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Business model innovation for urban smartization☆

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ABSTRACT

We present an integrative literature review of the strategic management literature to identify, critically evaluate and integrate the findings of all relevant, high-quality individual studies conducted on business modelling in smart cities. The aim of this work is to investigate how a metropolitan city must organize and re-configure the building blocks of its business model to become a smart city. We explore whether cities innovate their business models to become smart. To answer to this question, we conduct an integrative literature review of the strategic management literature published from 2007 to 2016 in top scientific journals, from which we identify the main drivers and factors used by policy-makers and corporate managers to promote the "smartization" of their urban contexts. We then discuss the results of our review based on the Canvas framework of business modelling. Finally, we present implications for policy-makers, scholars and managers.

1. Introduction

Over the last 15 years the "smart city" concept has become very popular in businesses, governments, the media and academic literature referring to the use of ICTs (Caragliu et al., 2011; Kitchin, 2015). The doctrinal success of the smart city concept is demonstrated by an increasing number of scholars and schools of thought contributing journal articles published in more than 30 international journals (Anthopoulos and Reddick, 2016). Prior research shows that a city's transition towards "smartness" clearly does not occur without effort. Instead, it requires a profound re-formulation of urban structures, strategies, ecosystems, and technologies. In other words, a city must revise its business models (henceforth: BMs).

A BM illustrates "how a business creates and delivers value to customers" (Teece, 2010, p. 173). This concept describes "the articulation between different BM components or 'building blocks' to produce a proposition that can generate value for consumers and thus for the organization" (Demil and Lecocq, 2010, p. 227). BM innovation (henceforth: BMI) is often more important than developing a good idea or novel technology for the survival and competitiveness of a firm (Chesbrough, 2007). Strategic choices made on such elements greatly affect the renewal of firm competitive advantage over time. Following Taran et al. (2016), several scholars consider innovation in BM as a response to outside changes (Demil and Lecocq, 2010), as an evolutionary process (Dunford et al., 2010), as an ongoing learning process and as a discovery-driven process rather than as an analytical process (McGrath, 2010; Sosna et al., 2010).

Massa and Tucci (2013, p. 423) argue that BM and BMI can also be used to describe the mechanisms of value creation and delivery of every "firm or other type of organization". However, almost surprisingly, there still is a significant lack of studies applying the rich body of theoretical BM knowledge to other research settings and/or units of analysis besides the traditional view of single firms and/or their supply chains. One of these unconventional research settings could be that of smart cities.

The present research takes inspiration from the argument made by Massa and Tucci (2013) on the "extendibility" of the BM concept to other organizational types. The present study contributes to the extant literature on BMI in smart cities (e.g., Letaifa, 2015) by investigating how a metropolitan city should be organized and re-configured through its building blocks to become smart. The research question of the present article is thus: "how do cities innovate their BM to become smart?". We define this process as one of urban smartization, which refers to the planned and organized process by which private and public players adopt and implement smart technologies in one metropolitan area.

To answer to this question we first conduct an integrative literature

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review (Torraco, 2005) of the strategic management literature published from 2007 to 2016 in top scientific journals, from which we identify the main drivers and factors used by policy-makers and corporate managers to promote the "smartization" of their urban contexts. We then discuss the results of our review based on the Canvas framework of business modelling (Osterwalder and Pigneur, 2010). Indeed, this framework is suitable for designing and identifying the most important building blocks of the BM of metropolitan cities implementing smartization. This result satisfies the need, as reported by some scholars (Hollands, 2008; Letaifa, 2015), to define better and more precise determinants of smart city emergence and competitiveness.

The article is organized as follows. The next section reviews the literature on smart cities and BMI. Section 3 describes the research design employed to address to the research question. Section 4 discusses our main findings and reports our elaboration of the Canvas framework applied to smart city BM. Finally, Section 5 summarizes our conclusions and theoretical and managerial implications of the study.

2. Background

2.1. Domains and key definitions

Authors of several disciplines have extensively illustrated (without reaching a universal consensus) the main components and domains of smart cities. In general, the literature outlines that smart cities do require not only highly sophisticated information technologies but also highly educated human resources (e.g., Hollands, 2008; Sauer, 2012). Several sub-areas or application domains of smartness have emerged, such as those smart living, smart mobility, smart governance and the smart economy (Höjer and Wangel, 2015). According to Giffinger et al.'s (2007) view, which supports urban growth and development theory, smart cities can be identified based on 6 main dimensions (see Table 1).

Smart cities are the result of a combination of investments made in resources (human, social, creative, infrastructural, technological and business capital) that encourage sustainable economic growth under the conditions of a strong management and governance system (Caragliu et al., 2011). A further critical component of any smart city is intelligent interaction between the city and its inhabitants (Harrison et al., 2010). The intelligence of smart cities originates from their ability to generate "*added value information from the processing of city's real-time data from sensors and activators*" (Zygiaris, 2013, p.2).

Drawing on the theories of Etzkowitz and Leydesdorff (1995), Lombardi et al. (2012) propose a conceptualization of frameworks of the triple and quadruple helix by linking their four core elements (university, industry, government, and civil society) to most of the abovementioned key dimensions (clusters) of smart development as follows: 1) smart governance; 2) smart human capital; 3) smart environment; 4) smart living; and 5) the smart economy. The interaction of these elements determines the successful urban smartization of a city. The model stresses interactions and feedback observed within and between clusters and offers a more truthful and realistic representation of the smartization process for policy-makers.

Smartness plays a primary role in the social, economic and environmental development of metropolitan contexts (Cocchia, 2014; Deakin, 2014; Mori and Christodoulou, 2012). According to Meijer and Bolívar (2016), efficient smart cities work by exploiting three key elements: smart technologies (technological focus), smart people (human resource focus) and smart collaboration (governance focus).

1) *Smart technologies* refer to sophisticated energy technologies (smart grids) used in transport and traffic regulation systems. According to Odendaal (2003) and Lee et al. (2013), the crucial technological tool used is that of ICTs. Technology forms the starting point for rethinking all other issues (Kunsmann, 2014). Aurigi (2005) argues that despite the many different perspectives on smart cities, the idea that ICTs are central to the operation of a city is at the core of all perspectives.
2) *Human capital and/or human resources* are crucial to smart cities, which are heavily based on the features of their populations and in which population education levels are considered a major driver of urban growth (Lombardi et al., 2012; Shapiro, 2006). Shapiro (2006) shows that highly educated citizens move to cities with a high quality of life. However, Winters (2011) notes that students remain in the cities that they studied in after graduating. According to Berry and Glaeser (2005), urban growth is achieved in cities with a high share of educated labour.
3) The *governance perspective* notes that relationships among different stakeholders are crucial to smart city success. In smart cities, relationships between people and other stakeholders are perceived as more important than the other city concepts (Calderoni et al., 2012). However, some scholars have criticized the advent of smart cities (Allwinkle and Cruickshank, 2011; Hollands, 2015; Söderström et al., 2014; Watson, 2013), highlighting that partnerships between the private sector and local governments for smart city development reflect a sort of utopic endeavour.

Table 1
Dimensions of smart city.
Source: Our elaboration from Giffinger et al. (2007).

