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## Unpacking open innovation neighborhoods: le milieu of the lean smart city

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*Original Citation:*

*Availability:*

This version is available <http://hdl.handle.net/2318/1659985> since 2018-02-15T11:32:56Z

*Published version:*

DOI:10.1108/MD-04-2017-0407

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Journal:	<i>Management Decision</i>
Manuscript ID	MD-04-2017-0407.R2
Manuscript Type:	Original Article
Keywords:	lean methodology, smart city, external knowledge, citizen's engagement, open innovation, job-to-be done

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Management Decision

## Unpacking open innovation neighborhoods: *le milieu* of the lean smart city

### Abstract

**Purpose** – This research aims to satisfy a clear gap in the main field of Open innovation research whereabouts a very little scholarship try to analyse the mechanisms of Innovative milieu down smart cities environments by applying through innovative projects that seem to support efficiently the entry of private firms and citizens in public collaborations.

**Design/methodology/approach** – The research performed an exploratory and qualitative evaluation based on the case study method built on the evaluation of organizational behaviour and urban boosting innovation through Smart City initiatives. In doing so, after a literature review in smart city as well in lean methodology fields, the case of Turin Smart City follows.

**Findings** – As acknowledged by international literature, the paper shows how a lean approach enables local government to define and realize smart projects and initiatives in a faster and more effective way. Particularly, the government in one of the main cities in Italy, id est Turin combines a lean methodology with the job to be done approach, according a new concept of smart initiatives involving a start-up mentality for the lead users which enables interesting predictions relating the human aspects of open collaborations.

**Research limitations/implications** – The specificity of this inquiry highlights valuable insights from double-gate Smart Cities' innovation, social and urban as well. The research is largely interpretative and exploratory and while this provides a solid scientific foundation for further research it does not, itself, subject any hypothesis to statistical testing and validation.

**Originality/value** – Since the city approached the smart city subject in a lean way, it was able to realize some projects in a faster way. Through specific initiatives, the city acquires the ability to involve more and better all its stakeholders such as citizens, companies, and public employees, among others. In this regard, the paper invigorates managerial debates concerning the urban and social aspects of open innovation ecosystems which represents in our minds a superior level of open innovation, testbeds of positive knowledge and stimulus of knowledge dissemination process around the city.

**Key Words:** open innovation, job-to-be done, lean methodology, smart city, external knowledge, citizens' engagement.

**JEL Classification** H83 · L20 · 032 · M10· L17·L86

### Introduction

These days, the rules of the business environment and innovation are continuously inclining to change, supported by a process of technological revolution that is leading to the redefinition of the competition patterns of the game by managers; such managers are at one and the same time constrained to reconsider the fundamentals of the business

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2  
3 model, and conversely to re-plan and reassert the boundaries of business organizations in  
4 order to innovate and develop durable and renewable competitive advantages within a  
5 “open space” ecosystem (Adler and Know, 2002; Pisano *et al.*, 2015; Vrontis *et al.*,  
6 2016). Innovation business models progressively assume that the discovery of novel  
7 products and processes goes through a crossover exchange of knowledge and capabilities  
8 outside-in and inside-out the firm, supported by external and internal relationships with  
9 various innovator stakeholders who are involved in various ways in the industrial and  
10 technological discovery-driven process, accentuating the need for the firm to drain,  
11 acquire, and combine knowledge from its context (Caetano and Amaral, 2011;  
12 Carayannis, 2011; Del Giudice and Della Peruta, 2013). This challenge not only  
13 constantly engages firms in business competitions and dynamics in unpredictable ways,  
14 requiring them to revisit their mindsets and practices, but also to build on and  
15 significantly intensify their stock and flow of intellectual capital within their  
16 organizations over time (Kale *et al.*, 2000; Murray *et al.*, 2016).

17  
18 The importance of both current and new resources and competencies thus dictates  
19 that innovative firms have to maintain their adaptiveness by exploiting their current  
20 knowledge and exploring new knowledge (Chesbrough *et al.*, 2007; Floyd and Lane  
21 2000; Levinthal and March 1993). Once privately owned, such knowledge and  
22 technologies have become increasingly absorbed further in public contexts accessible to  
23 individuals, governments, and research institutions, making acquisition feasible at both  
24 the individual and organizational levels (Del Giudice *et al.*, 2012). In this context,  
25 external sources of knowledge represent a crucial aspect for open innovation  
26 development, which can support, screen, and assimilate external inputs to be used and  
27 combine entrepreneurially in order to sustain knowledge-based innovation processes  
28 along the ecosystem (Del Giudice and Della Peruta, 2016).

29  
30 In this theoretical arrangement, the smart city can be considered an open platform of  
31 external knowledge, available in a codified, but especially a tacit manner, thus  
32 intensifying the requirement to support and develop exchange and relationship processes  
33 among actors in order to build and diffuse a knowledge-based society and a technological  
34 arena of competition (Del Giudice *et al.*, 2013; Mital *et al.*, 2017; Nonaka and Takeouchi,  
35 1995).

36  
37 With this in mind, this study aimed to redefine and reconsider not only the sources of  
38 knowledge, but also the boundaries of innovation gates, which lead to consideration not  
39 only of a shift from *labor-oriented* activities to leisure and pleasurable engagements for  
40 human resources, according to a new *milieu* for open innovation in which new  
41 technological issues and ideas evolve from bottom-up long-run collaborations among  
42 various stakeholders (private or public), and include urban dynamics to cloud systems of  
43 innovation (Etzkowitz and Leydesdorff, 2000; Du Plessis, 2007).

44  
45 By applying a new interpretative framework based on lean thinking (Arnheiter and  
46 Maleyeff, 2005), and the job-to-be-done approach (Johnson *et al.*, 2008), the concept of  
47 the smart city is reinterpreted according to the challenges specifically related to the  
48 entrepreneurial and leadership dynamics of various private–public collaborations,  
49 unpacking urban ecosystems. Through an exploratory case study, the research explored  
50 the concept of the lean smart city (LSC) as an environment of open and user-driven  
51 innovation, experimenting in and enabling technological and Internet-based services.  
52 Based on the concept of the quadruple and quintuple helix of innovation (Carayannis *et al.*,  
53 2014), the analysis of the current landscape of the smart city program in Turin aimed  
54 to investigate the purpose of instituting local urban innovation ecosystems to provide  
55 neighborhoods of sustainable society-driven open innovation partnerships, and foster  
56 cooperation strategies among private and public stakeholders.

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2  
3 The literature has not addressed the meaning of smartness in this way, but there is  
4 general agreement that a smart city is always characterized by a pervasive use of  
5 information communication technology (ICT), which, in various urban domains, helps  
6 cities make better use of their resources (Neirotti *et al.*, 2014). In recent years, there has  
7 been a shift from a vision of a smart city as being more technology-driven to one that is  
8 more citizen-driven. At the same time, there has been the spread of many smart city pilots  
9 rarely able to scale up and grow efficiently and rapidly. Thus, there is a need for smart  
10 cities to involve all their stakeholders, particularly citizens and local companies, more  
11 optimally and to a greater extent on the one hand, and to convert pilots into workable  
12 innovative products on the other (Cautela *et al.*, 2014).

13 Based on the case of Turin, this research fills the aforementioned gap in knowledge.  
14 In particular, the paper shows how open innovation can be implemented in practice by  
15 applying the right methodology in developing innovative smart projects. The remainder  
16 of the article comprises five sections. The next section reviews the literature review to  
17 identify the research gap, taking several different research streams into consideration: the  
18 smart city literature, and the lean methodology and job-to-be-done literature. The  
19 methodology section identifies the method and its rationale, then presents the case  
20 analysis (Turin Smart City). The discussion of its implications follows. Finally, the paper  
21 ends with conclusions, along with limitations and future research perspectives.  
22  
23

### 24 **Theoretical background**

25 Several studies (Lee *et al.*, 2012a; Nam and Pardo, 2011; Paskaleva, 2011; Scuotto *et al.*,  
26 2016; Wolfram 2012) have analyzed the enhancing of smart city patterns, debating the  
27 effects of an open social environment on innovation from a management perspective. At  
28 a glance, these researchers underline the complex challenges that underlie a city “going  
29 smart,” especially regarding socio-economic development (Lee *et al.*, 2012b), innovation  
30 breakthrough (Del Giudice and Straub, 2011), and the quality of social welfare (Almirall  
31 *et al.*, 2014).  
32

33 Studies on smart cities have become an emerging research trend in both knowledge  
34 and technological streams of research, closing the gap concerning certain aspects of  
35 business competitiveness, such as innovation, entrepreneurship, urbanization,  
36 organization, governance, construction, and social communities. A very limited body of  
37 work has previously discussed in a holistic manner the phenomenon, neglecting two key  
38 drivers of management smart city management, namely the value of the innovation  
39 climate and the business identity of smarter organizations (Angelidou, 2015). In general,  
40 it can be assumed that smart city initiatives produce a “*dominus effect*” that leads to a  
41 favorable and positive organizational climate among stakeholders, which in turn  
42 transmutes into a proactive involvement of citizens in the innovation process, converting  
43 once again into urban wellness and development capable of imprinting and leveraging  
44 innovativeness and responsiveness around the environment (Teece, 2007; Thrassou and  
45 Vrontis, 2008). In particular, organizational climate is frequently discussed as an  
46 important precondition for the success of smart city innovation (Soto-Acosta *et al.*, 2015).  
47

48 In this context, in accordance with the principle of the organizational innovative  
49 *milieu* (Harrison *et al.*, 1996; Maillat, 1995) and human resources in the innovation  
50 climate (Popa *et al.*, 2017), some best practices related to the adoption of smart cities are  
51 useful in understanding such open innovation tools, unboxed for urban and public  
52 organizations. Within the scope of smart cities, citizens, firms, and public organizations  
53 tend to cooperate to develop knowledge and technological innovations (Dyer and  
54 Noneoka, 2000; Pinegar, 2006). Despite significant advances in innovation management  
55 studies, the effects of human engagement in the open innovation context have scarcely  
56 been investigated, especially concerning smart city adoption (Choi *et al.*, 2008; Tseng,  
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2008). Thus, there is a clear research gap in terms of understanding how and under what circumstances human initiatives lead to better results.

