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A Business Model Approach to Smart City Governance

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Abstract

In transitioning from hierarchal corporate governance to platform governance mechanisms, smart cities need to develop new models for managing the dynamics of platform governance between city divisions. By conceptualizing smart cities as a platform of platforms, this paper uses the business model approach to develop a platform governance framework in the smart city context. The contribution of this paper is to illustrate how the business model approach can enhance better communication between different layers of smart cities and thus improve smart city development.

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Introduction

Smart cities emerged as a concept to explain the integration of ICT in the provisioning of city services and urban development (Walravens, 2015). In this study, we view smart cities as a system of systems, which comprises all systems involved in providing a better life for the citizens. The smart city comprises all day-to-day services accessed by its citizens, including infrastructure systems, healthcare systems, education systems, transportation and mobility systems, water, energy, and waste management systems (Timeus et al, 2020). Hence, when cities try to integrate all these smart systems to provide one unified system for their citizens to interact and deal with, they run into the platform of platforms dynamics (Kretschmer et al., 2020), where the data exchange and knowledge-sharing, governance, and coopetition between different city departments take place in such setting (Cusumano et al., 2020; Fenwick et al., 2019).

Governance has been identified as one of the main components of smart cities and their development (e.g., Perätalo & Ahokangas 2018), but several angles of smart governance remain unexplored. In particular, the history of rural and regional politics-driven governance models has been identified as the main cause of performance challenges in smart city development (Honeybone et al. 2018). According to Bolívar and Meijer (2016), smart city governance is about collaboration in which the role of governance is to enhance the communication and collaboration among different actors and encourage improvement and new innovations. Cities are becoming aware that they need new tools to transform and deliver services to their citizens, but they are equally challenged in how to estimate the value of those services to their citizens (Kuk and Janssen, 2011).

Previous research (e.g., Bolívar & Meijer, 2016) has also defined six elements of smart governance, which are (1) the use of ICT, (2) the decision-making process, (3) the government's ability to collaborate with citizens online and deliver services to them online, (4) the ability to achieve collective goals through internal collaboration, (5) the ability to collaborate externally, and (6) the ability to achieve social inclusion of citizens in public services. The evolving city context has opened new opportunities and innovative business models using digital solutions as a response to challenges in the city (e.g., Walravens & Ballon, 2013; Perätalo & Ahokangas, 2018). City developers have recognised the importance of smart city ecosystems in order to chart plans for the future (Perätalo and Ahokangas, 2018). Conceptualizing smart city ecosystems as platforms can thus help cities to identify the points of governance in the collaborative creation and capture of opportunities, value, and advantages that are based on smart city systems.

However, little is known in extant research about the tensions that arise during the transition process from traditional hierarchical governance mechanisms to platform governance mechanisms (Koo and Eesley, 2021). Contributing to this gap in our current knowledge, we argue that using the business model approach that embraces the key concepts of value, opportunity, and advantage (e.g., Demil & Lecocq, 2010; Perätalo & Ahokangas, 2018), cities can respond to the ever-growing pressure to advance effectiveness and quality of life and develop new ways of operating to make their cities smarter.

Accordingly, the purpose of this paper is to conceptualize smart cities as platforms and how, in this context, the business model approach can accordingly address issues related to the governance of smart cities. We ask "*how could smart city governance benefit from the business model approach?*" We first discuss the main literature on the intersection of smart cities, governance, and platforms, and we then present our framework and end with a discussion and conclusion.

Approach

In this conceptual paper, we combine two main themes from extant literature: smart cities and platform governance. In this chapter, we discuss previous research on smart cities as platforms, then business models, and smart cities and platforms governance.

Smart cities as multi-sided platforms

The smart city as a concept includes a strategic course that emphasises the increasing importance of ICT (innovation and communication technologies)

in social and societal regional and urban development (e.g., Walravens, 2015). Smart cities also attempt to prioritise their ecosystems to aim for social and environmental sustainability via urban planning. Smart cities can be viewed as platform ecosystems that are evolving as meta-organisations, including multiple platforms working together and known as the platform of platforms (Cusumano et al., 2020; Kretschmer et al., 2020). Likewise, smart cities nowadays are incorporating various platforms to work together and migrating from hierarchal corporate governance to platform governance mechanisms (Fenwick et al, 2019). Hence, smart cities often emerge around customer-centric platform ecosystems. In that, the hierarchal models are divided into multi-layered modular platforms working together within the same ecosystem (Iivari & Ahokangas, 2021).

