform. According to Ojasalo (2015b), with this option, the innovation platform is likely to have more freedom and it can develop and experiment with various visionary and future-oriented services. The success of this option highly depends on the support and vision of the city's top management team. However, with this option, there is a risk that the city departments may feel as though they are "outsiders".

Sparring relationships are based on sharing knowledge and networks. Those who spar share their knowledge, experience, and contacts of their networks to improve the professional performance and the effectiveness of the one being sparred. Sparrers are invited based on their professional expertise and knowledge or their position in a certain organization. They may have their own interest to gain something from the sparring relationship or they may function altruistically. In the present model, a sparring relationship exists between the open innovation platform and the central government of the city, city departments, companies, third sector organizations, research institutions, citizens, and other cities.

A collaborative innovation relationship aims at new solutions, which are new services, tangible products, or processes. Whereas the activity of sparring relationships is service or product development, the purpose of collaborative innovation is to develop new solutions that solve the city's problems. Both the city government as well the external actors have their interests in the innovation collaboration. The city seeks services and products that will solve its problems effectively and effi-

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ciently. The private companies are interested in new business opportunities and selling solutions to the cities. The third sector organizations aim to promote their own mission, and research organizations are interested in creating new knowledge. Citizens are interested in improving the quality of the public services and infrastructure of their own city, and ultimately the quality of the life in the city. Other cities are interested in knowledge transfer and learning about the best practices.

Conclusion

The purpose of this article was to increase knowledge of how an open innovation platform addressing a city's needs can relate to its public sector decision-making processes as it seeks to become a smart city. The article contributed to this objective by proposing a model for an open innovation platform based on a qualitative explorative study and the data from in-depth interviews and co-creative multi-actor workshops with participants from city governments and other organizations. It increased the knowledge of combining different decision-making cultures with the help of an intermediary organization in the context of collaborative innovation. It also proposed a practical approach for organizing three types of relationships of an innovation platform with the city's public sector decision making and external actors: governing, sparring, and collaborative innovation relationships.

The model has several practical implications. Following the ongoing global urbanization development and hype around smart cities, an increasing number of cities aim to brand themselves as "smart". Enhancing innovation networks and clusters lies in the heart of the smart city concept. Cities usually initiate a program or mechanism for this purpose: our model offers a simple starting point for cities and local actors to build one. It helps to clarify the roles and responsibilities of different actors by distinguishing governing, sparring, and collaborative innovation relationships. It makes explicit that effective innovation collaboration requires both permanent and case-specific expertise. It helps to connect the innovation platform to the city government in the way that gives it enough high-level sponsorship to back up its freedom and future-oriented approach, but at the same time involves the city departments in both strategic management of the platform as well as grassroots innovation projects. The model also shows the variety of external actors that need to be involved in co-creative innovation of any city wishing to break away from the traditional silo-based bureaucratic mode and truly be a "smart" city. The model offers a practical approach to orchestrate collaborative innovation of cities, which brings together viewpoints and goals of different stakeholders and enables in-depth and holistic understanding of problems. It helps the cities to learn, develop, and coordinate cross-departmental collaborative innovation, thus opening up mental locks of siloed organizations and removing administrative bottlenecks of urban innovation. It enhances grassroots democracy and social inclusion of minority groups in co-creation of new public services. It allows private companies to better understand the logic of public procurement and develop new business with high potential of scalability among cities home and abroad.

Opportunities for further research, experiments, and pilots emerge from the current empirical study. First, more knowledge is needed of public collaborative innovation in a multicultural context, because in metropolitan areas, the collaborating actors often come from diverse cultural backgrounds. Second, more research is needed on how different innovation platforms and intermediaries can collaborate more effectively with each other. Third, more knowledge is needed to explore special means to stimulate SMEs, startups, and young entrepreneurs for innovation collaboration with cities.

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About the Authors

Jukka Ojasalo is a Professor and current Head of the Master of Business Administration Degree Programme at Laurea University of Applied Sciences in Finland and Adjunct Professor at Aalto University School of Business and Helsinki University Faculty of Social Sciences. He completed his PhD at Hanken Swedish School of Economics and Business Administration in Helsinki, Finland in 1999. Previously, he was Professor of Marketing at Lappeenranta University of Technology as well as at Turku School of Economics and Business Administration. Prior to his academic career, he worked for several years in the IT industry and for the Finnish government. He has published two textbooks and many articles on service, customer relationships, networks, and innovation.

Lassi Tähtinen is a Research Assistant at Laurea University of Applied Sciences in Finland, where he holds a bachelor's degree in Business Administration and Management. As described in this study, his current research is focused on a project aimed at developing a framework for an open innovation platform/intermediary between a smart city and the private sector/third sector.

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