Based on these points, this research aims to contribute to the literature on open innovation by shedding light on whether and how a complete adoption of open and lean collaboration in smart city initiatives can facilitate a greater circulation of knowledge and enhance innovative capacities among public actors and firms, also involving in greater depth the capacities and feelings of citizens as lead users in co-creation projects.

The literature review in this study aims to explore and analyze the basis of smart cities' engagement with a view to providing an integrative framework that can be used to examine how citizens and local governments envision smart city initiatives. The review is organized in two stages. First, the main features of smart cities are compared, then conceptual building blocks are reconstructed and evaluated comparing different points of view for clarity and theoretical coherence. The second stage, which compares the concepts of lean management and the job-to-be-done perspective related to smart cities, is mainly a consequence of the way of interpreting innovation as an open paradigm predominantly focused on a user-centric approach that involves citizens and civil society (i.e., the customers) in smart projects in terms of a technologically driven climate and external sources of knowledge.

#### *Smart city concepts and open innovation environments*

Across the borders of multidimensional streams of research, the innovation management literature strongly agrees that urban cities act as relevant stakeholders in sustaining and accelerating innovation processes through the dissemination of external sources of knowledge (Laursen and Salter, 2014; West and Bogers, 2014). The "smart city" idea came up in the 2000s, thanks to IBM and Cisco (Cisco, 2010a, 2010b). At the core of this concept is a kind of perfect city with high levels of automation due to the extensive use of ICT tools. The phrase was then successfully adopted by technology companies, such as Siemens, for the application of complex information systems aiming to integrate the operation of urban infrastructure and services, such as transportation, electrical and water distribution, buildings, and public safety. The smartness of a city is composed of several dimensions. Early on, Giffinger (2007) identified six different dimensions of smart cities, namely smart mobility, smart environment, smart people, smart living, smart governance, and smart economy.

In recent years, many scholars have investigated this phenomenon, generating many definitions as a result. Lee *et al.* (2012, 2014) define a smart city with respect to the convergence of IT services within an urban space. In this space, citizens can access smart services, and this will consequently increase the city's competitiveness and its citizens' quality of life. The adjective "smart" also refers to the government of a city and its capacity to generate innovation in the ways that services and communication are delivered to the local population (González and Rossi, 2011). A smart city can also be seen as a conceptual urban development model based on the utilization of human, collective, and technological capital for the development of urban agglomerations (Angelidou, 2015). Again, Nam and Pardo (2011) conceptualize a "smart city" as an interplay between technological innovation, organizational innovation, and policy innovation, so that a smart city becomes an inherently "complex socio-technical system of systems" (Curry *et al.*, 2016).

Based on our knowledge, and in line with the principles of open innovation, we recognize that smart cities represent a locus of innovative milieu in which knowledge circulates around the neighborhood, and stakeholders are constantly interacting to foster technological advances, urban facilities, and local business circuits according the principles of co-creation, co-development, and co-evolution of innovation (Alves, 2013;

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2  
3 Carayannis and Alexander, 1999; Chesbrough *et al.*, 2014; Dezi *et al.*, 2006; Nicotra *et*  
4 *al.*, 2014).

5 In this regard, smart city projects are recognized as a necessary process in sustaining  
6 and maintaining competitive advantage within knowledge-intensive urban contexts,  
7 appreciating integrative perspectives that consider both internal and external sources of  
8 knowledge in order to cope with open environments, and to exploit technological and  
9 commercial opportunities (Del Giudice and Maggioni, 2014; Grant and Baden-Fuller,  
10 2004).

11 In accordance with Lichtenthaler and Lichtenthaler (2009), we also note the need to  
12 construct a framework for managing innovation within smart cities. Here, it is necessary  
13 to consider knowledge exploration, retention, and exploitation, especially outside  
14 organizational boundaries, as a proxy of the interconnection capacity for both the public  
15 and private partners to retain knowledge in interfirm relationships (Kale and Singh,  
16 2007).

17  
18 As a consequence, cities require a rethinking of strategies in order to achieve success  
19 in a smart manner, by exploiting efficiency and affordability, which are often  
20 underestimated by the public side. In addition, the relevance of open innovation is highly  
21 salient considering the growing interest in smart programs. Partnership in innovation  
22 involves the engagement and stimulation of civil society to support the process of  
23 knowledge and innovation creation proactively, thus emphasizing the human aspects of  
24 city value co-creation. Giving originality to this work, smart city projects have become  
25 the focus of a particular debate on the entrepreneurial and cooperative roles associated  
26 with citizens.

27  
28 Currently, what seems more interesting is that the smart city aspires to the  
29 democratization and reorientation of innovation processes, mostly through easy access to  
30 technology by lead users—the citizens—as the new experts of bottom-up driven  
31 innovation (Campbell, 2013).

32 According to the quadruple and quintuple model of innovation (Carayannis and  
33 Rakhmatullin, 2014), what enables innovation in democratic smart contexts is properly  
34 the “democracy of knowledge,” which highlights and underscores comparable processes  
35 of exchange and the trading of knowledge flows in public and political pluralism,  
36 favoring the reduction of innovation heterogeneity within society and boosting  
37 competitiveness between enterprises. Our theoretical assumptions are based on the  
38 management of knowledge and human capital (Stewart, 1997) in an urban open  
39 innovation ecosystem, namely the city, in which government and firms aim to gain access  
40 to internal and external resources, and to have sources of knowledge in place to create  
41 new products and services in common.

42  
43 Smart city projects thereby suggest new forms of interactions and collaborations,  
44 boosting new innovation models and processes coming contemporaneously from different  
45 market-based partners, such as competitors, suppliers, universities, and urban society  
46 (Carayannis *et al.*, 1998; Santoro *et al.*, 2016; Wang *et al.*, 2015).

47  
48 Clearly, an open innovation participatory ecosystem plays a huge role in facilitating  
49 this balance, encompassing the distance from the stakeholders at the bottom (i.e., civil  
50 society) to the top level (i.e., government), sustaining a circular flow of ideas,  
51 information, knowledge, and technology solutions, and fostering relationships with  
52 financial investors. In this regard, smart environments can qualify as a positive and  
53 favorable business crossroads, a place of meetings for policy making, technology  
54 exchange, and for firms and institutions to interact directly and reciprocally with citizens  
55 as urban users in order to sustain the diffusion of a fresh innovation climate for  
56 knowledge (Popa *et al.*, 2017).

57 Under these conditions, the openness of smart city projects can also be explained in  
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3 terms of the propensity to collaborate and the intensity of collaboration between firms  
4 and local external partners (Lee *et al.*, 2012). Hence, in summary, this study sketches an  
5 alternative “democratic” concept as a building block for smart city concepts that appear  
6 more in line with visions of human participation as well as urban development. Table I  
7 summarizes the definitions found in the literature.  
8

9 [Insert Table I about here]  
10

11 The smart city concept has to be distinguished from other similar ideas, such as the  
12 digital city, because it focuses on factors such as human capital and education as drivers  
13 of urban growth, rather than highlighting the role of ICT infrastructure (Hollande, 2008).

14 The flexibility of modern ICTs can foster knowledge inventiveness, knowledge  
15 absorption, knowledge transformation, and knowledge connection, by encouraging  
16 customers to become more proactive and more interconnected, thus stimulating business  
17 creativity (Del Giudice and Della Peruta, 2016; Guerteen, 1998). Human capital and  
18 citizens’ involvement is one of the most problematic points with respect to smart city  
19 development. As Guest (2001) noted, even if technology is a prerequisite of any smart  
20 city, it is not possible to define a city as smart when there is no real engagement and  
21 cooperation between citizens and other stakeholders, such as public institutions and  
22 private organizations. Scholars agree that the primary objective of a smart city is to  
23 improve the quality of the city and quality of life in the city. Indeed, the ultimate goal of a  
24 smart city is to create sustainable value for citizens, employees, shareholders, and other  
25 stakeholders (Lee *et al.*, 2014).  
26

27 Given an efficient ICT infrastructure, to become smart, a city needs appropriate and  
28 balanced citizens’ involvement, together with an appropriate and balanced model of  
29 governance (Rufin *et al.*, 2012). Concerning the first point, some scholars have focused  
30 on the role of human capital in improving a city’s “liveability.” Ultimately, smart city  
31 initiatives can also include human capital investments, aimed at fostering a city’s capacity  
32 for learning and innovation by supporting and motivating the local population to engage  
33 in education, improve their own lives, and attract and retain other valuable inputs from  
34 outside, i.e., investors and entrepreneurs (Del Giudice *et al.*, 2013; Ries, 2011).  
35 Concerning the second point, there is a growing central role of the government, especially  
36 on the local side, exercising a decisive pull for the smart city discourse (Wolfram, 2012).  
37 Thus, the ICT system of a smart city is complementary to human and organizational  
38 capital, and its usage is shaped by political choices and by the urban ecosystem of the  
39 citizens, technology vendors, and local authorities, depending on the city’s needs and  
40 habits (Kale and Singh, 2009; Moller *et al.*, 2005).  
41

42 Finally, there are two main positions in the debate on how a smart city should be. On  
43 the one hand, smart cities are seen as factories for life, and hence the focus is on a broad  
44 use of ICT that enables central planning and an integrated view of the processes  
45 characterizing urban operations. As a consequence of this approach, the emphasis is on  
46 the production and the distribution of energy, transportation, logistics, and waste  
47 management and pollution control, and it looks at the ways in which ICT can harness  
48 information processing in these fields.  
49

50 On the other hand, smart cities are characterized more by bottom-up approaches,  
51 providing access to big data and allowing citizens to make their own decisions.  
52 Consequently, the focus is on the importance of investments in urban living domains,  
53 wherein ICT plays a more limited role in enabling sustainability and handling  
54 “transactions,” thus being related to welfare and social inclusion policies, culture, and  
55 education (Neirotti *et al.*, 2014).  
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3 According to Kang *et al.* (2007), current research on smart city projects can be used  
4 strategically to support relational archetypes in external alliances, mainly focused on five  
5 areas, as identified in Table II.

6  
7 [Insert Table II about here]

8  
9 With respect to the final point, in order to deliver the applications and services needed for  
10 urban management, many cities are engaging in an open innovation model to increase the  
11 participation of citizens and organizations in citizen-led innovation. In particular, the  
12 alignment and explicit connection between open data policies with open innovation  
13 aspects of smart cities are increasingly becoming stronger (Curry *et al.*, 2016).

