A Systematic Approach to Managing Knowledge in the Context of Smart Cities

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Abstract

The most recent view on smart city development has recognized that the level of technology adoption in urban contexts is no more able to reflect the real smartness of cities. Smart cities are seen as a centre of knowledge, education, and creativity. The development of smart cities is becoming more and more knowledge based. As a result, knowledge has been perceived as the core component that makes cities smart. Hence, to take advantage of the opportunities that knowledge-based economy and society can bring to the city, leaders and decision makers need to develop cities that take advantage of local knowledge and intellectual capital of the population. Therefore, they need to take initiative to adapt Knowledge Management (KM) in smart cities development. Managing smart cities knowledge is considered an important source of sustainable competitive advantage. However, only a few studies in the academic literature on smart city initiatives address issues related to managerial and knowledge management perspectives. Reviewing the literature, articles were categorized under four groups based on the main theme and the key considerations of managing knowledge in the context of smart cities. This paper therefore investigates the underlying dynamics behind KM and the need for successful implementation of KM strategies within the context of smart cities. The findings are based on thorough review of literature where 16.6% of reviewed articles were in technical and managerial aspects; 38.8% on the role of KM and Intellectual Capital (IC) in implementing smart cities projects; 27.8% on KM processes and 16.6% on open innovation and managing smart cities knowledge. The paper concludes that effectiveness of smart cities knowledge creation, exploitation and management significantly influences on effectiveness of smart city development. Therefore, smart cities governance must be able to exploit and manage knowledge that results from smart cities development.

Keywords: smart cities, knowledge management, competitive advantage, knowledge creation.

Introduction

Urbanization and competitive pressures encourage the growth of cities that are more economically, environmentally and socially sustainable (Osman, 2019). Hence, the concept of smart cities emerged as a strategy to mitigate the unprecedented challenges of continuous urbanization, increasing population density and at the same time provide better quality of life to the citizens (Chourabi et al., 2012). Although the term seems to be simple and intuitively understandable, there is no globally recognized definition of the term; this is due to different perspectives about the how the label ‘‘smart’’ is loaded in the context of smart cities (Osman, 2019). There are several surveys in literature addressing the definition of ‘‘smart city’’ from different perspectives (Osman, 2019).

International Business Machines (IBM) defines a smart city as: ‘‘the city that makes optimal use of all the interconnected information available today to better understand and

control its operations and optimize the use of limited resources''. Knowledge is fundamental source of value for cities and the practical base upon which smart city plans must engage (Ardito et al., 2019). The knowledge needed for the development and prosecution of SC projects can reside in different domains within or beyond projects' boundaries (Ardito et al., 2019). The development of smart cities necessitates managing all types of this knowledge. Thus, the mechanisms to manage smart cities related knowledge may differ depending on the origin of knowledge; this in turn highlights the crucial need for modern urban planning and "smart city" appropriate managerial and KM actions. Research on smart cities lacks a systematic understanding of the different components of smart city KM. This often calls for the creation, use, capture and exploitation of new knowledge. However, previous studies in smart cities related literature have mainly focused on the solutions that target the efficiency and technological advancement of a city's hard infrastructure systems rather than delving into the managerial dynamics and KM problems underlying the development of smart city projects (Ardito et al., 2019). Therefore, the aim of this research is to explore KM in the context of smart cities.

Smart Cities

According to Ardito et al., (2019), originally, urban planners have mostly been concerned with the structural organization of cities, as identified in the effective and sustainable planning of land uses, urbanization areas, physical infrastructures, and business districts. Afterward, due to the growing number of people living in urban agglomerations and the subsequent need to face more demanding challenges related to energy use, transportation, social inclusion, service provision, etc., urban planning has become an extremely complex task requiring multidimensional urban information and strategies that integrate all potential challenges in a well- articulated systemic vision. Therefore, during the last two decades, metropolitan areas around the world have been engaged in initiatives to improve urban infrastructure and services, aiming at a better environment, social and economic conditions, and to improve the attractiveness and competitiveness of cities (Trindade et al., 2017). These efforts brought up the concept of intelligent cities that is the predecessor of smart cities (Yigitcanlar, 2015). Ruhlandt (2018) noted that various cities across the globe see a possibility to address challenges by adopting the 'smart cities' (SC) concept.

