DRIVING SMART CITIES AND PROJECTS IN ROMANIA

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Abstract
Cities are rethinking how to drive future urban development, following a smart vision to urban growth to improve the quality of life of citizens. As adopting a smart approach to urban development, cities are investing in the design and implementation of smart city projects to transform in a significant way the urban community, and to enhance the social and economic performances of cities. By Investing in smart city projects, cities identify a sustainability-oriented pathway addressing and developing smart and intelligent solutions to facing and solving urban problems, relying on information technology as a source that enables cities to develop innovative processes and drive sustainable urban growth. Romanian cities are adopting a smart vision by promoting smart city projects that help encourage cooperation, driving collaborative frameworks to enable innovation in services and knowledge for sustainable urban development. Smart city projects are increasing, but the pathway leading to smart and sustainable development is still in the initial stage. Smart city projects emerge as a necessary step to support collective learning processes and urban intelligence that enable urban change and innovation coherently with a long-term horizon for urban growth.

Keywords
Smart city, urban sustainability, smart city projects, Romanian smart cities.

Introduction

The future development of cities as communities relies on cities rethinking a smart vision for urban change and growth as a source that enables the city to advance towards urban sustainability and improve the quality of life of people living within urban communities. In particular, following a smart city vision implies that cities must adopt, develop and implement smart city projects to make an effective and substantial transition of the city towards a smart-driven or smart city that can improve urban, social, and economic performances.

According to Yigitcanlar (2015), smart city-based development is emerging as a potential model for cities within the information and knowledge era. It is no simple to make smart a city without rethinking how to plan and rethink the stages of urban change. As monitoring several steps, cities define a project that opens up to goals, sources, times, and organizational action to drive urban change, in following a smart vision leading to urban sustainable development.

Cities invest in smart city initiatives and vision to improve the quality of life, encompassing socio-environmental aspects, and information and technology applications (Neirotti, De Marco, Cagliano, Mangano, & Scorrano, 2014).

While the need to embrace a smart approach to the urban development of cities is an aspect well documented in the literature about smart city, few studies elucidate the role of smart city projects within a smart city model which includes social, economic, urban, institutional, technological and environmental aspects (Camboin, Zawiskak, & Pufal, 2019).

This study aims to elucidate the role of smart city projects as a means that helps cities to become smart, by viewing the smartness as a vision to support urban, social, and economic growth. In particular, we pay attention to some insights emerging from Romanian smart city projects as drivers of smart urban development. In Romania, a smart city is still a strategy and not yet an implemented reality. Romanian cities are still in the first step of smart evolutions and solutions in improving technological infrastructures in order to make effective the bridge between social, urban and technological frameworks (Bătăgan, 2012).

Cities are rethinking a smart-oriented approach to face the problems of rapid urbanization (Gil-Garcia, Nam, & Pardo, 2015). Smart cities emerge as a conceptual development model that relies on using information technology to improve human capital and increase urban sustainability and the future (Angelidou, 2016), enabling the optimization of all city functions (Baltac, 2019). The advantages of a smart city approach concern: benefits to urban transportation and mobility, access to city resources, opportunities for employment, and support to local growth (Bătăgan, 2012).

Smart city projects and vision help construct a people-centered approach to urban governance to develop jointly economic growth, social sustainability, and cohesion (Meijer, Gil-Garcia, & Bolivar 2016; Murphy, 2000). Building smart cities relies on promoting urban governance that enhances the relationships between bottom-up initiatives and city strategy, bringing together human collaboration and technological systems to transform urban spaces, making effective diverse public values coherently with specific context (Meijer, Gil-Garcia, & Bolivar 2016).

As drivers of economic and social growth and multi-level cooperation-led innovation (European Commission, 2017), cities aim to proceed towards sustainable development by using information and digital technology to support urban growth, knowledge and innovation-led economy (Angelidou, 2015; Bătăgan, 2011), and improve the living conditions for citizens (Ibrahim, El-Zaart, & Adams, 2017).

As following a smart approach and vision to urban development, cities design a pathway for sustainability and learn how to define and design organizational processes and infrastructures that drive cities to evolve as smart-driven and inclusive urban communities (Kummitha, & Crutzen, 2017; Ahad, Paiva, Tripathi, & Feroz, 2020).

