

The role of governance to support smart community development: a systematic literature review

Magdalena Ciesielska
Gdańsk University of Technology
magciesi@pg.edu.pl

Gabriela Viale Pereira
University for Continuing Education Krems
gabriela.viale-pereira@donau-uni.ac.at

Abstract

This paper studies the interaction between the smart community and smart governance concepts to elaborate on the role of governance to support local governments in developing smart communities' strategies and solutions. We perform a systematic literature review to analyse how the concept of smart community has advanced in terms of its definitions, context, benefits, challenges, and enablers and propose a unified term with a focus on the governance aspects. The review highlights that some conceptualizations of smart communities have a more technical perspective that evolved towards a socio-technical concept, being information and communication technologies a mediator to behaviour change and a tool to improve decision-making and citizen-centricity, as well as promoting social governance.

Keywords: smart community, smart governance, social governance, smart city, citizen engagement

1. Introduction

The concept of smart community is not new in the literature and is constantly changing. The smart community serves as a foundation for smart city services and also reflects how local governments are moving forward to address public value through digital solutions. According to UN-Habitat (2021) local government "is a result of decentralization, a process of transferring political, fiscal, and administrative powers from the central government to sub-national units of government to regulate and/or run certain government functions or public services, on their own, in the administrative-territorial areas of a country".

We understand local government broadly, as those public bodies that are the closest to the citizens (city, municipality, and other) and are the main actors in addressing their locally-based needs. Smart community concept sets the community and citizens' needs in focus and has a holistic view, engaging with all parties and combining the efforts to achieve the best results (Lindskog, 2004).

While smart cities development focuses on the innovation aspect of urban services through the use of information and communication technologies, smart communities have a special focus on the social benefit realization and sustainable development (Ciasullo et al., 2020; Wan and Jiang, 2022; Guo and Ling, 2021) as well as on stakeholders engagement (Mersand et al., 2019; Mellouli et al., 2014). Weiss (2000) explores the concept of good governance as underlying sustainable development. Specifically, the use of ICTs promotes good governance through automation, informatization, and transformation of government outputs, to improve their processes and ensure a citizen-centric approach for service development also known as electronic governance (e-governance) (Pereira et al., 2018; Rakesh et al., 2017). According to Nam and Pardo (2011) smart communities are a fundamental component of smart cities and highlight governance among stakeholders and institutional factors for governance. Therefore, smart governance has a key role in the success of smart community initiatives, with focus on stakeholder's engagement in decision-making processes and development of public/social services (Nam and Pardo, 2011; Mersand et al., 2019). Yet, as a very important element of the smart communities definition, smart and social governance (Guo and Ling, 2021; S. Wang and Guo, 2021; Ciasullo et al., 2020; Mellouli et al., 2014) could be further explored

to support community development. Therefore, we formulate two research questions: 1) How the concept of the smart community has advanced in the last two decades? 2) What is the role of governance to support the development of smart communities? Specifically, this paper aims to perform a systematic literature review to analyse how the concept of smart community has evolved in terms of its definitions, context, benefits, challenges, and enablers and propose a unified term with a focus on the governance aspects. The review highlights that some conceptualizations of smart communities have a more technical perspective that evolved towards a socio-technical concept, being ICT a mediator to behaviour change and a tool to improve decision-making and citizen-centricity, as well as promoting social governance. The structure of this paper is as follows. Section 2 provides theoretical background on both smart governance and smart cities concepts. Section 3 describes the methodology adopted in this study. Section 4 presents the results of the systematic literature review. Section 5 discusses the results and provides implications and conclusions of this study.

2. Background

2.1. Smart Governance

Governance is a widely known concept established in 1980s, overall associated with a system of national administration, focused on running governments and other agencies in order to provide public value (Weiss, 2000). According to Rhodes (Rhodes, 1994), the term governance itself has six distinct understandings, among others: 1) governance as a minimal state - determining both the scope and form of necessary public interventions; 2) corporate governance; 3) new public governance separating government from governance; 4) good governance; 5) socio-cybernetic governance; and 6) self-organized networks. According to Kooiman (Kooiman, 1999), governance includes the system of rule across all levels of societal activity, a continuing process of cooperative actions to solve conflicting interests; autonomous, interdependent, self-organizing, inter-organizational networks which have to exchange resources; management of government structures; mechanisms of a sovereign state, and finally focus on problems solving supported by opportunities creation and organizational and procedural facilitations. Three distinct aspects of governance are: the form of political regime; the process by which authority is exercised in the management of a country's economic and social resources for development,

and the capacity of governments to design, formulate and implement policies and discharge functions (Bank, 1994 p. XIV). Among the above the concept of good governance is understood as underlying sustainable development. Good governance consists on ensuring respect for human rights and the rule of law, which strengthen democracy, and increases the transparency and capacity of governments (Weiss, 2000). Good governance illustrates the way of capturing all complex elements of governance for the public good by a public administration, which exceeds the fundamental democratic structure of governing to include protection of human rights, government transparency, accountability, decentralization of decision-making, participating citizens and inclusive and anti-discriminatory legislation (Weiss, 2000; Nanda, 2006). However, the progress in implementing the above reforms is limited. Therefore, governments seek to improve their processes, and citizen-centric services and build strong ecosystems connecting citizens, governments, businesses, and non-governmental organizations through e-governance (Pereira et al., 2018; Misuraca and Viscusi, 2015). The role of ICT is no longer supporting only but transforming also external relationships directed towards people, processes, information, and technology in order to accomplish governance objectives (Heeks, 2001).

