Fostering citizens' engagement in smart city within digital era

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Abstract. Digital instruments, devices, and platforms are exerting a transformative influence on trends and dynamics within socio-economic assets. This evolution leads to the emergence of novel configurations, exemplified by the concept of Smart Cities. It is crucial to comprehend and effectively manage the associated challenges, risks, and opportunities to ensure the viability of socio-economic configurations. This necessitates a paradigm shift in managing and addressing the relationships that form the backbone of these configurations. Given the ongoing evolution in socio- economic landscapes, this paper zeroes in on the imperative to reassess established approaches to citizens' engagement in Smart City within Digital Era. By centring attention on the domains of technology readiness and the digital gap, the paper introduces a conceptual model grounded in the interpretative framework provided by Viable Systems Approach. This model serves to delineate key pillars for reflection and action, guiding the exploration of new pathways and processes aimed at amplifying citizens' engagement in Smart City within Digital Era.

1 Introduction

In light of the rapid influence exerted by digital devices, instruments, and platforms on socio-economic assets and configurations, it becomes imperative to recognize our current position within a paradigmatic transition. This transition gives rise to new rules, patterns, and behaviours [1, 2, 3, 4]. The emergence of the Smart City, rather than being a mere challenge for contemplation, is now an undeniable reality that socio-economic organizations must grasp and manage [4, 5, 6].

Over the past decade, digital instruments and technologies have undergone a transformative evolution, shifting from an 'instrumental' focus primarily on improving efficiency, effectiveness, and sustainability in well-established processes to a 'innovative' orientation and 'strategic' influence. This creative perspective engenders new socio-economic configurations and establishes novel rules for socio-economic relations [1, 6]. Traditional approaches to business management are increasingly proving inadequate in encapsulating emerging socio-economic trends driven by digital evolution, thereby presenting new challenges for managerial studies [8].

Foremost, the Smart City paradigm facilitates the proliferation of exponential relations among actors with diverse expectations, needs, and knowledge [9, 10, 11]. While often perceived as an opportunity within the context of digital evolution and the advent of Smart Cities [11], it conceals unexpected risks [13]. Actors within the socio-economic landscape are increasingly inclined to approach digital technologies as a means of fulfilling personal needs without a comprehensive understanding of the underlying processes [14, 15].

Although collaborations and participation in socio-economic configurations may appear to be on the rise [16], they are often built on lower levels of interest and engagement [17].

The ease of access to knowledge and information through digital devices diminishes the value of these critical resources, thereby reducing actors' motivation to invest time and resources in acquiring them [18, 19]. The growing trend of data sharing diminishes actors' engagement in generating and acquiring structured knowledge, given the rapid identification of solutions to simple problems [5, 20]. Consequently, a pervasive 'free riding' approach seems to be emerging in socio-economic relations, with actors displaying decreased interest in developing long-term relationships and investing resources in creating conditions for cognitive and knowledge alignment essential for effective collaboration and value (co)creative processes.

Recognizing the dynamic nature of the contemporary landscape, this paper strives to transcend the prevalent reductionist and instrumental perspective that regards Smart Cities and Digital platforms merely as collections of technologies aimed at enhancing efficiency within frameworks defined by outdated paradigms [21]. Instead, the paper proposes a paradigm shift, asserting that a Smart City is not merely a renovated, technologically advanced iteration of a traditional city adhering to established rules and pathways. Rather, it represents an entirely novel domain, necessitating fresh approaches, logics, and perspectives to effectively engage stakeholders and develop appropriate managerial strategies and strategic plans. In such a vein, the paper enlarges the perceptive investigating how the approach to stakeholder engagement is adapting to the challenges posed by the ongoing digital transition in the context of Smart Cities. The objective is to identify key pillars for reflection, re-evaluate established approaches, and pinpoint new processes and paths for value (co)creation. Subsequent sections outline the theoretical background (Section 2), depict the interpretive lens and observational framework (Section 3), present a conceptual model for rethinking citizens' management in the digital era with a focus on Smart Cities (Section 4), and conclude with final remarks, implications, and potential next phases of the ongoing research (Section 5).