Since the end of the 1990s, the 'smart cities' as a field of research has developed quickly (Vandercruysse et al., 2020). The term has been used frequently, especially after 2013, when it exceeded a frequency of citations of other terms including sustainable city (Yigitcanlar, 2006). However, smart cities (SC) is a fuzzy concept, and, there is disagreement in the scientific literature about when or how a city becomes 'smart' (Ruhlandt, 2018). The literature indicates that a number of authors have the difficulty of conceptualization the term, however, these definitions are not contradictory but partially overlapping (Albino et al., 2015; Gil-Garcia et al., 2015; Chourabi et al., 2012).

The literature shows that a strand of literature focuses mostly on the pure technological aspects underpinning urban development and sees smart cities as a successor of information city, digital city (Ruhlandt, 2018). For example, Trindade et al., (2017) noted that smart cities arise due to the intelligent use of digital information, i.e., in the areas such as human health, mobility, energy use, education, knowledge transfer and urban governance. Other studies see smart cities as making use of information and communication technology (ICT) extensively to help cities to build their competitive advantages. Therefore, it is a conceptual model where urban development is achieved through the use of human, collective and technological capital (Meijer and Bolívar, 2016; Albino et al., 2015; Angelidou, 2014). In general, Lee et al., (2014) noted that the concept of smart cities emphasis three core factors: technology (infrastructures of hardware and software), people (creativity, diversity, education) and institutions

(governance and policy) (see Figure 1).At large, the term can be seen as an umbrella concept that contains a number of subthemes such as smart urbanism, smart economy, sustainable and smart environment, smart technology, smart energy, smart mobility, smart health, and so on (Ruhlandt, 2018; Trindade et al., 2017; Albino et al., 2015).

Moreover, with the emergence of the knowledge economy, city planners need to develop cities that take advantage of local knowledge and intellectual capital of the population, promote new businesses, and facilitate access to information both locally and internationally (Bakici et al., 2013). Thus, it has been argued that knowledge is what makes the city smart and knowledge management (KM) makes that 'smartness' sustainable. Therefore, an attempt to model the Smart City should account for KM perspective, as a key element of decision making and competitive advantage (vandercruysse et al., 2020).



Figure 1: The core factors of the concept of smart cities (Lee et al., 2014).

Smart Cities Knowledge and Knowledge Management

Knowledge has always been a vital resource for creating and sustaining a strong economy, society and culture. Therefore, the establishment of cities relied heavily on knowledge (Yigitcanlar, 2010). During the last few decades, cities have become critical platforms for shaping and leveraging human capital into collective intellectual capital, which is one of the main triggers of knowledge production and innovation (Yigitcanlar, 2010). Knowledge is increasingly being regarded in the management literature as the most relevant resource of a firm. In detail, it is particularly relevant to sustain and promote the achievement and retention of a sustainable competitive advantage (Natalicchio et al., 2017). Therefore, smart cities managers and decision makers need to adopt proper organizational and managerial practices to effectively create, gather, organize, use, exploit, share, and transfer the internal and/or external knowledge in order to support their competitiveness.

