

# Rethinking Smart Green Cities for Knowledge-Led Urban Innovation

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**Abstract:** Cities of tomorrow are rethinking on the urban planning, adopting a smart city view to drive green urban innovation and growth. The study aims to elucidate that cities are planning a smart city view to make the city a smart green and knowledge-led urban community, an engine of collaborative spaces for innovation. The study relies on the analysis of one single case study related to the smart city framework as urban planning that aims at designing the future pathway to drive urban innovation. Florence is redesigning the urban planning, adopting a smart city view that supports collaborative approaches in order to make green and wealthy urban spaces and communities. The findings elucidate that cities may identify the smart city framework to make a smart green urban community, leading to the city an engine of social innovation, and developing collaborative pathways that contribute to social innovation and value. The smart city urban planning enables the city to make a smart green community in order to develop knowledge-led urban development and innovation.

**Keywords:** Smart green cities, Smart communities, Green urban innovation

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## 1. Introduction

The future smart society relies on cities that are able to rethink on green urban innovation and communities (Hu and Han, 2023; Yan, Sun, Shi and Zhao, 2023) by combining knowledge sources, capabilities and technologies (Angelidou, 1997; Knight, 1995), and promoting knowledge-led urban spaces of innovation (Yigitcanlar and Bulu, 2016). The smart city helps the city to develop collaborative pathways (Capdevila and Zarlenga, 2015) and knowledge management practices that contribute to driving community-led and people-driven smart green urban innovation (Israilidis, Odusanya and Mazhar, 2021; Nam and Pardo, 2011).

Cities adopt a smart city vision to make smart urban communities (Eger, 2005), that support collaborative knowledge making and sharing (Israilidis, Odusanya and Mazhar, 2019), leading to urban collaborative ecosystems for innovation (Mora *et al.*, 2023; Dolmans *et al.*, 2023).

Knowledge-based urban development relies on smart cities that enable the city to achieve urban sustainability (Chang *et al.*, 2018), and support the maintenance of urban ecosystems (Yigitcanlar and Teriman, 2015). Smart cities help support green technological innovation and development (Yan, Sun, Shi and Zhao, 2023).

Cities of the future aim at becoming smart green communities, by adopting a smart city planning view to develop knowledge assets for urban innovation (Angelidou, 2015), and understanding the potential of information technology in order to make the city an innovation-driven and knowledge-oriented urban community. Smart urban development relies on cities that are rethinking on smart green urban future (Hu and Han, 2023).

Cities are going smart in order to build a smart green city. The greenness of a city is positively related to the smartness of the city (Bonab, Bellini and Rudko, 2023) as the city's capability to develop collaborative pathways that contribute to social value and innovation within urban communities (Meijer and Bolívar, 2016).

Few studies investigate the role of smart city urban planning as a driver of green urban innovation and issues.

The aim of the smart city plan is to enable the city to make a smart green innovative urban community.

The research question refers to how cities are rethinking the urban future, following a knowledge-led view, shaping the city a socially green innovative urban community that relies on urban knowledge.

The case study concerns the choices drawn by the *Firenze Smart City Plan*. The aim of the smart city framework is to track the itinerary in order to make the city a smart green innovative urban community. The study analyses and elucidates the main issues of the document. Cities are re-planning the urban setting, following a smart city view to drive wealthy and green urban communities that develop knowledge sources to drive innovation.

The aim of this study is to elucidate how smart city urban planning enables cities to rethink on the green urban future, by strengthening multi-actor and knowledge-led collaboration that contribute to urban innovation. The paper is articulated in five sections. After introduction and theoretical background, in the third section, the methodological section follows. Findings, discussion and conclusions are set out.