14  
15 In general, as pointed out by Harrison and Donnelly (2011), smart cities comprise a  
16 field in want of a good theoretical base. Specifically, they represent a multidisciplinary  
17 field, constantly shaped by advancements in technology and urban development  
18 (Angelidou, 2015). Thus, many themes are to be considered in greater depth. The most  
19 important ones concern: the definition of a smart city, to be shared and useful in  
20 clarifying which initiatives are included in a smart city strategy; smart city goals and the  
21 measures needed to evaluate its success or failure; the collection of best practices, the  
22 repeatability of prototypes, and the financial sustainability of smart initiatives (Dameri  
23 and Rosenthal-Sabroux, 2014); also strategic planning in this field is still largely  
24 unexplored (Hollands, 2008; Komninos, 2011a; Wolfram, 2012). Finally, albeit planning,  
25 monitoring, and managing crowds of people are fundamental tasks in city management,  
26 the topic of crowd management has also received little attention within the smart city  
27 domain (Curry *et al.*, 2016).

28  
29 Furthermore, another interesting result of this analysis involves the firm side of  
30 partnerships, establishing that flexibility and lower formalization facilitate openness and  
31 the expansion of boundaries in smart city projects, which encourages new ideas and  
32 positive organizational behaviors (Damanpour, 1991; Komninos *et al.*, 2011).

33  
34 More generally, there is a need for more case studies of smart city deployments,  
35 including retrospective analyses of successful and unsuccessful smart city developments,  
36 to increase understanding of what it takes to deliver impact within a smart city, as well as  
37 to provide insights into the challenges, techniques, and lessons learned (Komninos *et al.*,  
38 2013). This is probably due to the high uncertainty linked to technological volatility, the  
39 randomness in the bargaining of knowledge between actors, the complexity of dynamics  
40 and content for performance appraisal and performance compensation (Campanella *et al.*,  
41 2017; Inkpen and Beamish, 1997; Kang *et al.*, 2007). Table III summarizes the current  
42 research and research gaps.

#### 43 44 *Lean methodology and job-to-be-done approaches for smart city development*

45  
46 The degree of openness and depth of collaboration depend on mechanisms that allow  
47 faster and more dynamic interaction between the various stakeholders engaged in the  
48 innovation process. In arranging this, the capacity to create and reproduce a captive smart  
49 city is particularly related to knowledge circulation (Chesbrough, 2003).

50  
51 [Insert Table III about here]

52  
53 With this in mind, in accordance with Scuotto *et al.* (2016), this study adopts a  
54 particular concept of the inbound open innovation model, whereby the degree of  
55 openness to smart collaborations is strictly tied to the ability to integrate more informally  
56 users' commitment to the innovation process. Informal inbound open innovation is  
57

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2  
3 considered the beginning of an approach to external actors to mitigate risks related to the  
4 asymmetry of information, as well as to strengthen the marketability of new technologies  
5 addressing urban needs. In the long run, this approach could ensure smart city strategies  
6 do not proceed with a “trial and error” approach, but more properly by adopting a  
7 common and well-planned process shared by all players in the urban context. To this end,  
8 this research aims to reconsider and extend the theoretical background by considering  
9 lean methodology and the job-to-be-done approach in order to provide a better  
10 explanation based on the relationship with the Quadruple and Quintuple helix of  
11 innovation.

12 Originally, the term “lean” described Toyota's business during the late 1980s, and the  
13 characteristics of a lean organization and supply chain were subsequently described by  
14 Womack and Dan Jones (2003). Although the lean concept is directly linked to the  
15 production strategies of Toyota, it is not only suited to manufacturing but also applies to  
16 every business and every process. It represents a way of thinking and acting for an entire  
17 organization. The core idea of lean methodology is to create greater value for customers  
18 with fewer resources. This means that a lean organization should understand customer  
19 value and focus its key processes on continuously increasing it. To achieve this objective,  
20 lean thinking changes the focus of management from optimizing separate technologies,  
21 assets, and vertical departments to optimizing the flow of products and services through  
22 entire value streams that flow horizontally across technologies, assets, and departments to  
23 customers. Specifically, the Lean Enterprise Institute recommends five steps to be  
24 followed in implementing lean techniques (Shook and Marchwinski, 2014), namely:  
25 specify value from the standpoint of the end customer by product family; identify all the  
26 steps in the value stream for each product family; ensure the value-creating steps occur in  
27 a tight sequence so the product will flow smoothly toward the customer; as flow is  
28 introduced, let customers pull value from the next upstream activity; as value is specified,  
29 value streams are identified, wasted steps are removed, and flow and pull are introduced;  
30 begin the process again and continue it until a state of perfection is reached in which  
31 perfect value is created with no waste.

32 Building around these ideas, Ulwick (2005) developed outcome-driven methodology,  
33 based on the job-to-be-done theory. Here, the focus is on customer needs: Companies  
34 must shift their attention from the product and focus their requirement-gathering efforts  
35 on the execution of the job that the product or service is intended to perform, i.e., giving  
36 customers a fair hearing (Ulwick and Bettencourt, 2008). The job-to-be done theory has  
37 at its core job mapping, which entails breaking down a job that customers want done into  
38 discrete steps, and then brainstorming ways to make the steps easier, faster, or  
39 unnecessary. For example, when cleaning clothes, people do not notice stubborn stains  
40 until they have taken the clothes from a dryer and started folding them. If they find a  
41 stain, they must repeat the job. A washer that detects persistent stains and takes  
42 appropriate action before consumers execute the rest of the job would have huge appeal,  
43 i.e., employing a customer-centered innovation map (Bettencourt and Ulwick, 2008). All  
44 jobs have a universal structure. That structure, regardless of the customer, includes the  
45 following process steps: defining what the job requires; identifying and locating needed  
46 inputs; preparing the components and the physical environment; confirming that  
47 everything is ready; executing the task; monitoring the results and the environment;  
48 making modifications; concluding the job. Because problems can occur at many points in  
49 the process, nearly all jobs also require a problem resolution step.

50 Finally, Ries (2011), further developing the lean concept, provided a method that is  
51 instructional on how to drive a startup (how to steer, when to turn, and when to  
52 persevere), and grow a business with maximum acceleration. It provides a scientific  
53 approach to creating and managing startups, and getting a desired product into customers'

hands faster. A core component of lean startup methodology is the build–measure–learn feedback loop. The first step is figuring out the problem that needs to be solved and then developing a minimum viable product (MVP, a product with just enough features to gather validated learning about the product and its continued development) to begin the process of learning as quickly as possible. Once the MVP is established, a startup can work on tuning the engine. This will involve measurement and learning, and must include actionable metrics that can demonstrate cause and effect. It is worth noting that not only can all businesses in all industries and services adopt these principles, but also governments.

## **Methodology and research question**

### *Research context*

Due to the lack of case studies regarding smart city deployments, this research first aims to fill that gap by collecting best practices in order to better inform theory. More precisely, the main research question is as follows:

*RQ: How could a smart city develop smart projects in a faster and more efficient manner, and simultaneously involve its citizens more optimally and to a greater extent?*

The growth in smart city initiatives among European countries involves transversally not only large but also small and medium-sized cities in launching innovative business projects that promote the development and technological conversion of urban centers. However, the territorial specificities of both the countries and the cities inextricably and idiosyncratically bind the development of smart city projects within their environments. Therefore, at least in an initial exploratory phase, this empirical research is focused on qualitative exploration (Eisenhardt, 1989; Gomm *et al.*, 2000; Yin, 2003).

To attain the goal of this research, a qualitative case study analysis of a smart city project in the city of Turin was adopted. The method is particularly appropriate when the research is formulated in the form of a “how” question. A case study confers reliability in terms of the discussion, representing an essential complementary part of the chosen methodology, as it enables the presentation of situational explanations of the problem under investigation, together with vivid illustrations of the reality of organizations and projects, and insights into cause–effect relations beyond what can be achieved through quantitative analysis. The focus in case studies is to produce descriptions of meanings and relations, and to understand how reality is “constructed” from the appearance and unfolding of events (Gephart, 2004). The case study follows well-accepted approaches of design and execution of case studies involving, according to Yin (2003): a criterion sampling strategy, data collection through multiple sources of evidence, an analytic strategy that aims to provide the greatest possible completeness of the targeted information through a sequential and cumulative analysis of the whole case population. In particular, to achieve the theory-building goal, a single-case design has been adopted.

### *Research design*

Building on the theoretical background provided above, and with the research question in mind, the empirical assessment was performed in two stages. Based on the main research question, the methodology focused on two sub-dimensions: a) the concept of the Turin smart city; b) the implementation of smart project initiatives.

The rationale underlying the methodological choice is related to the exploratory nature of this research: the Turin smart city is employed as revelatory case, in which the single-case study design choice is due to the capability of this method to provide a rich

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3 description of the existence of a phenomenon (Siggelkow, 2007). Turin is ranked third in  
4 the *EY Italy Smart City Index* (2016); furthermore, very recently the city government  
5 decided to approach its smart city project by adopting lean principles. Thus, it represents  
6 a unique opportunity to observe how an innovative project can be developed by applying  
7 a different methodology.

8 The target sample of the study consisted of 15 employees and 5 executives of the  
9 Innovation and Smart City Department of the Turin municipality, who had participated in  
10 simplification and learning programs, and pilot projects launched to sustain smart  
11 conversations in the town. The participants were selected because they were in charge of  
12 the development of the innovations chosen through a convenience sampling procedure.  
13 They were asked to participate based on an “ad-hoc” task force composed of specialists  
14 in engineering, management, and computer science, following the strategic planning of  
15 smart initiatives in Turin under the guidance of the Councilor for Innovation and the  
16 Turin Smart City Program. All participation was voluntary and each survey was  
17 independently collected within four weeks of distribution. With regard to the  
18 demographic distribution, 48% were male and 52% were female, and the majority of the  
19 respondents were in their 30–40s (70%), and had less than 10 years of tenure in the  
20 organization (54%).