Nowadays, thanks to the principles of the knowledge economy, knowledge management (KM) and KM frameworks have gained significant importance in both global and local strategic developments (Ardito et al., 2019; Bakici et al., 2013). The key elements of the knowledge-based economy in the modern management model becomes important to generate rapid pace of intangible capital, the implementation of innovation in every possible aspect of the business environment and the generation of high-quality knowledge. Therefore, Smart Cities decision makers need to be aware of all possible kinds of knowledge resources and to consider these resources as crucial factors for organization strategic management techniques. SC organizations need to design specific systems to acquire, analyze the use (re-use) of knowledge in order to make faster, smarter and better decisions, so that they can achieve a competitive advantage (Owoc and Marciniak, 2013). They further mentioned two aspects of KM. First KM is "management of information, knowledge and expertise available within the

organization, i.e. the creation, storage, sharing and use, to ensure the organization's future development of existing resources". Second, KM is regarded as a "deliberate business strategy, which selects, stores, organizes packs and provides information relevant to the company's business in a way that improves efficiency and competitiveness".

Pînzaru et al., (2018) highlighted the importance of collaboration and cooperation amongst public authorities, smart cities experts, stakeholders and project partners in order to strengthen the benefits of the development of SC. This cooperation enhances knowledge transfer, which is required to ensure successful SC development programs. Therefore, irrespective of the SC development program, public-private partnership agreements are needed. Knowledge-transfer with the purpose of smart cities construction should have two main objectives: education and interdisciplinary problem solving that may arise in the strategic planning stage, as well as in the implementation stage (Pînzaru et al., 2018). Baud et al., (2016) noted that knowledge exchange remains a difficult issue. Owoc and Marciniak, (2013) highlighted the challenges for managing implicit/tacit knowledge. Knowledge sharing is scarce, and, in some contexts, there is active resistance to the digitizing of internal databases due to the fear that greater transparency and control will reveal incompetence and corruption. With regard to smart cities (SC); the strongest networks in the development KM initiatives can be found between local government and the private sector.

However, the technical expertise of the private sector means that their power over local government is strong, and likely to grow, as the 'smart city' discourse requires technical expertise outside local government competencies. Links with knowledge institutes and civil society organizations in developing KM are weaker (Baud et al., 2016). Ardito et al., (2019) highlighted a variety of actions that are needed to complement the internal knowledge base of project partners, including the attraction and retention of skilled human capital, the establishment of living labs, and the adoption of social media platforms to acquire new ideas (see Figure 2) (Pancholi et al., 2015). Wiig (2016) emphasized the importance of acquisition and sharing policies, best practice, and knowledge between cities, and from other successful smart city projects.

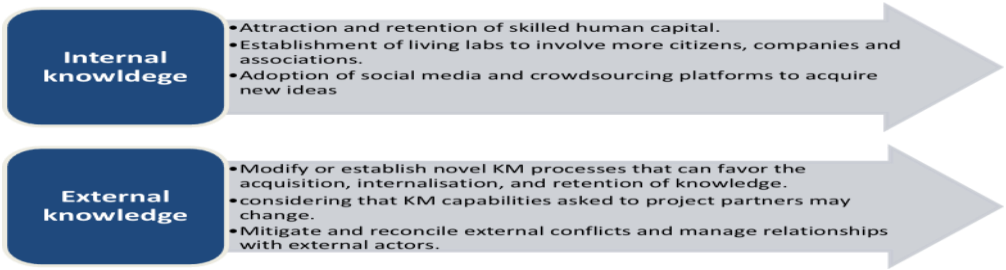


Figure 2: Internal and external knowledge domain in smart cities (Ardito et al., 2019)

Methodology

The aim of this research is to explore knowledge management in the context of smart cities. In order to achieve this aim, a robust methodology was considered essential. The study employs a systematic literature review covering smart cities and KM publications within the current literature. A research literature review is a: "systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners" (Castaneda et al., 2018). Indeed, as argued by many subsequent studies (e.g., Castaneda, et al., 2018; Natalicchio et al., 2017; Massaro et al., 2015), the systematic review can be considered as an analytical review scheme that is necessary to effectively evaluate the contributions of a given body of the literature, in that it entails the adoption of a clear and reproducible set of phases that allows scholars to improve the overall quality of the review process (Tranfield et al., 2003). The

method used in this study followed that proposed by Tranfield et al. (2003) with three stages: planning the review, conducting the review and reporting and disseminating the results.