2 Theoretical background

2.1 Framing Stakeholder Engagement using Smart City perspective

Smart City initiatives hold the promise of being the first genuinely human-centered and technology-driven socio-economy configuration, poised to exert a substantial impact on both the economy and the lives of citizens [22, 23]. To realize this ambitious social and economic vision, it becomes imperative to seamlessly integrate the digital (or cyber) space with the physical space [25].

The concept of a Smart City is broad and open to various interpretations that may carry a subjective element. Hence, the exploration of new conceptual interpretations is essential for comprehending the associated challenges and opportunities. Despite numerous scholarly efforts in recent years [26, 27, 28], research is still in its infancy, primarily due to the recent introduction of the term. In such a vein, [29] proposed a fresh interpretation of the challenges and opportunities of Society 5.0, positing that these are crucial for the transition to cyber-physical-social systems no longer reliant on 5G mobile networks (industry verticals) but rather on 6G mobile networks, which are more human-centered systems. In this context, foundational technologies for enabling human-robot interactions, such as blockchain and AI, are identified as indispensable also in the domain of Smart Cities for the creation of decentralized autonomous organizations—entities where humans and robots collaborate on both creative and non-creative activities.

This paradigmatic shift is undoubtedly impacting the dynamics of interactions between Smart Cities and their stakeholders [30]. In contrast to the consolidated and outmoded approach to digital transition, which places technologies at the centre of organization-stakeholder interactions, the Smart City concept prioritizes human beings [31]. This transition to a 'we society' (human-cantered), as opposed to an 'I society' (market-based), will play a significant role in shaping how organizational stakeholders can be engaged [22, 23]. The stakeholder engagement concept rests on the premise that for organizations to extract maximum economic and social value from interactions with stakeholders, it is crucial to include them in and involve them in organizational activities [32].

The inclusive perspectives of both Smart City initiatives and stakeholder engagement hold great promise for ensuring organizations' sustainability over time, as they work towards diminishing the distances between organizations and marginalized stakeholders [33]. Marginal stakeholders, typically excluded from engagement strategies due to their perceived minimal threat to value creation [34], are now brought into focus with the Smart City approach. Embracing the principles of Smart Cities and the imperative to facilitate organization-stakeholder interactions in cyber-physical-social systems, engaging all stakeholders becomes pivotal. The new technologies can facilitate this by promoting human-robot collaboration [35], leveraging stakeholders' capabilities [36], and creating human digital twins [37].

In essence, Smart Cities have the potential to elevate value creation and stakeholder engagement by enhancing the three stakeholder engagement dimensions recognized by [38]: 'jointness of interest,' 'cooperative strategic posture,' and 'rejection of a narrowly economic view of the firm.' This approach enables organizations to create shared value with their stakeholders [39], engaging them as a unified entity within the conceptual framework of Smart Cities. Such an approach not only fosters an 'inclusive business model' [40] but also unlocks unprecedented potential for 'corporate social innovation' [41], designed to address social problems alongside more traditional business-related goals.

2.2 Technology Readiness and Digital Gap in Smart City domain

As previously articulated, the core of the Smart City concept lies in the synergy between technology and people [31]. Consequently, comprehending the technological readiness and addressing the digital gap among citizens in the Smart City framework becomes imperative to discern barriers to value creation in this novel paradigm. Given the multifaceted nature of Smart City participants, including individuals, institutions, and organizations, an in-depth analysis of the technological readiness within each category is crucial to assess the preparedness required to maximize benefits in the context of Smart City initiatives.

Broadly conceptualized, technology readiness in the context of Smart City initiatives refers to the capacity of individuals, systems, or organizations to confront a situation and execute a planned set of actions [42]. Therefore, it is imperative that those engaging with the highly technological landscape of Smart Cities possess a commendable level of technological proficiency [1].