Smart governance as a concept has not been thoroughly established and includes multiple definitions and terms, according to the adopted lens. Smart governance reflects a need to merge together the two dimensions coexisting in the real world: one is the use of computing technologies to establish the infrastructure components (Washburn et al., 2009), used to provide more intelligent, interconnected and efficient public value for residents, businesses, or other users (Meijer and Bolivar, 2016; Pereira et al., 2018), and social governance. Such a socio-technical system is characteristic of all governments providing public services regardless of their level. Thus, e-governance at the operational stratum by using appropriate tools is resulting in the provision of quality public services, and enables citizen satisfaction, while at the managerial stratum, it improves decision-making and increases the transformative capacity of interactions (Finger and Pécoud, 2003). According to (Batty et al., 2012) the internal transformation of government and its increased use of intelligence functions enables the development of smart administration which in turn is capable of coordinating all smart community elements. As for the urban context, smart governance highlights the vital role of citizens in affecting ongoing policymaking as well as co-creating public services and assessing



undertaken projects (Castelnovo et al., 2016). The key role of citizens and facilitating the collaboration between the stakeholders underlays the necessity of developing improved interactions between the network and urban actors (Meijer and Bolivar, 2016; Pereira et al., 2018). According to (Kourtit et al., 2012), smart urban collaboration goes beyond the transformation of government to include proactive and open-minded governance structures, involving all stakeholders to maximize social, economic, and environmental benefits. Smart governance is understood as a such use of ICT which enables solving societal problems and the provision of such public services which in turn results in citizens' quality of life improvement and wellbeing (Ruhlandt, 2018). Some authors stress that transformation results in an incomplete, fragmented understanding of present policies and decision-making. As with any transformation, the public body requires breaking well-established silos and old patterns of decision-making, information exchange, collaboration, and more to quickly and efficiently respond to societal needs. Therefore, adaptive governance plays a vital role in the transformation phase, where much emphasis is put on the effectiveness of responsive mechanisms to the threats posed by digitalization, and satisfaction of human needs (Hatfield-Dodds et al., 2007; Linkov et al., 2018). Finally, ICT and data enable anticipatory capabilities of the government, which may predict the future, and track the progress toward socially desired outcomes (Wiek et al., 2013). Anticipatory governance "is able to harness changes in social, political, and ecological contexts by making informal flexible multi-actor, multilevel, and multi-sectoral coordination possible, as well as combining diverse sources of knowledge to cope with uncertainty" (Normandin, 2019).

2.2. Smart sustainable cities and communities

The concept of smart cities has a range of conceptual variants and a clear understanding that there is no one-size-fits-all definition of smart city (Nam and Pardo, 2011). Although "smart" has a strong focus on the innovations and transformation originated by the application of new technologies, social factors are key elements of smart cities, emphasizing its socio-technical nature (Nam and Pardo, 2011). In this sense, smart cities evolve into smart Communities, encompassing multilevel governance, as well as sustainable and collaborative innovation as an ecosystem driving social benefit realization (Ciasullo et al., 2020). More recently, smart cities have been used as drivers for sustainable development, with the emergence of

the smart sustainable city concept. According to (Viale Pereira and Schuch de Azambuja, 2022, p.6), smart sustainable cities can be defined as "a territory (urban and rural) in continuous transformation, enabled by digital technology and innovation, stakeholder engagement and collaboration, constructing human, institutional and technical capacities to solve problems and create new development opportunities, to raise and maintain the quality of life in communities, and pursuing sustainable development".

Granier (Granier and Kudo, 2016) indicates that in the Japanese conditions the "smart city" and "smart community" are considered synonyms, and the Japanese projects conform better with the concentrated intelligence type of smart city governance, in which resource dependence, social embeddedness, and citizen-centric social governance constitute the smart governance framework where the citizen participation is less significant and limited (Chatfield and Reddick, 2016). A distinct view of the community's role smart city (community) indicates (Ciaffi and Saporito, 2017), according to whom "communities" becomes new social subjects, economic actors and policy-makers, and the ICT power is to be used by the government to create a collaborative governance framework aimed at sustainable use of urban commons. In a similar way, Nam and Pardo, 2011 define smart communities as a fundamental component of smart city and highlight the importance of institutional preparation and community governance to the success of smart community initiatives. Based on a set of international definitions, (Lindskog, 2004 p.3) summarizes that the smart Community concept has "a holistic view and tries to incorporate all the possible aspects and parts involved outgoing from a geographically limited area such as a town, city or region and their citizens" and emphasize the role of ICT as a tool especially to facilitate the involvement of all stakeholders.

3. Methodology

This paper studies the interaction between the concept of smart community and smart governance to elaborate on the role of governance to support local governments in developing smart communities strategies and solutions. The research is conducted in two phases. Firstly, to answer the RQ1, we carried out a systematic literature review to depict the high-quality literature items which address the concept of a smart community. Secondly, we analyze the collected papers in terms of the definition, context, benefits, challenges, and enablers of the smart community. For the systematic review, we adopt the Preferred Reporting Items for