According to Tilson et al. (2012), a digital platform can be defined as a sociotechnical constitution including technical elements and associated organisational standards and processes. Digital platforms integrate products, services, and companies using private networks or the Internet, and they concern many business functions (Teece, 2018). These two descriptions represent well the smart city business platforms. In practice, the smart city platforms are continuously evolving due to different services that are changing citizens' daily lives and behaviour, as well as those of businesses, in an urban context in which modern technologies open new possibilities to multiple business models applied to public services in smart cities (Díaz-Díaz et al., 2017).

The paradox of smart city platforms is that in a public context, there is a need to both be stable and have control in order to keep a solid foundation for further development, but also to be flexible to be able to support growth and new innovations (Tilson et al., 2012). As in a multi-sided platform setting, the city is in the centre of the platform, because it must both provide services to the citizens as platform owners and facilitate access to services provided by third parties. For example, the city must coordinate and provide financial capital to create a structure for the business ecosystem it aims to create (Teece, 2018). The latest technological developments offer cities new ways to create value, which requires new

business models (Díaz-Díaz et al., 2017). That is why it is necessary to design innovative business models for smart city platforms. Furthermore, the business model and its three anchoring concepts of opportunity, value, and advantage become relevant in the context of cities.

Business models and smart city governance

Previous research has shown that governance can use business model logic as a tool to address change (e.g., Nielsen & Aagaard, 2021). In a fast-developing context, governance should loosen its mindset and move towards a more entrepreneurial way of working, to increase the resilience and preparedness of the organisation. In other words, it is important to understand and recognise how change creates new business opportunities (Nielsen & Aagaard, 2021). Smart cities can create competitive advantages through business model thinking. In practice, this means that business model thinking can act as an instrument to build synergies between different stakeholders in the ecosystem, and thus define how the ecosystem innovates.

The three core concepts of business models are opportunity, value, and advantage (e.g., Amit & Zott, 2001). Opportunity can be defined as something positive to be reached (Holm et al., 2015), and opportunity is strongly dependent on the external context (Atkova, 2018, p. 20). In other words, the business model can help to recognise and exploit opportunities that exist in the external environment (Atkova 2018). According to business model thinking, value creation can be a source of competitive advantage, and competitive advantages are needed by organisations to become and remain competitive (Demil & Lecocq, 2010). A competitive advantage enables the creation of greater value for the organisation, shareholders, and stakeholders, and thus, it gives a competitive edge related to competitors. The scalability of technical solutions and economic sustainability are also denominators of the business model, but they can also be regarded as important outcomes for the smart city (Alusi et al., 2011).

Smart city platform governance

Governance in a platform ecosystem refers to the design roles created by the platform owner to control

the platform ecosystem (e.g., deciding on the degree of openness/closedness of the platform), to govern complementary interactions with the platform owner and other stakeholders (Zhang et al, 2020; Koo and Eesley, 2021). According to Tiwana et al. (2010), a platform has to be governed not only by the platform provider but also by other actors, to be able to take advantage of the platform's collaborative and open infrastructure and to have a functioning platform business model. Together, technological infrastructure and governance are the key characteristics of platform business models. If a platform ecosystem remains ungoverned, it can create imbalance, with some players dominating the platform ecosystem, which makes it less attractive for new complementors to join the platform and develop smart offerings (Wareham et al., 2014).

The governance aspect also addresses how those players that complement the platform owner comply with the platform goals and objectives (Wareham et al., 2014). Platform governance is the main key in the stakeholders' heterogenous incentives to join and contribute to the growth of the platform ecosystem. However, among all governance mechanisms, the key goal in platform governance is to offer stakeholders the opportunity to balance their heterogeneous interests to work together (Zhang et al., 2020).

