

Smart City in Urban Innovation: Concept, Management, Policy and Technology

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Abstract— This article defines a smart city not as a measure of how smart a city is but as an endeavor to become innovative. The meaning attached to A smart city is innovative in terms of administration, policy, and technology. Because each city's distinct setting influences its technical, organizational, and policy elements, we may think of smart cities as a contextualized interaction of technical, managerial, and policy innovation. However, there is a dearth of study on innovation in Management and policy, despite the abundant literature on technological innovation. After reviewing the public management literature, the author concluded that urban planning is a critical component of urban growth. Cities with sufficient intellectual resources, established institutions, and developed infrastructure are smart cities. The purpose of this exposition is to analyze the smart city's function in urban administration. The research establishes a link between coverage planning and investment pressure zones. The author's categorization of Medium-Size Cities is the primary outcome. The purpose of this article is to close a research gap by developing a complete framework for seeing the smart city movement as an invention that encompasses technology, Management, and policy. Additionally, we explore the inherent dangers of innovation, innovative techniques while avoiding risks, and the settings in which innovation and risks occur.

I. INTRODUCTION

With the rapid advancement of information technology, the process of urban pattern transformation is accelerating as well. The Smart City, a new star in urban development, is highly sought after around the world. The creation of a smart city is like a roaring fire. Simultaneously, the management mode will shift. Security concerns, traffic congestion, food safety, medical resource limits, environmental pollution, public health emergencies, resource allocation, and job pressure become significant challenges in the setting of a rapidly rising urban population and expanding metropolis. It is critical for contemporary cities to be integrated into the whole spectrum of information management. A "smart city" and "smart city group" within the current city information

platform will be a "sensible" choice for the construction. With the city's growth, contemporary city management and services tend to be digitized, and provinces are also actively developing intelligent transportation, smart grid, smart city management, energy conservation, and other areas of pilot applications. To avoid fast urbanization becoming a catastrophe, cities must be operated creatively. To that aim, intelligent city development represents a paradigm shift in urban development. The adage that "crisis breeds creativity" holds for smart cities as well. The smart city concept is gaining traction to resolve the complex and nasty challenges left behind by increasing urbanization. Because the wicked and complex challenges of urbanization are social, political, and organizational, smart city plans for innovation must take Management and policy into account in addition to technology. While critics

frequently focus on the technical aspects of smart cities, their organization and policy concerns have received little attention. In an urban or metropolitan setting, smartness employs cutting-edge information and communication technology (ICTs) and Management and policy problems. Additionally, technology adoption is not the final goal; what is critical is the intelligent use of the technology chosen, which demands intelligent Management and policy. A smart city, we define it, is fully committed to innovation in technology, administration, and policy. Innovation for a smart city presents both potential and hazards. There is a void in the available literature on smart cities. Most writers focus only on technology issues. The literature has considered a smart city as an expression of creative ideas, mainly ignoring the policy and management aspects of innovation. However, an examination of a diverse body of literature on government initiatives, information technology innovation, and urban innovation gives a prism through which to see a smart city as a management and policy innovation, as well as circumstances in which a smart city initiative is formed. We examine the non-technological aspects of a smart city as innovative yet inextricably linked to technology, drawing on a vast body of literature. Unambiguous and transparent urban planning should be the bedrock of smart city operation. While initiating this study, the author posed the following research questions, which were sought during the elaboration: To what extent does urban planning play a role in the notion of smart cities? What variables influence urban planning? What are the distinctions between cities in terms of spatial Management? How can local governments contribute to the reduction of urban sprawl? This collection of reservations was used to determine the elaboration's objectives. The elaboration's primary objective is to explore the relationship between coverage planning and investment pressure regions in terms of urban Management. The test technique included Pearson's linear correlation, Ward's analysis, and k-means analysis.

II. BACKGROUND OF THIS STUDY

Smart cities, according to territorial Management, are currently one of the most prevalent concepts. Numerous academic endeavors have been made to define and conceptualize a smart city intellectually. This has also been demonstrated in emerging contemporary theories of development management, most notably the industrial district, the network model, knowledge organization, intellectual capital, e-governance, new public Management, intelligent specialization, regional foresight, the cluster, the learning region and city, value-based

Management, reengineering, innovative organization, and lean. [109, 115, 124, 120].