SMART ECONOMY (Competitiveness)	**SMART PEOPLE (Social and Human Capital)**
● Innovative spirit	● Level of qualification
● Entrepreneurship	● Affinity to life-long learning
● Economic image & trademarks	● Social and ethnic plurality
● Productivity	● Flexibility
● Flexibility of labour market	● Creativity
● International Embeddedness	● Cosmopolitanism/Open-mindedness
● Ability to transform	● Participation in public life
SMART GOVERNANCE (Participation)	**SMART MOBILITY (Transport and ICT)**
● Participation in decision-making	● Local accessibility
● Public and social services	● (Inter-)national accessibility
● Transparent governance	● Availability of ICT-infrastructure
● Political strategies and perspectives	● Sustainable, innovative and safe transport systems
SMART ENVIRONMENT (Natural resources)	**SMART LIVING (Quality of life)**
● Attractivity of natural conditions	● Cultural facilities
● Pollution	● Health conditions
● Environmental protection	● Individual safety
● Sustainable resource management	● Education facilities
	● Touristic attractivity
	● Social cohesion

Although the literature on smart cities has been critically and broadly examined in recent years, such studies have also addressed the lack of a clear and widely accepted definition and classification of smart cities and of a "common understanding" of the smart city concept (Anthopoulos, 2017; Pointing, 2013). This lack is demonstrated by Mora et al. (2017), who conducted a bibliometric analysis of the literature on smart cities published from 1992 to 2012 and who show that research is "fragmented and lacks cohesion" (p. 3). Although smart city research is a growing discipline, most studies have focused on technological elements while neglecting other relevant factors like social intelligence, cultural artefacts, and environmental attributes, which are crucial instead to ICT-related urban innovation.

Table 2 reports the three most cited definitions of the "smart city" (at September 2018). These definitions highlight different meanings ascribed to the concept and the perspectives from which it has been studied (Albino et al., 2015).

The literature discusses additional attributes of smart cities and has extended the concept to new avenues. For instance, such cities are

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Table 2
Definitions of smart city.
Source: our elaboration.

Reference	Definition
Giffinger et al. (2007, p. 11) *(1388 citations)*	*"Smart City is a city well performing in a forward-looking way in these six characteristics (a smart economy; smart mobility; a smart environment; smart people; smart living; and, finally, smart governance), built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens."*
Hollands (2008, p.308) *(1524 citations)*	*"[…] utilization of networked infrastructure to improve economic and political efficiency and enable social, cultural and urban development."*
Caragliu et al. (2011, p.70) *(2160 citations)*	A city is smart when makes *"investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance."*

significantly influenced by countries, governments, natural resources, IT knowledge and human abilities (Weisi and Ping, 2014). Other scholars have focused on innovative, socio-technical and socio-economic factors of urban growth (Atkinson and Castro, 2008; Bélissent et al., 2010; Shapiro, 2003).

2.2. BMI and urban smartization

Today, firms are obliged to continuously revise, reconfigure and innovate their BMs to survive and to effectively face external complexity (Malhotra, 2000). Such needs render BMI very important for firms, which mainly refers to the design of new BMs for novel organizations or to the reconfiguration of existing BMs (Massa and Tucci, 2013). Such a reconfiguration of activities should be innovative in the product/service market in which the firm competes and can be implemented through four main practices: relinking, repartitioning, relocating, and reactivating specific BM building blocks (Santos et al., 2009). Thus, firms can implement BMI by revising various elements of the activity system organized by the firm to create and deliver value. For instance, firms can revise the elements – the building blocks – of their BMs by engaging in novel activities (BM content), linking existing activities in novel ways (BM structure) and/or changing the party or parties performing activities (BM governance) (Zott and Amit, 2010, 2012).

The most widely used tool among scholars and practitioners for designing and innovating BMs is the framework of the "Business Model Canvas" (Osterwalder and Pigneur, 2010). This framework creates and tracks new strategic activities for organizations by monitoring nine building blocks: value propositions, market segments, customer relationships, distribution channels, key partners, key resources, key activities, cost structures, and revenue streams. The business model canvas simply describes how entities can create an offering, provide it to customers and generate profits. The central pillar of any BM is the value proposition. This notion is the reason why the business exists and determines core behaviours and activities of the business, guiding the direction of all activities.

The academic debate is currently focused on the issue of when a BM change can be considered BMI. Taran et al. (2015) argued that three approaches have been developed in regard to this concept: 1) BMI is defined any radical change in how a company does business (e.g., Chesbrough, 2007). Linder and Cantrell (2001) in particular clearly attempt to draw the line between what should and should not be defined as BMI. 2) BMI relates to innovativeness and to what might be called the "reach" of innovation (e.g., Garcia and Calantone, 2002; Olsen et al., 1995; Rogers, 1983). A suitable scale for measuring the degree that innovation is "new to whom" could measure, for instance, what is new to a company vs new to the world or what is new to the market vs new to a given industry. 3) BMI occurs when a firm implements a change in any of the building blocks of a BM or in relationships between them. This last approach considers BMI as a space encompassing all potential forms of corporate innovation (e.g., Taran et al., 2015).

Scholars have proposed several ways of supporting the BMI of metropolitan contexts: scenario analyses (Gnatzy and Moser, 2012; Pateli and Giaglis, 2005), user-centric approaches (Hienerth et al., 2011), and analogies between products and BMI (Bucherer et al., 2012). In the present article we argue that the Canvas framework (Osterwalder and Pigneur, 2010) is suitable for the analysis of urban smartization, which starts with the BMI of cities willing to become smart and which entails the revision of their mechanisms of value creation and building blocks. The Canvas framework is used to discuss the results of the following articles due to its simplicity, flexibility and focus on value creation.

Outside of the strategic management literature some authors have used the Canvas framework to analyse smart cities over the last few years. For instance, Díaz-Díaz et al. (2017) applied this model for the analysis of the smart ecosystem in Santander (Spain). The authors focused on four blocks of the model: customers, offers, infrastructure and financial viability. They found that urban services (e.g., waste management), when properly managed via IoT technologies, generates value through significant cost reductions made over the long term. According to Anthopoulos (2017), smart cities can generate value by improving typical urban functions (transportation, waste management, etc.), creating workplaces, improving citizen satisfaction (traffic awareness and energy efficiency), limiting the internal spending of municipalities (i.e., NYC) and providing real-time monitoring (air quality, street safety, etc.). These metropolitan contexts are also referred to as "innovating cities" and "knowledge cities" given their capacity to promote innovation (Shapiro, 2003) from knowledgeable and creative human capital (Florida, 2003). These results render the Canvas framework a valid tool for exploring urban smartization in more detail.

This framework moreover highlights the critical role of partners and ecosystems in urban value creation. Ecosystems are *"special types of systems in that their elements are intelligent, autonomous, adaptive agents that often form communities and also because of the way they adapt to elements being added or removed"* (Gretzel et al., 2015, p. 558). In ecosystems, groups of single actors establish relationships to enhance individual benefits and to achieve shared goals (Boley and Chang, 2007). Cities are made of subsystems that interact with one another and that form an ecosystem (Boley and Chang, 2007; Gretzel et al., 2015; McCormack, 2011; Walravens, 2015). Urban ecosystems are likely to contribute greatly to the innovation of key components/building blocks of metropolitan cities that are willing to become smart. For instance, some cities may be obliged to collaborate and to sustain certain elements of their ecosystems (e.g., local start-up firms) to renew their value propositions (e.g., offering more incentives to attract in loco talented human capital) and to implement urban smartization. This point is consistent with the governance perspective of smart cities, which stresses the value of relationships between urban stakeholders.

