frontiers in Political Science

TYPE Original Research
PUBLISHED 06 November 2026
DOI 10.3389/fpos.2026.1983336

Check for updates

OPEN ACCESS

EDITED BY
Alexandre Morais Nunes,
University of Lisbon, Portugal

REVIEWED BY
Irfan Setiawan,
Institut Pemerintahan Dalam Negeri (IPDN), Indonesia
Rui Jose,
University of Minho, Portugal

*CORRESPONDENCE
Alexandre Dias Carreiro Santos Serra
alexandre.serra@fd.uc.pt

RECEIVED 30 August 2026
REVISED 06 October 2026
ACCEPTED 14 October 2026
PUBLISHED 06 November 2026

CITATION
Ferraz D, Roque C and Serra ADCS (2026) Collaborative ecosystems for Smart City development: the case of B-Smart Famalicão.
Front. Polit. Sci. 8:1983336.
doi: 10.3389/fpos.2026.1983336

COPYRIGHT
© 2026 Ferraz, Roque and Serra. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Collaborative ecosystems for Smart City development: the case of B-Smart Famalicão

David Ferraz[1,2], Carolina Roque[1] and Alexandre Dias Carreiro Santos Serra[3,4]*

[1]ISCTE-Instituto Universitario de Lisboa Escola de Sociologia e Politicas Publicas, Lisbon, Portugal, [2]ISCTE-Instituto Universitario de Lisboa Centro de Investigacao e Estudos de Sociologia, Lisbon, Portugal, [3]Faculty of Law, University of Coimbra, Coimbra, Portugal, [4]Universidade de Coimbra Instituto Juridico, Coimbra, Portugal

Public–private and multi-actor collaboration has become increasingly relevant to Smart City development, particularly where municipalities seek to combine public capabilities with external knowledge, technological expertise, and resources. This study examines the collaborative configuration of a Smart City initiative through an exploratory qualitative case study of B-Smart Famalicão, Portugal. The study draws on documentary analysis and a semi-structured interview with a key informant from the Municipality of Vila Nova de Famalicão. The findings identify a collaborative ecosystem involving the municipality and a range of private, associative, technological, and institutional actors, although the perspectives of these actors are not directly captured through interviews. The evidence suggests that collaboration in B-Smart combines contractual, relational, and network-based forms of coordination rather than corresponding exclusively to a conventional contractual public–private partnership. The case also indicates, based on the municipal account and supporting documentation, a prominent coordinating role for the municipality in connecting actors, facilitating experimentation, and aligning external contributions with public objectives. The findings further highlight the relevance of local embeddedness, stakeholder complementarity, knowledge sharing, and public control over strategically relevant resources and data. Rather than establishing a general model of hybrid governance, the study illustrates how different modes of collaboration may coexist within a Smart City initiative and identifies associated challenges concerning accountability, data governance, coordination, and the balance between collaborative flexibility and public responsibility. The study contributes to the literature by providing an empirically grounded illustration of multi-actor collaboration in Smart City development and by identifying governance mechanisms that warrant further investigation through comparative and multi-stakeholder research.

KEYWORDS
B-Smart Famalicão, collaborative ecosystems, collaborative governance, network governance, public–private collaboration, Smart Cities

1 Introduction

Public Administration has undergone significant changes in the way it organizes its resources, delivers services, and responds to citizens' needs. These transformations have reinforced the debate on the role of the State, different models of public management, and cooperation between public and private entities (Tavares, 2005). In this context, the capacity of public

organizations to acquire, transfer, and apply knowledge is also relevant to improving performance and the delivery of public services (Asensio, 2023).

The public sector plays a central role in the implementation of public policies and in ensuring the provision of services of collective interest, seeking to promote the social and economic wellbeing of citizens and to guarantee access to essential, high-quality services, such as healthcare, housing, and security (Cardoso et al., 2023).

However, Public Administration faces several constraints, including bureaucracy, lengthy processes, and difficulties in decision-making, alongside issues related to transparency and corruption, which may affect perceptions of the quality and integrity of Public Administration (Correia et al., 2024).