Smart city initiatives rely on using emerging technologies and help in exploring future scenarios of contemporary cities (Andreani, Kalchschmidt, Pinto, & Sayegh, 2019).

Thereby, leading cities towards a long term urban development implies to understand how cities can define and implement a smart city project as an effective urban management model for urban growth (Yigitcanlar, 2015).

Designing cities of the future relies on developing a smart approach to strengthen social and public value creation, social inclusion, and innovation to drive urban development over time. Cities as smart communities understand the potential of information technology, designing and implementing smart city projects (Camboin, Zawislak, & Pufal, 2019).

The paper is structured in the following way. After the introduction, understanding smart and sustainable cities for driving urban development is presented in the second section. In the third section, smart city projects and strategies are considered as a means to drive cities into the urban future. In the fourth section, the issues of Romanian smart city projects are described to define a future-oriented landscape. Finally, conclusions are outlined.

Understanding the role of smart cities as drivers of sustainable urban development

Cities are embracing a smart vision to rethink and plan urban futures and spaces by embracing information technology to redesign a smart city urban planning. Cities promote smartness as a vision that enables the city to modernize urban services and infrastructures by employing information communication technologies (ICTs) in the urban economy, services, life, and society. «Smart City is furthermore used to discuss the use of modern technology in everyday urban life» (Giffinger *et al.*, 2007, p. 10).

Thereby, technology is one of the conditions for cities to become smart. There is no one route to becoming smart. Several approaches emerge because a smart city strategy refers to local aspects in terms of governance models, local culture, and the citizens' involvement (Dameri, Benevolo, Veglianti, & Li, 2019). In particular, cities promote smartness as a vision for change that makes the city a smart community (Deakin, 2014).

A smart city is a multidimensional and socio-technical phenomenon that relies on technology, management, and policy components in a comprehensive way (Gil-Garcia, Pardo, & Nam, 2015). According to Gil-Garcia, Pardo, and Nam (2016) «a smart city should be seen as a continuum in which local government officials, citizens, and other stakeholders could think about the initiatives that attempt to make the city a better place to live» (p. 5). As a conceptual development model, a smart city helps enhance the city's human, collective, and technological capital for increasing urban sustainability (Angelidou, 2016).

Cities adopt a smart strategy to address urban development «for improving the operational and managerial efficiency and the quality of life by building on advances in ICTs and infrastructures» (Nam, & Pardo, 2011a, p. 186). Cities are investing in smart solutions to contribute to ensuring high quality of life, achieving sustainable development in urban spaces in terms of efficient use of resources, competitive knowledge, and innovation-led economy (Bătăgan, 2011). According to Yigitcanlar *et al.*

(2018) community, technology, and policy drive smart city and enable productivity, sustainability, accessibility, wellbeing, liveability, and governance.

According to Alberti and Susskind (1996) sustainability as a process requires invention, involving a self-conscious choice. Smartness is considered as a source to drive cities to become sustainable. While smart city helps improve services through technology with regards to the human side of change, the sustainable city relies on decision-making processes to improve urban community following a future-oriented and long time horizon (D'Auria, Tregua, & Vallejo-Martos, 2018). Sustainability-oriented cities adopt a smart vision that relies on using information and digital technology as a source to support urban future, knowledge, and innovation economy (Angelidou, 2015). Following a knowledge management perspective, public authorities and private sectors must collaborate and have the responsibility to promote a shared vision in designing a smart-driven strategy for long-term development of smart cities (Pinzaru, Zbuchea & Vitelar, 2018). As drivers of economic and social growth fostering innovation and encouraging multi-level public-private partnerships (European Commission, 2017), cities develop knowledge-based strategies to drive sustainable urban development by sustaining high collective learning process and realize the potential of their knowledge sources (Knight, 1995) for building a sustainable and knowledge-oriented future by achieving social and environmental issues (Leon, 2013).

Smarter cities enhance values like innovation and cohesion, governance, and community (Allwinckle, & Cruickshank, 2011) by jointly developing land, technology, and government (Dameri, 2013), matching technologies, tools, and applications with urban functions and contexts (Stratigea, Papadopoulou, & Panagiotopoulou, 2015).

