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Performance Evaluation in the Inter-Institutional Collaboration Context of Hybrid Smart Cities

ABSTRACT

Objective: The smart city is defined as a mix of urban strategies aimed at optimizing and innovating public services. Current cities are hybrid and affected by complex systems with inter-institutional collaboration. This study aims to understand which variables are most present and important according to the literature review and comparative analysis of two case studies.

Methodology: The authors have chosen the emerging smart city of Turin and Lugano to conduct a cross-analysis based on the matrix proposed by Yin (2017). This research is characterized as a holistic study of multiple cases.

Findings: The research was carried out thanks to results produced by literature and emerging from the analysis of realities exposed, to assess the performance of projects and urban sustainability. A set of 71 indicators has been designed to assess the impacts of a smart city. 5 Indicators are related to management performance, 18 to governance and 48 to reporting.

Value Added: This research aims to implement the theory of information reporting by providing guidelines for indicators in inter-institutional, cross-sectoral and multi-level contexts maximising smart factors in cities and meeting stakeholder needs in a hybrid organization.

Recommendations: Future research is recommended to confirm the relevant indicators for stakeholders associated with communication methods.

Key words: smart city, hybrid organization, inter-institutional, index, Lugano, Turin

JEL codes: H11; H77; H79

Introduction

The smart city is defined as a mix of urban strategies aimed at optimizing and innovating public services to relate the physical infrastructure of cities with the human, intellectual and social capital of those who live there (Komninos, 2013; Nam, 2019). Caragliu and Del Bo (2018) define the term according to six variables: economy, mobility, governance, environment, life, people. Current cities are

complex systems characterized by a massive number of interconnected citizens, businesses, different modes of transport, communication networks, services and users (Hollands, 2015). At the same time, studies have discussed hybridity as a definition (Powell, 1987). As for smart cities, Denis et al. (2015) emphasize the collaboration between sectors and actors for their implementation. Billis (2010) defines hybrid organizations as integration between public, private, and non-profit models and logic; in this context, it is evident how the relationship between municipalities and subsidiaries or third sector requires new tools and approaches aimed at guaranteeing accountability and transparency (Argento et al., 2019). Smart cities are in fact complex organisms characterized by idiosyncrasies of hybrid processes between different logical institutions, relationships, networks and rules (Lima, 2020; Secinaro et al., 2021). In the literature, the debate regarding hybrid organizations and smart cities is ongoing. The investigation must be thorough considering intersectoral innovations, including multi-stakeholder/actor engagement involvement (Goodspeed, 2015; Mosannenzadeh and Vettorato, 2014). Viale Pereira et al. (2017) explore the phenomenon of smart cities as a result of inter-institutional collaboration and governance, including complex interactions between organizations, technologies and people (Lavie et al., 2010). This is the result of the evolution of the concept of traditional Public Administration (PA) and the transition from New Public Management (NPM) to the concept of New Public Governance (NPG) (Hood, 1995; Osborne, 2006; Pollitt & Bouckaert, 2004). Government policies have a critical role to play in promoting smart cities (Torfing et al., 2012; Yigitcanlar et al., 2008). Nam and Pardo (2011) state that studies on e-government and innovation are linked to urban governance to develop approaches that can make cities smarter. In addition, Kooiman (1999) defines socio-political governance as a general theory of inter-institutional relations in society, as a mechanism of inter-organisational networks (Kickert, 1993; Rhodes, 1997) using exploratory partnerships to generate the networks to create more value from activity (Hoffmann, 2007;

Lavie & Rosenkopf, 2006; Vaccaro et al., 2009), subsequently leading to the involvement of stakeholders (Freeman, 1984), creating intelligent participation fundamental for the relationship between city government and its citizens (Meijer, 2016), and promoting sharing of knowledge between public administrations, as in Italy and other European examples (Meneguzzo et al., 2018).