In this debate, the private sector is often associated with greater organizational flexibility, innovation capacity, and a results-oriented approach, characteristics that may contribute to improving the efficiency and quality of certain services (Fortini, 2021). However, the benefits arising from private sector involvement are not uniform and are conditioned by the institutional context, regulatory mechanisms, contract design, and the State's capacity for oversight (Ma et al., 2023). Furthermore, although private sector involvement may promote efficiency gains and resource optimization, it may also raise challenges related to equity in access to services, social responsibility, and the safeguarding of the public interest, particularly when economic objectives prevail over collective needs (Smith, 2023).

Despite the growing literature on Smart Cities, public–private partnerships, and collaborative governance, there remains limited empirical understanding of how collaborative arrangements involving municipalities, private companies, associations, and other stakeholders are configured and coordinated at the local level. Existing research has highlighted the importance of collaboration, stakeholder interaction, and network-based governance in Smart City development (Broccardo et al., 2019; Meijer and Bolívar, 2016; Ben Yahia et al., 2021). However, less attention has been given to how these different actors are configured within specific local ecosystems, how complementary resources and capabilities are mobilized, and how municipalities coordinate these relationships while maintaining control over issues of public interest. This is particularly relevant in cases where collaboration extends beyond conventional contractual public–private partnerships and involves broader networks of organizations with different roles, resources, and forms of interaction.

This gap is particularly relevant in the context of local Smart City initiatives, where the boundaries between public–private partnerships, collaborative governance, and network-based arrangements may become less clear. Rather than assuming that all forms of collaboration constitute conventional PPP's, this study therefore examines the empirical configuration of collaboration in the B-Smart Famalicão initiative and considers the extent to which different actors, coordination mechanisms, resources, and institutional conditions shape the development of Smart City initiatives.

Accordingly, the research question guiding this study is: How are collaborative arrangements configured and coordinated in the development of Smart City initiatives, and what organizational, institutional, and contextual factors shape collaboration in the case of B-Smart Famalicão?

To address this question, the study aims to examine the collaborative governance arrangements underlying the development of B-Smart Famalicão. Specifically, it seeks to: (1) identify the actors involved in the B-Smart Famalicão ecosystem and examine the formal, relational, and network-based forms of coordination through which they interact; (2) examine the different resources, knowledge, and capabilities mobilized through these collaborative arrangements and the complementary contributions attributed to the participating actors; (3) analyze the organizational, institutional, and contextual conditions that shape collaboration, including the municipality's role in coordination, data governance, and the safeguarding of the public interest; and (4) identify the main limitations and tensions associated with these collaborative arrangements and discuss the conditions that may affect their applicability to other municipal contexts.

2 Theoretical framework

2.1 Public–private partnerships and their institutional limitations

PPPs should be understood within the context of the transformations that have taken place in Public Administration and the search for new models of public management and service delivery. The decline of traditional approaches associated with bureaucratic structures, together with growing concerns regarding efficiency, performance, and financial sustainability, contributed to the emergence of New Public Management (NPM), which sought to introduce principles and practices associated with private-sector management into the public sector (Hood, 1991; Pollitt, 1995). In this context, NPM placed particular emphasis on efficiency, performance, results orientation, and accountability, contributing to changes in the organization and delivery of public services (Lapuente and van de Walle, 2020).

As part of these reforms, NPM also encouraged greater private-sector involvement in the provision of public infrastructure and services. One of the main precursors of contemporary PPPs was the Private Finance Initiative (PFI), established in the United Kingdom during the 1990s. The PFI reflected several principles associated with NPM by enabling private entities to participate in the financing, construction, maintenance, and operation of public infrastructure and services, while the public sector retained some of its core responsibilities (Wall and Connolly, 2009). PPPs can therefore be understood as part of a broader transformation in the relationship between the State and the private sector, characterized by new forms of cooperation, resource mobilization, and the distribution of responsibilities in the provision of public services (Casady et al., 2020).