21  
22 Data gathering and participant observation lasted six months, between July 2016 and  
23 January 2017, and was elaborated over another three months, leading to the definition of  
24 a roadmap of values with the theoretical framework presented in Figure 1. Overall, the  
25 empirical research lasted almost a year. Data were collected through focus group  
26 interviews and brainstorming activities, documentary analysis, and reviews of internal  
27 and external information sources, especially city government documentation, Internet  
28 sources, and publicly available studies and reports, and meetings with the mayor and the  
29 Councilor. These were enriched by participant observation of the activities of the Turin  
30 Innovation Team in charge of the project. All information was initially addressed face to  
31 face, directly participating in meetings and at round tables convened by the government  
32 of Turin and then via Skype or through mail (Cami).

33  
34 The results presented in this survey provide the first empirical data on the screening  
35 of feasibility studies and impacts on the city. After data collection, the results were  
36 discussed by proposing a conceptual framework of the citizens’ engagement in the Turin  
37 smart city, and investigating the specific smart initiatives in order to highlight successful  
38 best practices.

## 40 **Results and discussion**

### 41 *The Turin Smart City Program*

42 The Turin Smart City Program is implemented by an Innovation Team within the local  
43 government. The aim of the program is to create a more liveable city: citizen oriented,  
44 able to listen, and involving, communicating and collaborating inside and outside with  
45 citizens, government, public and private companies, universities, and research institutes  
46 (Du Chatenier *et al.*, 2007). In particular, the Turin Smart City aims to become a  
47 successful “startup,” driven by the following values:

- 48 1. Assuring citizens’ quality of life.
  - 49 2. Providing clear information exchange and communication between citizens and  
50 institutions.
  - 51 3. Simplifying city services.
  - 52 4. Developing an ecosystem as a platform for matching supply with demand for  
53 innovation.
  - 54 5. Developing and employing skills within the public domain.
  - 55 6. Assuring workers’ quality of life.
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4 Directly linked to these values, there are some specific objectives:

- 5 1. Putting citizens and districts at the center of innovation processes in order to define
- 6 activities and needs, and develop customized and simple services.
- 7 2. Improving communication, collaboration, and transparency in the relationship
- 8 between citizens and the municipality.
- 9 3. Attracting innovative companies.
- 10 4. Developing innovation demand.
- 11 5. Creating collaboration between different public and private actors, working on
- 12 innovation also through partnership with other local administrations.
- 13 6. Supporting active projects in the experimentation, development, growth, and
- 14 communication phases.
- 15 7. Creating a unique ecosystem to develop human capital, namely a “smart open-brain
- 16 city,” by increasing the skills of city government, attracting new talent, enjoining
- 17 new actors, and developing smart projects that use specific city areas, particularly
- 18 suburban areas, as an experimentation laboratory able to sustain and generate value
- 19 for the community.
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22 The city is concretely reaching these objectives by adopting a lean approach in  
23 developing its smart projects. As briefly shown in the literature review, companies adopt  
24 the lean approach to create customer value. With the same aim, Turin’s city government  
25 has been adopting the lean approach, applying its principles to citizens. Thanks to the  
26 lean approach, starting from the job-to-be-done method, the Turin Smart City is able to  
27 identify not just the citizens’ needs, but also the activities that citizens do and want to do.  
28 The city government then recreates the service around these activities. Generally, each  
29 project consists of three phases: a) citizens’ need identification based on the job-to-be-  
30 done methodology; b) building the minimum viable prototype, that is a demonstrator;  
31 finally c) scaling up, namely the extension of the minimum viable prototype previously  
32 realized into a minimum viable product. Each aspect receives feedback from the citizens,  
33 triggering crowd processes. In particular, the reconstruction of citizens’ services based on  
34 the job-to-be-done methodology occurs through the following steps: i) identification of  
35 citizens’ activities; ii) the division of city services into processes; iii) the analysis of  
36 services in terms of satisfaction level and the number of citizens involved in the services  
37 (it is thus possible to give priority to certain services over others). Drawing on the  
38 universal job map recommended by Drayton (2002), the public administration generally  
39 defines citizens’ needs, assessing entrepreneurially the way to solve these through a  
40 process, as shown in Figure 1.  
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44 [Insert Figure 1 about here]

45  
46 The lean approach, combined to the job-to-be-done methodology, is enabling the city to  
47 develop an internal startup mentality. This is possible, in particular, due to the following  
48 initiatives: the Startup in Residence (STIR) project; the “Citizen Saturday” initiative, the  
49 Innova.To project, and the establishment of a public competition awarding the best  
50 technology-driven service solution.  
51

#### 52 *Innovative projects and initiatives*

53 *The Startup in Residence (STIR) project.* In collaboration with the city of San Francisco,  
54 this project aims to solve Turin’s city government problems and challenges based on  
55 collaboration with local startups. The final objective is to create products as well as better  
56 services able to solve citizens’ critical needs. Furthermore, through this project and the  
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3 partnership with the NASDAQ Entrepreneurial Center, Turin will be part of a network of  
4 around 100 cities in the next five years. This is a great opportunity for the city to make its  
5 digital transformation effective in an efficient and faster way. At the core of the project  
6 there is the possibility of sharing value among two different actors usually not connected:  
7 startups and the public administration. On the one hand, the local administration will  
8 learn a faster, agile, lean, and cross-sectional way of working that is typical of  
9 entrepreneurs. On the other hand, startups will develop a deeper understanding of the  
10 public administration's needs. Due to more traditional bureaucratic mechanisms, startups  
11 usually face big challenges in collaborating with the public sector. Thus, a new economic  
12 development will be enabled by the reduction of entry barriers to the city government for  
13 startups.

14  
15 This project surely represents a first step towards a new economic development,  
16 offering many advantages to the public government, such as the opportunity to solve a  
17 complex problem and obtain for about 16 weeks new skilled human resources within the  
18 city government.

19 In greater detail, each local government department will identify one or two city  
20 challenges/problems. The list of challenges will be published. Then startups can submit  
21 their projects to solve those challenges and problems. The startups selected will work for  
22 16 weeks within the public administration to develop the proposed project. During the 16  
23 weeks, the startups will work within the city government and will be followed by an  
24 external company in charge of driving the prototype process creation in an agile way.  
25 Every four weeks, each startup will show a prototype for the problem solution. At the end  
26 of the 16 weeks, the startups and public administration employees will be able to gain  
27 access to the European Innovation Academy, where the prototype will be accelerated  
28 until the product is almost finished.  
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30  
31 *The Citizens' Saturday.* Each Saturday the public administration meets citizens with an  
32 innovative idea to propose. Then, if the idea is feasible, the city government helps the  
33 proponent implement it. Through the following open call, the public government's  
34 Innovation Team invited all citizens to participate:  
35

36 *“Saturday, January 28, 2017, between 9.00 am and 1.00 pm, in a public meeting, citizens*  
37 *can present their innovative projects to the Turin Innovation Team. If you have an*  
38 *innovative idea, send us an e-mail by Sunday, January 22, 2017 with: i) a brief*  
39 *description of your project (1000 characters); ii) the need it resolves; iii) required*  
40 *activities for implementing it; iv) the business model. Those selected have the opportunity*  
41 *to present the project in 10 minutes at the Civic Palace. We are awaiting all the city's*  
42 *innovators!”*  
43

44 The first meeting was completely dedicated to 15 projects in terms of their viability, and  
45 being in the culture and health domains, all proposed by citizens. These citizens proposed  
46 to the city government solutions for improving the quality of city life. For some proposed  
47 projects, the Innovation Team hypothesized an interaction with ongoing technological  
48 city projects (i.e., Big Data and WiFi), or other city divisions (such as a security project  
49 or support for city requalification projects). For other projects, the team defined main  
50 problems and possible solutions. Finally, other projects were already in the prototype  
51 phase, and the team discussed with citizens how to improve on the prototypes and test  
52 them on the city. Thus, Turin is becoming an open testing and development laboratory in  
53 which prototypes can be improved on through users' experience.  
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56 *Innova.To.* This project is a virtuous competition between the public employees of the  
57 municipality of Turin aimed at developing innovative ideas for improving the  
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3 performance of public administration through the reduction of waste and increased value  
4 of available resources. Innova.To was specifically proposed to transform ideas into new  
5 services, products, and solutions that would create both social and economic benefits for  
6 the local authority and the urban community.

7 As a result, in 2015 it started implementation of its winning projects, also through the  
8 direct involvement of employees and sectors interested in the ideas. The winning project  
9 concerned the allocation of a 5x1000 tax donation for the development of specific  
10 projects selected by the local community. In this manner, the citizens of Turin can  
11 concretely see what they are financing through the donation of 5x1000 of their individual  
12 income tax, promoting the transparency of public action and better participation on the  
13 part of the local community. The winning ideas, selected from among 71 projects, were  
14 acknowledged in a public ceremony. The winners were awarded a special certificate and  
15 several prizes offered by all the partners of the initiative (i.e., two electric bikes offered  
16 by Enel, eight smartphones by Huawei, etc.).

17  
18 Generally, Innova.To's main objective is to innovate through training, learning, and  
19 encouraging all public employees to propose new solutions to the city's problems. The  
20 core idea is that public employees know the city's problems on two grounds: as public  
21 employees and as citizens. Thus, this two-sided vision can enable employees to find the  
22 right solution to the city's problems.