In the last few years some scholars of strategic management have started to use the concepts of BM and BMI to study smart cities (Letaifa, 2015; Nam and Pardo, 2011; Walravens and Ballon, 2013; Zygiaris, 2013). However, research efforts in this direction remain limited. While smart cities require new BMs (Bélissent et al., 2010), there are different municipal BMs and a unique standardized solution does not yet exist

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(Kuk and Janssen, 2011). In the following we provide a review of the main articles on BMI in smart cities of the strategic management literature and classify the main findings via the Canvas framework.

3. Method

We perform an integrative literature review to synthetize how the literature published in strategic management journals describes and conceptualizes BMI for urban smartization. In particular, the integrative literature review approach "reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (Torraco, 2005, p. 356). This methodology has been widely used in the strategy and management disciplines in recent years (e.g., Mercurio, 2015; Stoeckl and Luedicke, 2015). The present review achieves the following results (Torraco, 2005):

- Provides a critical analysis of the literature;
- Synthesizes new knowledge on the topic;
- Presents practical implications and describes avenues for future research.

We decided to focus on the "strategic management" discipline and to identify key concepts and definitions on which the literature on smart cities is based. Only journal articles have been included, as they are viewed as validated knowledge (Podsakoff et al., 2005). We use the following top 20 journals on strategic management according to a *Google Scholar metrics* search[1]: Journal of Business Research, Journal of Management, Academy of Management Journal, Management Science, Strategic Management Journal, Entrepreneurship Theory and Practice, Technological Forecasting and Social Change, Journal of Business Venturing, Harvard Business Review, Industrial Marketing Management, Academy of Management Review, Omega, Organization Science, Journal of Product Innovation Management, Journal of Management Studies, Journal of the Academy of Marketing Science, Journal of Retailing and Consumer Services, Journal of Operations Management, Journal of Small Business Management, and Journal of Corporate Finance.

We used the *Google Scholar* online database to examine a broader collection of articles. According to Aguillo (2012), *Google Scholar* is a free database and is one of the largest scientific bibliographic databases for academics. *Google Scholar* is developed from a combination of different databases with content not available to the public and from the so-called invisible web, and it includes academic web documents stored in the Google search engine with citations.

Several authors (Gardner and Eng, 2005; Wleklinski, 2005; Yang and Meho, 2006) have found that *Google Scholar* is the most suitable database for bibliometric reviews of scientific studies, as it includes print and electronic journals, conference proceedings, books, theses, dissertations, pre-prints, abstracts, and technical reports available from major academic publishers, distributors, aggregators, professional societies, government agencies, and preprint/reprint repositories at universities as well as those available on the web. Furthermore, Jacso (2005) argues that *Google Scholar* is anticipated to become an excellent free tool for scholarly information discovery and retrieval. For the above reasons, we use *Google Scholar* to gather information for our literature review.

The *Google Scholar* database was used to sort all results by year of publication (2008–2017) to collect a reasonable, representative and recent subset of published articles.

[1] Source: https://scholar.google.com/citations?view_op=top_venues&hl=en&vq=bus_strategicmanagement (accessed on 26/09/18).

4. Results

In the following subsections we briefly describe the main results of our literature review and then review the 3 most important frameworks reported in 11 articles published in the abovementioned top journals. These results are central to our critical analysis of BMI practices employed by cities to become smart based on the canvas framework.

4.1. Descriptive analysis

According to our search 10 journal articles have been published in the above 20 top journals on strategic management. Among these 10 articles are 2 conference proceedings from the Academy of Management Review. Interestingly, 7 of the 10 articles including the terms "Smart City" or "Smart Cities" are published in the journal *Technological Forecasting and Social Change*.

These results illustrate growing interest from strategic management scholars in the BMs of smart cities. We found that the titles of 19 articles published in *Technological Forecasting and Social Change* include the term "Smart Cities", demonstrating recent interest in the subject. From the sample of 10 scientific articles we selected those focus on smart city BMs and found the following three articles: 1) Lee et al., 2013, 2) Lee et al., 2014, and 3) Letaifa, 2015.

According to *Google Scholar*, the above three articles are the most widely cited of the 10 articles collected from the top 20 strategic management journals. Therefore, we used them to structure our Canvas-based analysis of smart city BMs.

Table 3 below presents articles published in the top 20 strategic management journals ranked by Google Scholar (Aarseth et al., 2017; Bakıcı et al., 2013; Baumeister and Leary, 1997; Bizer et al., 2009; Cooper et al., 2001; Foss and Saebi, 2017; Gillett et al., 2004; Komninos et al., 2013; Mahizhnan, 1999; Zott et al., 2011). The third column shows articles listing the term "Smart Cities" and the fourth column shows the most cited articles analysing BMs for smart cities: Leitafa (2015), Lee et al. (2013) and Lee et al. (2014). Citations have been updated for September 2018. Fig. 1 shows how many of the 10 selected articles on strategic management were published over the last 10 years.

4.2. Key articles on smart city business modelling in the strategic management literature

4.2.1. Lee et al. (2013)

Lee et al. (2013) developed an integrated roadmap to support strategic planning for R&D initiatives and smart city development that can sustain a competitive advantage in Korea (Table 4).

Following Garcia and Bray (1997) and Strauss et al. (2008), they identify features critical to designing the road mapping process: preliminary activities, TRM development, and follow-up activities. These parts were subdivided into several steps and activities relevant to smart city development. All phases and steps involved are as follows:

This article describes the development of a smart city roadmap for Korea with a particular emphasis on the importance of developing roadmap formats. The developed roadmap serves as an important strategic resource and communication tool for supporting smart city R&D initiatives in Korea and for best practices for other smart cities, serving as an integrated knowledge platform founded on technological trajectories. It serves as a long- and mid-term strategic planning framework for smart city development. The roadmap process becomes "*a communication platform enabling knowledge exchange within the large and extended project team, including service development, integrated platform teams, legislation and regulation policy teams, and device-technology development teams*" (Lee et al., 2013, p. 302).

4.2.2. Lee et al. (2014)

Lee et al. (2014) published a journal article in *Technological Forecasting and Social Change* seeking to develop a conceptual framework to

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Table 3
The selected articles.