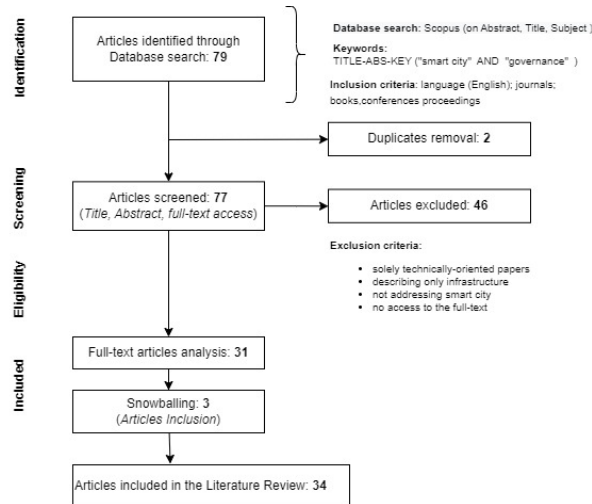


Figure 1. The search process

Systematic Reviews (PRISMA) method (Liberati et al., 2009). Such an approach allows us to clearly depict inclusion and exclusion criteria as well as to illustrate the review process. To cover disciplinary focus, and address high-quality academic papers, we select the Scopus database to run the search. Scopus offers wide coverage of journal publications relevant to the Smart City concept. The detailed process of the search presents Figure 1.

4. Results from the Systematic Literature Review

Section 4.1 presents three perspectives of smart communities definitions, while in the second part of the section we provide a detailed content analysis.

4.1. Smart community definitions

Some technology-driven concepts have the focus on digitizing services and creating online platforms to integrate the different stakeholders in the city. Sealy (2003) approached the concept of smart communities to address the digital divide in (peripheral) rural communities through the use of telecentres that can provide greater access to services to people in rural areas as an e-governance initiative. Chandra and Supangkat (2020) bring the concept of smart communities to groups of people with the same interests that can use technology and Internet of things (IoT) to work together and maximize benefits. In a similar way, Zhou et al. (2021) define smart community with the use and integration of emerging technologies to provide a safe and intelligent living environment for community residents, including a new management and

service mode based on information and intelligence for community management. Ding et al. (2022) elaborates on the smart communities concept in the context of China, as an online platform where people in the community can not only access digital services but also offer services and get involved in the community service process. In a similar way, Choudhuri et al. (2023) define the concept of platform-based public services to enable resource sharing and circular economy as a way to build smart communities and achieve operational efficiency in governance. The involvement of stakeholders is also highlighted by Kudo (2016) as a goal for smart communities in addition to the use of smart grid technologies and conscious behaviour for energy efficiency. Vijaya and Sivraj (2019) also highlights the potential of automation technologies to support smart services that can make the life of people stress-free and contented in their definition of smart communities.

Connecting people through technology is also an important element appearing in many definitions. J. Wang et al. (2018) and Yin et al. (2023) use a more technical definition of smart community to discuss governance and sustainability as a community that applies disruptive technologies such as IoT, cloud computing and big data to digitize and coordinate community residents' daily lives. Smart communities can be seen as networks of people (in general self-directed) responsible for changing a community, creating economic development, and improving quality of life using ICT (Albert and Fetzer, 2005). The community dimension according to Nanni and Mazzini (2014) is composed by a set of subjects operating on the same territory and sharing resources and objectives, and is an important carrier of urban governance Wan and Jiang, 2022. In a similar way, Coe et al. (2001) state that a smart community can vary in size from a neighborhood to a multicounty region (in a defined geographical area) and use technology to transform their region in significant and fundamental ways. Such initiatives support communities to "go online", but especially connecting and integrating local governments, schools, businesses, citizens, and other public sectors to create specific services that address local objectives, help advancing collective skills and capacities (Coe et al., 2001), and identifying shared governance strategies (Ladu et al., 2019). A smart community can be defined as a system where (smart) people and organisations (public and private) use IT in the creation of economic, cultural and social value or for supporting decision-making of actions which are to be implemented by the government or local authorities, to enhance the way that they conduct their everyday business and decisions (Phahlamohlaka

et al., 2015; Zurita et al., 2015). In this sense, smart communities exploit the possibilities offered by IT to undertake decisions that are more conscious and enhance the quality of life of citizens (Lindskog, 2004; for Smart Communities, 2001; Chen et al., 2021). Ciasullo et al. (2020) believes that although the technological focus from the smart cities domain is still eminent, the concept of smart communities focus on institutional factors as integrative element to promote socio-economic development, and, ultimately, increase quality of life in the communities. Guo and Ling (2021) define smart communities as new type of new concept of social governance. S. Wang and Guo (2021) also connect technology and governance in their definition of smart community, stressing the need for stakeholders engagement, calling it "multi-participation", starting with the understanding of peoples needs and further to analyze the leaders of smart communities construction, as a result of new technologies and multi-social governance system. When looking at the role of IT towards sustainable cities, Romanelli (2020a) focuses on the cities managing ICT to better interact with citizens using data, information and knowledge solving problems and highlights the importance of collaborative process and human-centred approaches.

The social aspect of smart communities have been highlighted in many studies. Geng and Du (2021) understand that community can be within a defined (geographic) space but also associated to a shared purpose, being inclusion a key characteristic in this context. Luo et al. (2020) also highlight the importance of solving the problems that people are more concerned about and increasing the general quality of life and happiness for smart communities to be meaningful, and bring the concept of people-oriented that allow to create community humanistic care for instance by allowing aging residents to receive elderly care services in a more convenient and secure way. Geng and Du (2021) elaborate on the concept of smart community governance, which is strongly based on bottom-up approaches (smart citizens), community engagement, and promotion of social inclusion. They propose the concept of volunteer 'smarter communities' based on upon shared interests, identity and values, promoting for instance self-organized communities for people with disabilities in a different level of aggregation as part of a smart city. The authors suggest that this concept grounds urban social innovation in a collaborative relationship between public authorities and citizens, making a distinction between the more data-centric 'smart-city' and the contextually focused 'smart communities'. For Mellouli et al. (2014) to deliver the expected values, smart communities should be grounded in two main

concepts, smart government, as the extensive use of technology by governments and citizens' engagement as the extensive use of technology by citizens to interact with governments.