The first stage is planning, involving developing a list of keywords, and criteria for the inclusion of articles, as well as defining the search string to be given in input to the data source. A university's library search engine, which gives access to various databases including: Directory of Open Access Journals, Science Direct, Scopus, TRID, Web of Science, and Wiley Online Library, was used to complete an online search. To this aim, we identified and, then, combined three keywords, namely "smart cities", "knowledge management", and intellectual capital. "Thereby, the resulting search string is ("smart cities" OR "smart city") AND "knowledge management" OR "KM" AND "intellectual capital") to search the titles, abstracts and key words of available articles. Specifically, the keyword "smart cities" captures our focus on the smart cities concept. While, given the generic nature of the separate terms "knowledge" and "management", we decided to use the keyword "knowledge management" as a whole in order to effectively limit the focus of this research on articles based on the KM literature hence avoiding to include papers with more general aims. Moreover, the key word "intellectual capital" has been used to expand the articles related to KM within the context of smart cities for the purpose of this review. Also, we defined inclusion criteria for the articles. In particular, the articles must be published in peer-reviewed journals, thus leaving out books, book chapters, and conference proceedings. According to Natalicchio et al., (2017), these choices are justified by the fact that those inclusion criteria may assure the identification of the most relevant articles related to the topic under investigation.

Literature Findings and Discussion

General Observations

The first step in the analysis of the selected articles was to classify them by date of publication. Slightly above one tenth (11%) of the reviewed articles were published in 2021 (n=2), around 17% of the reviewed articles (n=3) in 2019, the number of reviewed articles published in 2018, 2017, 2016 were equal with 11% (n=2) in each year, around one third of the articles were published in 2015 (28%, n=5), and finally 5.5% (n=1) in 2014, and another one article was published in 2012 which is the earliest article included in the literature review.

Regarding the academic journals, the articles published in: Journal of Open Innovation: Technology, Market, and Complexity appear most often with 3 articles, Technological Forecasting and Social Change, Cities, International Journal of Information Management, as well as Journal of knowledge management with 2 articles of each. Followed by Future Generation Computer Systems, Urban Geography, Journal of Business Research, Journal of Intellectual Capital, and Innovation, The European Journal of Social Science Research, Proceedings of the Association for Information Science and Technology, and Technovation, with one article of each (n=1). Articles were categorized under four groups. These groups were based on the main themes of the reviewed articles and the key considerations of managing knowledge in the context of smart cities. Around 16.6% of the reviewed articles (n=3) were in the technical and managerial aspects of smart cities, around 38.8% (n=7) were in the role of KM and IC in implementing smart cities projects and enhancing competitive advantage, around 27.8% of the reviewed articles were in KM processes, knowledge sharing and best practices in managing knowledge related to smart cities (n=5), and around 16.6% of the articles (n=3) were in open innovation and managing smart cities knowledge.

Table 1: showing analytical classification some literature reviewed by date

Category	Reference
Technical and managerial aspects of smart cities	Kourtit and Nijkamp, 2012; Dameri and Ricciardi, 2015; Angelidou, 2015
The role of KM and IC in smart cities projects and competitive advantage	Letaifa, 2015; Massaro et al., 2015; Pancholi et al., 2015; Natalicchio et al.,2017; Ardito etal.,2019; Israilidiset al.,2021; Lytras et al., (2021)
KM processes, knowledge sharing andBest practices	Angelidou, 2014; Wiig, 2016; Trindadeetal.,2017; Brescianiet al.,2018; Osman2019
Open innovation and managing smart cities knowledge	Mainkaetal.,2016; Paskaleva and Cooper,2018; Yunand Lee (2019)

Source: Authors Analysis (2024).