From an inter-organizational point of view aimed at improving strategic and operational management and improving communication with stakeholders, it is important to monitor the efficiency of public organizations through the measurement of performance (Bouckaert & Halligan, 2007). Wiig and Wyly (2016) present smart cities as cities in transformation with a propensity to face challenges of impact assessment and reporting at the project level, accelerating challenges of communication with stakeholders by developing appropriate tools. They focused their study on the role of reporting in the public sector, initiating a process of smartness also of reporting tools to be closer to the needs of stakeholders (Grossi et al., 2021; Adams & Frost, 2008; Botzem & Hofmann, 2010; Freeman, 1984; McGeough, 2015). The literature shows that stakeholders are users of information and therefore their needs must be put first. It is interesting that, starting from stakeholder theory in which Freeman (1984) defines it as 'the main multiple problems', which combines several problems of collective action that can occur with smartness, data of a company must be transmitted to professional and non-professional users (Grossi et al., 2021; Holt & Littlewood, 2015).

This work is an attempt to bridge the research gap on how shared outcome measures can be successfully implemented in inter-institutional, intersectoral and multilevel contexts as far as smart cities are concerned, therefore, looking for indicators of evaluation of smart city system, as literature shows that they are precisely the result of these variables. Consequently, the study answers the following research question: "What are the governance elements in a complex inter-institutional collaboration in smart cities that include multi-stakeholder engagement?"

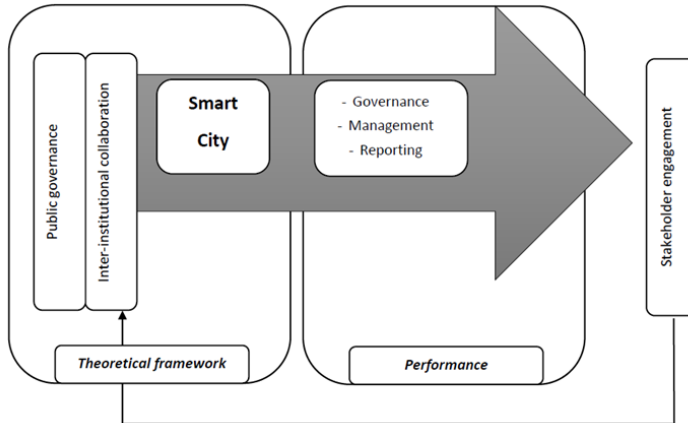
To explore how the phenomenon of smart cities – the result of inter-institutional collaboration and governance – occurs, an exploratory study was conducted based on multiple case studies and specifically through a comparative analysis of documents. This research method was chosen for its key feature of holistic investigation, which allows understanding complex and ubiquitous interactions between organizations, technologies, and people (Dubé & Paré, 2003).

Therefore, underlining the need for collaboration with stakeholders, it is necessary to investigate how smart cities communicate through reporting tools and how they should communicate.

This research aims to implement the theory of information reporting in inter-institutional, cross-sectoral and multilevel contexts. Innovation is a combination of stakeholder-driven reporting techniques (Sicilia & Steccolini, 2017; Grossi et al. 2021) that maximize the "smart factor" of cities and meet the needs of citizens in a hybrid complex context.

Figure 1 shows the overall theoretical framework in which it is shown that the study is aimed at responding to the research question by referring to smart cities, the result of inter-institutional collaboration and governance, with performance indicators to stimulate stakeholder engagement.

Figure 1. *Theoretical framework*



Source: our elaboration.

The authors will identify and codify if there is empirical evidence within the smart city by identifying KPIs (Key Performance Indicator). This aims to define whether it is possible to assess them from a performance governance, performance management, and performance reporting perspective by demonstrating inter-institutional collaboration.

The paper is structured as follows: the second section illustrates the theoretical framework through smart cities, public governance, inter-institutional collaboration and performance reporting necessary to structure the research model. In the third section the research methodology is illustrated, framing method of case study specifically through a comparative analysis of documents where one may better understand a novel phenomenon and concept. The fourth section presents the results of the analysis and finally, the fifth section concludes the research.

Theoretical framework

According to Komninos (2013), smart cities are the consequence of a dense ecosystem of innovation that creates value through the use and reuse of information that can come from different social connections and a highly qualified human capital. The smart city literature framework defines the term according to six variables: economy, mobility, governance, environment, living, people. UNITO-USI (2020) briefly explains the variables.

Mosannenzadeh and Vettoriato (2014) argue that the subdomains connected to smart cities can be made "smarter" through implementation precisely to make the city smarter by bringing what Goodspeed (2015) defines as cross-sector innovations, also including multi-stakeholder/actor engagement.

