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Understanding the Stakeholders of Smart City Governance

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Abstract

The establishment of effective governance is crucial for the development of Smart Cities, as the presence of outdated governance practices is seen as a hindrance to fully realising the immense potential of Smart City initiatives. The complete analysis of stakeholders is a critical factor in determining the effectiveness of Smart City Governance (SCG). The primary topic of this literature study is the examination of stakeholders within the context of Smart City Governance.

The key stakeholders of Smart City Governance can be categorised into four main groups: public, private, academic, and civic stakeholders. The public stakeholders assume the roles of enablers and coordinators, as well as funders and regulators, within the context of SCG. The roles of private stakeholders include acting as providers, financial suppliers and investors, as well as diffusers and influencers. The academic stakeholders play a crucial role as both knowledge brokers and innovators. Civic stakeholders play a crucial role as both users and contributors within the context of SCG.

Moreover, when considering the viewpoints of stakeholders, three widely recognised models of Smart City Governance are the self-governance model, the bureaucratic model, and the integrated model. Based on the literature review, the authors find there is a knowledge gap when it comes to an understanding of the relationships and interactions between stakeholders (1) in the specific urban context, (2) from a dynamic perspective, and (3) from a socio-technical perspective.

A. Introduction

Industrialisation caused technological and social changes that accelerated urbanisation worldwide (More, 2002). The process of urbanisation has given rise to a host of novel challenges and issues. The escalation in population size and the excessive utilisation of natural resources have resulted in ecological and environmental concerns including air and water pollution, environmental deterioration, population density, infectious diseases, and criminal activities as well as an upsurge in public order disturbances (Feng and Xu, 2021). The Smart City (SC) is a concept that has emerged to solve urban problems and enhance urban development. While there remains a lack of consensus regarding the precise definition of SC (Ruhlandt, 2018), it is widely acknowledged among scholars that the concept of SC encompasses 1) the adoption of ICTs in urban systems, 2) the implementation of new governance models, 3) a strong emphasis on human capital development and sustainability and 4) the improvement of the quality of citizens' lives.

As cities transform into SC, new governance patterns different from the traditional ones are required to manage SC. The concept of city governance pertains to the framework and processes by which the public sector is governed, supervised, administered, managed and regulated within urban areas. City governance also encompasses the interactions between governmental entities and various stakeholders such as private enterprises, individuals, non-governmental organisations, and research institutions (Raco, 2019). The concept involves the creation of structures, policies, and practices that facilitate efficient decision-making, strategic planning, and implementation of urban planning, public services, infrastructure development, and law enforcement within the geographical boundaries of a city (Garba, 2004; Tanner et al., 2009; Lovan, Murray and Shaffer, 2017). According to Razaghi and Finger (2018), governance encompasses the systematic process of making sound judgements, efficiently executing those decisions, and conducting thorough evaluations of the outcomes.

The emergence of Smart City Governance (SCG) is primarily attributed to the increasing significance of information technology and human resources in the operational aspects of urban areas. These factors enable governments to enhance the efficiency and effectiveness of governance processes and achieve desired outcomes (Meijer and Bolívar, 2016; Jiang et al., 2020). According to Meijer and Bolívar (2016), a widely accepted interpretation of SCG is the utilisation of ICT and crafting novel forms of human collaboration to foster improved results and enhance transparency in governance processes.

On the one hand, it can be observed that the field of information technology is causing significant disruptions in the realm of urban governance. According to Schuurman et al. (2012), the utilisation of sensors and sensor networks has been proposed as a means to gather diverse data and information to support public management. Meijer and Bolívar (2016) add the utilisation of information derived from new technologies in government decision-making processes as having the potential to enhance the rationality of the government. Walravens (2012) argues the utilisation of network technology has the potential to foster new decision-making processes. Technology is anticipated to enhance governance by increasing efficiency, promoting scientific approaches, and fostering transparency. In summary, the publications about SCG, which have a technological focus,

underscore the importance of employing information technology in an informed manner to enhance the process of decision-making.