23 In particular, special training for employees is addressed at: i) creating a  
24 startup/entrepreneurial mentality; ii) supporting individuals in developing a methodology  
25 for evolving innovative projects; iii) supporting individuals in developing a lean approach  
26 to projects; iv) supporting individuals in developing a lean "zero defect" approach.  
27 Objectives (i) and (ii) can be achieved through collaboration with the European  
28 Innovation Academy, together with the continuous openness of the Innova.To contest,  
29 while objectives (iii) and (iv) can be attained through the careful selection of "mentors,"  
30 working together with defined teams within the city government's innovation projects.  
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33 *Public award for the best technology-driven solution.* This is not a fully-developed  
34 project, but an ongoing initiative. The main idea is to offer a competition through a call in  
35 which citizens are asked to submit government service delivery solutions. Specifically,  
36 any type of government service delivery solution provided via a mobile phone is eligible,  
37 from smartphone apps to web solutions to automated text messages. Following similar  
38 ideas developed in other smart cities, the award will recognize innovation in eight  
39 categories: health, education, environment, social affairs, safety and security, tourism,  
40 economy and commerce, and transportation and infrastructure. The entries are assessed  
41 using three criteria: efficiency and effectiveness (40 percent), ease of use (40 percent),  
42 and innovation (20 percent). In addition, the solutions must be related to a core  
43 government service offered to external customers, whether consumers or businesses. This  
44 excludes government-to-government services. While improvements in this area are  
45 important to the country, the award aims to generate citizen- and business-focused  
46 solutions (Gassmann and Enkel, 2004). This public award represents another attempt to  
47 involve people in city matters in order to find better solutions to the city's problems.  
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### 50 **Conclusions, implications and future perspectives**

51 In conclusion, from this exploratory research, the study deems that smart city projects  
52 could be developed taking into consideration different factors, such as social and  
53 stakeholder engagement, citizens' startup mentality, firms' commitment, and strategic  
54 public control (Bresciani *et al.*, 2017). This approach serves as forerunner for the  
55 construction of a new conceptual and practical framework, which will rebuild the smart  
56 city based on social entrepreneurial intensity (Morris, 1998).  
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3 This research aims to understand how disruptive innovation could circulate within  
4 complex local systems, encompassing open innovation mechanisms and practices, and  
5 furthering the ways in which the opening of technological gates to urban smart networks  
6 can spread external sources of knowledge (Lhuillery and Pfister, 2009; Pisano *et al.*,  
7 2014).

8 Considering the status of the knowledge-intensive economy, the realization of smart  
9 cities has become a real opportunity to redefine competitive and urban development,  
10 which is significantly affected by technological progress and collaborations between  
11 economic and non-economic players at different stages. In this context, the adoption of  
12 job-to-be-done practices offers cities new opportunities to improve their knowledge  
13 management practices and increase knowledge flow through advanced high-intensive  
14 open innovation collaborations also with citizens (Del Giudice *et al.*, 2016; Malhotra,  
15 2000). Despite this, few studies have attempted to investigate the role played by the  
16 social aspects of open innovation. Hence, it is necessary to unpack the boundaries of  
17 smart cities in terms of internal and external sources of knowledge fostering efficacy and  
18 innovativeness (Vrontis *et al.*, 2016).

19  
20 To really understand if an identified need can be solved by the chosen technological  
21 solution, it is necessary to develop several prototypes: The quicker prototypes can be  
22 developed, the more it is possible to experiment and develop distinctive skills. To achieve  
23 this goal, one must be able to identify needs, develop prototypes, and attain an  
24 entrepreneurial mentality, which means acting as a startup. Last but not least, it is  
25 necessary to create an open organization able to capture opportunities, discover external  
26 talents, and inspire and motivate people (Barbutto, 2005). The Turin Smart City identifies  
27 citizens' needs by adopting the job-to-be-done methodology, developing prototypes and  
28 fostering a startup mentality due to the STIR and Innova.To projects, creating an open  
29 organization through the "Citizens' Saturday" initiative, and ensuring continuous  
30 collaboration among different institutions (Vigoda, 2002). Finally, the city is also trying  
31 to optimize technological solutions by activating a public competition aimed at awarding  
32 the best technological solution proposed. The aims of and subjects involved in each smart  
33 project are summarized in Table IV.  
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36 [Insert Table IV about here]  
37

38 As shown, all these initiatives contribute substantially to creating a virtuous ecosystem, in  
39 which the public actor combines a lean approach with the job-to-be-done methodology,  
40 together with a startup mentality, collaborating with companies and citizens (Johnson *et al.*,  
41 2008; Ries, 2011; Zadnor *et al.*, 2006). Specifically, lean methodology linked to the  
42 minimum viable product concept enables the startup approach, wherein the main output is  
43 the ability to develop smart projects more rapidly. Furthermore, thanks to these specific  
44 projects, the city is increasingly able to involve all its stakeholders—citizens, companies,  
45 public employees, and other institutions—to a greater extent and more optimally,  
46 highlighting the relevance of responsible public leadership in a global stakeholder society  
47 that aims to contribute to building social capital. This can be done within smart cities,  
48 ultimately leading to sustainable and efficient business as a precondition of urban  
49 development (Maak, 2007).  
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### 52 *Managerial implications*

53 From a managerial viewpoint, the approach advocated here is not exactly intended as a  
54 best practice model for smart cities, but rather aims to emphasize the integrated nature of  
55 different perspectives, and the possibility of combining an entrepreneurial approach, a  
56 kind of startup mentality, with the public sector to facilitate the development of  
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3 innovative smart projects. Despite the various interpretations of smart cities, the study  
4 aims to contribute to civil engagement in open innovation in smart cities, which is still  
5 scarce in the literature but promises widespread impact (Portney, 2005). This because a  
6 culture of innovation and a climate encompassing citizens has not yet been well  
7 developed; in such an environment, firms share the risks and responsibilities for the  
8 development and implementation of new technology or service projects with other public  
9 and private actors based on compensation benefits shared with managerial authority and a  
10 high degree of operational involvement by political players (Kivliece and Quelin, 2012).  
11 One of the interviewees stated that “*when the aim of the partnership is exploiting new  
12 services within the city, firms with different competencies become involved with the  
13 project.*”

14  
15 Our multiple project case study has shown that citizens’ networking capabilities and  
16 the external organizational climate are closely intertwined. Indeed, all smart city projects  
17 stress that citizens are critical for an innovative growth path, mostly because local  
18 governments often do not have the knowledge and management capabilities necessary in  
19 the new and complex context the smart city requires. Thus, the degree of smartness  
20 depends in part on the ability of the regulators to develop internal routines and processes  
21 to mobilize, coordinate, and integrate interorganizational partnerships strategically at all  
22 levels of the smart city (Boselie *et al.*, 2001; Jansen *et al.*, 2009). Moreover, the  
23 fundamental role played by citizens in transposing and disseminating tactically  
24 innovative and tacit knowledge also emerges, i.e., the nexus of absorptive capacity of the  
25 smart Shumpeterian environment (Giarratana *et al.*, 2007).  
26

### 27 *Theoretical implications*

28 From the theoretical perspective, the existing literature does not satisfactorily investigate  
29 the contingent factors regulating the lean management of smart factories (Santoro *et al.*,  
30 2017). Accordingly, this study finds that the open innovation literature provides greater  
31 scope in unpacking the boundaries of smart cities, by addressing several organizational  
32 situations and strategic resolutions for public industry as well as for firms’  
33 competitiveness in general (Giffenger *et al.*, 2007).  
34

35 Following the quadruple and quintuple helix innovation model of Carayannis and  
36 Campbell (2012), and subject to the study assumptions, the job-to-be-done approach  
37 emphasizes the need for the government and public institutions to develop open  
38 innovation projects that can be implemented through bottom-up methods, and employing  
39 metrics that will help to achieve the right timing in the market in terms of meeting  
40 citizens’ expectations (Lo and Jim, 2012), and ensuring efficiency and effectiveness in  
41 the implementation of top-down smart city projects (Bakıcı *et al.*, 2013; Ferraris and  
42 Santoro, 2014; Paskaleva, 2011).  
43

44 In this regard, the adoption of job-to-be-done practices delimits the boundaries of  
45 entrepreneurial activities for public and private partners, complementing the disruptive  
46 nature of smart projects, which at their core are relate to the competitiveness responsible  
47 for the growth of innovative performance strategies (Schaffers *et al.*, 2011). Moreover,  
48 job-to-be-done practices enhance the human side of open innovation because  
49 governments and firms are able to know more about users (i.e., citizens), and thus enable  
50 redirection in terms of what they are to accomplish when the project is taking a wrong  
51 turn (Radnor *et al.*, 2006).  
52

53 Indeed, the continuous monitoring and analysis of data, and provision of feedback  
54 and information can help to uncover unpredictable events, thus enabling the search for  
55 the best alternative. Therefore, the focus on acquiring knowledge concerning users by  
56 collecting enormous volumes of customer information could help speed up analysis and  
57 enable sophisticated analyses of customer needs, helping to develop innovation projects  
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3 structurally and with care through calculating and mitigating the risks related to the  
4 innovations process (Choi *et al.*, 2008; Tseng, 2008). From the outside, the application of  
5 this paradigm is complementary to a disruptive innovative strategy for firms; at its core, it  
6 is about competitive responses to innovation by helping predict the behavior of citizens,  
7 who pose the greatest threat of failure.

8 Thus, the job-to-be-done approach aids in understanding to how to create products  
9 and services that citizens want to acquire, thence transforming understanding of open  
10 innovation projects to a causal customer-driven purchase (Johnson *et al.*, 2008).  
11 Accordingly, the new perspective could change the rules of competition in private–public  
12 alliances by allowing partners to differentiate offerings competitively through successful  
13 innovations that help users resolve problems by being involved in: a) decision-making  
14 processes, b) pushing progress, and c) addressing powerful and emotional social  
15 ownership useful for improving social welfare and redressing imbalance.

16 Identifying and unpacking the boundaries of smart city projects through the job-to-  
17 be-done approach is only the first step in converting open innovation techniques from a  
18 technology to a customer-centered logic. Also, it indicates essential ways of integrating a  
19 dataset of experiences and insights that are often hard to see, but profoundly mark the  
20 need for the fulfilment of goals and the achievement of results in open innovation  
21 entrepreneurship (Chaston and Scott, 2012).  
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#### 25 *Limitations and future research perspectives*

26 Despite its achievements, the study presents some limitations due to its exploratory  
27 nature. The main limitation is certainly the use of a single-case design: while it has  
28 generated a considerable amount of data, it lacks the capability to generalize the results.  
29 The second limitation is related to the lack of empirical development, which makes it  
30 difficult and to replicate the findings and renders the implications less reliable. Finally,  
31 while the originality of the research gap represents a strong point for the study, it also  
32 makes the research theoretically vulnerable, as there is no clear pathway in terms of  
33 literature concerning the subject.  
34

35 Thus, starting from the results related to the case proposed, further investigation  
36 could strengthen the insights presented here by investigating more cases, particularly  
37 through a multiple-case design using data from a wider sample of cases. Furthermore, the  
38 case of Turin could be followed over a longer period to enhance or validate the research  
39 findings. Not only could a longitudinal perspective be adopted, but also a comparative  
40 analysis could be undertaken involving new smart cities' experiences. Moreover, smart  
41 evolution, such as the concepts of smart factories and the digital industry, could be  
42 supported by being combined with the smart city concept, enhancing productivity. In  
43 addition, it would be interesting to investigate empirically through the use of powerful  
44 quantitative methods within a specific industry context the variables and relationships  
45 affecting open innovation engagement by firms in smart city projects, thus generating  
46 valuable scholarly and managerial insights. Naturally, the relevance of the research topic  
47 also demands further investigation from multiple perspectives to provide a complete  
48 empirical validation of the findings herein.  
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#### 51 **References**

- 52 Adler, P.S., and Kwon, S. (2002), "Social capital: Prospects for a new concept", *Academy of*  
53 *Management Review*, Vol. 27, No. 1, pp. 17–40  
54 Almirall, E., Lee, M., and Majchrzak, A. (2014), "Open innovation requires integrated  
55 competition-community ecosystems: Lessons learned from civic open innovation", *Business*  
56 *Horizons*, Vol.57 No. 3, pp. 391-400.  
57 Alves, H. (2013), "Co-creation and innovation in public services", *The Service Industries*  
58  
59  
60

1  
2  
3 *Journal*, Vol. 33, No. 7-8, pp. 671-682.