In a broader sense, technology is construed as the application of novel scientific knowledge to create valuable and replicable processes and procedures. Contemporary technologies heavily feature a significant digital component and necessitate substantial investment in intellectual capital for effective user exploitation [43]. Hence, comprehending the digital gap among users—encompassing their understanding, willingness to adopt Advanced Digital Technologies, and inclination toward value co-creation—is crucial [44]. Closing this digital gap assumes greater importance, especially given that the Smart City model aspires to cultivate a 'super intelligent society,' wherein individuals can create value

anytime and anywhere within a secure and natural environment, devoid of current limitations [45].

Considering the foundational tenets of Smart City initiatives, it can be construed as a systemic configuration necessitating revolutionary digital breakthroughs, prompting reorganization at all levels, and restructuring relationships among all actors from a digital perspective. The rapid transition toward Smart Cities accentuates the digital gap, particularly in terms of the digital divide, recognized as a critical consequence of this transformative concept.

3 Interpretive lens and observational framework

For a long time, management and business studies have been significantly influenced by the imperative to examine socio-economic configurations and trends through a cause-and-effect logic [46, 47]. This inclination has been driven by the overarching need to delineate replicable models and generalizable best practices applicable across diverse organizational contexts [48]. However, over the past four decades, this approach and its underlying rationale have demonstrated an increasing inadequacy to align with the rapidly evolving dynamics of the socio-economic landscape [49]. Faced with the escalating variety and variability in socio-economic settings, there has been a renewed and reinforced interest in systems thinking. This approach serves as a comprehensive interpretative framework focused on analysing how organizations endure over time as a consequence of interactions among their components and with the external environment [27, 50, 51, 52].

Amidst the numerous research streams and conceptual frameworks within systems thinking, the Viable Systems Approach (VSA) emerges as a particularly effective interpretative framework offering a holistic perspective for organized entities seeking viability over the time [53, 54, 55]. Through a blend of structural-static and systemic-dynamic representation, the VSA facilitates a nuanced understanding of the crucial role that internal and external interactions play in ensuring organization's survival, without neglecting the structural components that form its foundation [56, 57].

Specifically, the VSA provides a platform for exploring relationships among multiple actors through the three drivers of the Information Variety Model [58]:

- *Information Units*: The total amount of data an organization can collect.
- *Interpretation Schemes*: The ways in which collected data are organized into a usable set, influenced by interpretative rules.
- *Categorical Values*: The strong beliefs motivating organizations' behaviours and decisions over time.

Combining these drivers allows a comprehensive understanding of why actors can (or cannot) establish collaborative relations [59]. In this context, the interpretative contributions offered by the *Information Variety Model* can be leveraged to re-evaluate and redefine the dimensions on which Citizens' Engagement is based. This approach helps comprehend how these dimensions are evolving and identifies the dynamic and unpredictable ways they should be managed, particularly in the era of Smart Cities.

4 A possible path for promoting citizens' engagement in the Smart City

The rapid transformation of socio-economic organizations, driven by the opportunities presented by the widespread adoption of digital technologies, is giving rise to numerous challenges in defining and implementing effective managerial and business models [36, 60]. As elucidated in preceding sections, digital technologies are fundamentally altering the

dynamics of actor interactions within established configurations while simultaneously catalysing the emergence of new and unfamiliar structures [61, 62].

Within the diverse domains exploring the impact of digital technologies and the evolution towards the Smart City, the concept of citizens' engagement is experiencing an escalating need for innovative explanatory and managerial models [4]. Traditional approaches, aimed at fostering enduring relationships between companies and stakeholders through information sharing, participation, and market exploration, appear inadequate in comprehending the evolving trends in stakeholder behaviours and decisions [63]. In response to these challenging trends, citizens' engagement requires a strategic reassessment, introducing new variables and conceptual domains. Consequently, there is a compelling need to shift attention from traditional components to ensure the emergence of a holistic view that explains how multiple actors interact, fostering reciprocal influences in subjective environments [64, 65].