Smart City

is a global movement in urban policies focused on reclaiming urban residents' quality of life and utilizing innovation and advanced technology to address the challenging challenges that high population density generates. It contributes to resolving urbanization-related issues, notably pollution of the environment, land consumption, urban sprawl, transportation congestion, energy needs, and difficulties in accessing public services. It encompasses a diverse set of public initiatives, ranging from developing better transportation systems to the endorsement of creative innovation and knowledge for designing energy-saving policies [34].



Fig. 1: smart city

The term "smart city" first appeared in 1994. (Cocchia 2013). Since 2011, the number of publications on this subject has increased significantly. This is related to the rise of smart city initiatives and the European Union's backing. The concept "smart city" is commonly used in literature. Nam and Pardo developed a three-dimensional concept of a smart city: technology, people, and institutions. The authors of all examined smart city models identified recurring social factors associated with technology to alter the economy, environment, and community (Nam, Pardo 2011). Caragliu and Nijkamp defined a city as smart when investments in human and social capital, as well as traditional and modern communication infrastructure, fueled balanced economic development and a high quality of life while also promoting responsible resource management through

participation in and commitment to natural resource management (Caragliu et al. 2011). Giffier compiled a rating of smart cities based on various urban characteristics (Giffinger et al. 2007). They classified governance, economics, mobility, people, environment, and lifestyle into six categories. The authors rated 70 European cities using a variety of ratios and indices. They proposed a Triple-Helix model of smart cities, with local governance, university leadership, and industry riches as pillars (Leydesdorff, Deakin 2011). Lombardi also discusses the Triple-Helix concept of smart cities and the importance of universities and research institutions in producing innovation and patents (Lombardi et al., 2012). At the same time, Sainz Pena described a smart city using information and communication technology to make critical infrastructure, components, and public services more interactive, efficient, and visible to residents (Sainz Pena 2011). Mandelson and Bradshaw, in turn, list eleven critical categories that a smart city must possess: health, resource efficiency, ICT literacy, public administration, regional economy, education, innovative services, culture and recreation, and public safety (Mandelson, Bradshaw 2009). Numerous writers define a smart city as an intelligent transportation system with a comprehensive urban plan based on several critical components such as technology, a sustainable economy and environment, everyday life digitalization, a decent governance style, and ICT (Simmie, Strambach 2005).

A smart city's distinguishing feature is its capacity for producing and consolidating knowledge and innovation (Sanchez 2013). This is why implementing smart initiatives enhances a city's social and economic attractiveness and competitiveness (Qi, Shaofu 2001). A smart city makes use of ICT to maximize the efficiency and efficacy of valuable and necessary municipal processes, activities, and services, generally by integrating disparate components and actors into a more or less fluidly interactive intelligent system (Yovanof, Hazapis 2009). These factors are considered in the context of broader ideas such as environmental preservation and energy production (Cozens 2008Mori, Christodoulou 2012). Today, each city needs indicators to assess its success. Generally, current indices are not standardized, interchangeable, or comparable throughout time.

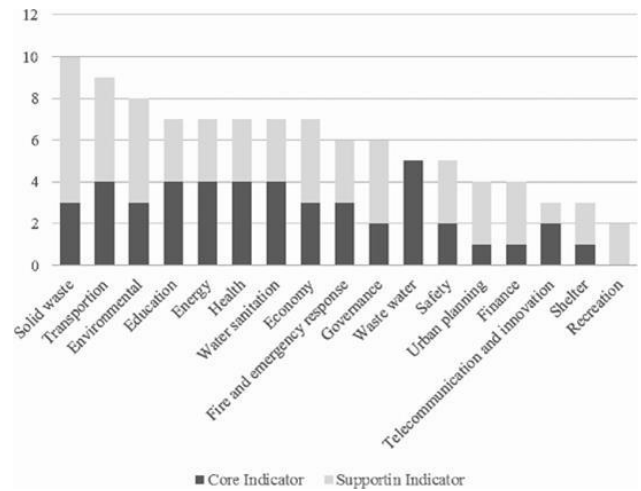


Fig. 1. Themes and the number of indicators

These indicators may be used to measure and monitor the sustainable development status of a city. Future requirements planning must consider the present efficacy of resource utilization. Certifies cities on a sliding scale based on the number of reported and confirmed indications.