On the other hand, the concept of SCG highlights the active engagement and cooperative involvement of diverse stakeholders within an urban setting (Alonso et al., 2016; Meijer and Bolívar, 2016). According to Albino et al. (2015), it is crucial to involve many stakeholders in decision-making processes and the provision of public services. Almeida et al. (2018) emphasise the process of stakeholder consensus-building is essential in the context of SCG, as it encompasses the formulation, implementation, and evaluation of solutions. Bătăgan (2011) underscores the significance of fostering collaboration among different governmental departments as well as between the government and local populations. Lee et al. (2014) spotlight a governance model that aims to unite various stakeholders to promote growth and facilitate the adoption of smart services. Nam and Pardo (2011a) emphasise the significance of including governance with different stakeholders in urban planning as a crucial element for achieving smart growth. In summary, SCG aims to prioritise citizens' involvement in governance processes and facilitate collaboration among diverse stakeholders (Albino *et al.,* 2015; Pereira *et al.,* 2018). These publications centre their attention on the pivotal significance of human resources in governance and examine the roles and duties, as well as the relationships and interactions, among different stakeholders engaged in SCG activities.

Consequently, it can be inferred that the term 'smart' in the context of SCG pertains to the amalgamation of technological advancements and human cooperation. The SCG exhibits characteristics that encompass both technological and social aspects. In summary, SCG refers to the approach through which a city is managed and governed with the application of information technology and full usage of stakeholder engagement to enhance urban governance efficiency, transparency, and the well-being of its residents. This literature review primarily examines the topic of stakeholders in the context of SCG.

The term stakeholder encompasses persons, groups, agencies, parties, or organisations that are engaged in the context of SCG in any capacity (Ruhlandt, 2018). In the extant literature on stakeholder engagement in SCG, the terms stakeholders (e.g., Ben Yahia *et al.*, 2021), actors (e.g., Dameri and Benevolo, 2016), partners (e.g., Polese et al., 2019), and players (e.g., Thomas, Salah and Garzik, 2022) are frequently employed interchangeably. In this study, the researchers consolidate these concepts into the overarching framework of stakeholders. SCG is a multifaceted system consisting of a fusion of stakeholders who possess intricate abilities, values, and demands (Mayangsari and Novani, 2015). According to Ielite *et al.* (2016), it is important to collect and organise the resources and knowledge of stakeholders in order to effectively support the development of specific cities. According to Korneć (2020), a crucial determinant of effective SCG lies in the comprehensive examination of stakeholders.

This paper presents a comprehensive analysis of the existing body of literature on stakeholders in the context of SCG. This paper first provides a definition of the various categories of stakeholders. Next, a concise summary is provided regarding the roles and responsibilities of various stakeholders. Finally, a comprehensive overview of the relationships and interactions among various stakeholders is provided.

B. Types of Stakeholders

The initial stage of stakeholder analysis involves the categorisation of stakeholder types. Jayasena, Mallawaarachchi and Waidyasekara (2019) divide the stakeholders into external and internal. Nevertheless, the scope of their study does not specifically target individual smart city projects, rendering the application of this classification approach inappropriate. There is also a classification method that divides stakeholders into four categories: political stakeholders, social stakeholders, knowledge stakeholders and economic stakeholders according to their functions or roles (Anindra, Supangkat and Kosala, 2018). The limitation of this classification method is that some stakeholders perform multiple functions at the same time. For example, companies that own technology and intellectual property are both knowledge stakeholders and economic stakeholders. The present study adopts the classification method of Ruhlandt (2018) and divides SCG stakeholders into four categories: public, private, academic, or civic stakeholders.

