

# Issues and challenges of smart cities governance: A systematic review

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## Abstract

Smart governance is a key factor when considering the successful implementation of smart cities strategies. Smart cities create an extensive variety of issues and challenges that often poorly organised to deal with by their respective governments as they grow in size and complexity. Therefore, developed countries are creating their infrastructure on the basis of smart governance and sustainable development to improve the quality of life for more than a decade now. This paper explores through a systematic review of the key challenges and issues that governance of smart cities is facing on this network performance by focusing on the governance models, with a particular interest on how these can contribute to successful smart city network governance. However, the government departments seem not to engage the public in every activity they do. Sometimes due to security and political reasons they try to maintain a distance from the public; this shows the issues within the existing smart cities governance model. This paper concludes that although there are considerable smart city dossiers in literature, their governance model and structural variations development across regions is lacking.

**Keywords:** Sustainable cities, Smart cities, Governance issues, Smart Cities Challenges

# 1. Introduction

The Smart Cities Mission is an innovative and new initiative by the Government to drive economic growth and improve the quality of life of people by enabling local development and harnessing technology as a means to create smart outcomes for citizens.

In the approach to the Smart Cities, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will act like a light house to other aspiring cities. The Smart Cities is meant to set examples that can be replicated both within and outside the Smart City, catalysing the creation of similar Smart Cities in various regions and parts of the country.

Smart governance is a key factor within the smart cities panorama when analysing the successful implementation of smart strategies (Meijer and Bolívar, 2016). On top of their individual smart city projects, many cities take part in smart city networks where best practices are shared and promoted among their members on different aspects, including smart governance. Despite the potential positive outcomes that local councillors can obtain from the activities carried out by these networks, their influence in the public sector has been questioned in literature, especially when practitioners and policy-makers hold questions about whether networks really do work or are counterproductive for cities (Turrini et al., 2010). Therefore, this work aims to contribute to the literature on councillor's 'governance in complex networks and on network performance by focusing on the existing network coordination mechanisms, with a particular interest on how these can contribute to successful smart city network governance.

We seek to establishing a theory behind smart cities governance policies impact on the innovation capacity at the local authority level spurring from its networked way of operation, and how this relates with new trends in city governance (Eisenhardt and Graebner, 2007; Yin, 2014). The scope of this work is not to provide statistical validity or reliability on establishing a successful smart city network but analysing the systematic review in a particular moment where the smart city concept is embedded in most political, economic, social and technological initiatives taken by local and national governments.

The purpose of this systematic literature review is to gather, analyse and outline measurements for smart city governance by logically classifying the relevant body of literature. In this paper we aggregate the different conceptualizations and distinguish any possible gaps or inconsistencies. To achieve these targets, the literature review is primary guided by four sub-regions of interest: the determining of the parts of smart city governance, the grouping of the kinds of indicators utilized to measure smart city governance, the recognizing of important relevant contextual factors, and the grouping of the envisaged results of smart city governance. The primary zone of interest is the search for a set of components that make up the present comprehension of smart city governance. To precisely characterize the appropriate parts of smart city governance. Ordinary organizational and, institutional theory applied to the smart city hypothesizes that governance represents an important building block of a functioning smart city develop. The second area attempts just to consolidate the different measurement approaches and not assess appropriateness.

As a third area of interest, coordination of the investigations that talk about or at least mention the role of contextual factors in smart city governance. Although smart governance is assumed to be influenced by numerous variables (Bolivar and Meijer, 2016), few papers notice, theorize or examine the potential role of contextual factors in smart city governance. Subsequently, this paper isn't planned to give the much-needed systematic analysis of the contextual phenomena related to smart city governance, however instead serves as an initial overview of the current state of the research. In conclusion, this paper attempts to identify the envisaged results of smart city governance. Significant efforts have been undertaken to distinguish the distinctive segments of smart city governance, as well

as the difference between their different results. Recently, for instance, Meijer and Bolivar (2016) have picked a classification in terms of ‘first, second and third results to describe smart city governance results (Meijer and Bolivar, 2016) include: 1) improvements to the city; 2) Changes in the position of government in compare to other urban actors; and 3) Changes to the government organization.