#	Journal	Articles contained "smart cities" articles	Selected articles
1.	Journal of Business Research (1 article)	Letaifa, S. B. (2015). How to strategize smart cities: Revealing the SMART model. Journal of Business Research, 68(7), 1414–1419.	Letaifa (2015) 131 citations
2.	Academy of Management Journal (1 article)	Zuzul, T. "Matter Battles:" Boundary Objects and the Failure of Collaboration in Two Smart Cities. Academy of Management Journal, Forthcoming. (Zuzul, in press)	0
3.	Technological Forecasting and Social Change (7 articles)	Grimaldi, D., & Fernandez, V. (2017). The alignment of University curricula with the building of a Smart City: A case study from Barcelona. Technological Forecasting and Social Change, 123, 298–306. (Grimaldi and Fernandez, 2017)	Lee et al. (2013) 209 citations
		Paroutis, S., Bennett, M., & Heracleous, L. (2014). A strategic view on smart city technology: The case of IBM Smarter Cities during a recession. Technological Forecasting and Social Change, 89, 262–272.	Lee et al. (2014) 249 citations
		Lee, J. H., Hancock, M. G., & Hu, M. C. (2014). Towards an effective framework for building smart cities: Lessons from Seoul and San Francisco. Technological Forecasting and Social Change, 89, 80–99.	
		Bresciani, S., Ferraris, A., & Del Giudice, M. (2017). The management of organizational ambidexterity through alliances in a new context of analysis: Internet of Things (IoT) smart city projects. Technological Forecasting and Social Change. (Bresciani et al., 2017)	
		Marsal-Llacuna, M. L., Colomer-Llinàs, J., & Meléndez-Frigola, J. (2015). Lessons in urban monitoring taken from sustainable and livable cities to better address the Smart Cities initiative. Technological Forecasting and Social Change, 90, 611–622. (Marsal-Llacuna et al., 2015)	
		Lee, J. H., Phaal, R., & Lee, S. H. (2013). An integrated service-device-technology roadmap for smart city development. Technological Forecasting and Social Change, 80(2), 286–306.	
		Yigitcanlar, T., & Lee, S. H. (2014). Korean ubiquitous-eco-city: A smart-sustainable urban form or a branding hoax?. Technological Forecasting and Social Change, 89, 100–114. (Yigitcanlar and Lee, 2014)	
4.	Academy of Management Review (2 conf. proceedings)	O'Connor, J., & Ozaki, R. (2016). Smart Cities: Logics, Practice and Hybridity in an Emerging Institutional Field. In Academy of Management Proceedings (Vol. 2016, No. 1, p. 17400). Briarcliff Manor, NY 10510: Academy of Management. (O'Connor and Ozaki, 2016)	0
		Nyberg, R., & Yarime, M. (2016). Assembling a Field into Place: Smart Cities in Japan. In Academy of Management Proceedings (Vol. 2016, No. 1, p. 18406). Briarcliff Manor, NY 10510: Academy of Management.	

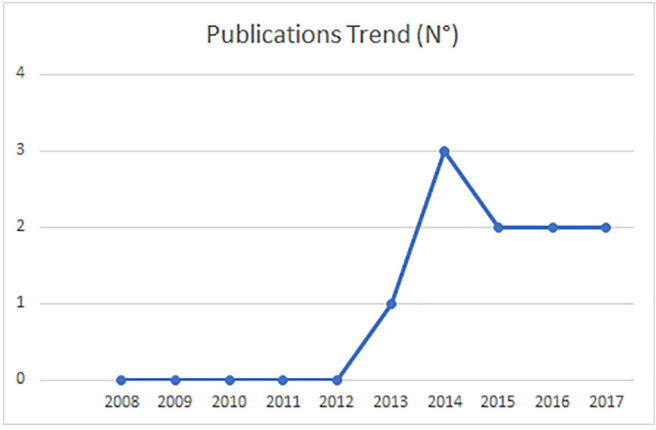

Fig. 1. The publications trend over the period 2008–2017.

better understand smart city practices and to more effectively identify and assess gaps in adaptation and strategic improvement by analysing the two cases of San Francisco (USA) and Seoul (Asia).

From gaps in studies and practices for smart cities, this study presents a taxonomy for investing in smart city strategic development. The framework allows for a more systematic exploration of smart development and implementation by providing a taxonomy of 6 and 17 key conceptual dimensions and sub-dimensions, respectively, that taken together offer a workable and holistic view of the scope and style of smart city development from a strategic perspective. These dimensions and sub-dimensions are reported in Fig. 2.

According to the authors, emerging interest in smart city development has addressing various urban problems such as those related to inequality, traffic, environmental and sanitation shortcomings, public service unavailability, land pressures, etc. through the infrastructure of ICT-based technology. The goal stressed by Lee et al. (2014) is to regenerate city structure inequalities and imbalances. In this context, smart city development is "in charge" of creating a better and more sustainable city in which quality of life is higher, environments more liveable and economic prospects are stronger. Finally, the authors argue that "*the form of these interactions reflects a smart city's developmental stage and embedded cultural and social capabilities*" (Lee et al., 2013, p. 81). From this framework they offer relevant insights for managers on practical smart city development.

4.2.3. *Letaifa (2015)*

Another recent study was conducted by Letaifa (2015). He presented a process of city smartization by analysing three models of smart city development (Stockholm, Montreal, and London) that differ in terms of visions, missions and strategic choices. These cities engage local communities and offer political and institutional leadership. The comparative analysis discusses relevant key facets of different stages of urban smartization (Table 5).

This stage covers macro, mezzo and micro dimensions of smart city processes of "smartization". The macro level considers strategic and multidisciplinary resources; the mezzo level is related to actor appropriation and strategy implementation; and the micro level refers to technologies. These three paths (macro, mezzo and micro) perfectly correspond with the five main stages of the SMART Model (*Strategy, Multidisciplinarity, Appropriation, Roadmap and Technology*) with different focuses. Strategic steps define the main goals of a city towards multidisciplinary that characterize the second step. Interactions of actor appropriation occur in the third stage, followed by roadmap monitoring. Finally, the identification of required technologies occurs as the last step.

These five phases embrace three dimensions (macro, mezzo, and

Table 4
Smart city development phases. Our elaboration from Lee et al. (2013).

Preliminary activity	**Phase 1. Planning**
	Step 1. Smart city mid- to long-term vision and goals identified
	Step 2. Definition of roadmap
	Activity 1. Individual objectives of the roadmap
	Activity 2. Setting roadmap boundaries and scopes
	Activity 3. Defining an individual time table
	Step 3. Critical success factors for the roadmap considered
	Step 4. Organization of the project team
	Activity 1. Identify the party responsible for the development of the roadmap
	Activity 2. Form a working group
Development activity of integrated roadmap	**Phase 2. Demand identification**
	Step 1. Identify urban problems
	Step 2. Infer demands and solutions
	Phase 3. Service identification
	Step 1. Smart city services classification
	Activity 1. Set classification standards
	Activity 2. List services ('list-up')
	Activity 3. Develop and verify service classification system
	Step 2. Analysis of service trends (Delphi)
	Phase 4. Device identification
	Step 1. Smart city device classification
	Activity 1. Set classification standards
	Activity 2. List devices ('List-up')
	Activity 3. Develop and verify device classification system
	Step 2. Analysis of device trends (Delphi)
	Phase 5. Technology identification
	Step 1. Smart city technologies identification
	Activity 1. Set classification standards
	Activity 2. List technologies ('List-up')
	Activity 3. Establishment and verification of classification system
	Step 2. Analysis of technical trends (Delphi)
	Phase 6. Roadmap drafting
	Step 1. Develop roadmap formats
	Step 2. Analyse interdependencies between service/device/technology
	Step 3. Develop integrated roadmap
	Phase 7. Roadmap adjustment
	Step 1. Roadmap adjustment
	Step 2. Roadmap verification
Follow-up activity	**Phase 8. Follow-up stage**
	Step 1. Development of execution plan
	Step 2. Execution of plan

micro) for tracking smart city strategies. The macro level refers to the design of strategies and multidisciplinary resources. The mezzo level is related to actors' appropriation of the project and to roadmap implementation. At the local level the micro dimension addresses technological transformations needed to implement new high-value-added services for residents.