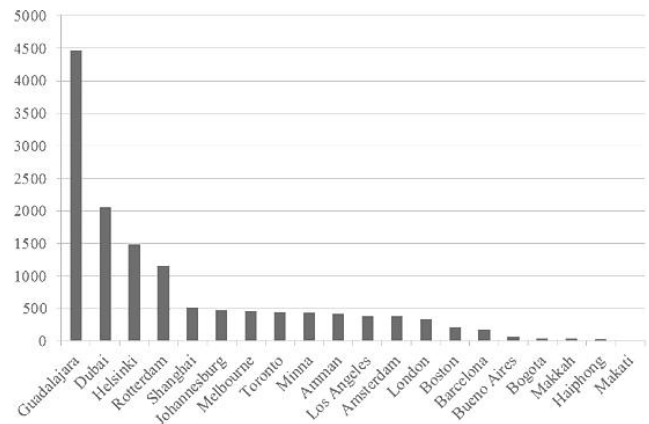


Fig. 2. Urban green space hectares/100000 people (source: self-elaboration based on WCCD 2014)

A city planning indicator's goal is to give data on the quantity of green space and trees planted per person, the size of informal settlements, and the employment/housing ratio (McCarney 2014). A green area is more expansive than a recreational place and is accessible to the general public. The World Health Organization recommends that all cities have at least 9 square meters of green space per resident. The most acceptable quantity is considered to be between 10 and 15 m² per inhabitant. At 446 m², Guadalajara, Mexico, has the highest green space per inhabitant. Dubai and Helsinki may be used interchangeably in the following instances. Integrating

substantial green spaces into highly crowded areas is a challenging task that Rotterdam and Shanghai have achieved.

Smart City Innovation

Simply said, innovation is "novelty in motion" [5] and "new ideas that work" [77]. These succinct formulations frequently stress not only a novel concept but also a novel behavior. When we define a smart city as an attempt by a city to become smart rather than a status, the connotation of a smart city reflects municipal innovation. The term "smart city" refers to technological advancements in addressing urban agglomeration-related difficulties [18].

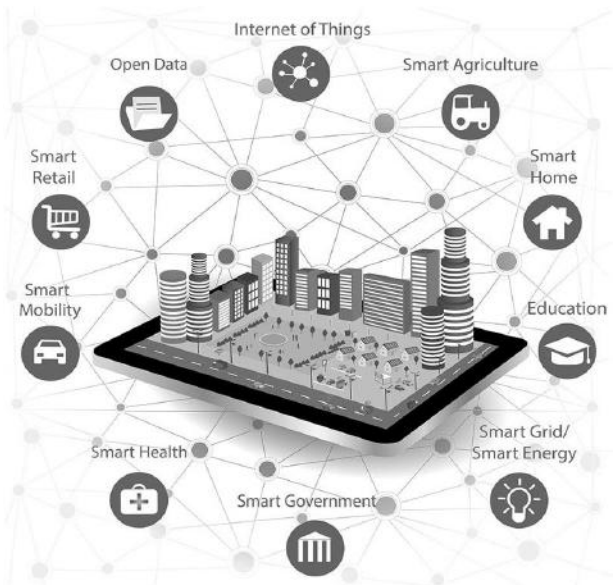


Fig. 2. Smart City Innovation

A smart city is an urban environment that has embraced ICT-enabled public sector innovation. It promotes long-standing methods for increasing operational and managerial efficiency and overall quality of life by capitalizing on improvements in information and communication technologies and infrastructures [53]. Innovation establishes connections between the definitional components of a smart city. Innovation in smart cities occurs at the infrastructural and process levels to fulfill ambitions. The prior literature on public sector and urban innovation define or categorizes innovation. According to Amanpour's [26] typology, innovations are classified as technical or administrative/organizational. Smith and Table [93] defined innovation in municipal government bureaucracies in three dimensions: Management, technology, and administration. According to Hartley [54], innovation can occur in the following areas: product, service, process (new ways of designing organizational processes and administrative reorganization

into front- and back-office processes), position, strategy (new goals or purposes), governance (new forms of citizen engagement and democratic institutions), and rhetoric (new language and concepts). Elements of a Smart City Concept Before delving into the intricacies of a smart city as an invention, it is necessary to grasp its fundamental conceptual aspects. The notion of the smart city is still developing, and work on defining and conceiving it is ongoing [13,57].