## 2. Methodology

In order to follow the systematic literature review standards, the author follows the guidelines through the creation of a reproducible research record. Moreover, the author embraces the systematic research method. Over-all, the systematic review methodology appears fundamentally not the same as the narrative approach, as it clearly determines its “criterion-based selection” process. It, in this way, looks to stay away from any possibility of partiality or prejudice that may potentially develop if unrevealed criteria are utilized for the selection of the literature.

A systematic literature review is characterized through the usage of a comprehensive search that scans the relevant body of literature with clearly expressed and comprehensible search choices and selection criteria (Table 2). The development of the corresponding search record makes reproduction and “assessment of the exhaustiveness” of the study with the end goal that, scholars in the field can more confidently reuse the results in their own research. The use of the systematic review has all the earmarks of being appropriate and reasonable, especially in a smart city that requires “the connection of many academic disciplines” (Mora, Bolici, and Deakin, 2017).

While some authors indicate potential outcomes at a broad level, such as public value, others establish outcomes based on their potential economic, environmental and social impact, however the next step to improve the outcomes is to

- provide changes to the government organization;
- provide changes in the position of government with regard to other urban actors;
- apply improvements to the smart city infrastructure; (Bolívar and Meijer, 2016; Lin et al, 2015)

### 2.1 Challenges Faced by Governments

**Funding:** In order to create a digital infrastructure and link everything online, the government needs a lot of funding and investment. Developing countries already face money crunch due to other developmental activities, low tax collection, heavy international loans, trade deficit and other social problems.

**Lack of interest:** Even though good governance implies more people participation; government departments don’t wish to engage public in every activity they do. Sometimes due to security and political reasons they try to maintain a distance with the public.

**Illiteracy:** Not everyone is e-literate. To reap the benefits of e-governance, basic knowledge of computer and internet is a must. People residing in rural areas, tribal regions, poor households and marginalized communities don’t have an easy access to the internet or digital systems. In order to make an effective use of ICT, the government must initiate public programs and training activities to make e-learning accessible to all sections of society. Only then people from various walks of life can benefit from these services and there will be a cross section development of society as a whole.

**Political impacts:** Innovative smart city strategies and regulations are expected to empower enable large scale project implementation and roll-out (Angelidou, 2015). Smart cities require an adequate set of framework conditions in the field of policy and regulations so as to have the capacity to smarten

up. To accomplish this objective, smart cities can all collectively learn from one another to yield general lessons for the circumstances in which specific strategies are appropriate, and the types of localisation that can best contribute to success. This is especially true when more information about their true results, more extensive impacts and long-term consequences becomes accessible. This work aligns smart city strategies from local to national level. On one hand knowledge sharing is a positive mechanism for policymakers who have to take faster decisions than in the past due to a rapidly evolving socio-political context. Then again, another constructive outcome is the response to forward thinking in policy making practices (Accordino, 2013). In the end, an extra positive effect has to do with the way that access to contacts and information may leverage differences among cities with bigger and smaller sizes.

**Economic impacts:** The beneficial political impact that good smart city governance produces over the city governments also gets translated into a positive economic impact where, first, smart cities can reduce their costs; and second, they can get funds to create innovative projects.

Overall, the economic impact onto the smart cities can be considered from three different aspects:

- Costs reduction based on shared knowledge and staff training
- Stimulation of the national investment on smart city projects
- Participation in funded projects.

**Social impacts:** For the most part, there is a tendency for associating the term smart cities with just new technologies, overlooking different perspectives linked to human, social, relational and environmental capital, which are viewed as key factors for urban development (Angelidou, 2015; Caragliu, Del Bo, and Nijkamp, 2011). In a smart city, incorporated actions that promote the relationships between the citizens and the different institutional, urban and technological elements are crucial to ensure both urban growth and knowledge and innovation economy. Actually, Caragliu et al. (2011) demonstrate steady evidence of a positive relationship between urban wealth and the presence of a vast number of creative professionals, a high score in a multimodal accessibility indicator, the quality of urban transportation networks, the diffusion of ICTs (most noticeably in the e-government industry), and, finally, the quality of human capital.