### 1.1 Towards Smart Green Innovative Cities. A Knowledge-Led and Collaboration-Driven View

As organisational spaces (Knox, 2010), and arenas of innovation (Zhang and Wu, 2019), cities are pursuing knowledge-led urban spaces of innovation (Yigitcanlar and Bulu, 2016), following a smart city view to ensure better quality of life by strengthening the collaboration for knowledge management and sharing issues (Israilidis, Odusanya and Mazhar, 2019), and leading to open social innovation in long-term horizon (Paskaleva, 2011; Costales, 2022).

Cities of tomorrow will be smart green and collaboration-driven urban communities (Bonab, Bellini and Rudko, 2023; Capdevila and Zarlenga, 2015; Gil-Garcia *et al.*, 2016), by fostering multi-actor collaborative innovation (European Commission, 2012; Sørensen and Torfing, 2018). Smart city policies and approaches help cities to drive collaborative innovation (Capdevila and Zarlenga, 2015).

As smart communities (Eger, 2005), cities develop knowledge sources and capabilities, and support the urban stakeholders to engage in collaborative pathways in order to drive intentional urban development and ensure better quality of life (Knight, 1995; Angelidou, 2017; Meijer and Bolívar, 2016), leading to social innovation issues (Costales, 2022).

Smart city construction does improve green living, production and growth. Thereby, urban planners aim at identifying policies that contribute to smart green urban places (Jiang and Sun, 2025). Smart city strategies and planning help the city to develop knowledge networks and drive urban innovation (Angelidou, 2015). Technologies empower cities to provide a meeting space for knowledge creation and sharing, by encouraging and nourishing the collective knowledge (Edvinsson, 2006), and supporting a culture of openness, collaboration, by promoting knowledge sharing skills (Capdevila, 2019).

The smart city framework is emerging as an innovation-driven strategy to achieve green development and support social green urban spaces (Jiang and Sun, 2025; Hu and Han, 2023).

Planning smart urban development relies on promoting bottom-up initiatives, and enables the cities to become intelligent, innovation-driven and knowledge-led urban communities (Kominos *et al.*, 2019; Dameri, Ricciardi and D'Auria, 2014; Israilidis, Odunsanya and Mazhar, 2021).

Smart city design may contribute to qualitative urban change, leading to collaborative processes that make healthy urban future, and improve the quality of life (Meijer and Thaens, 2018; Mora, Deakin, Reid and Angelidou, 2019).

Smart city planning helps the city to design smart green policies for urban innovation and community development (Israilidis, Odusanya and Mazhar, 2021; Macke *et al.*, 2018).

Cities are following a smart city approach to redesign the urban planning in order to support knowledge management practices that contribute to driving green urban development and innovation (Chang *et al.* 2018; Yan, Sun, Shi and Zhao, 2023). Smart city relies on knowledge generation, dissemination and absorption as enablers of innovation (Han, 2025). The smart green city helps to drive the city a smart innovative and knowledge-led urban community (Bonab, Bellini and Rudko, 2023). Implementing the smart city helps the city to make smart open and accessible urban spaces for everyone willing to contribute to urban social value (Obringer and Nateghi, 2021).

## 2. Methodological Section

The study has employed a qualitative, descriptive and exploratory methodology to analyse how cities are adopting a smart city framework to drive green urban innovation. The study focuses on one exploratory and illustrative case study concerning the city of Florence which is re-planning on the urban design, and following the smart city framework to drive green urban innovation and growth. The smart city framework aims to provide an exploratory and illustrative case study with regards to a city which is combining the potential of smart city applications and policies with the opportunity to drive green urban innovation and communities. The case study helps to explore and provide a comprehensive understanding of a phenomenon still in progress and emerging in contemporary times, whereas the boundaries between the phenomenon and the context are not clearly evident. The case study methodology follows an empirical inquiry without the rigidity of a predefined structure for observations and analysis (Yin, 2009). The study relies on the analysis of the official document related to the municipal urban planning framework. The research method has involved case selection and data collection from the policy document related to the smart city strategy framework *Firenze Smart City Plan* as the main data and information source to be collected and analysed. The future urban development relies on urban planning as a

platform that helps combine smart city approaches and green views as drivers of the city, an urban community and engine of urban innovation and social growth. Investigating the role of the smart city framework helps to understand the pathway of innovation that cities are following, by adopting a smart city vision and planning to drive knowledge-led green urban growth and innovation (Angelidou, 2017; Angelidou, 2015; Mora and Bolici, 2017; Sancino and Hudson, 2020; Dameri, Ricciardi and D'Auria, 2014).