Technical and Managerial Aspects of Smart Cities

Papers categorized under technical and managerial aspects of smart cities are those that provide insights into the wider perspective of smart cities rather than technical and hard infrastructure aspects. Research in this area focused predominately on the various aspects of smart cities. Smart cities represent a conceptual urban development model on the basis of the utilization of human, collective, and technological capital for the development of urban agglomerations. The concept of smart cities represents a multidisciplinary field, constantly shaped by advancements in technology and urban development (Angelidou, 2015). Smart city aims to resolve various urban problems, by focusing on three central factors technology, people and institutions. Smart cities initiatives necessitate integrated efforts to incorporate various public and private players, the academia, and the wider community.

This increases the pool of available knowledge and the possibility to address the development of smart city initiatives from multiple, albeit complementary perspectives (Kourtit and Nijkamp, 2012; Angelidou, 2015; Letaifa, 2015). The smart city community strongly believes that knowledge is the key to the future, and that the pivotal strategies in the development of "smart" knowledge are technological innovation, collaborative networking and participative social interactions (Dameri and Ricciardi, 2015). Smart cities can be perceived as the result of knowledge-intensive and creative strategies aiming at enhancing the socio-economic, ecological, logistic and competitive performance of cities. Such smart cities are based on a promising mix of human capital (e.g. skilled labour force), infrastructural capital (e.g. high- tech communication facilities), social capital (e.g. intense and open network linkages) and entrepreneurial capital (e.g. creative and risk-taking business activities) (Kourtit and Nijkamp (2012). Therefore, the development of smart cities requires investigating how intellectual capital (IC) and knowledge resources can be leveraged at the city level in order to build strong and sustainable social ecosystems (Dameri and Ricciardi, 2015). Smart cities are most likely well equipped with an advanced knowledge infrastructure, which may induce important benefits (Kourtit and Nijkamp, 2012; Angelidou, 2015).

The Role of KM and IC in Smart Cities Projects

Papers in this category provide insights into the role of KM and intellectual capital in smart cities projects. Knowledge is often conceived as the core component of the smart city (Ardito et al., 2019). Ardito et al., (2019) noted that SC projects should have a functional understanding of the diverse existing processes for knowledge creation and management. The specific smart city character consists in creating and consolidating knowledge and innovation

in a veritable SCs aspects. Knowledge has been perceived as a central structuring element of a development strategy for smart cities. Hence, knowledge must be applied to proceed with the development of the smart city project. KM processes help to sustain the development of smart city projects at different points of time and ways (Ardito et al., 2019). The development of the KM as an independent domain of investigation with practical significance in all sorts of organizations is significant aspect for SC projects (Massaro et al., 2015). Knowledge creation process may initially involve tacit knowledge of different project partners and stakeholders (Massaro et al., 2015). Smart cities necessitate that governments and citizens provide the local knowledge to shape cities with respect to local resources, priorities, values, and needs. Firms and universities working on SC projects are asked to contribute with their technical and scientific know-how to the development of SC (Letaifa, 2015; Ardito et al., 2019).

However, smart cities project partners are often driven by conflicting interests and views. Lytras et al., (2021) noted that citizen-centric initiatives aimed at developing knowledge- sharing and learning capabilities are crucial for the success of a smart city. Israilidis et al., (2021) noted that smart cities depend not only on a city's endowment of hard infrastructure, but also on the availability and quality of knowledge communication and social infrastructure. This emerging role of cities as information hubs and knowledge repositories is particularly decisive for urban competitiveness as well as enhancing the quality of life. Israilidis et al., (2021) argued that fostering learning, within and between smart city stakeholders such as local authorities and residential citizens, is key for knowledge creation and development. The literature highlighted the lack of a strategic planning and KM governance for smart city development (Letaifa, 2015; Ardito et al., 2019). Consistency on how knowledge is captured and shared is key, hence a wide-system framework to support documenting, storing and maintaining records of performance and actions undertaken needs to be developed (Israilidis et al., 2021; Pancholi et al., 2015; Angelidou, 2014).