Overall, an integrated smart city model should work towards these four goals (Angelidou, 2015):

**1. Progression of human capital:** citizen empowerment (informed, educated, and participatory citizen), intellectual capital and knowledge creation.

**2. Progression of social capital:** social sustainability and digital inclusion.

**3. Behavioural change:** sense of agency and meaning or feeling that we are all owners and equally responsible of our city.

**4. Humane approach:** innovation receptive to the needs, skills and interest of users, respecting diversity and individuality. In alignment with the importance of building a smart society integrated within a smart city, the main objective is identifying the needs of a smart city society, so the smart city solutions adopted are not disconnected from its social context and fail to solve the city challenges.

**Technological impact:** In the current digital society, ICT show up as the main support component for the development of society, cities and countries. While a few studies accentuate the impact of new technologies on economic development, and others centre around the analysis of the key factors related to ICT use and capability, all studies agree that new technologies play an essential role in the development of cities (Alfaro Navarro et al., 2017).

**Intelligent Waste Management:** The outlook for waste management in smart cities is rapidly changing. They are responding towards the situation with more of an innovative aspect, after years of resistance in previous decades. Today, the waste industries and start-ups are making big strides in integrating the innovation in robotics, machine learning, and smart city technology into waste management. The pioneering role of such industries and start-ups has given a ground existence to smart waste management. Though the real-world implementation comes with its own share of

challenges, the benefits are outperforming.

The intelligent waste management significance and the trending stories discussed here will compel you to believe ‘smart waste management is something worth more than gold itself’.

*Table 1: Specific areas of improvement for smart cities services contracting and staff development.*

Areas of improvement in relation to contracting services	Areas of improvement in relation to staff development
<ul style="list-style-type: none"> <li>• Waste management.</li> <li>• Parking and mobility management.</li> <li>• Smart city platform.</li> <li>• Energy management Public-private partnerships in sensor-related project.</li> <li>• Open Data, e-Government, transparency and citizen participation.</li> <li>• Define the expected quality of service by contractors.</li> </ul>	<ul style="list-style-type: none"> <li>• Training.</li> <li>• Discounts and free passes to conferences, workshops, fairs.</li> <li>• Travel Common interest topics.</li> <li>• Best practices and lessons learned by others.</li> </ul>

Overall, the suggestions of the members address one main desire, the effective execution of projects or initiatives in relation to smart cities. This efficiency is seen from three different angles: economic expenditure, best practises maximisation and time constrains. From the economic side, some members would like to see initiatives covering common interests in several cities rising. This would allow a reduction in economic costs by sharing technical specifications and contracting administrative processes.

## 2.2 Smart Governance across all Regions

Developed countries are creating their infrastructure on the basis of smart governance and sustainable development for more than a decade now. The developing world is not far behind either. As cities are developed, based on smart city models, governments across all regions are using e-governance to strengthen democracy, citizen participation and public welfare.

The aim of smart or e-governance is to make the system more transparent and citizens more informed. Government information will no longer be a repository of few public officials or servants but accessible by all sections of society.

## 2.3 Features of Smart Governance

E-governance and involvement of the public in decision making process is the most important aspect of smart governance. The tools used to achieve them are following:

**Use of Information and Communication Technology:** This implies the use of computers, the internet, telecommunication, digital equipment’s for collecting, processing, sharing and retrieving of data. Better penetration of telecommunication channels such as cable, radio, telephones and satellite systems for transmitting information. Use of Geographical Information System (GIS) for travel and transport, video conferencing, instant messaging in banking, healthcare, energy and security services.

**E-Consultation:** People participation is the main feature of smart governance. There must be a proper channel of interaction between government and citizens. They must be empowered to voice their opinions, ideas about government programs, schemes etc. Their feedback should directly reach out to leaders, counsellors, city managers or local head.