### 3. Findings

Smart city planning may help cities to rethink on green urban innovation and growth by employing knowledge management practices. Cities are rethinking on the urban development, following a green view by designing a smart city framework in order to develop the city a social platform to drive community-led and green innovation.

Cities are planning the future urban development by selecting a smart vision to green urban growth and innovation.

In particular, Florence aims at constructing a smart city-led and green urban community which is able to drive urban innovation, by following both a community-led and social innovation view that relies on collaborative as well as knowledge management practices that contribute to urban value creation and innovation.

A smart green urban community relies on encouraging all the urban stakeholders to work together and collaboratively, by enhancing knowledge sharing practices, and rethinking the city a system of interconnected processes that refer to technological, social and human capabilities.

The green urban future and innovation relies on the city which is able to employ the potential of smart city design to make a smart community an engine of innovation and collaborative meeting places among the urban stakeholders.

Florence aims at planning a smart city view to enable the urban community to proactively develop green and eco-friendly policies and services. The urban community aims at becoming an agent of social change and green urban development.

Florence is recognizing the importance of designing effective urban planning as a hub for innovation that aims to support green urban growth, by developing collaborative and knowledge-led practices that involve all the urban stakeholders of the community.

Florence is approaching a smart city view to make urban meeting cooperative spaces that contribute to social innovation, and support the design and the implementation of green and eco-friendly policies that help the city to shape a socially innovative and cohesive urban community.

The role of smart city urban planning is to provide guidelines that contribute to enhancing urban energies, competences and intelligence in order to enable urban spaces for social innovation and change, empowering citizens and the urban community, and supporting private, public and no profit actors to identify innovative solutions for policy and services co-production that help to improve the urban life and the sustainability of a city that is making a smart socially innovative green community.

Firenze is following a smart and green approach to urban planning and future in order to support social innovation within urban communities. In the *Firenze Smart City Plan*, the smartness is emerging as the way by which the city aims at becoming a sustainable, collaborative-led and green urban community. The smart city plan aims at becoming not only a descriptive document concerning subjects, ideas, proposals and guidelines on urban development but also a space for debate, confrontation and social exchange in order to support the urban actors to work together to improve green solutions and policies that contribute to ensuring better quality of urban life.

In the *Firenze Smart City Plan*, the concept of smart green city refers to a city that is continuously changing by constructing new social, urban, and economic responses to environmental and historical pressures, by developing the smartness as a collaborative approach to urban innovation, and leading to green solutions and policies in order to improve the quality of urban life of citizens and communities.

The smart city plan is an open space for debate, confrontation, exchange of information and knowledge that supports all the urban stakeholders to work together. A smart city master plan helps support a green urban vision, relying on knowledge resources, capabilities and competences that several stakeholders provide, by engaging in relational and cooperative exchanges that shape social meeting urban places.

Urban policies help the city to develop smart green urban innovation and growth by promoting collaboration among all the stakeholders that get involved along the urban value chain.

Smart city frameworks rely on promoting open innovation by involving the urban stakeholders (public administration, research centres, cultural institutions, businesses, associations, groups, citizens) to engage in collaboration in order to develop: the *integration* with regards to the competences they get; the *innovation* in terms of development of innovative services and solutions through digital and interactive information technology; the *involvement* as a means to enable stakeholders to work together, identify and implement strategic goals; and the *information* as a way to consolidate the relationships within the urban community.