Technology helps improve urban quality of life for sustainable development (Bătăgan, 2011), and drive urban innovation in management, governance, and policy (Nam, & Pardo, 2011b), leading to modernization and automation of urban spaces (Ahad, Paiva, Tripathi, & Feroz, 2020). In particular, cities invest in innovation, linking technology and knowledge with people and territory to drive urban development and support learning and policies for growth (Komninos, 2013; Paskaleva, 2011). Technology provides also a platform for collaboration and a symbol that provides community value to share new ideas, resources, and projects (Meijer, & Thaens, 2018). Smart and sustainable cities use ICTs to identify new ways to address urban development preserving capabilities for meeting the needs of future generations (Höjer, & Wangel, 2015).

The adoption of smart urban technologies helps cities to become a smart city by ensuring both technological excellence and economic competitiveness as a means to promote the urban society and support urban growth and development (Yigitcanlar, 2015). Cities adopt a smart approach to build collaborative processes between people, business, and government within the community as a means that leads to urban public value and open innovation enabling an inclusive city and empowering the role of citizens in shaping urban smartness and change beyond the adoption of information technology (Hollands, 2008; Paskaleva, 2011). Smart cities contribute to urban innovation involving all the stakeholders of the urban environment. Cities select a smart approach using the potential of information technology to enhance economy, governance, people, mobility, environment, and living to drive urban sustainable growth and ensure a high quality of life leading systems, service, and capabilities in an organic network (Albino, Berardi, & Dangelico, 2015).

Driving cities into the future through smart city projects and strategies

As becoming smart, cities are planning investments in human and social capital for ensuring high quality of life by developing new communication infrastructures for sustainable economic growth and participatory governance (Caragliu, Del Bo, & Nijkamp, 2011).

It is difficult to rethink about the city as a smart community without planning a smart city project and strategy to drive the city towards future urban development. Driving smart and sustainable urban change requires long-term processes and mindset (Camboin, Zawislak, & Pufal, 2019) and relies on a roadmap coherently with particular city context, needs, and local interests (Ibrahim, El-Zaart, & Adams, 2017).

Investing in smart city projects helps transform the urban community in a significant and positive way (Eger, 2005), by promoting specific local services and advancing collective skills (Coe, Paquet, & Roy, 2001). Smart city projects help cities to identify a pathway for building sustainable, learning, and inclusive cities that are meeting the expectations of urban society in the 21st century (Osborne, Kearns, & Yang, 2013).

Investing in smart city projects helps improve urban efficiency function leading cities to develop the innovative potential to support urban growth (Kollar, Bubbico, & Arsalides, 2018).

As real challenges that influence the development of cities (Baltac, 2019), smart city projects help design an integrated city of the future, stressing the relevance of both technological and collaborative dimensions that enhance the relationships among urban stakeholders as a means that enables the city to become smarter (Camboin, Zawislak, & Pufal, 2019).

Smart city projects help cities to identify both a comprehensive strategic plan and a sustainable pathway for urban growth (Angelidou, 2014). Smart city projects enable cities to develop human-centered pathways by using technology to involve stakeholders to engage in collaborative and participatory processes for engendering urban innovation (Andreani, Kalchschmidt, Pinto, & Sayegh, 2019).

According to Angelidou (2014) «cities should thus begin the journey towards becoming a smart city by selecting a few domains or areas that need to be improved urgently» (p. S9). Technology helps cities to design projects that support urban renewal and change. Smart cities encourage user-driven innovation projects by using technology for stimulating open and collaborative innovation (Shaffers, Komninos, Pallot, Trousse, Nilsson, & Oliveira, 2011). ICTs help support smart city strategies to improve services and ensure high quality of life following a sustainable way (Bifulco, Tregua, Amitrano, & D'Auria, 2016). Designing a smart city strategy relies on sustaining connectivity platforms by enabling the creation of new digital service systems by ICTs and telecommunication infrastructure (European Economic and Social Committee, 2015). Following a socio-technical framework, smart city projects are considered in terms of both technological and instrumental values, collaborative and symbolic value. Smart city

projects enable urban collaboration design and legitimize innovative solutions leading cities to face uncertainty and complexity of urban problems (Mejier, & Thaens, 2018).

A smart city strategy is an important means to drive urban development policy which has an impact on services delivery and relationships among the public sector, citizens, and businesses, shaping the future of society and governance. A smart city strategy relies on promoting technological infrastructure development using technology to ensure both efficient functions and develop innovative solutions to improve urban quality of life (Angelidou, 2016).