**E-Data:** Easy access to government funds, expenditure and investment data and public information

must be available online. Except for critical information pertaining to security and safety of citizens, data must be provided freely and openly. This will make government more accountable and citizen participative in government's functioning.

### 3. LITERATURE REVIEW

A systematic literature review is characterized through the use of a comprehensive search that scans the relevant body of literature with clearly stated and comprehensible search choices and selection criteria. The development of the corresponding search record makes reproduction and "assessment of the comprehensiveness" of the study possible such that "scholars in the field can more confidently reuse the results in their own research" (von Brocke, et al., 2009). The utilization of the systematic review appears to be appropriate and reasonable, especially in a smart city that requires "the association of many academic disciplines" (Mora, et al., 2017).

#### 3.1 Systematic governance in the public sector

Governance networks are more or less stable examples of social relations between commonly dependent actors, which form around public issues, and which are shaped, maintained, and changed through interactions between the involved actors (Koppenjan and Klijn, 2004; van Meerkerk and Edelenbos, 2014).

The literature on local governance focuses on the expanding operation of councillors in complex governing networks including public and private bodies (Copus, 2015). In these systems, councillors need to devise methodologies to impact and shape policy decisions taken by individual players (Copus, 2015). The second part of the literature focuses to the role of mixed groups as fundamental segments of the governance structure regulating service ecosystems in cities (Connolly, et al., 2014). There is additionally another interesting stream of literature, studying the conditions for success in shared-governance networks (Cristofoli et al., 2012).

These three distinctive research streams give interesting insights of knowledge that help understanding networked governance;

- 1) By demonstrating the significance of councillor's soft power to influence public and private bodies.
- 2) By demonstrating the relevance and state of service ecosystems within the framework of city governance.
- 3) Thoroughly studying shared-governance.

Considering the mentioned networks, a network success would depend on:

- The significance of formalized coordination mechanisms.
- Formalized principles to build the liability of decisions made.
- Well organised network meetings.
- Contracts with partner organizations that are likewise key understanding the performance of these networks (Cristofoli et al., 2012).

Moreover, the stream of literature examining the conditions for success in shared-governance systems makes a distinction among three forms of network governance: Shared-Participant governance, Lead Organisation governance and Network Administrative Organisation, following Provan and Kenis (2008).

In the recent development of public network research literature, scholars have set aside their interests on network structure and have focused on the skills of the network manager as a way of predicting network performance. This focus on the network manager is based on the assumption that managerial skills have a direct impact on network performance (Agranoff and McGuire, 2001; Mandell, 2001).

A few authors even contend that network managers, in some cases, have a considerably greater influence in contrast with the system structure and instruments (Kort and Klijn, 2011).

Against this backdrop, public system management skills may be split into two general classifications:

the individuals who sustain the system and the individuals who steer it. Abilities of the former kind are typical of system ‘facilitators’ and ‘mediators’, while those of the last kind are associated with the system leaders (Cristofoli, et al., 2014).

The system facilitator-mediator is relied upon to cultivate a situation of good partner interaction in order to support the system. This is made by establishing working guidelines to administer partner participation, advance information trades between system partners, maintain harmony and develop approaches to adapt to strategic and operational complexity (Agranoff and McGuire, 2001; Cristofoli et al., 2014; O’Toole and Meier, 2004). This individual is likewise expected to fabricate commitment to the mission and the goals of the system, among system members as well as among external stakeholders (Agranoff and McGuire, 2001; Cristofoli et al., 2014).

Following Cristofoli et al. (2014) with regards to guiding the system, the system leader is required to have the capacity to perform three tasks: action planning, activating and re-planning. Action planning consists of establishing clear missions, creating focused strategies and measures for the system and for the organisation in which the leader works (Agranoff and McGuire, 2001).

Activating consists of choosing the proper players and resources for the system, tapping the skills, knowledge and resources of others, picking up trust and building agreement (Agranoff and McGuire, 2001). And in the end, re-arranging consists of altering and repositioning the system objectives when imperative changes happen in the system environment (Shortell et al., 2002). Integrating the previous streams of literature in a system governance environment, the components for the coordination of the system partners and the ability of the network manager to run the network are reliable predictors of a network governance performance. Kern and Bulkeley (2009) propose three governance mechanisms available to city-systems:

- Information and communication
- Project funding and coordination
- Recognition, benchmarking, and certification.