4.2. Detailed content analysis

Firstly, we would like to present the results of contextual factors' analysis. One of the contextual factors brought by the literature is the purpose of smart community creation. On one hand, community members' purpose is to build relationships which in return enable them to collaborative learning, information, and resource sharing (Phahlamohlaka et al., 2015), on the other hand, the purpose may be understood as a smart integration of distinctive subsystems to create purposeful self-consistent and self-sustaining smart city community (Nanni and Mazzini, 2014). The purposefulness of using social networks through the Internet is diverse in nature ranging from the realization of a common goal, a community forum, networking agreements between local companies, and discussion groups on social or political issues. The purpose of the use is not subject-limited, so it can be formulated both by individuals, groups, associations, and government agencies (Gargiulo et al., 2015). As Ciasullo et al. (2020) state, innovative solutions are to meet important societal challenges. Guo and Ling (2021) formulate four objectives of a smart community, namely 1) harnessing the potential of modern technology, 2) integrating resources; 3) enhancing comprehensive social governance; 4) achieving quality of life and well-being of the residents. Similarly, Ding et al. (2022) expresses four objectives of the smart community, including enabling smart services, provision of smart management and maintenance, provision of smart application platforms, and collecting smart resources. It is emphasized that smart community is of a socio-technical nature (Coe et al., 2001; J. Eger and Maggipinto, 2009; Ciasullo et al., 2020) and their territorial nature (federal, provincial, or a mix thereof) (Coe et al., 2001; Lindskog, 2004), while J. Eger and Maggipinto (2009) stress inter-administrative, inter-subjective and political-institutional levels of interactive communications development. In line with the above, Tang (2022) splits the social side of the smart community focused on the delivery of benefits to the community from communicating network perspective, which utilizes ICT and the device to create a smart governance system which provides smooth management of the community operations in an urban context. At the core of smart



community creation, three sectoral mechanisms emerge 1) the formation of the local private market; 2) the formation and functioning of democratic principles, rules, and procedures of e-government focused on good governance, accountability, transparency, and citizen right protection, and 3) public involvement and participation (Coe et al., 2001; Zurita et al., 2015). As pointed out by S. Wang and Guo (2021), smart community construction results from institutional structure, modern technology, and a multi-social governance system, where either governments or the market may play a leadership role. The importance of smart and social governance in the smart community is stressed by Guo and Ling (2021), S. Wang and Guo (2021), Ciasullo et al. (2020) and Mellouli et al. (2014). According to Guo and Ling (2021) smart community results from a continuous pursuit toward excellence accompanied by social governance, the governance model of the smart community itself is responsible for the provision of various community service systems and operating mechanisms to the residents to meet their needs. The significant determinants of community functioning (social, political, institutional) are gaining importance, which, given the means by which they are used - can be a subject of behavioural modeling (Kudo, 2016; Cappellaro et al., 2019). Smart communities become a relevant source of data for policy-makers, as more citizens reveal their needs which can serve as the input to community-based participatory governance (Ladu et al., 2019). In the urban context, establishing a smart community is aimed at both quality of life promotion among urban communities and the development of mature and environmentally, socially, and economically responsible behavioural models (Gargiulo et al., 2015). Therefore, in a smart community, citizens have the capabilities to participate in decisions, co-create sustainable initiatives and promote conscious behaviours (Cappellaro et al., 2019) The study of Kudo (2016) indicates that smart community focus is primarily on modeling participants' behaviours rather than promoting their e-participation. According to Romanelli (2020a), smart governance based on dialogue supporting engagement, participation, and social inclusion is inevitably chained to smart growth. Finally, some authors point that a smart community is a form of a new digital utopia, where the expression of needs and creation of reality occurs in the digital world (Schneider, 2019). Since smart community may be executed both in real and virtual life, it serves as a means to social inclusion of vulnerable groups. According to Geng and Du (2021), in the urban context, for people with disability smart community may serve as nexus for participation and connection.

Secondly, we present benefits associated to smart community establishment. As Romanelli (2020a) states "cities should evolve as smart communities" as a guarantor and the guardian of democratic and participatory governance occurring among the smart city stakeholders. Cities understood as smart sustainable communities (Tang, 2022) act as facilitators of public value co-creation through the continuous development of human capital and knowledge sources. Hence, smart community benefits are relevant as they may facilitate sustainable urban, social and economic development of cities (Romanelli, 2020a). Moreover, smart communities have the potential of facilitating innovation and decreasing service or product time to market (Phahlamohlaka et al., 2015). The smart community may create the city of the future where a community is organised in such a way that is capable to reinvent itself to knowledge society benefit and develop self-governing capabilities of the residents (J. Eger and Maggipinto, 2009). Smart communities may lead to new revenue streams, improve public administration decisions, and improve quality of life and community decision-making (Zurita et al., 2015) providing safe, comfortable, convenient and intelligent living environment supported by new management and service mode (Zhou et al., 2021). In this sense, a smart community is understood as a smart city enabling citizen empowerment, and improving residents' well-being (Romanelli, 2020a) through constructive interaction between urban ecosystem actors. From a more detailed view, treating smart community creation as a particular smart city initiative, Chandra and Supangkat (2020) point out that smart community offers motivation, psychological support, and knowledge exchange mean for the internship students. It is not insignificant that smart community is strongly supporting the vision of an inclusive city, resulting in three substantive outcomes: engagement, evaluation, and leadership, which are founded by adopting an inclusive approach towards design, ICT and innovation with active participation of NGOs, service providers and vendors (Ladu et al., 2019; Geng and Du, 2021; Romanelli, 2020a).