Table 1. Definitions Provisional of the Term "Smart City

| Definition |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A city that excels in a forward-thinking manner across a range of qualities, founded on a clever mix of endowments and the actions of self-decisive, autonomous, and informed inhabitants. |
| A city that continuously analyses and combines the health of all of its essential facilities. |
| A city that "connects the physical infrastructure, the information technology infrastructure, the social infrastructure, and the economic infrastructure to maximize the city's collective intelligence. |
| A city "that integrates ICT and Web 2.0 technology with other organizational, design, and planning efforts to de-materialize and accelerate bureaucratic processes, as well as contribute to the identification of novel, innovative solutions to city management complexity, to improve sustainability and livability. |
| application of Smart Computing technologies to enhance the intelligence, connectivity, and efficiency of a city's essential infrastructure components and services, including municipal administration, education, healthcare, public safety, real estate, transportation, and utilities. |

[45,50,52,54]

Table 1 summarizes some commonly used working definitions. Three fundamental elements emerge from such definitions. To begin, infrastructure is critical to the notion of a smart city. While technology enables a smart city, it is not always an essential aspect [79]. Combining, connecting, and integrating technologies and infrastructures is critical to the smart city's success]. Core systems are not discrete entities; they evolve into a complex multi-dimensional network of various systems that operate in synergy to achieve optimum performance [34,96]. Second, processes—how a city becomes smart—are critical in the working definitions. A critical

component of a smart city is a fundamental shift in the way services are delivered. Achieving the smart city is mainly about service transformation and improvement, not technology [21]. Finally, dreams for a brighter future are critical. A smart city should include the following elements: smart economics, competent government, smart transportation, smart environment, smart people, and smart lifestyle [72,96].

Risk of Smart City

Every invention has some level of risk. When a smart city is defined as innovative, it transforms into a living laboratory for experimentation [17], which always includes inevitable dangers (generated by new, untested trials). A smart city program is a catalyst for innovation and an attempt to control the risks associated with innovation. The risks associated with smart city innovation are relevant in this article, as prior research has grossly underestimated the potential negative consequences of developing the new technical and networked infrastructures required to make a city smart [18,57]. As an innovation, a smart city programmed may introduce a new degree of complexity. The project goes beyond technology, combining technology, people, capacity, and global reach into sufficiently complex systems to allow for the emergence of unanticipated emergent characteristics [62]. Collapse to manage high risks effectively results in the complete failure of technology-driven public sector initiatives. Of IT initiatives fail because of non-technical elements of innovation—risks associated with policy, organization, and Management [41]. Poor planning, a weak business case, a lack of top management support, a lack of leadership, a lack of professional skills, a misalignment between organizational and project objectives, vulnerability to policy swings, too much technology-driven enthusiasm, and political hyper-activism are all common reasons [15,19,25].

Additionally, public sector innovation may be an oxymoron [11], as public sector innovation programs operate under less favorable conditions for invention. Government agencies are monopolies that lack competitive motivation to innovate and bureaucracies organized to execute essential functions reliably and consistently and to oppose change or disruption of those functions. The public sector cannot readily absorb the many expenses associated with learning, experimentation, and improvisation. Avoiding failure is a top organizational objective in the public sector, where responsibility is strongly valued [29,85]. Short-term achievement of objectives and results, and a lack of a long-term plan for service innovation [24].

Framework

A holistic vision of smart city innovation encompasses technological, Management, and policy advancements. The two non-technical aspects of a smart city (administration and policy) warrant additional attention. Fig. 2 summarizes the multidimensional framework for smart city innovation, emphasizing the relevance of technology, organization, policy.[127,128,129]