All three aims to encourage cities to convert commitments into action.

*Table 2: Reviewed studies on smart city governance (a systematic review)*

<b>Study</b>	<b>Statements and findings on smart city governance</b>
<b>Giffinger et al. (2007)</b>	<ul style="list-style-type: none"> <li>• Defines ‘smart city’ concept and rates European cities accordingly, considering factors and pointers.</li> <li>• Delineates smart city as political participation, services for citizens and workability of the administration.</li> </ul>
<b>Bătăgan (2011)</b>	<ul style="list-style-type: none"> <li>• Analyses importance of smart networks on quality of life and sustainability. Identifies key factors of future smart cities.</li> <li>• General need to improve collaboration across departments as well as with communities. Describes potential results of a smarter government.</li> </ul>
<b>Caragliu et al. (2011)</b>	<ul style="list-style-type: none"> <li>• Defines operational smart city concept and uses statistical methods to analyse and state factors education and ICTs defining smart city performance.</li> <li>• points participatory aspect of smart city governance.</li> </ul>
<b>Chourabi et al. (2012)</b>	<ul style="list-style-type: none"> <li>• Suggests framework to understand smart cities concept. Identifies critical factors of smart city initiatives like management, organization, technology, governance.</li> <li>• Defines smart city ICT governance as communicating collection of</li> </ul>

	technology, people, policies, practices, resources and information.
<b>Gil-Garcia (2012)</b>	<ul style="list-style-type: none"> <li>• Argues challenges of organizational collaboration and information technologies in smart government.</li> <li>• Highlights smart governance's technology usage to interconnect information, processes, institutions and infrastructure.</li> </ul>
<b>Angelidou (2014)</b>	<ul style="list-style-type: none"> <li>• Identifies four strategic choices of policies with spatial reference for the development of smart cities.</li> <li>• Describes participatory aspects of SG with regards to citizens</li> </ul>
<b>Bolívar (2016)</b>	<ul style="list-style-type: none"> <li>• Studies the role of governments in cities. High-lights importance of engagement of government and citizens.</li> <li>• Describes unsatisfactory status quo of smart city governance in most cities.</li> </ul>
<b>Bolívar (2016)</b>	<ul style="list-style-type: none"> <li>• Analyses relevance of mains dimensions of smart city governance models. Results show that dimensions mainly drawn from empirical experience than theory.</li> <li>• Stresses managerial feature of organizing collaboration among stakeholders, network characteristics and special role of government with regards to smart governance</li> </ul>
<b>Bolivar and Meijer (2016)</b>	<ul style="list-style-type: none"> <li>• Develops research smart city governance model consisting of elements, outcomes and implementation strategies. Emphasizes importance of additional innovation capacity.</li> <li>• Conceptualizes model of smart governance including strategies (ideas, actions), arrangement and outcomes.</li> </ul>
<b>Castelnuovo et al. (2016)</b>	<ul style="list-style-type: none"> <li>• Discusses importance of holistic approach for assessment of smart city governance develops performance valuation framework consisting of five dimensions</li> <li>• Provides guidance on how to assess smart city governance scopes.</li> </ul>
<b>Meijer (2016)</b>	<ul style="list-style-type: none"> <li>• Discusses cooperative knowledge potential and nature of the problem as key contextual factors. Develops model to assess smart city governance in context.</li> <li>• Argues that efficiency of techno-governance arrangements depends on situational factors.</li> </ul>
<b>Meijer and Bolivar (2016)</b>	<ul style="list-style-type: none"> <li>• Analyses smart city governance publications and finds different emphases technology, people, collaboration, perspectives on smart city governance changes, and result.</li> <li>• Discusses for comprehensive smart city governance perspective where smart city governance crafts new forms of human collaboration through use of ICTs to obtain better outcomes.</li> </ul>
<b>Meijer et al. (2016)</b>	<ul style="list-style-type: none"> <li>• Argues contextual conditions, governance models and assessment of public value in smart city context. Highlights importance of modified smart city approaches.</li> <li>• Mentions various smart city governance components raises questions regarding multilevel, public value aspects of smart city governance.</li> </ul>