Thirdly, we examine the challenges associated to smart community development. Albert and Fetzer (2005) indicate three challenges, namely problem-solving and relationship, roles, goal assignment, feedback, and structure. Another issue posed by the literature is both constituency of the leadership as well as the processes to be undertaken in order to establish a smart community (Coe et al., 2001; Gander et al., 2017). Schneider (2019) connects the functioning of a smart community with the development of contemporary surveillance where public administration acts as a creator of social life,



by imposing the definition of the "intelligent" citizen, establishing boundaries for the smart community, and deciding on public value priorities. Therefore, according to the author, those individuals who do not fit the established definition become excluded from the capital and power circuits. This falls in line with Wan and Jiang (2022) who point to the implementation of alienation through smart communities. Challenges associated with this phenomenon are fully benefiting from the internal resources of smart communities and relying on social organizations which are to promote service provision, enhance the mechanism of smart communities and improve smart city management. According to Ciaffi and Saporito (2017) achieving benefits from a smart community is to be supported by the capacity of administrative bodies to achieve intelligent democracy, empowering local knowledge and sharing tasks and responsibilities. The distributional dimensions of collective intelligence as challenges of the smart community are present in the literature for some time (Coe et al., 2001). As Cappellaro et al. (2019) indicate, smart community reflects the social dynamic, which in turn, in relation to the complex and unpredictable nature of human behaviour, may firstly not bring the intended outcomes and secondly, result in unintended outcomes, and the mismatch between community construction and residents' needs, lack of facilities, or inadequate utilization Geng and Du, 2021. Ciasullo et al. (2020) stress that so far, no framework for decision-making in smart communities has been established, and no aware policies for defining social context relevance in policy-making strategies exist. Therefore, the challenge is to establish the appropriate association between behaviour and both affective and cognitive elements concerning community benefits, such as individual and collective advantage, cost benefits, efficiency, convenience, security, enjoyment, utility, well-being, and needs satisfaction (Gargiulo et al., 2015). S. Wang and Guo (2021) point out that the construction of a smart community is to be supported by a bottom-up social governance system and the reformulation of governance towards innovation and adaptability. Moreover, Guo and Ling (2021) state such smart communities which are established solely in the technological dimension may inhibit both their further progress and intelligent development of social governance. Geng and Du (2021) reveal several challenges embodied in smart community governance such as information islands, lack of integration and distribution of community resources, and lack of self-government awareness of community residents. Yin et al. (2023)) add to this catalog mismatching demands, shortage of funds, and insufficient residents' participation. Therefore,

according to Tang (Tang, 2022) the main challenge is to establishment of efficient information systems particularly communication networks which must address all residents' needs. Yet as pointed out by Phahlamohlaka et al. (2015) one of the challenges depicted by the literature is the digital divide, which results in limited or no access to the smart community for vulnerable groups, which requires accurate monitoring, intimate service and visual talk-time, trusteeship and guidance (Tang, 2022). Finally, Gander et al. (2017)) formulate three challenges of smart community creation: complexity - related to a high number of stakeholders, focus - related to aligning separate and automated information systems into a smart community under one governance framework, and momentum - relying on capability to establish a governance structure, collecting residents' needs, deliberate the shared and community-tailored vision.

Finally, we present the enablers of smart communities creation. The foundational paper of Coe et al. (2001) on smart communities defines two prerequisites to effective smart community creation and functioning, which are: 1) collective intelligence, and 2) effective social learning. J. Eger and Maggipinto (2009) stress establishing interoperability and interconnectivity of various networks establishing a smart community. Zurita et al. (2015) presents more detailed prerequisites for a crowdsensing platform including a new geo-localized social model to profile users, and algorithms to select residents for involvement and to assess the algorithm performance. In a similar tone Tang (2022) formulates conditions for a smart community, including: a) adaptability to the local economy and broadband economy; b) balancing community characteristics and traditions, and c) investment in human capital. Albert and Fetzer (2005) indicate leadership, which ensures community champion begins the initiative, institutionalizing collaboration, managing partnerships and relations across a smart community ecosystem, and provision of human capacities. However, since a smart community connects various stakeholders with various aims, values, and sometimes conflicting interests, a shared vision backed by an informal social governance mechanism becomes a main prerequisite to smart community establishment (Chatfield and Reddick, 2016; Romanelli, 2020b). The local character of such an arrangement should reflect smart community uniqueness and specific challenges to overcome locally-based impediments and be founded on good governance principles (Gander et al., 2017). Understanding residents' needs, values, motivations, interactions and analysis is a prerequisite for smart community construction (S. Wang and Guo,



2021), which will solve urban, community-based problems and satisfy community needs (Wan and Jiang, 2022). Yet, ensuring the effectiveness of the above depends on smart community evaluation (J. Wang et al., 2018). Yet, over the years a value-based approach toward smart community emerged from the literature review (Phahlamohlaka et al., 2015). A smart community is no longer regarded as the simple IT capability offered to the community but as a means to the creation of substantial value for the community. As a prerequisite to this objective, the capabilities among the users are to be in place, to provide a wide range of possibilities to create value and improve the quality of life and well-being of the community (Ding et al., 2022) through continuous, active, network-based collaboration and participation. Therefore, training and continuous support offered to the community becomes vital (Phahlamohlaka et al., 2015; Ciasullo et al., 2020). Finally, another prerequisite that emerges from a new understanding of the smart community role is trust. As pointed out by Kudo (2016) trust factor is inevitably related to the public value co-creation, citizen participation, and accompanying behavior change.