The quality of life of citizens is the issue of cities becoming smart. Planning smart city development relies on bridging technological advancements, knowledge, and innovation networks to realize an effective digital and human intelligence-driven smart city (Angelidou, 2015). The role of smart city strategies is to enhance information technology to support a bottom-up vision, to improve citizen awareness, and provide privacy and security issues (Angelidou, 2017). Driving smart city projects helps develop urban innovation as innovative practices to improve urban environments (Meijer, & Thaens, 2018). By implementing smart city projects, cities become smarter upgrading the elements related to techno-economic activity, the environ-urban configurations, and the socio-institutional structure, enhancing the relationships between public and private actors to support urban innovation ecosystems (Camboin, Zawislak, & Pufal, 2019).

Developing smart city projects relies on building a smart city ecosystem that enhances cooperation breeding entrepreneurial opportunities (Ardito, Ferraris, Petruzzelli, Bresciani, & Del Giudice, 2019). Successful smart city projects rely on considering citizens as key stakeholders that provide inputs for urban development and growth (Engelbert, van Zoonen, & Hirzalla, 2019).

Smart city initiatives contribute to placing human values and dimension at the core of the smart city as a community which relies on technological infrastructure as a source to strengthen economic growth regeneration, inclusivity, and opportunities for change (Allam, & Newman, 2018). Smart city projects make cities as smart and inclusive communities where citizens promote innovations and technological advancements, by improving their local communities and fostering community entrepreneurship (Kummitha, & Crutzen, 2017).

Promoting smart city projects to develop sustainable future and urban growth within Romanian smart cities

In Romania, a smart city is still a strategy and not yet a reality. Smart city design is still in the first step of smart and technological solutions and infrastructures (Bătăgan, 2012). Romanian cities believe in embracing a smart approach to promote the urban development of communities. Smart and intelligent solutions help cities to go into the future.

Three possibilities of implementing a smart city that can be used in Romania (Bătăgan, 2012): the use of facilities offered by technology and communications solutions cloud computing, open data in areas that individuals have identified as basic (administration,

education, health, and transport). This variant is aimed at an integrated operations center. This can facilitate access and share information, coordinate city resources, and can predict and solve problems faster. The use of efficient solutions for producing electricity using wind power and photovoltaic solar panels capture solar energy, free energy, clean and green. In this variant, monitor and reduce carbon dioxide emissions and efficient use of natural resources are the important results. The investments made in several elements that create a high standard of quality of life for citizens and visitors, and tourist areas - parks, museums, and historical centers.

According to Romanian Smart City and Mobility Association, in Romania, 15 billion euros are made as available for Smart City projects 8 billion from national funds 7 billion from 8 European funds.

Iasi is focused on smart mobility, pursuing the following objectives: low-emission mobility; full mobility solutions; and multimodal transport. Iasi bought 100 low-carbon buses, Euro 6, and focused on public transport with carbon "0" emissions (completing the park with 11 trams). In 2019 was planned the purchase of 44 electric buses and 16 trams implementation of the Iași Velo City - Bike Sharing project, which will include 54 bicycle hire and rental stations, 35 private bicycle parks, 11 service stations, 940 mechanical bikes, 83 electric bikes, 43 tricycles for the elderly third, 19 tricycles for people with disabilities.

Iasi is preparing to recover the lost land in front of other cities and announced that it intends to set up 200 smart banks in the city. (The bank, produced entirely by the Iasi City Hall, is equipped with solar panels, it benefits from lighting at night, offers the possibility of charging mobile devices, and works as a WiFi hotspot.) The City Hall has also signed a consultancy contract with European Investment Advisory Hub (divisions of the European Investment Bank) for the realization of the urban development project "Smart City District". (Iasi is among the 15 cities selected by the European Commission in the Digital Cities Challenge program, through which European experts provide consulting services for establishing and implementing strategic sustainable development plans).

Another project correlates with the implementation of the Integrated Mobility Plan (combining traditional transport with bike sharing, car sharing, scooter sharing, taxi stops, etc.), Electronic displays installed in stations. The application "Where is my bus", System of prioritizing public transport, Park and ride parking, Intermodal stations (romaniansmartcity.ro).