4 Angelidou, M. (2015) "Smart cities: A conjuncture of four forces", *Cities*, Vol. 47, No. 9,  
5 pp. 95-106.

6 Bakıcı, T., Almirall, E., and Wareham, J. (2013), "A smart city initiative: the case of  
7 Barcelona", *Journal of the Knowledge Economy*, Vol. 4, No. 2, pp. 135-148.

8 Barbuto Jr, J.E. (2005), "Motivation and transactional, charismatic, and transformational  
9 leadership: A test of antecedents", *Journal of Leadership & Organizational Studies*, Vol. 11, No.  
10 4, pp. 26-40.

11 Batt, P.J., and Purchase, S. (2004), "Managing collaboration within networks and  
12 relationships", *Industrial marketing management*, Vol. 33 No. 3, pp. 169-174.

13 Bettencourt, L.A., and Ulwick, A.W. (2008), "The customer-centered innovation map",  
14 *Harvard Business Review*, Vol. 86, No. 5, pp. 109.

15 Boselie, P., Paauwe, J., and Jansen, P. (2001), "Human resource management and  
16 performance: lessons from the Netherlands", *International Journal of Human Resource  
17 Management*, Vol. 12, No. 7, pp. 1107-1125.

18 Bresciani, S., Del Giudice, M., and Papa, A. (2017), "Public control and strategic  
19 governance in state-owned public utilities: empirical evidence from Italian listed firms", *Sinergie  
20 Italian Journal of Management*, Vol. 102.

21 Caetano, M., and Amaral, D.C. (2011), "Roadmapping for technology push and partnership:  
22 a contribution for open innovation environments", *Technovation*, Vol. 31, No. 7, pp. 320-335.

23 Campanella, F., Della Peruta, M. R., Bresciani, S., and Dezi, L. (2017), "Quadruple Helix  
24 and firms' performance: an empirical verification in Europe", *The Journal of Technology  
25 Transfer*, pp. 1-18.

26 Campbell, T. (2013), *Beyond smart cities: how cities network, learn and innovate*,  
27 Routledge, New York, NY.

28 Carayannis, E. G., and Alexander, J. (1999), Winning by co-opeting in strategic government-  
29 university-industry R&D partnerships: the power of complex, dynamic knowledge networks, *The  
30 Journal of Technology Transfer*, Vol. 24, No. 2-3, pp. 197-210.

31 Carayannis, E.G. (2008), "Knowledge-driven creative destruction, or leveraging knowledge  
32 for competitive advantage Strategic knowledge arbitrage and serendipity as real options drivers  
33 triggered by co-opetition, co-evolution and co-specialization", *Industry and Higher Education*,  
34 Vol. 22, No. 6, pp. 343-353

35 Carayannis, E.G., and Rakhmatullin, R. (2014), The quadruple/quintuple innovation helixes  
36 and smart specialisation strategies for sustainable and inclusive growth in Europe and beyond,  
37 *Journal of the Knowledge Economy*, Vol. 5, No. 2, pp. 212-239.

38 Cautela, C., Pisano, P., and Pironti, M. (2014), "The emergence of new networked business  
39 models from technology innovation: an analysis of 3-D printing design enterprises", *International  
40 Entrepreneurship and Management Journal*, Vol. 10, No. 3, pp. 487-501.

41 Chaston, I., and Scott, G. J. (2012), "Entrepreneurship and open innovation in an emerging  
42 economy", *Management Decision*, Vol. 50, No. 7, pp. 1161-1177.

43 Chesbrough, H. (2003), *Open Innovation: The New Imperative for Creating and Profiting  
44 from Technology*, Harvard Business School Publishing, Boston, MA.

45 Chesbrough, H. W. (2007), "Why companies should have open business models", *MIT Sloan  
46 management review*, Vol. 48 No. 2, pp. 22.

47 Chesbrough, H., Vanhaverbeke, W., and West, J. (2014), *New frontiers in open innovation*,  
48 Oxford University Press, New York, NY.

49 Christensen, C. M., Hall, T., Dillon, K., and Duncan, D. S. (2016), "Know your customers  
50 jobs to be done", *Harvard Business Review*, Vol. 9, No. 1 pp. 54-62.

51 CISCO (2010a), "Smart + connected communities; changing a city, a country, the world",  
52 available at: [http://www.cisco.com/c/en/us/solutions/industries/smart-connected  
53 communities.html](http://www.cisco.com/c/en/us/solutions/industries/smart-connected-communities.html) (accessed 12 November 2016).

54 CISCO (2010b), "Smart + Connected Life", Shanghai, China, available at:  
55 [http://www.cisco.com/web/CN/expo/pdf/Smart\\_Connected\\_Life\\_Guide\\_EN.pdf](http://www.cisco.com/web/CN/expo/pdf/Smart_Connected_Life_Guide_EN.pdf) (accessed 13  
56 January 2017).

57 Curry, E., Dustdar, S., Sheng, Q. Z., and Sheth, A. (2016), "Smart cities – enabling services  
58 and applications", *Journal of Internet Services and Applications*, Vol. 7, No. 6, pp. 1-3.

1  
2  
3 Damanpour, F. (1991), "Organizational innovation: A meta-analysis of effects of  
4 determinants and moderators", *Academy of management journal*, Vol. 34, No. 3, pp. 555-590.

5 Dameri, R.P. (2014), "Comparing smart and digital cities: Initiatives and strategies in  
6 Amsterdam and Genoa. Are they digital and/or smart?" in Dameri, R.P., Rosenthal-Sabroux C.  
7 (Eds.), *Smart city. How to create public and economic value with high technology in urban space*,  
8 Springer International Publishing, Heidelberg, pp. 24–88.

9 Del Giudice, M., and Maggioni, V. (2014), "Managerial practices and operative directions of  
10 knowledge management within inter-firm networks: a global view", *Journal of Knowledge  
11 Management*, Vol. 18, No. 5, pp. 841-846.

12 Del Giudice, M., and Della Peruta, M.R. (2013), *Unpacking open: Highlights from a co-  
13 evolutionary inquiry*, Springer, New York.

14 Del Giudice, M., and Straub, D. (2011), "Editor's comments: IT and entrepreneurship: an on-  
15 again, off-again love affair or a marriage?", *MIS Quarterly*, Vol. 35, No. 5, pp. 3-8.

16 Del Giudice, M., Carayannis, E. G., and Maggioni, V. (2017), "Global knowledge intensive  
17 enterprises and international technology transfer: emerging perspectives from a quadruple helix  
18 environment", *The Journal of Technology Transfer*, Vol. 42, No. 2, pp. 229-235.

19 Del Giudice, M., Carayannis, E.G., and Della Peruta, M.R. (2012), "Culture and cooperative  
20 strategies: knowledge management perspectives", eps. *Cross-cultural knowledge management*,  
21 Springer, New York, pp. 49-62.

22 Del Giudice, M., Della Peruta, M.R., and Maggioni, V. (2013), "The 'Right' knowledge and  
23 spin-off processes: an empirical analysis on knowledge transfer", *Journal of the Knowledge  
24 Economy*, Vol. 4, No. 3, pp. 304-318.

25 Della Peruta, M. R., and Del Giudice, M. (2013), "Knowledge accumulation and reuse for  
26 spinning off firms from learning organizations: an individual knowledge based perspective",  
27 *International Journal of Social Ecology and Sustainable Development*, Vol. 4, No. 4, p. 20-29.

28 Dezi, L., Gilardoni, A., Miglietta, A., and Testa, F. (2006), "L'esperienza delle public  
29 utilities locali: un modello di rapporto impresa-territorio?", *Sinergie*, Vol. 70, pp. 151-179.

30 Drayton, W. (2002), "The citizen sector: Becoming as entrepreneurial and competitive as  
31 business", *California management review*, Vol. 44, No. 3, pp. 120-132.

32 Du Chatenier, E., Biemans, H.J.A., Verstegen, J.A.A.M., and Mulder, M., (2007),  
33 "Collaborative knowledge creation in open innovation teams", In *Eighth International  
34 Conference on HRD Research and Practice Across Europe, Oxford, Usa, 2007*, Oxford  
35 University, pp. 27-29.

36 Du Plessis, M. (2007), "The role of knowledge management in innovation", *Journal of  
37 knowledge management*, Vol. 11, No. 4, pp. 20-29.

38 Dyer, J.H. and Nobeoka, K. (2000), "Creating and Managing a High-Performance  
39 Knowledge-Sharing Network: The Toyota Case", *Strategic Management Journal*, Vol. 21, No. 3,  
40 pp. 345–367.

41 Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of  
42 management review*, Vol. 14, No. 4, pp. 532-550.

43 Ernst&Young, (2016), "EY Italy Smart City Index", Smart City Index Report available at:  
44 [http://www.ey.com/Publication/vwLUAssets/PI/EY-smart-city-index-2016/\\$FILE/2016-EY-  
45 smart-city-index.pdf](http://www.ey.com/Publication/vwLUAssets/PI/EY-smart-city-index-2016/$FILE/2016-EY-smart-city-index.pdf) (accessed 11 March 2017).