KM Processes, Knowledge Creation and Sharing

Papers under KM processes, knowledge sharing, and best practices category emphasized the importance of knowledge acquisition and sharing policies, practice, and best knowledge between cities, and from other successful smart city projects, considering how initiatives from elsewhere inform developments in another location (Wiig, 2016). SC domains necessitate comprehensive analytics based on datasets generated from different domains (Osman, 2019). KM processes involve different actors and KM capabilities (Bresciani et al., 2018). Knowledge sharing and transfer remain one of the key challenges encountering effective SC knowledge management efforts. Tacit/ discreet knowledge includes employees' skills, qualifications and experience (Bresciani et al., 2018). Managing smart cities knowledge often represents a barrier to knowledge capture, acquisition, sharing and transfer. Therefore, it requires being conceptualized in more explicit knowledge and shared among the project partners (Angelidou, 2014). Implementing smart cities requires sharing policy strategies that used responsive and adaptive information technologies to improve on urban issues for "current and prospective residents and businesses (Wiig, 2016). In addition to advancement of human capital and citizen empowerment, intellectual capital and knowledge creation are of the most mentioned advantages of soft infrastructure and people-oriented smart cities strategies (Angelidou, 2014; Trindade et al., 2017). ICT capabilities make knowledge creation and integration easier, in combination with external actors, through alliances, capitalizing on internal bulk of knowledge. Therefore, in order to attain successful implementation of smart cities projects, companies have to build up their ICT capabilities internally with the final aim being to transfer, manage and integrate structurally separate ambidextrous activities at different levels (Trindade et al., 2017; Bresciani et al., 2018).

Open Innovation and Managing Smart Cities Knowledge

The delivery of better services to citizens requires both recognizing the pressures for innovation and quality in government and the need for capacity building in public administration. In "smart cities", where ICT are used to enhance quality of life of citizens - government partners are expected to actively listen to the needs of citizens, as service users are deeply involved in development processes. Thus, for a city to be smart it requires developing and managing a variety of innovative services that engages citizens in co-production via interactive and internet-based applications (Paskaleva and Cooper, 2018). Accordingly, cities have become "collaborative innovation platforms" (Mainka et al., 2016; Yun and Lee, 2019). Smart cities have been referred to as "knowledge cities". In this regard, smart cities are required to spur open innovation of tacit knowledge (Yun and Lee, 2019).

Open innovation is understood to mean the free flow of knowledge and innovative ideas between different stakeholders. Thus, the open innovation paradigm facilitates knowledge acquisition and using external knowledge effectively (Paskaleva and Cooper, 2018, Mainka et al., 2016). Cities that try to meet the needs of the knowledge society are "living labs", which have been boosted as the new ways to speed up the innovation capacity of public agencies and other organizations in co-producing smart city services (Paskaleva and Cooper, 2018; Mainka et al., 2016). However, the idea of smart cities becoming an open innovation platform is rather new and in only a few cases has this approach been realized. Nonetheless, implementing open innovation at the city level is as difficult as in companies that are mostly deadlocked in hierarchical structures (Mainka et al., 2016).

Conclusion

As the global urban population is expected to grow exponentially by 2050, cities will face unprecedented sustainability challenges. A successful smart city emerges when knowledge is combined from various sources that have usually not been used in combination. Capitalizing on city's knowledge is an ongoing issue. Knowledge management is to create added value for the company. Smart cities KM offers the means to create valuable knowledge that brings consistent and sustainable added value that can therefore be useful in avoiding strategic risk, better-informed decision, and finding smart and effective business solutions. However, very little research looking at the role of knowledge management in the context of smart cities appears to have been conducted. Smart cities projects require special tools for knowledge management, including robust efforts to integrate various public and private players, the academia, and the wider community. Innovative knowledge management tools and techniques to address smart cities specific needs must be created before initiating a smart city project. Smart cities knowledge creation process may initially involve tacit knowledge of different project partners. The tacit knowledge requires being conceptualized in more explicit knowledge and shared among the project partners, with the aim of validating the effectiveness of such knowledge for the project goals. Research on smart cities lacks a systematic understanding of the different components of smart city knowledge management. Therefore, there is an urgent need to develop and deliver a comprehensive understanding to identify and address the knowledge managing in the context of smart cities.