<b>Kourtit et al. (2017)</b>	<ul style="list-style-type: none"> <li>• Highlights information needs for strategic planning of smart cities.</li> <li>• Shows governance aspects of big digital data management. Stresses importance of citizen participation and role of city governments within cities network.</li> </ul>
<b>Marek et al. (2017)</b>	<ul style="list-style-type: none"> <li>• Defines implementation experiences of new technologies in post-disaster environment. Examines problems arising from top-down technocratic solutions</li> <li>• Defines smart cities as urban center where smart technologies drive effective governance through the engagement of citizens</li> </ul>
<b>Yigitcanlar et al. (2018)</b>	<ul style="list-style-type: none"> <li>• A perfect model to build the smart cities of the century, for the situation, its training includes a system of systems approach and a sustainable and adjusted view on the financial, societal, environmental and institutional development spaces.</li> </ul>

## 4. DISCUSSION

This paper focuses on the requirement for further research to better comprehend what components constitute smart city governance, how to measure them, and their impact in achieving the intended outcomes of smart city governance. Thus, the author advocates establishing smart city governance as a more distinct smart city research area.

Furthermore, considering it is difficult to offer a conclusive number for the present number of smart cities or smart city projects, the significant gap between smart cities and smart cities governance studies highlights both the lag and gap in the academic literature in comprehension and informing the practice of smart cities governance.

Regardless, it isn't just observed as worthwhile to address the general shortage of empirical studies explicitly, yet in addition to raise awareness of the issues of the existing ones. Additional empirical research on smart city governance will require clear identification of both the independent and dependent factors and their proper measurement techniques. the author proposes the following research directions.

1. Multiple identified components stand to gain from additional data collection. One route forward for this explicit research initiative might be to send more case study research. The research method has the potential to look at currently marginalized themes and is particularly suitable for theory building.

2. Research should explicitly look at the connections of smart city governance components and their envisaged outcomes, which remain largely vague. Potential insights should be tested against their causal connections. The few components and sub-components that show predominant similitudes with respect to their generated insights can be additionally analysed utilizing confirmatory statistical research.

3. Future research should investigate empirically the role of contextual factors and their potential influence on smart city governance components and outcomes Besides, further research should concentrate not just on the contextual factors addressed within this review but should broaden the analysis to include a variety of other potential factors.

4. Finally, longitudinal investigations can give valuable insights to sharpen causal models of

components, interrelationships and dynamics related to the field of smart city governance. Moreover, longitudinal research could offer further insights into the development stages of smart city governance where certain connections may not be explainable or recognizable through other research designs.

5. In research concerning urban planning, it is important to clarify the structure of governance, various levels within the system and how different actors relate to one another and eventually what services are provided by different institutions (Alawadhi and Scholl, 2016). The objective here is to identify the issues that the governance is facing and how they can contribute it with the citizens, businesses, employees and the government. models of Smart Governance that can help with the governance issues:

**Government to Citizen Model:** Under this approach government directly interacts with citizens through various communication channels like newspapers, web portals, forums, radios, Apps etc. The aim is to reach out to citizens and allow them to speak for themselves, listen to their problems, complaints, advice and make them applicable.

**Government to Business Model:** Entrepreneurs play a crucial role in taking an economy ahead. The model is aimed towards the direct interaction between central and state government with the business sector and bottlenecks faced by entrepreneurs, traders and start-ups. Companies can get direct knowledge about latest policies, regulations, taxes, schemes, and credit facilities to improve and expand their businesses.