5. Discussion, contributions and implications

In the present section we discuss the main findings of our literature review by adopting the Canvas framework for business modelling. As reported above, Osterwalder and Pigneur (2010) argue the complete description of any BM can be broken down into nine elements. We define these elements within the context of smart cities as follows:

1. Revenue streams: How a smart city can generate income;
2. Cost structure: All costs needed to sustain BMI in a city;
3. Key resources: All relevant assets supporting the operation of the smart city BM;
4. Key activities: All relevant activities that a smart city must support to have its BM work;
5. Key partnerships: The network represented by suppliers and partners;
6. Value propositions/creation: A clear description of the smart city's offerings and of how it solves problems or creates value for residents;
7. Customer relationships: Maintaining strong relationships with customer segments;
8. Customer segments: Groups of people (citizens and tourists) that the smart city aims to serve;
9. Channels: A smart city can use channels to reach its customer segments by communicating with them and delivering products and services to them.

We summarize our analysis via the Canvas framework in Table 6. The analysis largely utilizes dimensions of the 3 models on smart cities reviewed in the above section (Lee et al., 2013; Lee et al., 2014 and Letaifa, 2015). According to the strategic management literature, parameters defining each building block play a role in drivers of urban smartization, as they help orient metropolitan contexts towards smartness.

Revenue streams can shape how a smart city can generate income. In this context, dimensions are identified by all persons involved and are used by the city government to collect more income tax and other revenue flows from citizens, tourists and/or visitors. Costs structures relate to all costs needed to sustain the BM for smart cities regarding infrastructural development, expenses for administrative and marketing actions, storage, communication networks, publicity, and so on. Key resources refer to all relevant assets supporting the smart city BM in terms of network-based services (available information, public relationships, political sponsorship, collective intelligence, interdependencies between service/device/technological resources and open and big data). Key activities are all relevant activities that a smart city must support to make its BM work and specifically all activities that promote the ICT infrastructure that supports smart city initiatives and that have stronger network effects with complementary devices. Key partnerships represent the network of partnerships formed to support smart city development in terms of private-public partnerships and highlight the most important urban ecosystems. The value proposition pertains to a clear description of the smart city's offerings and to how it solves problems or creates value for those who live or work there. The value of smart cities can be measured in several ways: from customized information based on preferences, from enhanced flows of private and public company revenues, and from improved public administration services that enhance the credibility of citizens and that increase the volume of tourists. Customer relationships are maintained over periods in terms of customer experiences and service provisions. In particular, smart cities allow for more efficient service development through direct citizen/user participation in service management, affording them a crucial and active role in sustainable urban development in contrast to what is observed in traditional cities where they act as service receivers (Díaz-Díaz et al., 2017). Customer segments are all groups of people (citizens and tourists) and institutions/organizations that the smart city aims to serve. Finally, smart cities can use channels to reach their customer segments, to communicate with them and to deliver products and services. The most popular channels used are mobile applications, websites and delivery services.

Cities willing to implement urban smartization must revise most drivers of each building block in an integrated and coherent fashion just as a company does do to create more value. Antecedents of this process are likely to include a healthy economic and social infrastructure, an effective use of real-time data intelligence, a shared vision of urban development among city stakeholders, and stakeholder goal alignment with the city's identity and human, natural, and economic resources.

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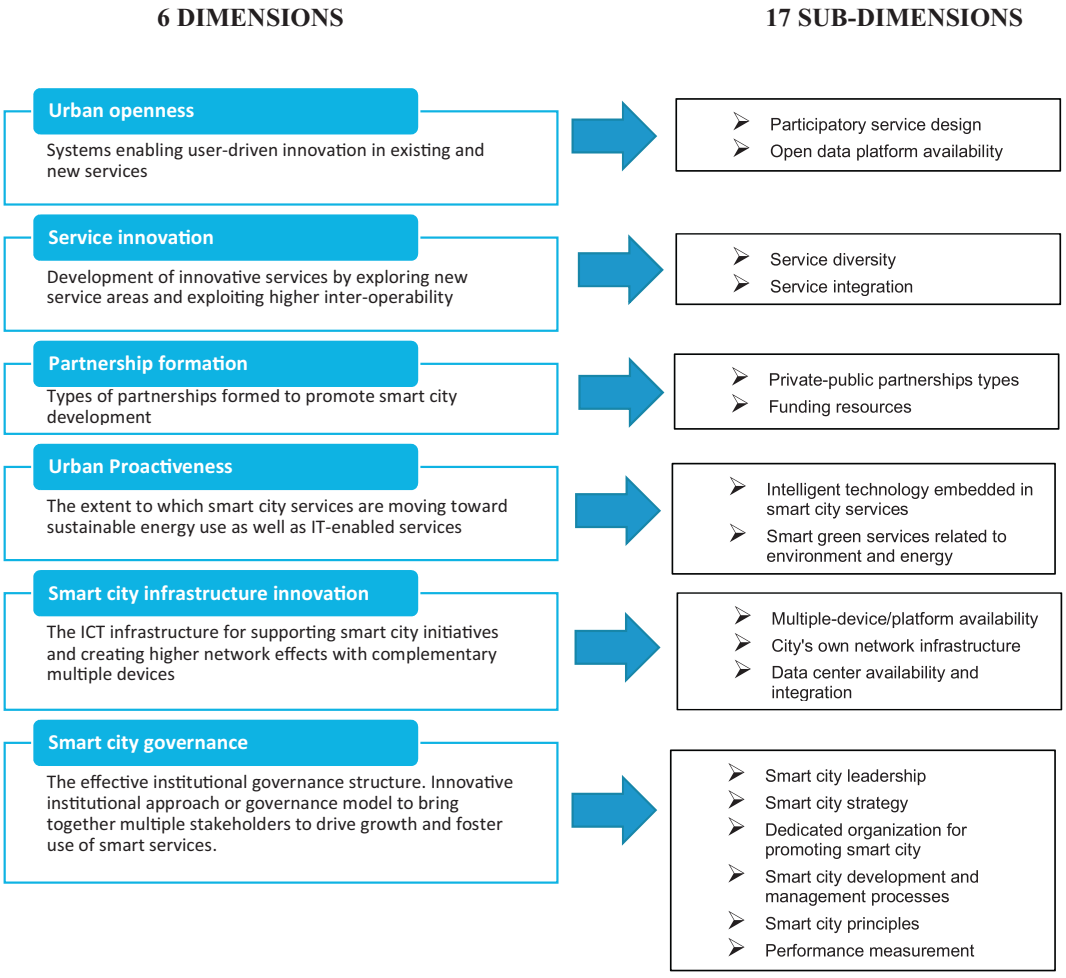

Fig. 2. Dimensions of smart city.
Source: our elaboration from Lee et al. (2014, p. 84).

5.1. Contributions

The present article contributes to two bodies of knowledge. First, our analysis contributes to the strategic management literature on business modelling in smart cities (Lee et al., 2013; Lee et al., 2014 and Letaifa, 2015) by categorizing various drivers (building blocks) of urban smartization from a well-known and validated theoretical framework. Our canvas analysis offers a more detailed classification of the various elements that form smart city BMs. Indeed, we identify several parameters/dimensions of each building block mentioned in previous frameworks on BM for smart cities but which have not been systematically addressed. Our analysis serves as a milestone for implementing a strategic tool for measuring the success of smart cities. Public leaders, managers, scholars and practitioners often think that technology drives environmental, social, and economic change and development. Our model suggests that technology in smart cities can play a crucial role as a smartness driver only when all building blocks of urban smartization are linked and integrated coherently. Moreover, the results of our integrative literature review show that the contributions of strategic management journals on smart city BMs remain limited. Although in

Table 5
The smartization process of smart cities. Our elaboration from Letaifa (2015).