References

Albino, V., Berardi, U. and Dangelico, R.M., (2015). Smart cities: Definitions, dimensions, performance, and initiatives. Journal of urban technology, 22(1), pp.3-21.

Angelidou, M., (2014). Smart city policies: A spatial approach. Cities, 41, pp.S3-S11.

Angelidou, M., (2015). Smart cities: A conjuncture of four forces. Cities, 47, pp.95-106.

Anttiroiko, A.-V., Valkama, P., Bailey, S.J., (2014). Smart cities in the new service economy: building platforms for smart services. AI & Soc. 29 (3), 323–334.

Ardito, L., Ferraris, A., Petruzzelli, A. M., Bresciani, S. and Del Giudice, M., (2019). The role of universities in the knowledge management of smart city projects. Technological Forecasting and Social Change.

Bakici, T., Almirall, E. and Wareham, J., (2013). A smart city initiative: the case of Barcelona. Journal of the knowledge economy, 4(2), pp.135-148.

Baud, I., Pfeffer, K., Sydenstricker-Neto, J., DEnis, E., Scott, D. and Minaya, L.C.M., (2016). Knowledge management in urban governance; building adaptive capacity through ICT-GIS-based systems in the global South. Development, Environment and Foresight, 2(1), pp.7-22.

Bresciani, S., Ferraris, A. and Del Giudice, M., (2018). 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, 136, pp.331-338.

Castaneda, D.I., Manrique, L.F. and Cuellar, S., (2018). Is organizational learning being absorbed by knowledge management? A systematic review. Journal of Knowledge Management, 22(2), pp.299-325.

Chang, D.L., Sabatini-Marques, J., Da Costa, E. M., Selig, P. M. and Yigitcanlar, T., (2018). Knowledge-based, smart and sustainable cities: a provocation for a conceptual framework. Journal of Open Innovation: Technology, Market, and Complexity, 4(1), p.5.

Chesbrough, H., (2011). Open services innovation: Rethinking your business to grow and compete in a new era. John Wiley & Sons

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., Pardo, T. A. and Scholl, H.J., (2012). Understanding smart cities: An integrative framework. In System Science (HICSS), 2012 45th Hawaii International Conference on (pp. 2289-2297). IEEE.

Dameri, R. P. and Ricciardi, F., (2015). Smart city intellectual capital: an emerging view of territorial systems innovation management. Journal of Intellectual Capital, 16(4), pp. 860- 887.

Gil-Garcia, J. R., Pardo, T. A. and Nam, T., (2015). What makes a city smart? Identifying core components and proposing an integrative and comprehensive conceptualization. Information Polity, 20(1), pp.61-87

Israilidis, J., Odusanya, K. and Mazhar, M.U., (2021). Exploring knowledge management perspectives in smart city research: A review and future research agenda. International Journal of Information Management, 56, p.101989.

Kourtit, K. and Nijkamp, P., (2012). Smart cities in the innovation age. Innovation: The European Journal of Social Science Research, 25(2), pp.93-95.

Lee, J. H., Hancock, M.G. and Hu, M. C., (2014). Towards an effective framework for building smart cities: Lessons from Seoul and San Francisco. Technological Forecasting and Social Change, 89, pp.80-99.

Letaifa, S. B., (2015). How to strategize smart cities: Revealing the SMART model. Journal of Business Research, 68(7), pp.1414-1419.

Lytras, M. D., Visvizi, A., Chopdar, P. K., Sarirete, A. and Alhalabi, W., (2021). Information Management in Smart Cities: Turning end users' views into multi-item scale development, validation, and policy-making recommendations. International Journal of Information Management, 56, p.102146.