This paradigm shift is achievable through the application the Information Variety Model developed within the Viable Systems Approach studies. Thanks to this Model, it is possible to reinterpret the three stakeholder engagement dimensions recognized by [38]. Specifically:

- *Jointness of Interest:* Can be analysed in terms of shared and shareable Categorical Value to enhance stakeholders' comprehension of the company's vision.
- *Cooperative Strategic Posture:* Demands the development of common Interpretation Schemes, enabling stakeholders and companies to accord relevance to the same critical elements in a dynamic environment.
- *Rejection of a Narrowly Economic View:* Rooted in the development and sharing of a broad range of common Information Units used by both cities and citizens to construct a subjective and holistic representation of dynamics and contexts.

Moreover, utilizing the Information Variety Model [58] to analyse and explain stakeholder engagement dimensions [38] offers an opportunity to depict three strategic scenarios, providing potential actions to promote citizens' engagement in the era of the Smart City, as illustrated in Figure 1.

As shown in Figure 1, the three drivers of the Information Variety Model [58] and the three dimensions of stakeholder engagement [38] can be connected in a three-dimensional conceptual model. Each pair of dimensions defines a strategic domain for promoting Citizens' Engagement:

- *Information Alignment*: Derives from the combination of 'cooperative strategic posture' and 'rejections of a narrowly economic view,' observed and analysed in terms of 'Interpretative Schemes' and 'Information Units.' It involves strategic actions on the total amount of data available to citizens and cities for evaluating reciprocal behaviours and actions.
- *Interpretative Alignment*: Derives from the combination of 'cooperative strategic posture' and 'jointness of interest,' observed and analysed in terms of 'Interpretative Schemes' and 'Categorical Value.' It necessitates defining a common observing view between cities and citizens through educational processes and the definition of shared languages.
- *Cognitive Alignment*: Derives from the combination of 'jointness of interest' and 'rejections of a narrowly economic view,' observed and analysed in terms of 'Categorical Value' and 'Information Units.' It involves defining common 'inspiring elements' to stimulate citizens and cities to accord the same relevance to common aims and purposes.