Strategic level	Strategic steps/phases	Brief description	Dimensions
Macro level	Strategy *Defining a strategy for the city*	Structuring a common vision of the city addressing the local challenges	- Objectives, mission, vision, values, resources - Political sponsorship - Leadership
	Multidisciplinarity *Mobilizing multidisciplinary actors and resources*	Addressing opportunities for envisioning the issues, outcomes, and resources required by a successful urban transformation	- Diversity of actors - Collective intelligence - Integration of resources
Mezzo level	Appropriation *Actors appropriation of the project*	Achieving social acceptability among different users to ensure project adoption and success	- Users co-creation - Legitimacy - Integration, interaction, convergence
Micro level	Roadmap *Strategy implementation* Technology *Technologies identification*	Identifying an “action plan” and defining all projects for different services (smart transportation, smart education, smart health) Adopting technologies when the urban transformation is clear. Technology is not the goal but it should improve customer experience (e.g., smart mobility or smart health)	- Action plan - Projects - Enabler/transformative role: new services for citizens, enterprises, governments and cities - A mean rather than an objective

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Table 6
The BM canvas for smart cities.

Building blocks	Parameters/dimensions
Revenues stream	Citizens/tourists/visitors (for collection of more income taxes)
Cost structure	Infrastructure development
	Administrative and Marketing expenses
	Storage
	Communication network
	Publicity
Key resources	Technological devices (Lee et al., 2013; Letaifa, 2015)
	Public relationships (Letaifa, 2015)
	Political sponsorship (Letaifa, 2015)
	Collective intelligence (Letaifa, 2015)
	Interdependencies between service/device/technology (Lee et al., 2013)
	Open data platform availability/big data availability (Lee et al., 2014)
Key activities	Developing interdependencies between service/device/technology (Lee et al., 2013)
	Developing ICT Infrastructure allowing entities to deliver any kind of services to people with complementary multiple devices (Lee et al., 2014)
	Multiple-device/platform availability (Lee et al., 2014)
	City's own network infrastructure (Lee et al., 2014)
	Data center availability and integration (Lee et al., 2014)
	Users co-creation and participation (Lee et al., 2014; Letaifa, 2015)
Key partners	Any kind of private-public partnerships types (Lee et al., 2014)
Value creation	Increase the participation of citizens/users
	Customized information based on preferences
	Increase revenue of private and public companies
	Improve citizens' credibility about the local Public Administration
	Increase tourism volume
Customer relationships	Customer experience (e.g. smart mobility and smart health) (Letaifa, 2015)
Market segments	Users in shops, restaurants, hotels, public services, museums, transport
	Citizens
	Visitors
Channels	Mobile application
	Websites
	Delivery

other disciplines several prior studies have analysed this topic and have provided widely accepted definitions and frameworks (Nyberg and Yarime, 2016), smart city BMs must be investigated much more according to a strategic perspective.

Second, the present article contributes to the general literature on smart cities (e.g., Caragliu et al., 2011; Giffinger et al., 2007; Kitchin, 2015) by formalizing and defining the notion of urban smartization. To implement urban smartization, cities must improve the quality of public services delivered to enhance their credibility among citizens. Such improvements may be achieved by offering customized information, by enhancing private and public company revenue flows, and by promoting private-public partnerships.

5.2. Implications

The present study has implications for various audiences. For policy-makers, our analysis shows that transforming traditional cities into smart cities involves a considerable investment of resources. Policy-makers can use our framework to fully understand the most suitable dimensions for implementing urban smartization in their local contexts. For instance, policy-makers may design programmes promoting the use of technology to enhance the satisfaction of their citizens through the facilitation of their day-to-day activities (Paroutis et al., 2014).

Our study also has managerial implications. First, managers of firms in cities becoming smart should as much as possible develop the ICT capabilities of their organizations and align them with the technological infrastructures of smart city projects. Second, managers should carefully analyse through the Canvas framework which building block dimensions are most suitable for their companies to collaborate with public actors for urban smartization.

This article also has implications for academics. Scholars can use our framework to further knowledge of BMs for organizations in metropolitan areas becoming smart. Researchers can use our review of studies and canvas framework to better exploit the identified parameters and dimensions and to test them in reference to certain contexts. For instance, scholars may explore if the impact of various drivers on urban smartization changes across various urban contexts (e.g., rural vs. industrial cities). Field studies (e.g., case studies) involving in-depth interviews with practitioners and researchers could also be conducted by scholars to validate or refine our theoretical framework.

6. Conclusions

New technologies have played a relevant role in re-adapting and innovating BMs for institutions like smart cities, which offer public services and infrastructures. There is also a growing need to design and implement BMs for smart cities to transition to smartness. The article offers a model for conceptualizing the building blocks of smart cities from the BM Canvas (Osterwalder and Pigneur, 2010). While cities can vary in shape and size, the flexibility of our Canvas-based model allows for its application to a range of different smart policy paradigms.

There seems to be a tendency among scholars to be subjective and to track personal routes in isolation of other studies and there appears to be general disagreement in the research on ways of conceptualizing and defining the smart city, which emerges as one of the main terms used to refer to ICT-related urban innovation (Mora et al., 2017). We developed a framework that any scholar, practitioner or policy-maker can use to determine ways to strategically manage smart city BMs and to mitigate confusion in smart city research.

Although the topic of smart cities is a fast-growing topic of scientific enquiry, few studies link business modelling to smart cities. Research is still fragmented and focused mainly on technological tools while neglecting other important points related to social intelligence, cultural artefacts, and environmental factors crucial to urban innovation, for instance. To address this issue we developed an integrative literature review to identify the most important drivers of smartization reported in the strategic management literature.

This work presents some limitations related to a lack of empirical cases for testing our proposed canvas. Other shortcomings form the basis of suggestions for future research that enriches understanding of smart city BMs. First, case studies must shed light on components of smart city strategies. Second, we must investigate citizen perceptions of technologies and services provided. Additionally, methods must also be developed to analyse and compare smart city BMs, as the development of smart city initiatives will render BM analysis more relevant to urban strategies. Although these avenues for future research are not exclusive, we believe that addressing these issues can further the understanding of urban smartization and offer valuable insights for designing and implementing more inclusive smart city policies from a valid BM.