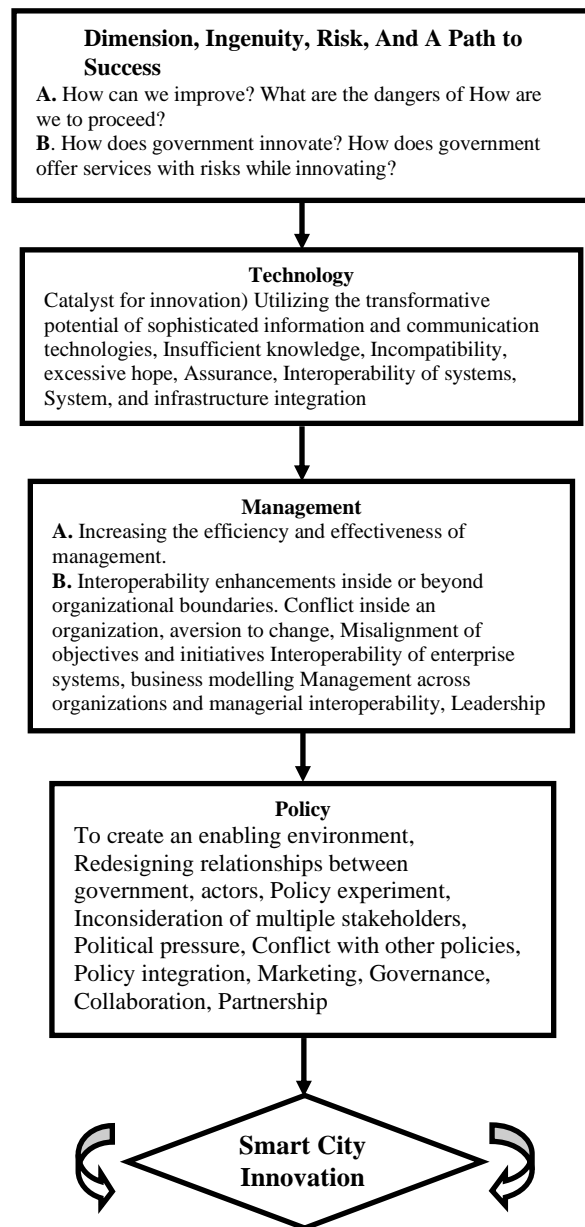


Fig. 3. The Framework of Smart City Innovation

As an innovation, a smart city capitalizes on the transformative potential of smart technologies (for example, instrumentation with intelligent sensors), mobile technologies, virtual technologies, cloud computing, and digital networks such as mobile wireless and Metropolitan

Area Networks. These technical advancements introduce dangers associated with technology, such as incompatibility between old and new systems, a lack of technological expertise, and excessive optimism on technological capability [29]. Interoperability is critical for technical innovation in the context of a smart city. A smart city delivers interoperable services that enable pervasive connection to alter internal and external government operations to people and companies [24]. To intelligent cities, technology must be easily linked across systems and organizations [15]. Technical performance should not be assumed to follow naturally from technological innovation; instead, performance is contingent on the successful management of technical systems and infrastructure. Not all communities are intelligent.

In terms of technology, management, and policy, we describe smart city innovation:

- A. Management OF Organizational, Technology innovation is changing and upgrading technical tools to improve services and create circumstances for the instruments to be used more effectively. It is a process that develops Management and organizational competencies necessary for the efficient use of technology tools and environments.
- B. Policy innovation is a tool for addressing institutional and non-technical urban issues and establishing the circumstances necessary to develop a smart city.

This study does not re-emphasize the importance of technology compared to the past literature, which has already explored technical innovation for a smart city enough. Rather than that, we will contribute to a balanced picture by bridging a research gap between widely discussed and less-addressed topics by taking Management, policy, and context into account. Fig 2 illustrates a framework for comprehending smart city activities in terms of the four dimensions. The following sections discuss the organizational Management, policy, and contextual aspects of a smart city.

III. MANAGEMENT INNOVATION

This section discusses the organizational and administrative techniques that may be used to advance smart city innovation. According to Moon and Norris [76], the most compelling motivation for municipal governments to incorporate new ICTs in their core tasks is management innovation. Managerial innovation influences the extent to which technological and administrative innovation occurs [100]. Successful organizational change management is critical in the public sector [42]. A smart

city is one in which intelligence is applied to municipal administration [12]. Numerous strategic techniques may be used to advance smart city innovation.

Architectures of Businesses

Smart city innovation can be thought of as a business-to-business initiative. Enterprise architecture, as defined by Ross, Weill, and Robertson [90], is "the organizing logic for core business processes and IT infrastructure that reflects the standardization and integration of a business's operating model" (p. viii). Enterprise architecture, they believe, can be reduced to two concepts: business process integration and business process standardization. Thus, enterprise architecture is a business issue, not an IT one. Enterprise architecture is not just for businesses; governments also use it. Enterprise architecture and business process modeling are a means of innovating organizational and managerial processes to transform traditional bureaucracy. The term enterprise refers to the architectural scope, denoting a distinct, interdependent group composed of multiple agencies cooperating and a defined network of those organizations sharing a policy area to provide services that no single agency can provide alone [81]. It is regarded as a necessary condition for cross-government collaboration [20,31,61]. Ibrahim [38] defines e-government architecture as "the standards, infrastructure components, applications, technologies, business model, and guidelines for electronic commerce among and between organizations that facilitate government interaction and increases group productivity (p. 591)." Enterprise architecture is critical for designing and developing systems aligned with business process management, which is defined in the enterprise architecture as enterprise-wide rather than project-specific [38,60,89,91,92]. Thus, business model and enterprise architecture readiness [23] is a critical capability for innovation in the direction of a smart city.