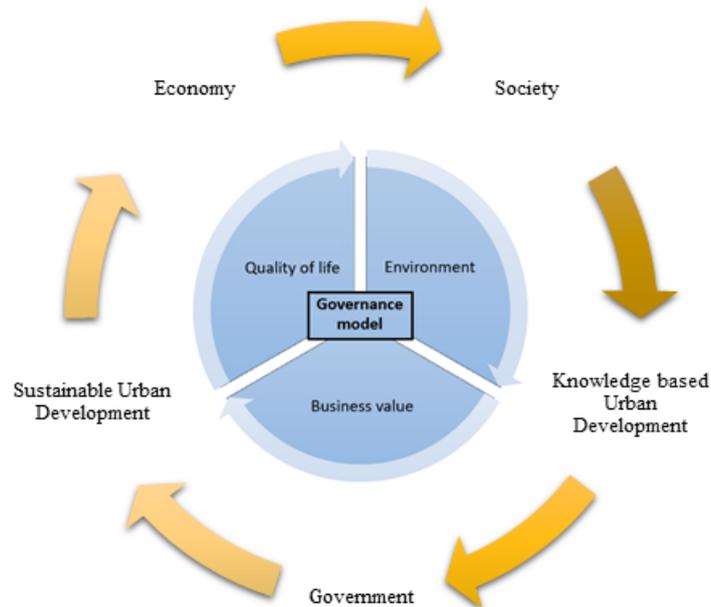
The model also encourages online business transaction to save time, costs, and provide real-time data which can further be used for planning and forecasting of the economy. Business houses can benefit from government collected survey, reports, data to initiate new ventures.

Also, sustainable development is integral for good governance. The government can inform companies about environmental regulations, guidelines and protocols to follow on setting up of manufacturing units, product specifications, factory waste disposal etc.

**Government to Government:** The model is targeted towards the direct interaction between government to government organizations, departments and agencies. The aim is to integrate all channels of governance for a simpler, holistic system. This will lead to more transparency, accountability and smooth delivery of administrative duties.

With the use of ICT, a paperless, digital model of services will come in place. This will reduce unnecessary clutter, corruption in public offices. A proper two-way communication will set up between officials and citizens, especially at municipal and regional level bringing more accountability and efficiency in government proceedings.

**Government to Employee:** The model aims to provide online software system and tools to create a channel of interaction between employees, government and companies. The idea is to maintain a personal account for each employee with his social security number, bank account number and personal information. Many employee related tasks such as payroll, medical compensation, provident funds, pension schemes, bank loans can be carried out online.



*Figure 1: Triple relationship governance model and smart cities framework.*

This paper suggests the following research directions:

- Multiple recognised components stand to improvement from additional information collection. deploy more case study research.
- Research should specifically inspect the connections of smart city governance and their future outcomes.
- Future research should investigate empirically the role of contextual factors and their potential influence on smart city governance outcomes.
- Future studies can provide valuable insights to sharpen fundamental models of components, interrelationships and dynamics related to the field of smart city governance.

## 5. CONCLUSIONS

By studying the smart city governance, this paper intends to contribute to the existing academic literature analysing the successful governance and mode of operation of public networks. Specifically, the operational investigation has revealed insight into new trends in governance in smart cities, all the more concretely in complex networks and network performance. The literature studying the conditions for success in shared-governance networks (Cristofoli et al., 2014) claims that a system's success relies upon the importance of formalised coordination mechanisms, formalized guidelines to expand the liability of decisions made, well organised network meetings, contractual agreements and informal relations; and contracts with partner organizations that are also key understanding the performance of these networks.

As described in this paper and reaches out to the relationship and impact to other stakeholders, for example, the national government and standardisation bodies with the promotion and development of a definitive objectives of interoperability and replicability for all different local initiatives, the case investigation demonstrates an effective empowerment of these objectives through experience exchange. The local governments acquire distinctive advantages from their network participation gaining synergies and efficiency in their operations. This replicability has already led to important savings in terms of contracting services and staff development. This positive sustaining isn't just limited to the policy or political impact, but it also expands to important economic and technological

in cities.

Lastly, the difficulties found by some cities to take on board some of the technological solutions promoted within the network due to their local lack of technical knowledge, and the promotion of joint contracting processes for members in need of a similar solution, were identified as potential improvements.

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