Platform governance has been addressed by strategic management researchers from two perspectives. First, granting authority mechanisms have been found to strategically divide the decision-making process between the platform owner and stakeholders. This ensures that the overall platform ecosystem makes the best use of the value creation and capture process (Tiwana et al., 2010). Second, the compliance mechanism in the platform ecosystem ensures alignment of the various incentives of stakeholders to ensure the establishment of the coopetition framework within the platform ecosystem (Zhang et al., 2020; Wareham et al., 2014). Further, the extant research has proven that the platform owner, namely the city, can shape stakeholders value creation activities through platform governance roles (Zhang et al., 2020), as platform owners define how information can be shared between stakeholders and how they interact with each other

(Tiwana et al., 2010; Zhang et al., 2020). Governance is hence important especially in a smart city context, as governance impacts the overall sustainability and survival of the platform ecosystem as a whole, where city organisations act as platform owners.

Key Insights

In this chapter, we illustrate how the business model as an approach can be applied to governing smart cities as platforms.

What does a business model approach bring to the governance of smart cities?

We apply a 4C business model framework in the analysis of smart city platform governance. Wirtz et al. (2010) suggested a 4C model for classifying digital-age business models, but their classification can also be used in a smart city context. The 4C model covers most of the classical Internet-based business activities, consisting of (1) connection, (2) content, (3) context, and (4) commerce layers, which each have their own value proposition (Wirtz et al., 2010; Yrjölä et al., 2015; Iivari & Ahokangas, 2021). In the smart city context, the 4C model can be described as a layered platform structure in which the lower layers are needed to enable the existence of the higher-level business models (Yrjölä et al., 2015). Hence, the 4C model is manifested in how cities as platform owners may provide their services and how citizens can use those services, as illustrated in Figure 1 below.

The ultimate goal for cities is always the provision of better services for their citizens. The role of smart governance is therefore to control and foster communication and collaboration among different city units for service utilisation and provisioning for the citizens and also for the businesses providing those services (1).

However, to make this possible, cities also need to facilitate the socio-technical integrations and synergies, both on a large scale in between different sectors and within specific sectoral services, meaning contexts (2), such as transportation, education, healthcare, and so on. Therefore, context can be further
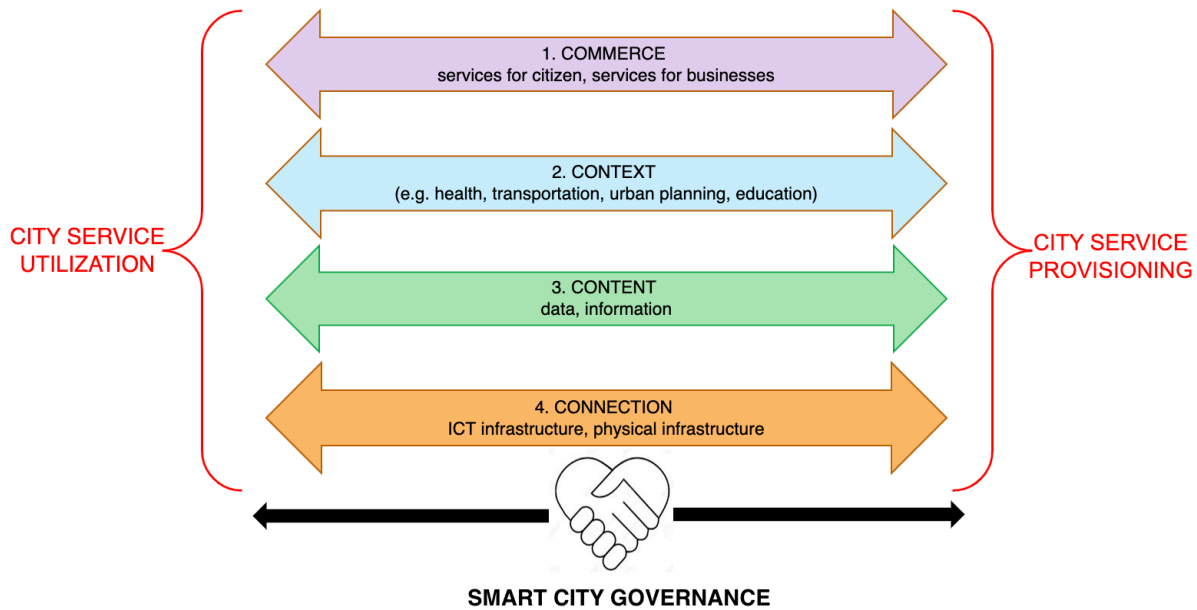
Figure 1: 4C platform governance framework for smart cities

defined as situation or location-based, as cities are always bound to a certain physical location. Hence, in smart cities, the context layer contributes especially to the government's ability to deliver city services, irrespective of location, via online interfaces.