First and foremost, public stakeholders are commonly characterised as city authorities (Ependi, Rochim and Wibowo, 2022), central, regional and local governments (Anindra, Supangkat and Kosala, 2018; Thomas, Salah and Garzik, 2022), local and regional administrations (Jayasena, Mallawaarachchi and Waidyasekara, 2019), national and regional regulators (Kaginalkar et al., 2023), political bodies (e.g., mayor, deputy mayor, aldermen, city counsellors, etc.) and administrative subjects (e.g., public managers, public officials, civil servants, etc.) (Dameri and Benevolo, 2016).

Secondly, private stakeholders are primarily characterised as entities within the private sector, encompassing (ICT) multinationals, (ICT) companies and (ICT) start-ups ((Mayangsari and Novani, 2015; Thomas, Salah and Garzik, 2022), ICT sector representatives (Jayasena, Mallawaarachchi and Waidyasekara, 2019), businesses, vendors, journalistic communities, media, private investors (Van Der Hoogen, Scholtz and Calitz, 2019), consulting companies and business firms (Mayangsari and Novani, 2015), and industry and commerce, finance, energy suppliers, ICT partners, innovation bodies and international companies (Ielite, Olevsky and Safiulins, 2016).

Thirdly, academic stakeholders are mostly characterised as those within academia, such as researchers (Ependi, Rochim and Wibowo, 2022), research institutions, experts and scientists (Jayasena, Mallawaarachchi and Waidyasekara, 2019), R&D groups, schools, universities, think tanks and incubators (Van Der Hoogen, Scholtz and Calitz, 2019), professionals, strategic committees and smart city alliances (Mayangsari and Novani, 2015), and educational institutions (Ruohomaa, Salminen and Kunttu, 2019).

Lastly, civic stakeholders, commonly known as citizens and civil society (Dameri and Benevolo, 2016), are also referred to as residents (Van Der Hoogen, Scholtz and Calitz, 2019), visitors and tourists (Mayangsari and Novani, 2015), city inhabitants (Ruohomaa, Salminen and Kunttu, 2019), NGOs (Kaginalkar *et al.*, 2023), and social organisations and non-profit organisations (Jayasena, Mallawaarachchi and Waidyasekara, 2019).

C. Roles and Responsibilities of Stakeholders

The prevailing notion in contemporary literature is that SCG is mostly dominated by public stakeholders (e.g., Ependi, Rochim and Wibowo, 2022). The primary aim of the public sector is to promote public welfare and attain social objectives such as happiness, prosperity, and safety through the implementation of the smart governance project (Noori, Hoppe and de Jong, 2020; Alsaid, 2021). The following are the three primary duties and responsibilities of public stakeholders. First of all, public stakeholders are the enablers and coordinators of SCG (Mayangsari and Novani, 2015; Bolívar, 2016). They are in charge of formulating plans, allocating resources, offering strategic leadership, encouraging networking and improving citizens' experience (Van Der Hoogen, Scholtz and Calitz, 2019). Secondly, public stakeholders are the funders of SCG (Bolívar, 2016). Since many SCG projects provide public services, public stakeholders need to use taxes to support them. Several novel financing tools have been suggested, including crowdfunding, earmarking government funds, monetizing the vast amounts of big data produced, carbon offsetting, and the establishment of smart government bonds (Tan and Taeihagh, 2020). Third, public stakeholders are the regulators of SCG (Bolívar, 2016). Public stakeholders are in charge of national, regional and local policy formulation, regulation, monitoring and compliance (Kaginalkar et al., 2023). Tan and Taeihagh (2020) also claim that the establishment of well-defined regulatory frameworks by public stakeholders is essential in mitigating the risks associated with technology and cultivating investor confidence and public trust.