Managing a smart city means creating new forms of human collaboration using information and communication technologies. City managers should realize that technology alone will not make a city smarter: building an intelligent city requires a political understanding of technology, a process approach to manage the emerging intelligent city and a focus on both economic benefits and other public values (Meijer & Bolívar, 2016; Nam & Pardo, 2011; Suciú et al., 2021).

Government policies have a critical role to play in promoting smart cities (Yigitcanlar et al., 2008) and this fits well with the perspective of public management which highlights that solution of social problems is not only a question of developing good policies but much more a managerial issue of organizing a strong collaboration between government and other stakeholders (Torfing et al., 2012). As Freeman (2000) claims, governance returns interdependence and accountability. Osborne (2006) and Torfing et al. (2012) identify four ideal-typical concepts of smart city governance. They refer to intelligent city governance, intelligent decision-making, intelligent administration and intelligent urban collaboration, reflecting different theoretical perspectives on the role

of government in modern society to make cities smarter. Hood (1991) identifies New Public Governance (NPG) as a result of a transition from New Public Management (NPM) and evolution from traditional PA (Osborne, 2006; Pollitt & Bouckaert, 2004). Several existing approaches to governance lead to the definition of socio-political governance as a general theory of inter-institutional relations within society (Mak & Lam, 2021; Kooiman, 1999), as a mechanism of self-organizing inter-organisational networks that work with and without government to provide public services (Kickert, 1993; Rhodes, 1997). Moreover, it is considered together with the theory of administrative conjunction (Frederickson, 1999) and governance is added as a way to explore the functioning of political communities and networks (Kickert et al., 1997; Marsh & Rhodes, 1992).

As Meneguzzo (1995) and Cepiku (2005) demonstrate, the system of relations between local administrations and private stakeholders is external governance, therefore – inter-institutional governance, concerning agreements and interactions between administrations, agencies and state-owned companies; and internal governance, which concerns individual public administrations.

In dealing with the reality of a city, however smart, the main stakeholders are citizens. As argued by Alawadhi et al. (2012), smart city initiatives usually have intersectoral relations and encourage the participation of these, in addition to the continuous provision of public services seeking, as added by AAström et al. (2012) and Pozzebon et al. (2016). Their goal is to allow them to have a real impact on public policies.

As Lavie & Rosenkopf (2006) explain, it is clear that there are not only citizens but also important ideas that literature gives on this subject, focusing on the main activity of a company, public or private, using exploration partnerships generating inter-organisational connections to develop and multiply the value of activity mentioned through, for example, contributing through research activities the development of innovative technologies for territory, trying to balance different functional domains characteristic of a

smart city as proposed by Lavie et al. (2010). Hoffmann (2007) & Vaccaro et al. (2009) demonstrate through the theme of alliance that inter-organisational connections can improve and integrate the exploration and exploitation activities that companies undertake in action. Therefore, companies will be able to compose their exploration and exploitation partnerships through a combination of different inter-organisational connections to focus on value creation in activities (Lavie et al., 2010). As Meneguzzo et al. (2018) state, the priority is the importance of knowledge sharing between public administrations, citing Italian and European examples of local governance. The second priority is the choice to introduce a sort of integrated strategic agenda for the governance of the network, aimed at supporting the strengths obtained by inter-institutional cooperation and experimentation of public-private partnerships and intersectoral policies (health, transport, communication, volunteering, etc.). Therefore, it is precisely based on these principles that a smart city should be assessed from the point of view of inter-institutional collaboration.

Through the analysis of a case study, Wiig & Wylly (2016) present smart cities as cities in transformation with a propensity for assessment and reporting challenges, with a focus on assessment and project-level reporting of impacts accelerating challenges of stakeholder communication value created by demonstrating how the work of smart cities contributes to the evolution of city's performance and reporting obligations under the law by having citizens develop the use of data and processes of assessment and reporting.

To better develop inter-institutional, cross-sectoral and multi-level frameworks, the use of standardised KPIs should be adapted to support emerging innovation opportunities through initial monitoring and measurement phases (Phillips et al., 2000). The aim is to develop scoreboards that map and integrate assessments and KPIs of smart city developments at different scales to determine results for cities (Bakıcı et al., 2013; Rigby et al., 2014).

Through the mapping of due process and use of appropriate indicators, as Moonen and Clark (2014a, 2014b) argue, results could identify the requirements to address governance issues. Holman (2009) shows the issue that city authorities' share of stakeholders would prefer to measure the contribution of developed projects and programmes against existing KPIs, in line with city strategies for establishing impact at the city level rather than establishing new KPIs.