There is no single universally accepted definition of PPPs, as their configuration varies according to the institutional, political, and contractual context in which they are implemented (Cruz and Sarmento, 2019; Klijn, 2010). The OECD (2008) defines PPPs as arrangements between public and private entities in which private actors provide services according to requirements defined by the government and where remuneration is linked, among other factors, to the risks assumed by the parties. This definition emphasizes the contractual nature of PPPs and the importance of allocating risks and responsibilities between the public and private partners. Similarly, Yescombe (2007) characterizes PPPs as long-term contractual arrangements involving public and private entities in activities such as the design, financing, operation, and maintenance of infrastructure or services. The European Court of Auditors (2018),

meanwhile, emphasizes the joint involvement of public and private entities in the provision of goods and services traditionally associated with the public sector.

Considering these different perspectives, PPPs can be understood as having contractual, financial, operational, and collaborative dimensions. Although their configuration may vary according to the context in which they are implemented, these partnerships generally involve a long-term relationship between public and private entities, the allocation of risks and responsibilities, the mobilization of complementary resources and capabilities, and the establishment of mechanisms that link performance to the provision of public infrastructure or services.

Accordingly, the main characteristics of PPPs identified in the literature are summarised in Table 1.

Within a PPP, the public entity retains responsibility for defining strategic objectives and safeguarding the public interest, while the private sector may assume responsibilities related to the financing, construction, operation, and maintenance of infrastructure or services (Cruz and Sarmento, 2019). In this way, PPPs lie between traditional public procurement models and privatization, as the private sector participates in different stages of the project without the State relinquishing all of its responsibilities. However, the way in which these responsibilities and risks are allocated depends on the characteristics of each partnership and on the institutional and contractual context in which it is developed.

PPPs should therefore not be understood solely as a transfer of functions from the public sector to private entities. These partnerships also enable coordination among different actors by combining resources, skills, and knowledge to achieve specific objectives (Casady et al., 2020). In this context, the effectiveness of a PPP depends not only on the conditions established in the contract but also on the capacity of public and private entities to work together, coordinate responsibilities, and safeguard the public interest.

This issue is particularly relevant in the context of Smart Cities. The development of such initiatives may involve significant investments, specialized technological knowledge, and a constant need for innovation. At the same time, budgetary constraints and the complexity of urban projects may lead municipalities to seek support from private entities to develop and implement technological solutions (Silva et al., 2024; Quan and Solheim, 2023). In this regard, PPPs can play a role that extends beyond financing or service procurement, enabling the mobilization of different resources and capabilities to address the challenges associated with the development of Smart Cities.

2.2 Smart Cities

There is no universally accepted definition of a Smart City, although the literature converges around the use of technology and knowledge to improve urban management, public services, resource efficiency, sustainability, and citizens' quality of life (Lazzaretti et al., 2019). Information and Communication Technologies (ICTs) therefore constitute an important component of Smart City strategies, enabling more efficient management of urban resources, infrastructure, and services (Correia et al., 2024). Dameri (2016), for example, conceptualizes the Smart City as an urban strategy based on the use of technologies, particularly ICTs, to promote social and economic development and environmental sustainability. The application of smart solutions can contribute to reducing resource consumption, emissions, and operational costs, while simultaneously enabling more efficient management of urban infrastructure (Harrison and Donnelly, 2011). Real-time management systems can support the monitoring of urban activities, such as traffic and security, facilitate rapid responses to emerging problems, and optimize service delivery (Correia et al., 2024). In addition, new technologies can foster innovative services for citizens, including mobility applications and digital health solutions, while supporting business competitiveness through open data and technological solutions (Castelnovo et al., 2016).

However, the concept of a Smart City extends beyond technological infrastructure and digital solutions (Serra et al., 2026). Its development also involves human, social, and institutional dimensions, with citizens playing a central role in shaping urban solutions and ensuring their alignment with local needs (Meijer and Bolívar, 2016; Nam and Pardo, 2011; Pla-Castells et al., 2015). From this perspective, technology should be understood as an enabling tool rather than an end in itself. The development of a smart city therefore requires the integration of technological innovation with participation, social inclusion, and the broader institutional and political context within which urban policies are designed and implemented. This perspective is consistent with the multidimensional approach proposed by Giffinger et al. (2007), which incorporates dimensions such as smart governance, smart people, smart mobility, smart environment, smart economy, and smart living (see Table 2).

TABLE 1 Main characteristics of public–private partnerships.

