



# Rethinking Technology-Based Services to Promote Citizen Participation in Urban Mobility

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## ABSTRACT

Cities are complex and dynamic systems in which a network of actors interact, creating value through different activities. Cities can, therefore, be viewed as service ecosystems. Municipalities take advantage of digitalization to implement a service-dominant logic in urban and mobility planning and management, developing strategies with which citizens, local authorities, and other actors can create value together. While citizens are offered a better service experience, local authorities use citizens' input to improve decision-making processes. This research considers that designing an integrated service supported by an integrated information system can respond to current challenges in decision-making and information access for transport and mobility. Through a multidisciplinary methodological approach, this work proposes some guidelines to design an integrated information system to improve citizens' participation in urban planning and mobility services.

## KEYWORDS

Co-Creation, Decision-Making, Information Systems, Participation, Urban Mobility, Service Design, Service-Dominant Logic

## INTRODUCTION

For several years, cities have been implementing smart solutions to improve many of their services. Transportation is especially relevant due to its essential role in citizens' daily lives and its significant environmental impacts. Although other sectors are steadily decreasing emission levels, that is not the case of the transport sector (European Union, 2017).

The premise for this work is that improving the way citizens interact with local authorities will improve both the decisions made by planners in designing better urban and mobility plans, and it will improve citizens' behavior towards the transportation systems. This will impact the harmful effects of transportation systems on the sustainability of cities.

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The link between sustainability and technology is visible in the evolution of the concepts of *smart cities* and *sustainable cities*. Some authors currently adopt the term *smart sustainable city* since it reflects both the technological and the sustainability perspectives (Ahvenniemi et al., 2017). In this context, some technological solutions are naturally linked to the current high levels of digitalization, and terms such as *digital city* and *information city* were common before the universal adoption of the term *smart city* (De Jong et al., 2015). Considering that cities are dynamic complex systems, other authors also apply a service-dominant (S-D) logic to the study of urban systems. This leads to an evolution of the *smart city* concept to *smart cities as a service system* (SCSS) (D'aniello et al., 2020; Polese et al., 2019).

The increasing level of digitalization and usage of information and communication technologies (ICT), along with a rising awareness of the climate changes, have been changing the way people use transports, also impacting urban mobility solutions and business models. This period of organizational and institutional changes, implemented alongside technological developments, is considered not only a socio-demographic transition but a socio-technical transition (Spickermann et al., 2014). Following the same trend of technological-based businesses, the service design science has strongly embraced information technologies, allowing for new services to adapt to the digital world (Grenha Teixeira et al., 2017; Lusch & Nambisan, 2015; Patrício et al., 2011). This is accomplished by designing multi-channel services, including digital channels (Patrício et al., 2008).

In a service exchange, value is co-created through physical or virtual interactions between networks of suppliers and customers (Frow et al., 2014; Patrício et al., 2018). According to the service-dominant (S-D) logic, value is co-created with customers, as they assume an active, connected and informed role in the value creation process (Vargo & Lusch, 2008).

Considering the three elements of the framework presented by Lusch & Nambisan (2015) – service ecosystems, service platforms, and value co-creation – this work adopts an S-D logic to design an integrated approach to urban and mobility challenges. This perspective is justified as it is assumed that citizens' well-being must be central in planning activities. Therefore, citizens should be involved in the design of new solutions by sharing information and ideas. In line with the idea of a *smart city service system*, this paper presents research in mobility services, going beyond the traditional one-to-one interaction of local authorities and citizens, including interactions between citizens with different profiles. From the citizens' perspective, these interactions can simplify the process of obtaining information. From the point of view of service providers, these interactions can improve their service level, as more customers are fulfilling their needs. Such an approach also contributes to research in the area of service design, since it considers that customers can create value not only with the service provider but with other customers, becoming, therefore, service providers themselves.

Improving citizens' involvement is also a requirement of Sustainable Urban Mobility Plans (SUMP) (Rupprecht, 2019), with stakeholders' participation being viewed as a precondition for sustainable mobility (Lindenau & Böhler-Baedeker, 2014). The importance of involving stakeholders in the design of smart sustainable cities is twofold: (1) it improves public participation in policy design processes; and (2) it enhances knowledge co-creation by promoting information sharing and transparency (Deligiannidou & Amaxilatis, 2016). Since solutions for smart sustainable cities are supported by technological tools, the involvement of stakeholders should also be included in the design of those tools, as a way to assure their success.

The basis for this work was set in previous papers where a conceptual framework for an integrated information system (Duarte et al., 2019) and the application of an S-D logic approach in this context (Duarte et al., 2020) were presented. The framework highlights the importance of understating the decision processes of the different stakeholders and improving how stakeholders access the information that feeds those decisions. Some lessons were learned from different existing methods, leading to the methodological approach presented here, resulting in a set of guidelines that can be used to develop an integrated information system in an urban mobility environment.

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