5. Discussion and Conclusions

Trying to understand how the smart community has advanced in the last two decades, referring to RQ1, we have discovered that the concept of smart communities has grown in different streams: technology-driven concepts, technology as a means of networking and collaboration, and sustainable development and social innovation. While some authors consider it as part of the smart cities concept (Nanni and Mazzini, 2014), others highlight the importance to differ the smart community concept from the smart city one, and elaborate a strategy to subdivide cities into smaller communities to facilitate the formation of an intelligent community (Tang, 2022). Despite not being a unified concept, smart communities are essential for the development of smart cities and regions worldwide (Zhou et al., 2021; Wan and Jiang, 2022). According to Ciasullo et al. (2020), smart cities evolve into smart communities, encompassing multilevel governance in addition to sustainable and collaborative innovation as an ecosystem driving social benefit realization. In this way, the construction and development of smart communities should adhere to sustainable development (Wan and Jiang, 2022; Guo and Ling, 2021) and promote the city of the future (J. M. Eger, 2005). According to Tang (2022), as the construction of smart communities is still in a very early stage of development, there is an urgent need for them to use Information Technology (IT) to design a governance

system that will integrate social and technical elements to enhance the operation and stability of intelligent communities. However, this was already seen as a driver a decade ago, with the need to redefine smart communities as layered systems in which multi-level governance is required (Vargo and Lusch, 2011; Spohrer et al., 2012). Granier and Kudo (2016) also connect the governance element in smart cities to the term smart community, underscoring the importance of community and citizens' participation.

Referring to RQ2, to understand the role of governance in supporting the development of smart communities, the review highlights that some conceptualizations of smart communities had a more technical perspective that evolved towards a socio-technical concept, being ICT a mediator to behaviour change. In some definitions, technology was the end, not the mean, and the goal was to create online platforms and digital services, which evolved towards creating a network of people through technology and finally to use digital technologies as means for improving decision-making and citizen-centricity, as well as promoting social governance. In order to reap the benefits of the smart community, it is necessary not only to adapt social and smart governance to ICT means but also to ensure that the patterns happening within the social realm of a smart city are more closely represented in the solutions adopted, in AI algorithms and in smart city performance assessment. Beyond well-known functions such as interoperability, interconnectivity, and collective intelligence provided by the literature, smart governance mechanisms ought to fulfill a prominent role in adaptation to local societal context and stimulate collaboration among the actors within the ecosystem, and foster stakeholders' behavior. Hence, in the smart community concept, the smart governance idea is therefore embodied by such a deliberate and purposeful use of technology which reflects people's present and future needs, community values, and constraints (e.g., education, disability, digital divide), applying intelligent mechanisms to motivate, boost community and stakeholder interactions, or provide social learning. Recent studies point to the new research aims focused on investigating inter-occurrence between trust, behavior change, participation, and engagement. So far, the studies conducted on smart communities do not provide clear conclusions allowing to development of governance frameworks to stimulate citizen participation and achieve desired outcomes in terms of social, economic, and environmentally responsible behavioral change.

One of the main limitation of this study is that the search process includes only English text, therefore



challenges and enablers of the smart community may differ as global north and global south. A different combination of keywords or using different databases would bring a broader outlook and more diversity-oriented perspectives on the field. Since the contextual differences are relevant to both smart community and smart governance, and that local government may vary in different countries, future work can focus on exploring such factors.