This findings of the analysis elucidate that the city of Florence is rethinking on a green and smart vision to drive urban future, relying on collaboration as a pillar to enable urban energies and competences of stakeholders that support and construct urban innovation. The smart city framework helps the city to develop a community-led view to green urban innovation, by redesigning the urban planning, and support the city to rethink about the future perspectives of urban growth within urban communities. As a sustainable and innovative community, the city is adopting a smart vision, strengthening the collaborative frameworks, and designing urban collaborative spaces that enable several stakeholders to drive innovation processes in order to improve the quality of urban communities.

#### **4. Discussion and Conclusions**

Planning smart city frameworks for designing the urban future helps the city to develop green policies and solutions that improve the quality of urban life, and contribute to urban innovation and growth. The urban planning is becoming a social platform that helps the city to support community-led and collaborative innovation, investing in knowledge sources to make the city a smart green and knowledge-led urban community which is able to drive open collaborative innovation. Cities of tomorrow are planning the urban future to make smart green innovative urban communities, by adopting a knowledge management view to engage urban communities and shape collaborative open urban spaces.

In the city of Florence, the smart city planning focuses on bringing together integration, innovation, involvement, and information as driver of green and social innovation. The smart city framework enables several urban stakeholders to work together in order to make the urban community an engine of social innovation.

The main issue of the smart city planning in Florence refers to the development of collaborative approaches and frameworks that contribute to green urban innovation for sustainable growth, and support community and citizen engagement, and knowledge management practices.

The future development of cities relies on building smart green urban communities, and sharing urban knowledge-led practices. Smart green cities enable the city to develop organisational competences that support collaborative frameworks.

As engines of smart green urban innovation, cities contribute to building smart community-oriented and human-centred open urban spaces, putting the people first, and focusing on human and social capital in order to drive multi-actor collaborative innovation.

There are social, managerial and organisational implications. The smart city planning supports green policies and enables the pathways to drive social innovation. The smart city plan makes the urban community the pillar of smart green policies and fosters the development of urban managerial capabilities. Planning a smart city view enables the city to support green urban growth, leading to social and collaborative innovation, and promoting community development.

Smart city planning helps the city to enhance urban energies and capabilities that enable the urban communities to achieve green issues and mind set within the community. Smart city frameworks help support green, collaborative and knowledge-led urban innovation.

Further research perspectives imply to investigate how Italian cities are planning the future of urban communities, following a smart green city vision and framework to urban innovation and growth, by employing knowledge sources and capabilities in order to enhance collaborative itineraries that contribute to enriching the urban potential for value creation and innovation.