So that the creation and facilitation of different innovative city services can take place, city governance also needs to manage the vast amount of data and information related to different systems and services, meaning content (3). Taking advantage of different types of data for decision-making, in particular, can be acknowledged as one of the key factors in fostering the competitiveness of cities.

Nevertheless, none of the above layers can exist without information and communications technologies. Connection (4) is the backbone of digitalization and smart cities, and therefore smart city governance needs to pay specific attention to the control and alignment of the physical infrastructure and the key enabling ICT technologies (such as the Internet, mobile network communications, and IoT technologies), as together these provide the smart city infrastructure upon which all the upper layers are built.

As a whole, the layered 4C platform perspective of smart city governance results, then, in the city authorities' ability to make informed decisions, for example, regarding the city's ability to achieve the collective goals of wellbeing and sustainability by fostering collaboration and openness among cities as platform owners and different stakeholders such as businesses and citizens. These layers can therefore be considered as the foundations of novel smart opportunities and value for cities, improving their competitiveness with digital technologies.

Discussion and Conclusions

In the transition from corporate governance to platform governance, smart cities need to develop new models for managing the dynamics of platform governance between city divisions. By conceptualizing smart cities as a platform of platforms, new insights can be created for developing a smart city platform governance framework. Identifying the 4C platform business model layers and their contents can help smart city governance to appreciate specific characteristics of smart cities and use these insights when planning and implementing governance decisions.

Digital technologies have opened new opportunities and helped to create platforms through which citizens, companies, also public utilities, and cities can share their products and services. Thus, the question of opportunities, values, and advantages

in the context of a wider public good is vital for understanding digital platform economies and planning a business model framework that works in practice. We have seen that both the business model and smart city development have moved towards a collaborative and cooperative way, and thus the business model can act as a tool for city development (Perätalo & Ahokangas, 2018) in breaking sectoral silos and bridging the different layers of smart cities together. By viewing smart cities from a layered rather than sectoral perspective, enables us to pinpoint key issues that smart city developers need to acknowledge when steering and governing their cities. In answering the research question of how smart city governance could benefit from the business model approach, we suggest city governance to:

- consider if the physical infrastructure can respond to the increased phase of digitalization and collaborative networks at the connection layer
- be aware of the key services that can be built upon those infrastructures, and what should be enabled at the content layer
- evaluate how the context of services determines the governance model for individual sectors
- consider the role of multi-sided platforms in engaging citizens in value creation at the commerce level

As this study is conceptual in nature, these aspects give rise to future research opportunities. For example, Nielsen and Aagaard (2021) identified that business model innovation can provide solutions and highlight the challenges by reassessing value creation in an intricate business environment in which technology and different platforms play an important role. We call for further research in the context of smart cities. Demil et al. (2018) argue that business ecosystems are becoming the dominant level of analysis in strategic management, and recently, discussions about business models are also related to increased discussions on platform models (e.g., Walravens & Ballon, 2013). Here, especially the innovation ecosystem approach to smart cities in the context of platforms could increase our understanding of public–private types of platforms, as digital ecosystems and platforms enable us to combine data and capabilities across boundaries into new, effective, innovative solutions that not only create but also capture new sorts of value (Nielsen & Aagaard, 2021).

This paper aimed to provide some conceptual and theoretical tools to apply the platform business model approach to smart cities and give preliminary ideas on what a smart city platform business model approach needs to include from a governance perspective. As the governance of smart cities has not been extensively studied in prior research, we conclude that the business model approach can bring novel insights regarding the intersection of platforms and business models.

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