According to Castelnovo et al. (2016), measuring the intelligence of a city should not be considered separately from its sub-systems but through a comprehensive vision (Pardo et al., 2010) collecting inter-institutional, cross-sectoral and multi-level information through three dimensions of management, governance and reporting.

As already demonstrated by Hood (1995, 1991), Robbins & Lapsley (2015), Pollitt & Bouckaert (2004), the measurement of performance has aroused renewed interest in the public sector and in the new process of reforming public management. In agreement with Bouckaert & Halligan (2007), the interest in performance measurement mainly concerns the efficiency of public organisations from an intra-organisational point of view aimed at improving management at a strategic and operational level, supporting managers in making decisions on activities of their organisational units, and improving communication with stakeholders regarding the results achieved, connecting decision-making and performance measurement (Behn, 2002; Bouckaert & Halligan, 2007; Hammerschmid & Meyer, 2005; Meyer & Hammerschmid, 2006). Through reporting, it is possible to evaluate what are the KPIs that generate outputs and outcomes. Zygiaris (2013) presents very clearly the KPIs that smart cities must have. They are summarized in UNITO-USI (2020).

To evaluate a good reporting tool, it is necessary to be able to assess whether it meets these three requirements: learning process, management and control of management and finally external responsibility (Behn, 2002; Bouckaert & Halligan, 2007).

The first performance measurement provides useful information on how to improve strategies and plans; the second provides information on how performance improves the decision-making process and makes organizational units and individual employees more accountable for the results achieved (Adams et al., 2014; Adcroft & Willis, 2005; Goldoff, 2000); and finally, the third is oriented to make implemented activities more transparent and verifiable, therefore more complete in terms of compliance with the level of responsibility towards stakeholders, who can then act accordingly influencing decisions of public organizations (Borgonovi et al., 2018; Julnes & Holzer, 2001; Talbot & Wiggan, 2010).

Therefore, the framework must return benefits to external stakeholders to complete the picture of the analyzed company, and critical variables for internal ones that can be influenced in decisions, remembering, that the structure and form of a document are important aspects of its effectiveness as a communication tool (Bonollo & Merli, 2018; Glasmeier & Christopherson, 2015).

Methodology

As shown by Yin (2014), most studies require the analysis of multiple cases, following the logic of literal or theoretical replication for case selection. The analyzed literature provides a framework that can be confirmed by empirical evidence by comparing multiple case studies that enrich a prospective view of confirmation (Massaro et al., 2019). To select case studies in this article, the logic of literal replication has been used, where case conditions have led to a prediction of similar results (Yin, 2014). The authors have chosen the cross-analysis of multiple cases where they are not shown separately, looking for more general results (Yin, 2017). Following the matrix of case study types proposed by Yin (2017), this research is characterized as a holistic study of multiple cases in which each case study presents a different context (two different cases, then two different contexts). This study was conceived as a

comparative analysis of documents by organizing information on documents into categories referring to specific questions/research categories (Bowen, 2009). Documents were downloaded from official websites of cities covered by the case studies.

The quantitative comparison in terms of urban intelligence between different cities has been developed, for example, the above-mentioned Smart Cities report ranks medium-sized European cities and cities in Italy (Brunetto et al., 2016; Vallicelli, 2018). Inductive evidence provides results and enriches the model (Secinaro et al., 2020).

In the IMD Report, "IMD Smart city index 2019", 102 cities around the world have been selected and ranked according to a series of indices and indicators, including social inclusion, environment, technological innovation, infrastructure, services to citizens and businesses, entertainment, cultural offer, management. The choice of selected case studies was made about two European countries with more cities in the top 50 of IMD Smart City Index 2019 (Bris et al., 2019): Italy (Bologna – 18th, Milan – 22nd), and Switzerland (Zurich – 2nd, Geneve – 4th). The researchers were encouraged to choose two emerging cities in a smart context that have the potential to bring six variables of smart cities to the required levels thanks to local universities that have activated projects to support: Turin and Lugano. An action was coordinated by the European Union for two respective cities and prestigious universities located in Unito (Università degli Studi di Torino) and Polito (Politecnico di Torino) and for Lugano, Usi (Università della Svizzera Italiana) and Supsi (Scuola universitaria professionale della Svizzera italiana). The two cases, Turin City of Turin, 2020; City of Turin, 2021); and Lugano (Ticino, 2021) were selected because they reflect six variables of smart cities listed in the literature (Caragliu & Del Bo, 2018). In addition, as UNITO-USI (2020) shows, both cities possess the characteristics of governance and inter-institutional collaboration that distinguish this research.