**Ethics statement:** I declare that any ethical clearance was required for the research.

**AI statement:** I declare that AI tool were not used to create this paper.

## References

- Angelidou, Margarita. (2017) "The role of smart city characteristics in the plans of fifteen cities", *Journal of Urban Technology*, Vol. 24, No. 4, pp 3-28.
- Angelidou, Margarita. (2015) "Smart cities: A conjuncture of four forces", *Cities*, Vol. 47, pp 95-106.
- Bonab, Aysan Bashirpour, Bellini, Francesco and Rudko, Ihor. (2023) "Theoretical and analytical assessment of smart green cities", *Journal of Cleaner Production*, Vol. 410, 137315.
- Capdevila, Ignasi and Zarlenga, Matias I. (2015) "Smart city or smart citizens? The Barcelona case", *Journal of Strategy and Management*, Vol. 8, No. 3, pp 266-282.
- Capdevila, Ignasi. (2019) "Motivating participation in collaborative spaces", *Journal of Business Strategy*, Vol. 40, No. 2, pp 14-21.
- Chang, Daniel Lage, Sabatini-Marques, Jamile, Da Costa, Eduardo Moreira, Selig, Paulo Mauricio and Yigitcanlar, Tan. (2018). Knowledge-based, smart and sustainable cities: A provocation for a conceptual framework. *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 4, No. 1, pp 1-17.
- Comune di Firenze. (2015) Firenze Smart City Plan. Retrieved by [https://ambiente.comune.fi.it/sites/ambiente.comune.fi.it/files/2019-11/Smart\\_City\\_Plan\\_it.pdf](https://ambiente.comune.fi.it/sites/ambiente.comune.fi.it/files/2019-11/Smart_City_Plan_it.pdf)
- Costales, Emilio. (2022) "Identifying sources of innovation: Building a conceptual framework of the Smart City through a social innovation perspective", *Cities*, Vol. 120, 103459.
- Czarniawska, Barbara. (2002) "Remembering while Forgetting: The Role of Automorphism in City Management in Warsaw", *Public Administration*, Vol. 62, No. 2, pp 163-173.
- Dameri, Renata Paola, Ricciardi, Francesca and D'Auria, Beatrice. (2014) "Knowledge and intellectual capital in smart city", *European Conference on Knowledge Management*, Kidmore End, Vol. 1, pp 250-257.
- Dolmans, Sharon A.M., van Galen, Wouter P.L., Walrave, Bob, den Ouden, Elke, Valkenburg, Rianne and Romme, A. Georges, L. (2023) "A Dynamic Perspective on Collaborative Innovation for Smart City Development: The role of uncertainty, governance, and institutional logics", *Organization Studies*, Vol. 44, pp 1577-1601.
- Edvinsson, Leif. (2006) "Aspects on the city as a knowledge tool. *Journal of knowledge management*", Vol. 10, No. 5, pp 6-13.
- Eger, John M. (2005) "Smart communities, universities, and globalization: Educating the workforce for tomorrow's economy", *Metropolitan Universities*, Vol. 16, No. 4, pp 28-38.
- European Commission. (2012) Smart cities and communities – European Innovation Partnership, C (2012) 4701 final, Brussels, 10.7.2012. Retrieved by <https://www.kowi.de/Portaldata/2/Resources/FP/com-2012-smart-cities-en.pdf>
- Gil-Garcia, J. Ramón, Pardo, Theresa A. and Nam, Taewoo. (2016) "A Comprehensive View of the 21 Century City: Smartness as Technologies and Innovation in Urban Contexts", In Gil-Garcia, J.R. *et al.* (eds), *Smarter as the New Urban Agenda. A Comprehensive View of the 21<sup>st</sup> Century, City*, pp 1-21. Public Administration and Information Technology, Cham: Springer.
- Han, Junghee. (2025) "Open innovation in a smart city context: the case of Sejong smart city initiative", *European Journal of Innovation Management*, Vol. 28, No. 4, pp 1740-1762.
- Hu, Rui and Han, Xinliang. (2023) "Toward a "Smart-Green" Future in Cities: System Dynamics Study of Megacities in China", *Energies*, Vol. 16, No. 17, 6395.
- Israilidis, John, Odusanya, Kayode and Mazhar, Muhammad Usman. (2021) "Exploring knowledge management perspectives in smart city research: A review and future research agenda", *International Journal of Information Management*, Vol. 56, 101989.
- Israilidis, John, Odusanya, Kayode and Mazhar, Muhammad Usman. (2019) "Knowledge Management in Smart City Development: A Systematic Review", in 20<sup>th</sup> European Conference on Knowledge Management (ECKM 2019). Proceedings of a meeting held Lisbon, Portugal, 5-6 September 2019, Vol. 1.
- Jiang, Yuchen and Sun, Jiasen. (2025) "Does smart city construction promote urban green development? Evidence from a double machine learning model" *Journal of Environmental Management*, Vol. 373, 123701.
- Knight, Richard V. (1995) "Knowledge-based development: policy and planning implications for cities", *Urban studies*, Vol. 32, No. 2, pp 225-260.
- Knox, Hannah. (2010) "Cities and organisation: The information city and urban form", *Culture and Organization*, Vol. 16, No. 3, pp 185-195.
- Komninos, Nicos, Kakderi, Christina, Panori, Anastasia and Tsarchopoulos, Panagiotis. (2019) "Smart city planning from an evolutionary perspective", *Journal of Urban Technology*, Vol. 26, No. 2, pp 3-20.
- Macke, Janina, Casagrande, Rodrigo M., Sarate, João Alberto R. and Silva, Kelina A. (2018) "Smart city and quality of life: Citizens' perception in a Brazilian case study", *Journal of Cleaner Production*, Vol. 182, pp 717-726.
- Meijer, Albert and Bolívar, Manuel Pedro Rodriguez. (2016) "Governing the smart city: a review of the literature on smart urban governance", *International Review of Administrative Sciences*, Vol. 82, No. 2, pp 392-408.
- Meijer, Albert and Thaens, Marcel. (2018) "Urban Technological Innovation: Developing and Testing a Sociotechnical Framework for Studying Smart City Projects", *Urban Affairs Review*, Vol. 54, No. 2, 363387.
- Mora, Luca, Appio, Francesco Paolo, Foss, Nicolai J., Arellano-Gault, David and Zhang, Xiaoling. (2023) "Organizing for Smart City Development: Research at the crossroads. Introduction to the Special Issue", *Organization Studies*, Vol. 44, No. 10, pp 1559-1575.