46 Etzkowitz, H., and Leydesdorff, L. (2000), "The dynamics of innovation: from National  
47 Systems and "Mode 2" to a Triple Helix of university–industry–government relations", *Research  
48 policy*, Vol. 29 No. 2, pp. 109-123.

49 Ferraris, A., and Santoro, G. (2014), "Come dovrebbero essere sviluppati i progetti di Social  
50 Innovation nelle Smart City? Un'analisi Comparativa", *Impresa Progetto-Electronic Journal of  
51 Management*, Vol. 4, No. 1, pp. 1-15.

52 Floyd, S. W., and Lane, P. J. (2000), "Strategizing throughout the organization: Managing  
53 role conflict in strategic renewal", *Academy of management review*, Vol. 25, No. 1, pp. 154-177.

54 Gassmann, O., and Enkel, E. (2004), "Towards a Theory of Open Innovation: Three Core  
55 Process Archetypes", In: *R&D Management Conference (RADMA)*, Lisbon, Portugal, Vol. 6, pp.  
56 1-18.

57 Gephart Jr., Robert P. (2004), "Qualitative Research and the Academy of Management  
58 Journal", *Academy of Management Journal*, Vol. 47, No. 4, pp. 454-462.

1  
2  
3 Giarratana, M. S. and Fosfuri, A. (2007), "Product Strategies and Survival in Schumpeterian  
4 Environments: Evidence from the US Security Software Industry", *Organization Studies*, Vol. 28,  
5 No. 6, pp. 909–929.

6 Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N., and Meijers, E.  
7 (2007) "Smart Cities - Ranking of European medium-sized cities", *Rapport technique, Vienna*  
8 *Centre of Regional Science*, University of Technology, Vienna, 2007.

9 Gomm, R., Hammersley, M., and Foster, P. (2000), *Case study method: Key issues, key texts*,  
10 Sage, New York, NY.

11 González, J. A., and Rossi, A. (2011), "New trends for smart cities, Open Innovation  
12 Mechanism in Smart Cities", *European Commission within the ICT Policy Support Programme*,  
13 European Commission, Brussels, 2011.

14 Grant, R. M., and Baden-Fuller, C. (2004), "A knowledge accessing theory of strategic  
15 alliances", *Journal of management studies*, Vol. 41, No. 1, pp. 61-84.

16 Guest, D.E. (2001), "Human resource management: when research confronts theory",  
17 *International Journal of Human Resource Management*, Vol. 12, No. 7, pp. 1092-1106.

18 Gurteen, D. (1998), "Knowledge, creativity and innovation", *Journal of knowledge*  
19 *Management*, Vol. 2, No. 1, pp. 5-13.

20 Harrison, B., Kelley, M. R., and Gant, J. (1996), "Innovative firm behaviour and local  
21 milieu: exploring the intersection of agglomeration, firm effects, and technological change",  
22 *Economic Geography*, Vol. 72, No. 3, pp. 233-258.

23 Harrison, C., Donnelly, I.A. (2011), "A theory of smart cities", in Proceedings of the 55th  
24 Annual Meeting of the ISSS-2011, Hull, UK, 2011.

25 Hollands, R. G. (2008), "Will the real smart city please stand up? Intelligent, progressive or  
26 entrepreneurial?", *City*, Vol. 12 No. 3, pp. 303-320.

27 Inkpen, A. C., and Beamish, P. W. (1997), "Knowledge, bargaining power, and the  
28 instability of international joint ventures", *Academy of management review*, Vol. 22 No. 1, pp.  
29 177-202.

30 Jansen, J.J., Tempelaar, M.P., Van den Bosch, F.A., and Volberda, H.W. (2009), "Structural  
31 differentiation and ambidexterity: The mediating role of integration mechanisms", *Organization*  
32 *Science*, Vol. 20, No. 4, pp. 797-811.

33 Johnson, K. L., Danis, W. M., and Dollinger, M. J. (2008), "Are you an innovator or  
34 adaptor? The impact of cognitive propensity on venture expectations and outcomes", *New*  
35 *England Journal of Entrepreneurship*, Vol. 11, No. 2, pp. 5.

36 Johnson, M. W., Christensen, C. M., and Kagermann, H. (2008), "Reinventing your business  
37 model", *Harvard business review*, Vol. 86, No. 12, pp. 57-68.

38 Kale, P., and Singh, K. (2009), "Managing strategic alliances: what do we know now, and  
39 where do we go from here?", *The Academy of Management Perspectives*, Vol. 23 No. 3, pp. 45-  
40 62.

41 Kale, P., H. Singh, H. Perlmutter (2000), "Learning and protection of proprietary assets in  
42 strategic alliances: Building relational capital", *Strategic Management Journal*, Vol. 21, No. 3,  
43 pp. 217–237.

44 Kang, S. C., Morris, S. S., and Snell, S. A. (2007), "Relational archetypes, organizational  
45 learning, and value creation: Extending the human resource architecture", *Academy of*  
46 *Management Review*, Vol. 32, No. 1, pp. 236-256.

47 Kivleniece, I., and Quelin, B.V. (2012), "Creating and capturing value in public-private ties:  
48 A private actor's perspective", *Academy of Management Review*, Vol. 37 No. 2, pp. 272-299.

49 Komninos, N. (2011), "Intelligent cities: Variable geometries of spatial intelligence",  
50 *Intelligent Buildings International*, Vol. 3, No.1, pp. 172–188.

51 Komninos, N., Pallot, M., and Schaffers, H. (2013), "Special issue on smart cities and the  
52 future internet in Europe", *Journal of the Knowledge Economy*, Vol. 4 No. 3, pp. 119-134.

53 Laursen, K., and Salter, A.J. (2014), "The paradox of openness: Appropriability, external  
54 search and collaboration", *Research Policy*, Vol. 43 No. 5, pp. 867-878.

55 Lee J. H., Hancock M.G., Hu M.C. (2014), "Towards an effective framework for building  
56 smart cities: Lessons from Seoul and San Francisco", *Technological Forecasting and Social*  
57 *Change*, Vol. 89, No.11, pp. 80–99.

58 Lee, M., Bakici, T., Almirall, E., and Wareham, J. (2012a), "New governance models  
59  
60

1  
2  
3 towards an open Internet ecosystem for smart connected European cities and regions”, in *Open*  
4 *innovation, directorate-general for the information society and media*, European commission,  
5 Brussels, 2012, pp. 91–93.

6 Lee, S. M., Hwang, T., & Choi, D. (2012), “Open innovation in the public sector of leading  
7 countries”, *Management Decision*, Vol. 50, No. 1, pp. 147-162.

8 Levinthal, D. A., and March, J. G. (1993), “The myopia of learning”, *Strategic management*  
9 *journal*, Vol.14, No. 2, pp. 95-112.

10 Lhuillery, S. and Pfister, E. (2009), “R&D cooperation and failures in innovation projects:  
11 Empirical evidence from French CIS data”, *Research Policy*, Vol. 38 No. 1, pp. 45-57.

12 Lo, A. Y., and Jim, C. Y. (2012), “Citizen attitude and expectation towards greenspace  
13 provision in compact urban milieu”, *Land Use Policy*, Vol. 29, No. 3, pp. 577-586

14 Maak, T. (2007), “Responsible leadership, stakeholder engagement, and the emergence of  
15 social capital”, *Journal of Business Ethics*, Vol. 74, No. 4, pp. 329-343.

16 Maillat, D. (1995), “Territorial dynamic, innovative milieus and regional policy”,  
17 *Entrepreneurship & Regional Development*, Vol. 7, No. 2, pp. 157-165.

18 McDonnell, L.M., and Elmore, R.F. (1987), “Getting the job done: Alternative policy  
19 instruments” *Educational evaluation and policy analysis*, Vol. 9, No. 2, pp. 133-152.

20 Mital, M., Choudhary, P., Chang, V., Papa, A., and Pani, A. K. (2017), “Adoption of Internet  
21 of Things in India: A test of competing models using a structured equation modeling approach”,  
22 *Technological Forecasting and Social Change (forthcoming)*.

23 Möller, K., Rajala, A. and Svahn, S. (2005), “Strategic Business Nets: Their Type and  
24 Management”, *Journal of Business Research*, Vol. 58, No. 2, pp. 1274–1284.

25 Morris, M. H. (1998), *Entrepreneurial intensity: Sustainable advantages for individuals,*  
26 *organizations, and societies*. Greenwood Publishing Group, New York, NY.

27 Murray, A., Papa, A., Cuzzo, B., and Russo, G. (2016), “Evaluating the innovation of the  
28 Internet of Things: Empirical evidence from the intellectual capital assessment”, *Business*  
29 *Process Management Journal*, Vol. 22, No. 2, pp. 341-356.

30 Nam, T., and Pardo, T.A. (2011), “Conceptualizing Smart City with Dimensions of  
31 Technology, People, and Institutions”, *12th Annual International Conference on Digital*  
32 *Government Research*, College Park, MD, June, 2011.

33 Neirotti P., De Marco, A., Cagliano, A. C., Mangano, G., and Scorrano, F. (2014), “Current  
34 trends in Smart City initiatives: Some stylised facts”, *Cities*, Vol. 38, No. 1, pp. 25-36.

35 Nicotra, M., Romano, M., and Del Giudice, M. (2014), “The Evolution Dynamic of a Cluster  
36 Knowledge Network: the Role of Firms' Absorptive Capacity”, *Journal of the Knowledge*  
37 *Economy*, Vol. 5, No. 1, pp. 70-93.

38 Nonaka, I., and Takeuchi, H. (1995), *The knowledge-creating company: How Japanese*  
39 *companies create the dynamics of innovation*, Oxford university press, New York, NY.

40 Paskaleva, K.A. (2011), “The smart city: A nexus for open innovation?” *Intelligent*  
41 *Buildings International*, Vol. 3, No. 3, pp. 153-171.

42 Paskaleva, K.A. (2011), “The smart city: A nexus for open innovation?”, *Intelligent*  
43 *Buildings International*, Vol. 3, No. 3, pp. 153-171.

44 Pinegar, J.S. (2006), “What Customers Want: Using Outcome-Driven Innovation to Create  
45 Breakthrough Products and Services by Anthony W. Ulwick”, *Journal of Product Innovation*  
46 *Management*, Vol. 23, No. 5, pp. 464-466.