Private stakeholders are the most proactive and innovative SCG stakeholders, as they strive for economic and commercial profitability, and market share while also fulfilling their corporate social responsibility (Noori, Hoppe and de Jong, 2020; Alsaid, 2021). The following are the three primary duties and responsibilities of private stakeholders. First and foremost, private stakeholders are the providers of SCG. For instance, ICT enterprises are primarily in charge of offering appropriate hardware and software products, information systems, applications and services to the general public and its stakeholders (Mayangsari and Novani, 2015). Second, private stakeholders are the financial suppliers and investors of SCG. The growth of SCG projects and the modernisation of urban infrastructure depend heavily on finance. The return on investment of the SCG projects is the primary factor that investors, including banks, private finance institutions, and venture capital firms, take into account (Jayasena, Mallawaarachchi and Waidyasekara, 2019). Thirdly, private stakeholders are the diffusers and influencers of SCG. By reporting on issues and the benefits of smart governance, social media and mass media can have an impact on SCG (Anindra, Supangkat and Kosala, 2018).

Academic stakeholders have a progressively significant role in the field of SCG, assuming the positions of advocates and advisors. According to Anindra, Supangkat and Kosala (2018) and Jayasena, Mallawaarachchi and Waidyasekara (2019), individuals and organisations in the academic, research, and consulting sectors serve as knowledge brokers, planning and developing smart governance strategies, as well as offering practical solutions to address challenges encountered throughout the implementation of smart governance. Furthermore, academicians, professionals and researchers play a crucial role as innovators. They contribute by introducing novel research and design methods, creating operational and

assessment models for smart governance, enhancing knowledge, and implementing systematic knowledge distribution (Mayangsari and Novani, 2015; Kaginalkar *et al.*, 2023).

Civic stakeholders are the primary beneficiaries and contributors of the SCG. According to Mayangsari and Novani (2015), citizens partake in smart governance experiments both as active participants and passive recipients of services. In addition, Jayasena, Mallawaarachchi and Waidyasekara (2019) assert that individuals including citizens, visitors and tourists, contribute their creativity and expertise in a collaborative manner, resulting in the generation of feedback via experiences that are grounded in specific locations. NGOs and other social organisations play a significant role in raising awareness, advocating for causes, and providing environmental education to the general public (Kaginalkar *et al.*, 2023).

Table 1 Roles and Responsibilities of Stakeholders

Types of Stakeholders	Roles and Responsibilities		Reference
Public stakeholders	Enablers and coordinators	Formulating plans, allocating resources, offering strategic leadership, encouraging networking and improving citizens' experience	(Van Der Hoogen, Scholtz and Calitz, 2019)
	Funders	Funding SCG projects with tax	(Bolívar, 2016)
	Regulators	Formulating national, regional and local policy, regulating, monitoring and compliance	(Kaginalkar et al., 2023)
Private stakeholders	Providers	Offering appropriate hardware and software products, information systems, applications and services	(Mayangsari and Novani, 2015)
	Financial suppliers and investors	Investing in SCG projects and modernisation of urban infrastructure	(Jayasena, Mallawaarachchi and Waidyasekara, 2019)
	Diffusers and influencers	Converging and communicating the SCG projects through mass media and social media	(Anindra, Supangkat and Kosala, 2018)
Academic stakeholders	Knowledge brokers	Planning and developing smart governance strategies, providing applicative solutions to any problems found during smart governance implementation	(Anindra, Supangkat and Kosala, 2018; (Jayasena, Mallawaarachchi and Waidyasekara, 2019)
	Innovators	Introducing novel research and design methods, creating operational and assessment models for smart governance, enhancing knowledge, and implementing systematic knowledge distribution	(Mayangsari and Novani, 2015; Kaginalkar et al., 2023)
Civic stakeholders	Users	Partaking in smart governance experiments both as active participants and passive recipients of services	(Mayangsari and Novani, 2015)
	Contributors	Providing creativity, knowledge, feedback, awareness, advocacy, and environmental education	(Jayasena, Mallawaarachchi and Waidyasekara, 2019; Kaginalkar et al., 2023)

D. Relationships and Interactions between Stakeholders

It is widely acknowledged in the field of SC literature that the inclusion of many stakeholders and their collaborative efforts are integral aspects of governance (Hollands, 2008; Nam and Pardo, 2011; Fatima *et al.,* 2018; Gil *et al.,* 2019; Nesti and Graziano, 2020). Governance can be defined as the dynamic and collaborative interactions among diverse stakeholders, processes, and institutions within the realm of policy domains (Marcussen and Torfing, 2006). The mediated interactions in which various stakeholders from the public, private, academic and civil sectors engage are intended to foster societal prosperity and enhance the well-being of individuals (Kooiman, 1999; Ruhlandt, 2018b).