Cluj Napoca was the first city that introduced electric buses in Romania. Main directions: attracting local, regional, national, and European financial resources to strengthen the ecosystem of innovation in Cluj, preparing the future jobs for Cluj, and Romania, accelerate the digitization process of local public administration and improving urban mobility through smart solutions.

Cluj had a project "The first intelligent street in Romania", art from the Mărăști district, which makes it easy to follow a point equipped with lighting poles with WiFi embedded systems, charging stations for electric bicycles and scooters, banks with charging prizes for the devices. mobile etc. The City Hall of Cluj-Napoca has managed to pass in the list also a technological premiere - the first virtual public official in Romania (Antonia),

whose purpose is to reduce by 40% the time required to process documents submitted by citizens and process the answers, in parallel with the decrease of administrative costs.

Alba Iulia is the first intelligent city in Romania. It is the most ambitious IT infrastructure project. Energy consumption has been streamlined, and the local government controls the intensity of light from public posts. Buses have WiFi, monitor air, projects to digitize education and interact with public institutions. The e-album iulia, a kind of digital guide, tells the story of the goals, but also where the people find them. Also, in Alba Iulia, the citizens can talk to the authorities, without an appointment or waiting hours in front of the office. According to a communiqué of Orange, at present in Alba Iulia, there are over 600 sensors which, together with fixed and dedicated mobile communication networks, create a digital infrastructure of the city. "In almost one year of Wi-Fi hotspots on buses, about 8% of the 60,000 Alba Iulia population has accessed the service, generating more than 1 TB of data in 30 minutes' sessions", notes Orange in the release.

With the Civic Alert application, citizens can alert authorities to the problems identified in the city, while through City Analytics, City Hall can track city traffic trends, depending on the day's weather or weather conditions, also identifying the most common routes.

"The digital class solution was installed in two high schools in Alba Iulia:" Dionisie Pop Marţian "Economic College and Horea National College, Closca and Crisan. This includes tablets, through a partnership with Lenovo, digital catalog, secure Wi-Fi Internet access, and filtered web traffic.

In addition to using the catalog for the 2017-2018 school year, school performance data for the past three years has been uploaded into the app. Altogether this year, 120 teachers and almost 1,500 students will benefit from this solution in Alba Iulia. With e-album iulia, available on Android and iOS, tourists have access to information about the city's main objectives, and local businesses can hold dedicated campaigns.

At this time, the app has 1,200 users who initiated over 11,300 sessions. Besides, as part of the pilot project developed by Orange, four teams of students and students from Alba Iulia presented solutions on the smart city at the Innovation Labs hackathon, and one of them qualified for the Demo Day 2017 final in Bucharest, according to the Orange Romania release.

In Alba Iulia, air quality monitoring sensors are also installed in the 15 buses equipped with Wi-Fi hotspots. The solution provides both authorities and citizens with information on the impact that their daily activities have on the environment.
On the other hand, the existing public lighting management solution has generated savings of 50-70% on electricity consumption, depending on the intensity of light selected for each pillar, and the water management solution is being installed.

The cities of Cluj Napoca - Timişoara - Oradea - Arad formed in December 2018 the *Western Alliance*: common objectives include "the acceleration of the Transylvania Motorway project, the support of the Timisoara - Belgrade Motorway, the development of a high-speed train between the four cities, the completion of the belts, the development of airports, an intra-regional and interregional public transport network, the increase of ecological mobility through tramway projects, metropolitan subway,

support of the public-private partnership through infrastructure projects" (romaniansmartcity.ro).

Brasov practices modern management of public utility services: local public transport, traffic management, public lighting, and territory management. There are 11,500 lighting poles and 200 transformation stations, 191 surveillance cameras in the public domain (arteries, intersections, public areas), mobile incident reporting application and electronic services - integrated with the CiRM system, intelligent pedestrian crossing (sensor detection of pedestrians engaged in passing; when pedestrians are detected, the lighting level increases vertical, creating a positive contrast; light signaling system, mounted in the roadway, visible from 2 km). It is desired to create a network of stations charging electric vehicles at the level of the whole city.

Future projects concern: the extension of remote management of public lighting system (total budget € 1.4 million, EU funds 98%); the extension of the computerized management system of the public transport system (total budget € 3.4 thousand, EU funds 98%) (source: http://oer.ro/wp-content/uploads/Smart-city-Bra%C8%99ov).