References

Zuzul, T., 2018. Matter battles: boundary objects and the failure of collaboration in two smart cities. Acad. Manag. J. https://journals.aom.org/doi/10.5465/amj.2016.0625 (in press).
Aarseth, W., Ahola, T., Aaltonen, K., Økland, A., Andersen, B., 2017. Project sustainability strategies: a systematic literature review. Int. J. Proj. Manag. 35 (6), 1071–1083.
Aguillo, I.F., 2012. Is Google Scholar useful for bibliometrics? A webometric analysis. Scientometrics 91 (2), 343–351.
Albino, V., Berardi, U., Dangelico, R.M., 2015. Smart cities: definitions, dimensions, performance, and initiatives. J. Urban Technol. 22 (1), 3–21.
Allwinkle, S., Cruickshank, P., 2011. Creating smarter cities: an overview. J. Urban Technol. 18 (2), 1–16.
Anthopoulos, L., 2017. Smart utopia VS smart reality: learning by experience from 10 smart city cases. Cities 63, 128–148.
Anthopoulos, L.G., Reddick, C.G., 2016. Understanding electronic government research and smart city: a framework and empirical evidence. J. Inf. Policy 21 (1), 99–117.
Atkinson, R., Castro, D., 2008. Digital quality of life. The Information Technology and Innovation Foundation, pp. 137–145.
Aurigi, A., 2005. Making the Digital City: The Early Shaping of Urban Internet Space. Ashgate, Farnborough.
Bakıcı, T., Almirall, E., Wareham, J., 2013. A smart city initiative: the case of Barcelona. J. Knowl. Econ. 4 (2), 135–148.
Baumeister, R.F., Leary, M.R., 1997. Writing narrative literature reviews. Rev. Gen. Psychol. 1 (3), 311–320.
Bélissent, J., Mines, C., Radcliffe, E., Darashkevich, Y., 2010. Getting Clever about Smart Cities: New Opportunities Require New Business Models, Cambridge, Massachusetts, USA.
Berry, C.R., Glaeser, E.L., 2005. The divergence of human capital levels across cities. Pap. Reg. Sci. 84 (3), 407–444.
Bizer, C., Heath, T., Berners-Lee, T., 2009. Linked data – the story so far. In: Issue on Linked Data, International Journal on Semantic Web and Information Systems (IJSWIS).
Boley, H., Chang, E., 2007. Digital ecosystems: principles and semantics. In: IEEE International Conference on Digital Ecosystems and Technologies, Cairns, Australia, February. National Research Council Canada, Ottawa, Canada, pp. 2007.
Bresciani, S., Ferraris, A., Del Giudice, M., 2018. The management of organizational ambidexterity through alliances in a new context of analysis: Internet of Things (IoT) smart city projects. Technol. Forecast. Soc. Chang. 136, 331–338.
Bucherer, E., Eisert, U., Gassmann, O., 2012. Towards systematic business model innovation: lessons from product innovation management. Creat. Innov. Manag. 21 (2), 183–198.
Calderoni, L., Maio, D., Palmieri, P., 2012. Location-aware mobile services for a smart city: design, implementation and deployment. J. Theor. Appl. Electron. Commer. Res. 7 (3), 74–87.
Caragliu, A., Del Bo, C., Nijkamp, P., 2011. Smart cities in Europe. J. Urban Technol. 18 (2), 65–82.
Chesbrough, H., 2007. Business model innovation: it's not just about technology anymore. Strateg. Leadersh. 35 (6), 12–17.
Cocchia, A., 2014. Smart and digital city: a systematic literature review. In: Smart City. Springer International Publishing, pp. 13–43.
Cooper, H., Carlisle, C., Gibbs, T., Watkins, C., 2001. Developing an evidence base for interdisciplinary learning: a systematic review. J. Adv. Nurs. 35 (2), 228–237.
Deakin, M., 2014. Smart cities: the state-of-the-art and governance challenge. Triple Helix 1 (1), 7.
Demil, B., Lecocq, X., 2010. Business model evolution: in search of dynamic consistency. Long Range Plan. 43, 227–246.
Díaz-Díaz, R., Muñoz, L., Pérez-González, D., 2017. Business model analysis of public services operating in the smart city ecosystem: the case of SmartSantander. Futur. Gener. Comput. Syst. 76, 198–214.
Dunford, R., Palmer, I., Benveniste, J., 2010. Business model replication for early and rapid internationalisation: the ING direct experience. Long Range Plan. 43 (5), 655–674.
Etzkowitz, H., Leydesdorff, L., 1995. The triple helix: university - industry – government relations: a Laboratory for Knowledge-Based Economic Development. EASST Rev. 14, 14–19.
Florida, R., 2003. Cities and the creative class. City Community 2 (1), 3–19.
Foss, N.J., Saebi, T., 2017. Fifteen years of research on business model innovation: how far have we come, and where should we go? J. Manag. 43 (1), 200–227.
Garcia, M.L., Bray, O.H., 1997. Fundamentals of Technology Roadmapping. Sandia National Laboratories, Albuquerque, NM, pp. 3–31.
Garcia, R., Calantone, R., 2002. A critical look at technological innovation typology and innovativeness terminology: a literature review. J. Prod. Innov. Manag. 19 (2), 110–132.
Gardner, S., Eng, S., 2005. Gaga over Google? Scholar in the social sciences. Library Hi Tech News 22 (8), 42–45.
Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanović, N., Meijers, E., 2007. Smart Cities: Ranking of European Medium-sized Cities. Centre of Regional Science, Vienna UT, Vienna.
Gillett, E., Lehr, H., Osorio, C., 2004. Local government broadband initiatives. Telecommun. Policy 28 (7), 537–558.
Gnatzy, T., Moser, R., 2012. Scenario development for an evolving health insurance industry in rural India: input for business model innovation. Technol. Forecast. Soc. Chang. 79 (4), 688–699.
Gretzel, U., Werthner, H., Koo, C., Lamsfus, C., 2015. Conceptual foundations for understanding smart tourism ecosystems. Comput. Hum. Behav. 50, 558–563.
Grimaldi, D., Fernandez, V., 2017. The alignment of university curricula with the building of a Smart City: a case study from Barcelona. Technol. Forecast. Soc. Chang. 123, 298–306.
Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., Williams, P., 2010. Foundations for smarter cities. IBM J. Res. Dev. 54 (4).
Hienerth, C., Keinz, P., Lettl, C., 2011. Exploring the nature and implementation process of user-centric business models. Long Range Plan. 44 (5–6), 344–374.
Höjer, M., Wangel, J., 2015. Smart sustainable cities: definition and challenges. In: ICT Innovations for Sustainability. Springer, Cham, pp. 333–349.
Hollands, R.G., 2008. Will the real smart city please stand up? City 12 (3), 303–320.
Hollands, R.G., 2015. Critical interventions into the corporate smart city. Camb. J. Reg. Econ. Soc. 8, 61–77.
Jacso, P., 2005. Google Scholar: the pros and the cons. Online Inf. Rev. 29 (2), 208–214.
Kitchin, R., 2015. Making sense of smart cities: addressing present shortcomings. Camb. J. Reg. Econ. Soc. 8 (1), 131–136.
Komninos, N., Pallot, M., Schaffers, H., 2013. Special issue on smart cities and the future internet in Europe. J. Knowl. Econ. 4 (2), 119–134.
Kuk, G., Janssen, M., 2011. The business models and information architectures of smart cities. J. Urban Technol. 18, 39–52.
Kunsmann, K.R., 2014. Smart cities: a new paradigm of urban development. Crios 4 (1), 9–20.
Lee, J.H., Phaal, R., Lee, S.H., 2013. An integrated service-device-technology roadmap for smart city development. Technol. Forecast. Soc. Chang. 80 (2), 286–306.
Lee, J.H., Hancock, M.G., Hu, M.C., 2014. Towards an effective framework for building smart cities: lessons from Seoul and San Francisco. Technol. Forecast. Soc. Chang. 89, 80–99.
Letaifa, S.B., 2015. How to strategize smart cities: revealing the SMART model. J. Bus. Res. 68 (7), 1414–1419.
Linder, J.C., Cantrell, S., 2001. Five business-model myths that hold companies back. Strateg. Leadersh. 29 (6), 13–18.
Lombardi, P., Giordano, S., Farouh, H., Yousef, W., 2012. Modelling the smart city performance. Innovations 25 (2), 137–149.
Mahizhnan, A., 1999. Smart cities: the Singapore case. Cities 16 (1), 13.
Malhotra, Y., 2000. Knowledge management and new organization forms: a framework for business model innovation. Inf. Resour. Manag. J. 13 (1), 5–14.
Marsal-Llacuna, M.L., Colomer-Llinàs, J., Meléndez-Frigola, J., 2015. Lessons in urban monitoring taken from sustainable and livable cities to better address the smart cities initiative. Technol. Forecast. Soc. Chang. 90, 611–622.
Massa, L., Tucci, C., 2013. Business model innovation. In: The Oxford Handbook of Innovation Management, pp. 420–441.
McCormack, R., 2011. Digital ecosystems: a framework for online business. Accessed online (August 25, 2018) at. http://bitstrategist.com/2011/06/digital-ecosystems-a-framework-for-onlinebusiness/.
McGrath, R.G., 2010. Business models: a discovery driven approach. Long Range Plan. 43 (2), 247–261.
Meijer, A., Bolívar, M.P.R., 2016. Governing the smart city: a review of the literature on smart urban governance. Int. Rev. Adm. Sci. 82 (2), 392–408.
Mora, L., Bolici, R., Deakin, M., 2017. The first two decades of smart-city research: a bibliometric analysis. J. Urban Technol. 24 (1), 3–27.
Mori, K., Christodoulou, A., 2012. Review of sustainability indices and indicators: towards a new city sustainability index (CSI). Environ. Impact Assess. Rev. 32 (1), 94–106.
Nam, T., Pardo, T.A., 2011. Conceptualizing smart city with dimensions of technology, people, and institutions. In: Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times. ACM, pp. 282–291.
Nyberg, R., Yarime, M., 2016. Assembling a field into place: smart cities in Japan. In: Academy of Management Proceedings. vol. 2016, No. 1. Academy of Management, Briarcliff Manor, NY 10510, pp. 18406.
O'Connor, J., Ozaki, R., 2016. Smart cities: logics, practice and hybridity in an emerging institutional field. In: Academy of Management Proceedings. Vol. 2016, No. 1. Academy of Management, Briarcliff Manor, NY 10510, pp. 17400.
Odendaal, N., 2003. Information and communication technologies (ICTs) and local governance: understanding the differences between cities in developed and emerging economies. Comput. Environ. Urban. Syst. 27, 585–607.
Olsen, E.M., Walker, O.C., Ruekert, R.W., 1995. Organizing for effective new product development: the moderating role of product innovativeness. J. Mark. 59 (1), 48–62.
Osterwalder, A., Pigneur, Y., 2010. Business Model Generation: A Handbook for