To investigate through city reporting, three key performance areas were analysed i.e. reporting, governance and management.

Subsequent case study analyses were based on revisions of city reports (Caird, 2018). The two determining variables in the choice are based on hybridization and interinstitutional cooperation policies (Meneguzzo et al., 2018; Ramirez Lopez & Grijalba Castro, 2021).

Indicators should express as precisely as possible the extent to which an objective, target or standard has been achieved or even exceeded (Kellen & Wolf, 2003). To arrive at a set of indicators shown in the results, a series of criteria were used, based on the framework that Van Rooijen et al. (2013) describe: relevance, completeness, availability, measurability, reliability, familiarity, non-redundancy, and independence.

Findings

Based on the research carried out thanks to results produced by literature and emerging from the analysis of realities exposed, to assess the performance of projects and urban sustainability, a set of 71 indicators has been designed to assess the impacts of smart city projects in UNITO-USI (2020).

The selection of indicators for the evaluation of smart city projects has been linked to corresponding indicators at the city level. Of the 71 indicators, 5 are related to management performance, 18 to governance and 48 to reporting.

The cases analyzed as mentioned in the methodology section reflect KPIs of smart cities shown in UNITO-USI (2020), so the results showed that the need was to provide a set of indicators that allow the public sector to evaluate all phases of their processes because often only the output and not the outcome is evaluated. Therefore, the research can define that in the evaluation phase, the indicators can be catalogued in 5 types: input, process, output, outcome, impact (Brescia & Calandra, 2020). In the presentation of results, the study does not focus on confirming the characteristics of smart cities for cases analyzed, as this research is positioned in a step of next process since the objective is to implement the the-

ory of information reporting in inter-institutional, intersectoral and multi-level contexts to maximize the "smart factor" of cities by meeting the needs of stakeholders. Nevertheless, in the set of indicators presented in the UNITO-USI (2020) for completeness, those have also been included.

What emerges as a need for representation is a demonstration of the ability of a smart city to create and maintain its identity over time to strengthen the sense of belonging of stakeholders and create lasting relationships, for example through the involvement of stakeholders in strategic governance processes, citizens in the development of policies and strategies or creation of public value and socio-economic impacts. Demonstration in short term is no longer a requirement, the prospects are always to provide evidence of long-term sustainability by translating the vision into specific strategic plans, consistent with the availability of existing resources and avoiding waste, therefore through the degree of integration of service management processes, technological and organizational infrastructure, change management techniques and process reorganization or re-engineering. There is also a need for the public sector and stakeholders to assess performance related to the ability to provide services and operational efficiency of use of available resources through, for example, the assessment of the cost-effectiveness of services provided, ability to manage knowledge, use of resource planning management systems and use of systems to calculate the basic costs of activities.

In addition, a very important aspect that has already emerged in the literature is the measurement of performance through monitoring of interdepartmental integration in which it is measured how much administrative departments contribute to initiatives and management of smart cities and evaluation of government at different levels in measuring city's collaboration with other authorities at different levels. UNITO-USI (2020) summarizes all indicators.

As already highlighted in the literature with Pollitt and Bouckaert (2004), there are four types of strategies that are linked to a

management policy that can be adopted: minimize (privatization), commercialize (bring techniques and values of the private sector into government), modernize (change techniques and values of the public sector) and maintain (use old techniques more intensively). In addition, the study highlighted the need to identify how the approach started and therefore how it is devalued in bottom-up or top-down initiatives defining performance management indicators UNITO-USI (2020).

The most important aspect that emerges is that continuous monitoring and reporting are required to measure progress towards project objectives and compliance with requirements are monitored and reported.

The KPIs and performance evaluation can be defined through a systematic and organic approach of elements (UNITO-USI, 2020).

These performances are also referred to in the main reporting elements in UNITO-USI (2020).

Discussion and conclusion

This research aims to implement the theory of information reporting by providing guidelines for indicators in inter-institutional, cross-sectoral and multi-level contexts maximising smart factors in cities and meeting stakeholder needs in a hybrid organization.