References

- Albert, S. R., & Fetzer, R. C. (2005). Smart community networks: Self-directed team effectiveness in action. *Team Performance Management: An International Journal*, 11(5/6), 144–156.
- Bank, W. (1994). *Governance: The world bank's experience*.
- Batty, M., Axhausen, K. W., Giannotti, F., Pozdnoukhov, A., Bazzani, A., Wachowicz, M., Ouzounis, G., & Portugali, Y. (2012). Smart cities of the future. *The European Physical Journal Special Topics*, 214, 481–518.
- Cappellaro, F., Chiarini, R., Meloni, C., Snels, C., et al. (2019). Smart community co-creation: The case of centocelle project. *International Journal of Sustainable Energy Planning and Management*, 24, 155–162.
- Castelnovo, W., Misuraca, G., & Savoldelli, A. (2016). Smart cities governance: The need for a holistic approach to assessing urban participatory policy making. *Social Science Computer Review*, 34(6), 724–739.
- Chandra, Y. U., & Supangkat, S. H. (2020). Smart community model using togaf to help higher education students on internship program. *2020 International Conference on ICT for Smart Society (ICISS)*, 1–6.
- Chatfield, A. T., & Reddick, C. G. (2016). Smart city implementation through shared vision of social innovation for environmental sustainability: A case study of kitakyushu, japan. *Social Science Computer Review*, 34(6), 757–773.
- Chen, W., Xu, C., Yuan, S., & Chen, P. (2021). Study on the application of the digitalization and information technology of community governance in the post-epidemic era. *2021 2nd International Conference on Information Science and Education (ICISE-IE)*, 157–160.
- Choudhuri, B., Srivastava, P. R., Mangla, S. K., & Kazancoglu, Y. (2023). Enterprise architecture as a responsible data driven urban digitization framework: Enabling circular cities in india. *Annals of Operations Research*, 1–29.
- Ciaffi, D., & Saporito, E. (2017). Shared administration for smart cities. In E. Riva Sanseverino, R. Riva Sanseverino, & V. Vaccaro (Eds.), *Smart cities atlas: Western and eastern intelligent communities* (pp. 243–248). Springer International Publishing. https://doi.org/10.1007/978-3-319-47361-1_10
- Ciasullo, M. V., Troisi, O., Grimaldi, M., & Leone, D. (2020). Multi-level governance for sustainable innovation in smart communities: An ecosystems approach. *International Entrepreneurship and Management Journal*, 16, 1167–1195.
- Coe, A., Paquet, G., & Roy, J. (2001). E-governance and smart communities: A social learning challenge. *Social science computer review*, 19(1), 80–93.
- Ding, J., Xu, J., Weise, T., & Wang, H. (2022). Community services and social involvement in covid-19 governance: Evidence from china. *International Journal of Environmental Research and Public Health*, 19(22), 15279.
- Eger, J., & Maggipinto, A. (2009). Technology as a tool of transformation: E-cities and the rule of law. In *Information systems: People, organizations, institutions, and technologies: Itais: The italian association for information systems* (pp. 23–30). Springer.
- Eger, J. M. (2005). Smart communities, universities, and globalization: Educating the workforce for tomorrow's economy. *Metropolitan Universities*, 16(4), 28–38.
- Finger, M., & Pécoud, G. (2003). From e-government to e-governance? towards a model of e-governance. *Electronic Journal of E-government*, 1(1), pp52–62.
- for Smart Communities, C. I. (2001). *Smart communities guide book*.
- Gander, B., Lazenby, B., Duffett, C., Richards, G., Hoddenbagh, M., Kristmanson, M., Dusome, R., Linkletter, S., & Cohn, S. (2017). Seizing the initiative. In T. M. Vinod Kumar (Ed.), *Smart economy in smart cities: International collaborative research: Ottawa, st.louis, stuttgart, bologna, cape town, nairobi, dakar, lagos, new delhi, varanasi, vijayawada, kozhikode, hong kong* (pp. 157–167). Springer Singapore. https://doi.org/10.1007/978-981-10-1610-3_5
- Gargiulo, C., Natale, A., & Russo, L. (2015). Smart community for the smart governance of the urban environment. *2015 IEEE First International Smart Cities Conference (ISC2)*, 1–6.
- Geng, Q., & Du, Y. (2021). From blockchain to digital twin community: A technical framework for smart community governance. *2021 International Conference on Public Management and Intelligent Society (PMIS)*, 277–280.
- Granier, B., & Kudo, H. (2016). How are citizens involved in smart cities? analysing citizen participation in japanese “smart communities”. *Information Polity*, 21(1), 61–76.
- Guo, J., & Ling, W. (2021). Impact of smart city planning and construction on community governance under dynamic game. *Complexity*, 2021, 1–11.
- Hatfield-Dodds, S., Nelson, R., & Cook, D. C. (2007). *Adaptive governance: An introduction and implications for public policy* (tech. rep.).
- Heeks, R. (2001). Building e-governance for development: A framework for national and donor action.
- Kooiman, J. (1999). Social-political governance: Overview, reflections and design. *Public Management an international journal of research and theory*, 1(1), 67–92.
- Kourtit, K., Nijkamp, P., & Arribas, D. (2012). Smart cities in perspective—a comparative european study by means of self-organizing maps. *Innovation: The European journal of social science research*, 25(2), 229–246.
- Kudo, H. (2016). Co-design, co-creation, and co-production of smart mobility system. *Cross-Cultural Design: 8th International Conference, CCD 2016, Held as Part of HCI International 2016, Toronto, ON, Canada, July 17-22, 2016, Proceedings* 8, 551–562.
- Ladu, M., Balletto, G., & Borruo, G. (2019). Sport and smart communities. assessing the sporting attractiveness and community perceptions of cagliari (sardinia, italy). *Computational Science and Its Applications—ICCSA 2019: 19th International Conference, Saint Petersburg, Russia, July 1–4, 2019, Proceedings, Part VI* 19, 200–215.
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., Clarke, M., Devereaux, P. J.,