- Mora, Luca, Deakin, Mark, Reid, Alasdair, and Angelidou, Margarita. (2019) "How to overcome the dichotomous nature of smart city research: Proposed methodology and results of a pilot study", *Journal of Urban Technology*, Vol. 26, No. 2, pp 89-128.
- Mora, Luca and Bolici, Roberto. (2017) "How to Become a Smart City: Learning from Amsterdam", in A. Bisello, D. Vettorato, R. Stephens, P. Elisei, *Smart and Sustainable Planning for Cities and Regions*, pp 251-266, Springer: Cham.
- Nam, T. and Pardo, T.A. (2011) "Smart city as urban innovation with dimensions of technology, people and institutions", *Proceedings of the 5<sup>th</sup> international conference on theory and practice of electronic governance*, ACM, 185-194.
- Obringer, Renee and Nateghi, Roshanak. (2021) "What makes a city 'smart' in the Anthropocene? A critical review of smart cities under climate change", *Sustainable cities and Society*, Vol. 75, 103278.
- Paskaleva, Krassimira Antonova. (2011) "The smart city: A nexus for open innovation?", *Intelligent Buildings International*, Vol. 3, No. 3, pp 153-171.
- Sancino, Alessandro and Hudson, Lorraine. (2020) "Leadership in, of, and for smart cities—case studies from Europe, America, and Australia", *Public Management Review*, Vol. 22, No. 5, pp 701-725.
- Sørensen, Eva and Torfing, Jacob. (2018) "Co-initiation of collaborative innovation in urban spaces", *Urban Affairs Review*, Vol. 54, No. 2, pp 388-418.
- Yan, Zheming, Sun, Zao, Shi, Rui and Zhao, Minjuan. (2023) "Smart city and green development: Empirical evidence from the perspective of green technological innovation", *Technological Forecasting and Social Change*, Vol. 191, 122507.
- Yigitcanlar, Tan and Bulu, Melih. (2016) "Urban Knowledge and Innovation Spaces", *Journal of Urban Technology*, Vol. 23, No. 1, pp 1-9.
- Yigitcanlar, Tan and Teriman, Suharto. (2015) "Rethinking sustainable urban development: towards an integrated planning and development process", *International journal of environmental science and technology*, Vol. 12, pp 341-352.
- Yin, R.K. (2009) *Case study research: Design and methods*, Thousand Oaks, CA, Sage.
- Zhang, Fangzhu and Wu, Fulong. (2019) "Rethinking the city and innovation: A political economic view from China's biotech", *Cities*, Vol. 85, pp 150-155.