The results showed that many indicators are linked to the need for stakeholder collaboration, and this can be the result of smart cities' communication methods, the tool they use, and which set of indicators they choose to meet stakeholder needs. Through the identification and codification of KPIs, within the context of smart cities, it was understood that it is possible to assess from the point of view of performance governance, performance management and reporting by demonstrating inter-institutional collaboration.

The topic of governance has also found a lot of feedback in the literature related to the needs mentioned earlier. Indeed, according to Albino et al. (2015), when it comes to the topic of gov-

ernance in the smart city theme, it assumes considerable importance as it consequently enters the definition of smart governance. The latter means that various stakeholders are engaged in decision-making processes and public services, strengthening, as Federici et al. (2015) demonstrate, the collaboration between citizens and urban administrations, and, as Bătăgan (2011) discuss, between departments.

With the intention of a better allocation of resources and optimization of strategies (Epstein & Yuthas, 2017) mentioned in the chapter performance management, to perpetually improve public value, the approach mentioned by Esposito et al. (2021) of smart cities aimed at multifaceted, interconnected and dynamic evaluation of governance is effective.

Savoldelli et al. (2013) show that these steps have a positive influence in stakeholder engagement phase as a service is offered that can generate public value in full transparency and decision-making accountability by supporting the definition of Garcia Alonso and Lippez-De Castro (2016) that governance is an interaction and collaboration between different stakeholders in decision-making processes. The main objective is the optimisation of services in urban space, which goes hand in hand with actions taken to improve quality of life. In addition to this traditional understanding, Castelnovo et al. (2016) underline the importance of using ICT-based approaches to achieve a qualitative improvement in the relationship between citizens and their government (Nam & Pardo, 2011).

Albino et al. (2015) claim that the concept of governance placed in the smart city context a position assumes considerable importance, as claimed by Milward and Provan (2003), networks characterizing the governance model as flexible and capable quality creating the so-called intelligent collaboration (Meijer and Bolívar, 2016) with various stakeholders, which can take place at different levels and can be inter-organizational, intersectoral or through the relationship between government and citizen (Nam & Pardo, 2011).

Brescia & Calandra (2020) demonstrate that the performance differs from mere "behaviour" in that it implies a certain degree of

intent. The first performance perspective focuses on tasks performed by an interpreter and therefore includes all actions that are performed. Furthermore, when performance is conceptualised with attention to both the quality of actions and quality of results, it can be characterised as sustainable results. Performance refers to a productive organization, an organization that can achieve and converts this ability into results-output and outcome (Bouckaert & Halligan, 2007).

Performance is not only a concept but also an agenda. The term 'performance' expresses a program of change and improvement, which is promoted by a group of actors who share the same ideas and are usually only vaguely coupled. From an inter-institutional, cross-sectoral and multi-level perspective, public management science is studying the influence that performance has on governments (Kuhlmann, 2018; Kuhlmann & Wayenberg, 2016). Performance Management – using performance measurement information – can "influence the positive change in culture, systems and organisational processes" when information is used for learning, management and control and to provide external accountability (Cepiku et al., 2017; Cepiku & Savignon, 2012).

The smart city indicators have two primary stakeholder groups: city council decision-makers who need to follow impacts of their smart city strategy over time, essentially responding to the city's needs; and national governments and European bodies, to examine whether their smart city policies have led to a greater focus on overall objectives, also and especially in line with Agenda 2030 and to be able to compare cities. So, this confirms the theoretical framework because communication through the right levers of performance management, governance and reporting information leads to stakeholder engagement and we find among stakeholders the issues of public governance and inter-institutional collaboration.

Through the elements highlighted, smart cities can define an information system capable of providing a relationship between the internal organization system inputs and stakeholders, increasing decision-making, and providing valuable elements that can be the

base of social reports and collaborative technological solutions (Grossi et al., 2021).

Through this research, the starting point for future analysis can be to monitor whether, based on changes in the ecosystem, these, which we can define guidelines for inter-institutional, cross-sectoral and multi-level contexts, are always effective to be able to develop innovation of system at the highest levels. The study is limited to analyzing the phenomenon and the variables in two emerging cities and could be extended to the leading smart cities identified globally to increase or redefine the approach provided.

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