Management at the Inter-organizational

Smart city innovation requires advanced levels of information and knowledge sharing, and integration. To that end, managerial interoperability across organizations and applications is critical for the cross-organizational integration of information and knowledge required for ICTs to fulfill their promise of government transformation [80]. Governments are increasingly relying on inter-organizational collaboration to maximize the value of information. Interoperability's growing popularity transcends political partisanship and cuts across policy areas and institutions. Interoperability across agencies and levels of government requires leadership that can operate in cross-border settings, networks, and governance.

Leadership Roles

Support from top management and commitment to organizational change is critical to the success of innovation [1,16,30,42,64,107]. Both executive and managerial leaders have a critical role in championing the cause of innovation, establishing detailed justifications for change, identifying and encouraging champions, and developing a unified set of goals to which people can commit [21,42]. Chief Information Officers (CIOs) are identified as enablers of a smart city in metropolises [101]. Leadership in cross-organizational settings entails a variety of leadership and management capabilities. Not only does leadership apply to a single agency, department, or team, but also a network and enterprise of organizations. This is not to say that central leadership is irrelevant; instead, ICT-driven organizational and structural changes such as network-based collaboration encourage coordination among diverse actors rather than hierarchical command and control [56]. As a result, leaders should hone their network leadership abilities. A strong leader is required to ensure the successful implementation of a smart city initiative [21]. City leaders can create a social infrastructure for collaboration that enables multiple organizations to work together across jurisdictional and sectoral boundaries [65].

IV. POLICY INNOVATION

While technology is a tool, policy innovation can result in the tool being used intelligently. An innovative government places a premium on policy changes, as the government cannot innovate without a normative imperative [40]. While technological innovation can be observed and broadly agreed upon, policy innovation is ambiguous [54]. Three critical policy directions for smart city innovation are proposed. Integration Urban policy is critical in shaping and changing cities' regional, national, and even global connections [9]. Coordination of policies across multiple spatial scales, organizational practices, and levels of governance—is critical to a city's innovation [70,84]. Metropolitan areas receive a plethora of policies from various bodies, but policies from various levels of government are frequently poorly coordinated, fragmented, overlapping, or even conflicting, resulting in perverse outcomes. Not only are technologies, systems, infrastructure, services, and information integrated, but also policies. Successful innovation requires "packages of policies," not single-targeted interventions [63,73,99]. Van Winden [99] proposed three distinct types of policy integration: sectoral, horizontal, and vertical integration. Sectoral integration is concerned with coordinating various policy areas and sectors, for example, economic policy,

transportation policy, and housing policy. Horizontal integration refers to the alignment of policies among urban actors [82]. The majority of metropolitan areas are governed by a network of municipalities that interact and share resources. Vertical integration is concerned with the coordination of activities between various levels of government—typically the federal (central or national), state (provincial or regional), local (or municipal), and international.

Developing a holistic vision for a metropolitan region can be a critical first step toward greater policy integration. While various visions for a smart city may conflict, thriving modern cities integrate multiple visions [73]. For example, increasing transportation accessibility may be detrimental to the urban environment, whereas improving air quality may necessitate reducing accessibility. A challenge for that city is maintaining economic growth while remaining accessible and improving the overall quality of life. A situation in which one stone kills two birds is possible. The term "decoupling" [10] refers to a set of policies that reduce the transport intensity of activities while maintaining economic growth. In this case, policymakers must prioritize decoupling economic growth from negative externalities associated with transportation. Integration of policies is required for this approach. By connecting health and transportation policies through references to healthy lifestyles and related issues, it is possible to persuade citizens to change their mode of transportation. Transport policies, in this way, integrate other policy areas such as health care, public safety, and economic development.