- Kleijnen, J., & Moher, D. (2009). The prisma statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *Annals of internal medicine*, 151(4), W–65.
- Lindskog, H. (2004). Smart communities initiatives. *Proceedings of the 3rd ISOneWorld Conference*, 16, 14–16.
- Linkov, I., Trump, B. D., Poinette-Jones, K., & Florin, M.-V. (2018). Governance strategies for a sustainable digital world. *Sustainability*, 10(2), 440.
- Luo, M., Hou, Y., Liu, Y., & Xu, W. (2020). Impact of smart community on resource accessibility: A case study in shanghai. *2020 Chinese Automation Congress (CAC)*, 5981–5984.
- Meijer, A., & Bolívar, M. P. R. (2016). Governing the smart city: A review of the literature on smart urban governance. *International review of administrative sciences*, 82(2), 392–408.
- Mellouli, S., Luna-Reyes, L. F., & Zhang, J. (2014). Smart government, citizen participation and open data. *Information Polity*, 19(1-2), 1–4.
- Mersand, S., Gasco-Hernandez, M., Udoh, E., & Gil-Garcia, J. R. (2019). Public libraries as anchor institutions in smart communities: Current practices and future development.
- Misuraca, G., & Viscusi, G. (2015). Shaping public sector innovation theory: An interpretative framework for ict-enabled governance innovation. *Electronic Commerce Research*, 15, 303–322.
- Nam, T., & Pardo, T. A. (2011). Conceptualizing smart city with dimensions of technology, people, and institutions. *Proceedings of the 12th annual international digital government research conference: digital government innovation in challenging times*, 282–291.
- Nanda, V. P. (2006). The “good governance” concept revisited. *The ANNALS of the American academy of political and social science*, 603(1), 269–283.
- Nanni, S., & Mazzini, G. (2014). From the smart city to the smart community, model and architecture of a real project: Sensornet. *Journal of Communications Software and Systems*, 10(3), 188–194.
- Normandin, J.-M. (2019). Adaptive governance for incoming disruptive technology: Public innovation under constraint. *International Conference on Public Policy (ICPP4)*.
- Pereira, G. V., Parycek, P., Falco, E., & Kleinhans, R. (2018). Smart governance in the context of smart cities: A literature review. *Information Polity*, 23(2), 143–162.
- Phahlamohlaka, J., Dlamini, Z. I., Malinga, L., Ngobeni, S., & Mnisi, T. (2015). A practise-based theory of seidet smart community centre model. *2015 IEEE International Symposium on Technology and Society (ISTAS)*, 1–9.
- Rakesh, R., Cheikhrouhou, N., & Manoj, K. (2017). Sustainability in the banking industry: A strategic multi-criterion analysis. *Business strategy and the environment*.
- Rhodes, R. A. (1994). The hollowing out of the state: The changing nature of the public service in britain. *The Political Quarterly*, 65(2), 138–151.
- Romanelli, M. (2020a). Analysing the role of information technology towards sustainable cities living. *Kybernetes*, 49(7), 2037–2052.
- Romanelli, M. (2020b). Rediscovering urban smart communities. In D. Cagaňová & N. Hornáková (Eds.), *Mobility internet of things 2018* (pp. 381–388). Springer International Publishing.
- Ruhlandt, R. W. S. (2018). The governance of smart cities: A systematic literature review. *Cities*, 81, 1–23.
- Schneider, F. (2019). Digital smartness: Rethinking communities and citizenship in the face of ‘smart’ technology. *Asiascape: Digital Asia*, 6(3), 152–159.
- Sealy, W. U. (2003). Empowering development through e-governance: Creating smart communities in small island states. *The International Information & Library Review*, 35(2-4), 335–358.
- Spohrer, J., Piciocchi, P., & Bassano, C. (2012). Three frameworks for service research: Exploring multilevel governance in nested, networked systems. *Service Science*, 4(2), 147–160.
- Tang, J. (2022). Design and research of intelligent community management system based on intelligent internet of things. *Mobile Information Systems*, 2022.
- UN-Habitat, U. (2021). Sdg indicator metadata.
- Vargo, S. L., & Lusch, R. F. (2011). It’s all b2b... and beyond: Toward a systems perspective of the market. *Industrial marketing management*, 40(2), 181–187.
- Viale Pereira, G., & Schuch de Azambuja, L. (2022). Smart sustainable city roadmap as a tool for addressing sustainability challenges and building governance capacity. *Sustainability*, 14(1), 239.
- Vijaya, D. R., & Sivraj, P. (2019). Communication network with interoperable communication architecture for smart community. *2019 4th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT)*, 1425–1430.
- Wan, L., & Jiang, S. (2022). Research on the influencing factors of sustainable development of smart community. *Mathematical Problems in Engineering*, 2022.
- Wang, J., Ding, S., Song, M., Fan, W., & Yang, S. (2018). Smart community evaluation for sustainable development using a combined analytical framework. *Journal of Cleaner Production*, 193, 158–168.
- Wang, S., & Guo, Y. (2021). Research on construction and optimization of smart community in china. *2021 2nd International Conference on Big Data Economy and Information Management (BDEIM)*, 524–528.
- Washburn, D., Sindhu, U., Balaouras, S., Dines, R. A., Hayes, N., & Nelson, L. E. (2009). Helping cios understand “smart city” initiatives. *Growth*, 17(2), 1–17.
- Weiss, T. G. (2000). Governance, good governance and global governance: Conceptual and actual challenges. *Third world quarterly*, 21(5), 795–814.
- Wiek, A., Guston, D., van der Leeuw, S., Selin, C., & Shapira, P. (2013). Nanotechnology in the city: Sustainability challenges and anticipatory governance. *Journal of Urban Technology*, 20(2), 45–62.
- Yin, J., Wang, J., Wang, C., Wang, L., & Chang, Z. (2023). Critic-topsis based evaluation of smart community governance: A case study in china. *Sustainability*, 15(3), 1923.
- Zhou, J., Zheng, Y., & Yang, Q. (2021). Smart community construction system architecture based on five-viewing demands. *2021 7th International Conference on Computer and Communications (ICCC)*, 879–883.
- Zurita, G., Pino, J. A., & Baloian, N. (2015). Supporting smart community decision making for self-governance with multiple views. *Ubiquitous Computing and Ambient Intelligence. Sensing, Processing, and Using Environmental Information: 9th International Conference, UCAmI 2015, Puerto Varas, Chile, December 1-4, 2015, Proceedings 9*, 134–143.