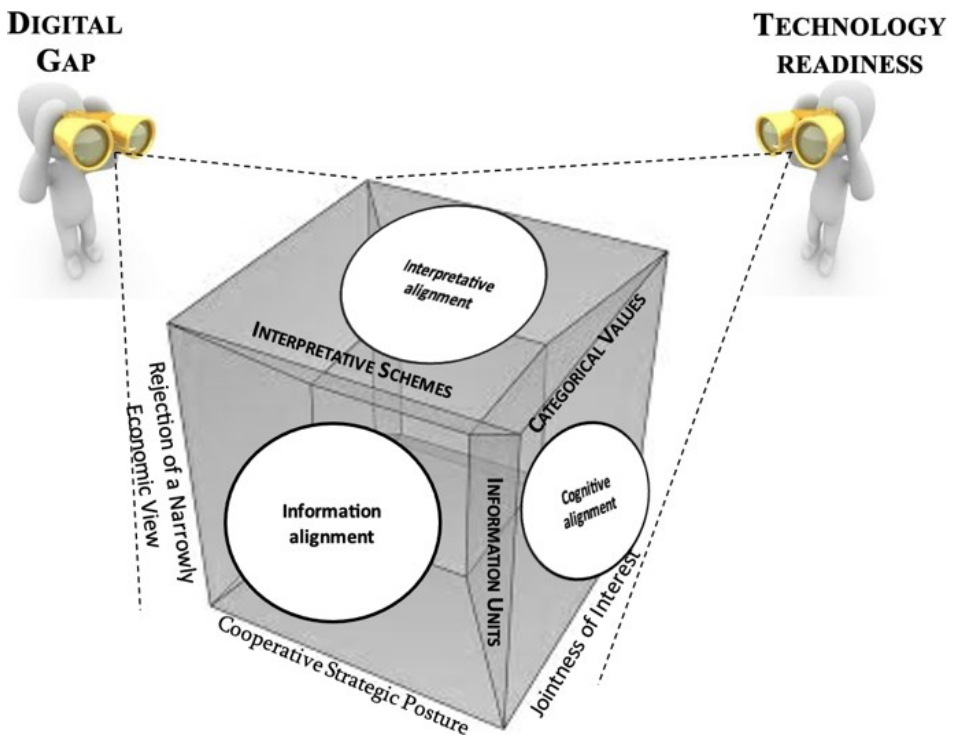

Figure 1: A conceptual model for depicting the area of Citizens' Engagement within the Smart City. Source: Author's elaboration

The proposed conceptual model also sheds light on the elements influencing the correct actions and smart decisions within the three analysed domains (*Information Alignment, Interpretative Alignment, Cognitive Alignment*). Specifically:

- *Digital Gap*: Defines the boundaries of the field in which strategic actions are required in cases where conditions for Information (dis)Alignment and Interpretative (dis)Alignment exist. Technologies play a pivotal role in ensuring effective reciprocal understanding among the actors involved. To achieve this, all actors should possess the necessary skills through an extensive approach to educational programs.
- *Technology Readiness*: The level at which Citizens' Engagement is analysed in cases where conditions for Interpretative (dis)Alignment and Cognitive (dis)Alignment exist. In such configurations, both citizens and cities need to act on the definition of a shared body of knowledge to deeply understand the contributions that digital technologies can provide in defining common and shared strategies and actions.

In summary, the proposed conceptual model provides a strategic framework for understanding where and how to strategically promote in Smart City within Digital Era, highlighting the pivotal role of knowledge and skills in ensuring Information Alignment, Interpretative Alignment, and Cognitive Alignment for effective, suitable, and long-term oriented citizens' engagement.

5 Conclusions, implications, and future directions for the research

Recognizing the imperative to redefine stakeholder engagement in response to the escalating influence of digital technologies, this study contributes to the existing literature

by presenting a conceptual model aimed at identifying domains and processes to promote Citizens' Engagement in Smart City within Digital Era.

From a theoretical standpoint, this study enriches the current literature by making an initial attempt to contextualize stakeholder engagement within the framework of Smart Cities. While numerous recent studies on this topic have been empirical, they were often limited to specific geographic areas [66, 67]. Consequently, the generalizability of their results is constrained by the contextual specifics of their investigations, including factors like the level of economic development, gross annual income, and digital literacy. Furthermore, while some research acknowledges the role of citizens as a central pillar in the development of Smart Cities, none explicitly addresses the need to discover innovative ways to effectively engage citizens to maximize the economic and social value of the transition to a smarter society.

This critical point poses a significant challenge for management, carrying several implications from a managerial perspective. Without a profound understanding of how to attain citizens' engagement in a turbulent and dynamic environment, future engagement strategies are likely to fall short of their objectives. By adopting the broad and holistic perspective of the conceptual model presented here, organizations stand a better chance of success in the context of Smart Cities. Not adopting such lenses may lead to underestimating the impact of digital readiness and the digital gap among the stakeholders involved in Smart Cities.

Moreover, managers recognize the importance of creating an environment conducive to the development of a "wise" Smart City. Thus, ensuring the sustainable development of this society over time is a crucial concern for managers. Consequently, organizational business models must be designed sustainably to effectively prepare for the Smart City. Given the myriad challenges posed by Smart Cities to organizations, the proposed model could serve as an effective tool in achieving the aforementioned economic and social objectives.

While the proposed model holds intrinsic value, it remains a theoretical and conceptual effort to address the inherent complexity of Smart Cities. This stands as the primary limitation of this study. Furthermore, despite the increasing need for a holistic view, both academics and managers should approach a model that seeks to generalize specific aspects of the investigated topics with caution.

As a result, the authors recommend that future studies employ empirical and robust methods to analyse the phenomenon, utilizing the proposed model as a foundational framework for further exploration.

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