Brand Promotion

City marketing requires policy rhetoric [7]. In the policy realm, innovation necessitates a branding strategy [69]. Additionally, a brand is a public promise made by a city government to urban residents and external individuals or organizations. Image creation is not a trivial matter; it is critical to the transition to a smart city, as a well-known brand makes a city well-known to the outside world [58]. Cities, not nations, are increasingly competing for people, ideas, and capital, and a city's smartness is becoming a central selling point. City marketing is critical for cities that serve as magnets for new talent, resources, and investment. A city brand should communicate its unique selling points [33-35]. Labeling a city as "smart" or using an alternative equivalent nickname risks being interpreted as hype, illusion, fad, or empty rhetoric [22]. By contrast, there are several instructive examples of where abrasive rhetoric underpins positive policy developments. Hospers [58] provided three examples of a result-driven and broadly supported branding strategy used to promote a city's sustainable growth and differentiation

from competitors: "Austin: The Live Music Capital of the United States," "The resund: The Human Capital," and "Manchester: The Original and Modern." Austin, the state capital of Texas, is home to the domestic pop and rock scene. The resund, the Danish-Swedish border city, has developed a reputation for being a desirable place to live, work, and play. Manchester's nickname implies a repetition of the city's glorious past as a historical cradle of the Industrial Revolution, thereby establishing the city as a modern and classic industrial metropolis.

Initiative Concentrated on Demand

Prosperous smart cities have demand-driven policies rather than supply-driven, or that are well balanced between the two. The difference between demand and supply reflects economic activity and a contrast between the government's push for a smart city initiative and the engagement of non-governmental parties in the initiative. At its most fundamental level, more innovative government entails truly citizen-centric operations and services [59]. Supply-side (government-led) policies are insufficient on their own and must be supplemented by demand-side initiatives. Policies for smart cities must be balanced with an emphasis on demand and must promote diversity, social networks, and cross-sector innovation. Often, successful innovation occurs due to the involvement of key stakeholders [49-51,54]. Demand-driven policies may result in improved governance. Governance is a collective action of multiple actors and the ability to accomplish goals in the face of complexity, conflict, and social change [99]. ICT-enabled governance, in particular, is the interaction of ICTs and governance processes [74,75]. Digital networks-enabled governance reflects a shift away from established and increasingly ineffective hierarchical structures toward better-understood frameworks regarding the negotiated involvement of multiple public and private stakeholders operating at varying scales [43,56,84,86,97,98]. Policies governing a brilliant city initiative should promote collaboration and partnership to overcome fragmentation through the involvement of key stakeholders. A smart city serves as a laboratory for collaboration between disparate functional sectors and jurisdictions [39]. Demand-side policies also encourage and facilitate active citizenship and network governance that is centered on citizens. A smart city initiative must foster an environment conducive to citizen engagement that is convenient and effective [21,83]. Citizen engagement has the potential to increase citizens' sense of ownership over their city, heighten local governments' awareness of their needs, and ultimately reshape the citizen-government relationship [67,97]. Governments now have more opportunities to engage the public in a transparent learning environment that provides

input into governance through Web 2.0 [24]. Donovan et al. [37] drew attention to a large-scale municipal e-government initiative in Ireland called Innovative Cities for the Next Generation (ICING). Its central principle, "the thin-skinned city," refers to a city becoming more sensitive and responsive to the needs of its residents.

V. CONCLUSION

Any claim about the future of cities that is normative is necessarily contextual [13]. "Context significantly defines and influences innovation," according to [54]. Each city faces unique challenges in innovation for a smart city, and each city's strategy may be unique as well [96]. Both innovation and risk must be contextualized. A detailed description of the likely risks associated with a particular initiative should accompany the presentation of strategies [47]. The author noted in the public management literature that urban planning is a critical factor in urban development. Cities with sufficient intellectual resources, established institutions, and developed infrastructure are called smart cities. According to the author, those cities should implement proper local spatial development plans. Critical areas of the city, such as technology parks, research and development companies, business incubators, technology transfer centers, and industrial complexes, should undoubtedly be included in these plans. The most practical way to assess a city's performance is through standardization. The level of investment pressure is the determining factor in determining whether special Management is necessary. If this indicator decreases, the area is no longer required to be included in local spatial development plans. Applying taxonomic methods to ten medium-sized urban centers in Europe revealed a strong correlation between coverage planning, investment pressure, and green space. Cities that have been analyzed have been classified into distinct categories. The first category of urban centers included cities in need of coverage planning enhancements. It will undoubtedly have a positive effect on these cities' levels of innovation. The author's suggested and recommended methods may play a critical role in supervising planning coverage across various territorial units. This type of surveillance may benefit local governments, public institutions, and organizations affiliated with those entities. The technologies of today are referred to as "space-shrinking technologies" [32], and they have enabled the development of a knowledge society and a global community. One could argue that location is irrelevant, and that all that is required is a reliable cable connection to bring the entire world within easy reach. Nonetheless, the hyperbolic assertion that distance is dead conceals a significant paradox [108]. Geographical concepts such as distance,

location, location, place, and space continue to be important for a city's innovation [14,63,68,84]. Individuals' face-to-face interactions continue to be critical. People's proximity remains a necessary condition for intensive communication and knowledge exchange.