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Visionaries, Game Changers and Challengers. John Wiley & Sons.
Paroutis, S., Bennett, M., Heracleous, L., 2014. A strategic view on smart city technology: the case of IBM smarter cities during a recession. Technol. Forecast. Soc. Chang. 89, 262–272.
Pateli, A.G., Giaglis, G.M., 2005. Technology innovation-induced business model change: a contingency approach. J. Organ. Chang. Manag. 18 (2), 167–183.
Podsakoff, P.M., Mackenzie, S.B., Bachrach, D.G., Podsakoff, N.P., 2005. The influence of management journals in the 1980s and 1990s. Strateg. Manag. J. 26 (5), 473–488.
Pointing, A., 2013. The Political and Economic Implications of the Smart City (Honors Thesis). Stanford University, Stanford, CA.
Rogers, E.M., 1983. Diffusion of Innovations. The Free Press, New York, NY.
Santos, J., Spector, B., Van der Heyden, L., 2009. Toward a theory of business model innovation within incumbent firms. In: INSEAD Working Paper, Fontainebleau, France.
Sauer, S.C., 2012. Do smart cities produce smart entrepreneurs? J. Theor. Appl. Electron. Commer. Res. 7 (3), 63–73.
Shapiro, J., 2003. Smart Cities: Explaining the Relationship Between City Growth and Human Capital. Harvard University, Boston.
Shapiro, J., 2006. Smart cities: quality of life, productivity, and the growth effects of human capital. Rev. Econ. Stat. 88 (2), 324–335.
Söderström, O., Paasche, T., Klauser, F., 2014. Smart cities as corporate storytelling. City 18 (3), 307–320.
Sosna, M., Trevinyo-Rodríguez, R.N., Velamuri, S.R., 2010. Business model innovation through trial-and-error learning: the Naturhouse case. Long Range Plan. 43 (2), 383–407.
Strauss, J., Radnor, M., Peterson, J., 2008. Plotting and navigating a non-linear roadmap: knowledge-based roadmapping for emerging and dynamic environments. In: Proceedings of the East Asian Conference on Knowledge Creation Management, March 6–7th 2008, Singapore.
Taran, Y., Boer, H., Lindgren, P., 2015. A business model innovation typology. Decis. Sci. 46 (2), 301–331.
Taran, Y., Nielsen, C., Thomsen, P., Montemari, M., Paolone, F., 2016. Business model configurations: a five-V framework to map out potential innovation routes. Eur. J. Innov. Manag. 19 (4), 492–527.
Teece, D.J., 2010. Business models, business strategy and innovation. Long Range Plan. 43 (2), 172–194.
Torraco, R.J., 2005. Writing integrative literature reviews: guidelines and examples. Hum. Resour. Dev. Rev. 4 (3), 356–367.
Walravens, N., 2015. Qualitative indicators for smart city business models: the case of mobile services and applications. Telecommun. Policy 39, 218–240.
Walravens, N., Ballon, P., 2013. Platform business models for smart cities: from control and value to governance and public value. IEEE Commun. Mag. 51 (6), 72–79.
Watson, V., 2013. African urban fantasies: dreams or nightmares? Environ. Urban. 26 (1), 2150–2231.
Weisi, F.U., Ping, P.E.N.G., 2014. A discussion on smart city management based on meta-synthesis method. J. Manuf. Sci. Eng. 8 (1), 73.
Winters, J.V., 2011. Why are smart cities growing? Who moves and who stays. J. Reg. Sci. 51 (2), 253–270.
Wleklinski, J.M., 2005. Studying Google Scholar: wall to wall coverage? Online 29 (3), 22–26.
Yang, K., Meho, L.I., 2006. Citation analysis: a comparison of Google Scholar, Scopus, and Web of Science. Proc. Am. Soc. Info. Sci. Technol. 43 (1), 1–15.
Yigitcanlar, T., Lee, S.H., 2014. Korean ubiquitous-eco-city: a smart-sustainable urban form or a branding hoax? Technol. Forecast. Soc. Chang. 89, 100–114.
Zott, C., Amit, R., 2010. Business model design: an activity system perspective. Long Range Plan. 43, 216–226.
Zott, C., Amit, R., 2012. Creating Value Through Business Model Innovation. MIT Sloan Management Review, Spring.
Zott, C., Amit, R., Massa, L., 2011. The business model: recent developments and future research. J. Manag. 37 (4), 1019–1042.
Zygiaris, S., 2013. Smart city reference model: assisting planners to conceptualize the building of smart city innovation ecosystems. J. Knowl. Econ. 4 (2), 217–231.

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