47 Pisano, P., Pironti, M., and Christodoulou, I.P. (2014), “The open long tail model between  
48 new culture and digital technology”, *Sinergie Italian Journal of Management*, pp. 79-93.

49 Pisano, P., Pironti, M., and Rieple, A. (2015), “Identify Innovative Business Models: Can  
50 Innovative Business Models Enable Players to React to Ongoing or Unpredictable Trends?”,  
51 *Entrepreneurship Research Journal*, Vol. 5, No. 3, pp. 181-199.

52 Popa, S., Soto-Acosta, P., and Martinez-Conesa, I. (2017), “Antecedents, moderators, and  
53 outcomes of innovation climate and open innovation: An empirical study in SMEs”,  
54 *Technological Forecasting and Social Change*, Vol. 118, No. 3, pp. 134-142

55 Portney, K. (2005), “Civic engagement and sustainable cities in the United States”, *Public*  
56 *Administration Review*, Vol. 65, No. 5, pp. 579-591.

57 Radnor, Z., Walley, P., Stephens, A., and Bucci, G. (2006), “Evaluation of the lean approach  
58 to business management and its use in the public sector”, *Scottish Executive Social Research*,

1  
2  
3 Vol. 20.

4 Ries, E. (2011), *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Crown Publishing Group, Crown Business, New York, NY, pp. 320.

6 Rufin, C., and Rivera-Santos, M. (2012), "Between Commonweal and Competition Understanding the Governance of Public-Private Partnerships", *Journal of Management*, Vol. 38, No. 5, pp. 1634-1654.

10 Santoro, G., Vrontis, D., Thrassou, A., and Dezi, L. (2017), "The Internet of Things: Building a knowledge management system for open innovation and knowledge management capacity", *Technological Forecasting and Social Change*.

13 Schaffers, H., Komninou, N., Pallot, M., Trousse, B., Nilsson, M., and Oliveira, A. (2011), "Smart cities and the future internet: Towards cooperation frameworks for open innovation", *The Future Internet Assembly*, Springer, Berlin Heidelberg, pp. 431-446.

16 Scuotto, V., Ferraris, A., and Bresciani, S. (2016), "Internet of Things: Applications and challenges in smart cities: a case study of IBM smart city projects", *Business Process Management Journal*, Vol. 22, No. 2, pp. 357-367.

19 Shook, J., and Marchwinski, C (2014), *Lean Lexicon: a graphical glossary for Lean Thinkers*, Lean Enterprise Institute, Cambridge, Ma, USA.

21 Siggelkow, N. (2007), "Persuasion with case studies", *Academy of Management Journal*, Vol. 50, No.1, pp. 20-24.

23 Soto-Acosta, P., Popa, S., and Palacios-Marqués, D. (2015), "E-business, organizational innovation and firm performance in manufacturing SMEs: an empirical study in Spain", *Technological and Economic Development of Economy*, Vol. 22, No. 6, pp. 885-904.

26 Ulwick, A.W. (2005), *What customers want: Using outcome-driven innovation to create breakthrough products and services*, McGraw-Hill, New York, NY.

28 Ulwick, A.W., and Bettencourt, Lance A. (2008), "Giving Customers a Fair Hearing", *Mit Sloan Management Review*, Vol. 49, No. 3, pp. 62-68.

31 Vigoda, E. (2002), "From responsiveness to collaboration: Governance, citizens, and the next generation of public administration", *Public administration review*, Vol. 62, No. 5, pp. 527-540.

33 Stewart, T., and Capital, I. (1997), *The new wealth of organizations*, Nicholas Brealey, London, UK.

35 Vrontis, D., Thrassou, A., Santoro, G., and Papa, A. (2016), "Ambidexterity, external knowledge and performance in knowledge-intensive firms", *The Journal of Technology Transfer*, Vol. 42, No. 2, pp. 374-388.

38 West, J., and Bogers, M. (2014), "Leveraging external sources of innovation: a review of research on open innovation", *Journal of Product Innovation Management*, Vol. 31, No. 4, pp. 814-831.

41 Wolfram, M. (2012), "Deconstructing smart cities: An intertextual reading of concepts and practices for integrated urban and ICT development", *REAL CORP*, 2012, Schwechat, 2012.

43 Womack, J. P. and Jones, D.T. (2003), *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, New York, NY, Free Press.

45 Yin, R. K. (2003), *Case study research (Vol. 5)*, Thousand Oaks, California.

51 **Conflict of interest** The authors declare that they have no conflict of interest.

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3 **APPENDIX: TABLES AND FIGURES**  
4

5 **Table I.**

6 Definitions of smart city building blocks

Definition of a smart city	Author(s)/year
A kind of perfect city with a high level of automation due to the considerable use of ICT tools	IBM, CISCO (2000)
An interplay between technological innovation, organizational innovation, and policy innovation	Nam and Pardo (2011)
A city where the adjective “smart” also refers to the governance of a city, and its capacity to generate innovation in the ways that services and communication are delivered to the local population	González and Rossi (2011)
Relates to the convergence of IT services within an urban space. In this space, citizens can access smart services, and this will consequently increase the city's competitiveness and its citizens' quality of life	Lee <i>et al.</i> (2012)
Characterized by a pervasive use of ICT, which, in various urban domains, helps cities make better use of their resources	Neirotti <i>et al.</i> (2014)
A conceptual urban development model based on the utilization of human, collective, and technological capital for the development of urban agglomerations	Angelidou (2015)
An inherently “complex socio-technical system of systems”	Curry <i>et al.</i> (2016)

28 Source: Authors' own elaboration  
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**Table II.**  
Equipment in smart city development

<b>Dimensions</b>	<b>Key elements</b>
Requirements for smart cities	To investigate the evolving needs of infrastructure requirements Next-generation smart city solutions
Architectures and paradigms for smart cities	To study theoretical foundations of architectures City-as-a-platform Cloud computing for smart cities
Infrastructures for smart cities	Design and implementation infrastructure services Internet of things platforms and middleware analytics Sensor and connectivity infrastructures
City information management	Urban information models Interdependent work structures Urban analytics and Big Data
Service innovation and design for smart cities	Promote trust through socialization programs Smart architecture and building Smart urbanism

Source: Authors' own elaboration



**Table III.**

Research foci and gaps concerning smart cities

Current research focus	Main gaps and needs
Production and distribution of energy, transportation and logistics, waste management and pollution control, and the ways in which ICT can harness information processing in these fields	Theoretical studies of smart cities and the definition of a smart city useful for clarifying which initiatives are included in a smart city strategy, together with a collection of best practices to better inform theory
Investments in urban living domains wherein ICT plays a more limited role in enabling sustainability, which is thus related to welfare and social inclusion policies, culture, and education	Smart city goals and the measures needed to evaluate success or failure; the repeatability of prototypes and the financial sustainability of smart initiatives
Evolving needs of infrastructure requirements for next-generation smart city solutions, and the theoretical foundations of architectures for smart cities	Studies focused on strategic planning in smart city projects and an exploration of the crowd management topic within the smart city domain
Design and implementation of infrastructure services for smart cities; city information management, and service innovation and design for smart cities	Case studies of smart city deployments, including retrospective analyses of successful and unsuccessful smart city development

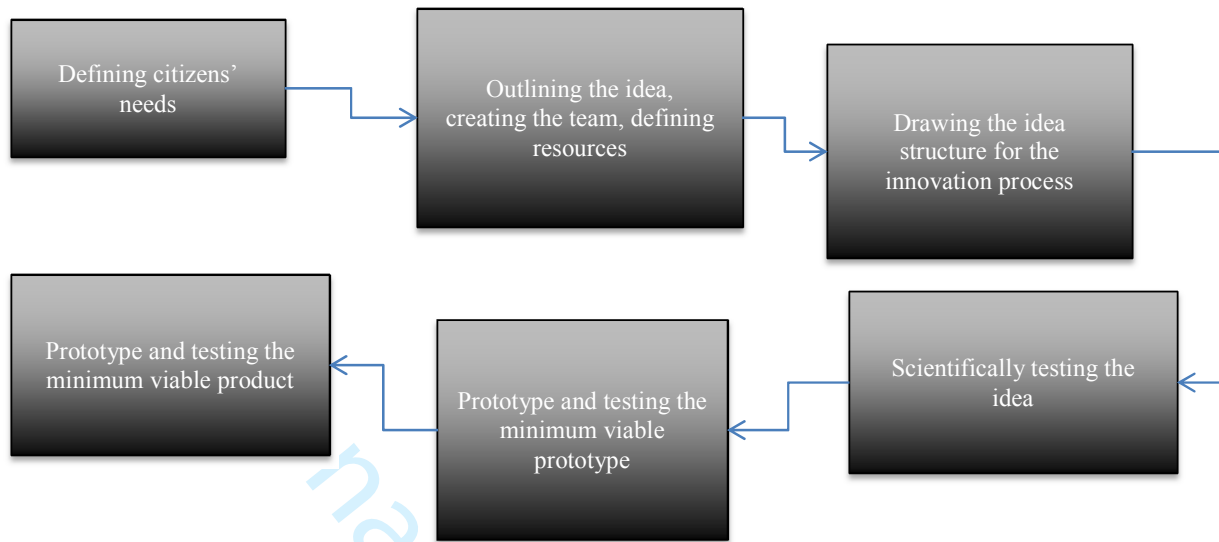
Source: Authors' own elaboration

**Table IV.**  
Turin Smart City projects

Project	Aims and expected results	Subjects involved
<b>STIR</b>	Creating a virtuous smart city network Solving Turin's city government problems and challenges through collaboration with local startups Creating products and better services able to solve citizens' critical needs	Startups The San Francisco municipality NASDAQ Entrepreneurial Center
<b>Citizens' Saturday</b>	Involving citizens Finding innovative solutions to citizens' needs	All citizens
<b>Innova.To</b>	Innovating through training, learning, and encouraging all public employees to propose new solutions to the city's problems Acquiring a startup mentality, as well as a lean approach to projects	Public government's employees
<b>Public competition</b>	Involving citizens Finding innovative solutions to improve city life through new technologies	All citizens

Source: Authors' own elaboration

Figure 1. Defining citizens' needs – The framework



Source: Authors' own elaboration