There are numerous reasons why the physical dimension is significant in this digital era. A progressive reason is the feasibility of a hybrid (physical and virtual) city, which is a sensory fusion of cyberspace and physical space [108]. The ambiguous relationship between the ostensible place lessness of cyberspaces and the pervasive importance of place underscores a critical concern for smart cities [13]. Additionally, the context of urban proximity remains significant for a variety of compelling reasons. Cities' economic and technological attractiveness is a result of their agglomeration economies [8]. Innovative organizations and individuals will continue to cluster in specific locations such as financial districts, industrial districts, and cultural districts [6]. Urbanization fosters innovation; the more concentrated the talent pool, the more innovative the output [105]. Spatial concentration, in turn, generates pernicious urban problems. According to poverty researchers, negative neighborhood effects such as increasing income polarization and deteriorating community infrastructure are occurring [14]. Neighborhoods within the same city are frequently not equally accessible or usable in terms of transportation systems, digital infrastructure, and other services. For instance, in some urban areas, the digital divide becomes a neighborhood-specific spatial divide.

issue. Certain aspects of location context are advantageous while others are disadvantageous.

Urban policies are inextricably linked to and shaped by the broader environmental context (social, political, economic, cultural, and demographic) [47]. Odendaal [78] compared smart city initiatives in Brisbane and Durban against a backdrop of broader environmental issues. The success of the two cities is contingent on contextual differences in the relationships between key actors and the political and economic environment. Eger [39] asserted that, given the changing geopolitical context, there is no one-size-fits-all approach to city innovation. Thus, the city government's imperative is to establish a set of well-articulated strategies that are contextually appropriate.

The broader environmental context's challenges reflect the growing exclusion of certain segments of the population due to socioeconomic disparities [72]. There is also a clear demographic divide in terms of access to online tools. Numerous cities are concerned about the ageing society's impact on technology diffusion. In comparison, the proportion of Digital Natives, Digital

Immigrants, or Net Generation [94]—individuals born into and familiar with new technologies—creates an important urban context worthy of our attention, as the technology-savvy generation is likely to benefit from smart city innovation. Another environmental context is the international pressure on urban competitiveness. The level of competition among global cities may influence the policy suite for a smart city. Numerous metrics exist for ranking and rating smart cities and their innovation initiatives. European Smart Cities Ranking is a representative evaluation that could be an effective tool for positioning, benchmarking, and branding cities. However, the metrics introduce some risks, such as overlooking complex interrelationships, overlooking the long term, and promoting current initiatives as stereotypes [45,46].

Innovation is significantly influenced by the complexity of the process and the uncertainty of the environment [95]. The degree of complexity varies according to the nature of the interactions. Intergovernmental, interorganizational, or intraorganizational smart city initiatives are possible, as are program-specific or enterprise-wide initiatives [80]. Smart city initiatives can span multiple jurisdictions. Data, information, and knowledge are all examples of objects of interaction. Interactions can take the form of sharing, communication, or integration. Numerous possible combinations result in a range of complexity levels. Smart city initiatives involving a greater number of actors and at a higher level would be more complex. Success in smart city innovation requires an understanding of the complexity's level and nature.

The discussion thus far has been explicitly focused on smart city initiatives as managerial and policy innovations to provide a balanced perspective on already-heavily debated technological issues and relatively little-discussed managerial and policy issues. We observe that most smart city studies are optimistic about the future of smart city initiatives. Their conclusions are not incorrect in and of themselves but are circumscribed. and insufficient, we provide a more complete picture of the smart city phenomenon. This review of the extensive literature on e-government projects, public sector innovation, and urban innovation suggests counterclaims to commonly held (and sometimes erroneous) beliefs about smart cities. To summaries, the following propositions represent our message to government practitioners and smart city researchers.

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