Three distinct governance models have been proposed by scholars, which are founded on the diverse principles of relationships and interactions among stakeholders. The initial concept is the self-governance model, which employs a bottom-up strategy to control the subject matter of SC. In Capra's (2018) examination of the Amsterdam case study, it is observed that the governance model revolves around four key stakeholders: the Amsterdam Economic Board Foundation, the Grid Operator Liander, Gemeente Amsterdam (the municipality of Amsterdam), and the telecommunication company KPN. The four initial stakeholders collectively contribute financial resources, and specialised professional expertise, and engage in strategic decision-making. In their study, Lin *et al.* (2015) establish a typology of governance models within Chinese migrant communities, drawing upon the interactions among three principal actors: the state, the market, and society. One of the modalities that can be observed is the self-governance model, wherein various actors such as the informal sector, experts, civic organisations, and households assume significant roles. In the self-governance approach, the public stakeholder does not assume the role of the leader. On the contrary, the involvement of additional stakeholders is of utmost significance.

The second paradigm might be characterised as the bottom-up bureaucratic model, wherein the public stakeholder assumes the role of centralised leadership inside the SC. According to Bolívar (2015), the governance model under consideration assigns primary responsibility for the strategy and stakeholder interactions of the SCG to local governments. Leading groups, consisting of many departments, have been established in cities around China to oversee and manage SC programmes within their respective jurisdictions. Similarly, the predominant governance form observed in India exemplifies the bureaucratic paradigm, wherein parastatal entities exercise authority over urban planning and crucial physical infrastructure (Praharaj *et al.*, 2018). Nevertheless, it is evident that local governments in smaller cities have significant challenges in terms of their ability and available resources to effectively address the evolving demands of governance (Praharaj *et al.*, 2018). The bureaucratic model operates on the principle of public stakeholder monitoring, whereby other stakeholders assume somewhat diminished influence and adopt more passive positions within the SC.

The final governance style is an exemplary integrated approach that facilitates the engagement and cooperation of diverse stakeholders in the management of SC. According to Hollands (2008), the SC introduces fresh objectives for urban development, necessitating the active involvement of all stakeholders in the governance process for effective functioning. According to Paskaleva *et al.* (2015), the Peripheria Project's empirical research

indicates that a sequential strategy for engaging stakeholders is important in order to collaboratively develop novel civic services. According to the findings of Ielite *et al.* (2016), the city of Riga, which serves as the capital of the Republic of Latvia, has devised a comprehensive strategy for engaging stakeholders. This plan aims to effectively gather and coordinate the valuable resources and knowledge possessed by key stakeholders. The ultimate goal is to utilise these assets for the betterment of the city and to facilitate the development, implementation, monitoring, and continuous improvement of the energy policy for the SC.

E. Conclusion

Currently, there exists a substantial body of literature pertaining to the many types, roles and responsibilities of stakeholders, and the consensus among scholars is relatively consistent. However, the relationships and interactions between stakeholders exhibit a higher level of complexity, specificity, and difficulty in achieving unity. Consequently, further empirical study is required to conduct comprehensive investigations into the governing models of SC, taking into account the unique characteristics of each city. Moreover, the responsibilities and contributions of diverse stakeholders vary across different phases of the SCG. Therefore, it is imperative to employ a comprehensive examination of stakeholders using a dynamic approach. Lastly, the governance models that are built on stakeholder interactions tend to overlook other crucial components of SCG, namely technology, organisational structures, outcomes and contextual factors. Hence, a thorough examination of the subject matter of SCG necessitates the utilisation of a socio-technical framework that incorporates additional foundational elements.

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