The main objective of digitizing business is to share business flows with those of life. Knowing the competition, the clients, and the characteristics of the market in which the business operates will create additional revenue-generating opportunities, and the sooner the information is accessed and individuals can understand and integrate them into the business flows, the higher the profit margin. Smart Economy describes all actions aimed at transforming and strengthening the economy of a municipality. Cities are considered "engines of the economy" by attracting economic activities in the secondary and tertiary sectors. According to the United Nations, the degree of urbanization has increased steadily, from 29.6% in 1950 to over 55% in 2018 and it is estimated that by 2050 more than 68% of the world's population will live in cities.

Figure 1. Romania's Smart Cities Map
Source: https://map.romaniansmartcity.ro/ 24.03.2020

Table1. Romanian cities with smart city projects

City	Smart city Projects	City	Smart city Projects
Satu Mare	2	Mures	4
Bihor	5	Sibiu	9
Maramures	1	Brasov	6
Arad	9	Arges	1
Timis	21	Dambovita	1
Caras-Severin	5	Olt	1
Mehedinti	1	Dolj	3
Bistrita Nasaud	3	Prahova	1
Cluj Napoca	18	Bucuresti	12
Alba	102	Giurgiu	2
Hunedoara	24	Suceava	2
Botosani	1	Neamt	6
Iasi	7	Bacau	1
Galati	5	Braila	1
Constanta	4	Tulcea	2

In Romania, there are more than 300 smart city projects. The map in Figure 1, as well as Table 1 shows the following situation: There are cities with no projects such as: Salaj, Gorj, Valcea, Teleorman, Harghita, Covasna, Vrancea, Buzau, Ialomita, Calarasi, Teleorman, Vaslui. Alba has the greatest number of projects.

According to Eduard Dumitrașcu, the President of the Romanian Association for Smart City. “A smart city should put the citizen in the middle of the community and try to give them a better life, easier interaction with the city's infrastructure, its school, hospital, transport, interaction with state institutions. At the level of Romania, 8 standards are being implemented, starting from last year. Romania has a representative in the international standardization body. The benefits are multiple, whether we speak of school, education, city safety, or obtaining permits. " According to the Romanian Association for Smart City and Mobility in Romania, 15 billion euros are available for Smart City projects, 8 billion from national funds, and 7 billion from 8 European funds.

Conclusions

Investing in smart city projects and strategies means to identify a long-term horizon for urban change. Promoting smart city projects helps develop debate and dialogue within the city as a community in order to identify possible trajectories of development that contribute to addressing strategic and social urban growth.

Driving cities to identify and develop a pathway for building the city as a more smart and sustainable community is a long term goal that relies on promoting and implementing smart city projects as a source and means to support urban innovation, knowledge creation, modernization, and growth for urban value creation.

In Romania, cities are sustaining relevant efforts to modernize urban spaces and environments to improve the quality of life of people. The orientation to smart city projects is advancing even if a smart strategy design seems to be still in infancy age. In particular, rethinking smart city projects by following a top-down and techno-centric approach fails to help social and economic urban growth, while a smart city project is to emerge as an opportunity to support urban community-based and collective intelligence and construct a sustainable-oriented pathway that relies on a participatory and collaborative-oriented framework to support the relationship between city governments and urban stakeholders involved in defining and implementing smart city projects' issues.

Smart city as a model of urban development is a global trend with local peculiarities in effective implementation. Following a smart approach, cities redesign urban planning and select a strategic pathway and long-term horizon to realize effectively livable urban environments that enable economic and productive activities and facilitate the improvement of urban quality of life. Romanian urban landscape is emerging as an interesting workshop, whereas cities are experimenting with new ways to develop urban innovation in services and functionalities. The focus on Romanian smart city projects helps us to understand how a smart-driven pathway is an evolutionary issue and requires a long-term horizon because the present and future of urban communities rely on continuously identifying the trajectories of development for urban change, social and economic development.

There are some limitations to the study. Only some cases in the Romanian urban landscape are considered and described to indicate how smart solutions and approaches are viewed as a driver of urban growth and development. The case studies highlight the efforts of Romanian cities in developing a smart vision for urban growth and development. There is not a comparison among different urban realities. The study is mainly descriptive and sheds light on the efforts of cities planning a smart-driven urban future. Further research investigations would focus on a comparison among more countries about how smart city projects are planned, designed, and implemented in different urban environments.

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