Mainka, A., Castelnovo, W., Miettinen, V., Bech-Petersen, S., Hartmann, S. and Stock, W.G., (2016). Open innovation in smart cities: Civic participation and co-creation of public services. Proceedings of the Association for Information Science and Technology, 53(1), pp.1-5.

Massaro, M., Dumay, J. and Garlatti, A. (2015) "Public sector knowledge management: a structured literature review", Journal of Knowledge Management, 19 (3), pp 530-558.

Meijer, A. and Bolívar, M. P. R. (2016). Governing the smart city: a review of the literature on smart urban governance. international review of administrative sciences, 82(2), pp.392-408.

Natalicchio, A., Ardito, L., Savino, T. and Albino, V., (2017). Managing knowledge assets for open innovation: a systematic literature review. Journal of Knowledge Management, 21(6), pp.1362-1383.

Osman, A. M. S., (2019). A novel big data analytics framework for smart cities. Future Generation Computer Systems. 91, pp.620-633.

Owoc, M. and Marciniak, K., (2013). Knowledge management as foundation of smart university. In 2013 Federated Conference on Computer Science and Information Systems (pp. 1267- 1272). IEEE.

Pancholi, S., Yigitcanlar, T. and Guaralda, M., (2015). Public space design of knowledge and innovation spaces: learnings from Kelvin Grove Urban Village, Brisbane. Journal of Open Innovation: Technology, Market, and Complexity, 1(1), p.13.

Paskaleva, K. and Cooper, I., (2018). Open innovation and the evaluation of internet-enabled public services in smart cities. Technovation, 78, pp.4-14.

Pînzaru, F., Zbuchea, A. and Vițelar, A., (2018). Knowledge Transfer from Business to Public Administration in Smart City Development. In European Conference on Knowledge Management (pp. 700-XXV). Academic Conferences International Limited.

Ruhlandt, R. W. S., (2018). The governance of smart cities: A systematic literature review. Cities, 81, pp.1-23. 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, 22(2), pp.357-367.

Selada, C., (2017). Smart cities and the quadruple helix innovation systems conceptual framework: the case of Portugal. In The Quadruple Innovation Helix Nexus (pp. 211-244). Palgrave Macmillan, New York.

Tranfield, D., Denyer, D. and Smart, P., (2003). Towards a methodology for developing evidence- informed management knowledge by means of systematic review. British journal of management, 14(3), pp.207-222.

Trindade, E. P., Hinnig, M. P. F., Moreira da Costa, E., Marques, J. S., Bastos, R. C. and Yigitcanlar, T., (2017). Sustainable development of smart cities: A systematic review of the literature. Journal of Open Innovation: Technology, Market, and Complexity, 3(3), p.11.

Vandercruysse, L., Buts, C. and Dooms, M., (2020). A typology of Smart City services: The case of Data Protection Impact Assessment. Cities, 104, p.102731.

Wiig, A., (2016). The empty rhetoric of the smart city: from digital inclusion to economic promotion in Philadelphia. Urban Geography, 37(4), pp.535-553.

Wataya, E. and Shaw, R. (2019). Measuring the value and the role of soft assets in smart city development. Cities, 94, pp.106-115.

Yigitcanlar, T. (2006). Australian local governments' practice and prospects with online planning. URISA Journal, 18(2), 7–17.

Yigitcanlar, T., (2010). Making space and place for the knowledge economy: knowledge-based development of Australian cities. European Planning Studies, 18(11), pp.1769-1786.

Yigitcanlar, T. (2015). Smart cities: an effective urban development and management model? Australian Planner, 52(1), 27–34.

Yu, C., Zhang, Z., Lin, C. and Wu, Y., (2017). Knowledge creation process and sustainable competitive advantage: The role of technological innovation capabilities. Sustainability, 9(12), p.2280.

Yun, Y. and Lee, M., (2019). Smart city 4.0 from the perspective of open innovation. Journal of Open Innovation: Technology, Market, and Complexity, 5(4), p.92.