Characteristic	Description
1. Long-term contractual relationship	PPPs generally involve long-term agreements between public and private actors for the development, financing, operation, and/or maintenance of public infrastructure or services
2. Risk allocation	Risks associated with financing, construction, operation, demand, or performance are allocated between the public and private partners according to their respective capacities to manage them.
3 Performance-based arrangements	Public and private partners assume defined responsibilities throughout the different stages of the project, while the public authority retains responsibility for safeguarding the public interest.
4. Shared responsibilities	Contractual arrangements may establish performance requirements, service standards, and incentives linking the private partner's remuneration to the quality or availability of the service.
5. Mobilisation of complementary resources	PPPs allow the combination of public and private financial resources, technical expertise, organisational capabilities, and technological knowledge.

Source: own authorship based in Yescombe (2007) and Cruz and Sarmento (2019).

TABLE 2 Documentary sources and their analytical use

Source	Type	Date/period	Producer	Analytical use
B-Smart Famalicão	Institutional	2025	Municipality	Strategy/governance
B-Smart Alliance	Institutional/web	2025	Municipality	Actor configuration
Bairro Digital	Project documentation	2025	Municipality/ACIF	Collaboration
ENTI	Policy document	2025	National government	Institutional context

Source: own authorship.

This broader understanding is particularly relevant given the risks associated with technology-centred approaches to urban governance. The literature has criticized the emergence of technocratic models in which urban problems are understood primarily as technical and measurable challenges that can be addressed through data and technological solutions (Kitchin, 2014a; Linhares and Santos, 2024). Such approaches may reinforce centralized and top-down decision-making while limiting meaningful citizen participation and overlooking the social, cultural, and political dimensions of urban development (Kitchin, 2016). Consequently, digital platforms and data-driven tools do not necessarily translate into more inclusive forms of governance unless citizens and other relevant stakeholders are effectively incorporated into decision-making processes.

The development of Smart Cities should therefore be understood as both a governance challenge and a technological challenge. Indeed, Smart Cities should be viewed not only as an instrument for bureaucratic modernization but also as a space for local digital democracy (Paskarina et al., 2026). Ensuring that technological innovation generates public value requires coordination among the public and private sectors, citizens, academia, and other stakeholders, while addressing risks related to inequality and the digital divide (Stroparo, 2021). This multilevel dimension is particularly important for understanding the role of PPPs in Smart Cities, as the implementation of technologically intensive and innovative urban projects may require resources, specialized knowledge, and capabilities that extend beyond the public sector (Quan and Solheim, 2023). Thus, Smart City initiatives provide a relevant context for analyzing how public and private actors collaborate, coordinate responsibilities, and jointly contribute to urban development.

2.3 PPPs as an instrument for the development of Smart Cities

Smart Cities depend on the use of innovative technologies to improve urban quality of life, the efficiency of public services, and environmental sustainability. Public Administration plays a central role in the planning, coordination, and implementation of these initiatives (Firmino, 2018). However, it does not always have, on its own, the financial, technological, and technical resources required to address the growing complexity of urban challenges. In this regard, cooperation between public and private entities is particularly relevant (Pardo et al., 2010), with Public–Private Partnerships (PPPs) being one of the mechanisms through which such collaboration can be implemented (Lee et al., 2014).

The implementation of smart solutions requires significant investments in infrastructure and technologies, such as traffic management systems, sensors, monitoring systems, and other digital solutions, which may exceed the public sector's immediate investment capacity (United Nations, 2019). Through PPPs, the private sector can assume part of the investment and implementation of the necessary infrastructure, while payments may be made gradually over the contractual period, in accordance with the established conditions and service performance (Yescombe, 2007).

Furthermore, PPPs can provide efficiency gains, access to private-sector expertise and specialized knowledge, promote innovation, and establish performance-related incentives. The contractual structure can define parameters related to operational efficiency, service quality, and infrastructure maintenance, thereby promoting greater accountability among partners (Anjos, 2019). PPPs can also contribute to easing public-sector budgetary constraints and enabling investments in urban infrastructure and technologies (Almarri and Boussabaine, 2025).

In this context, collaboration among different actors, namely government, the private sector, and academia, can contribute to reducing costs, accelerating the implementation of innovations, and improving the quality of services provided (Genauch and Silva, 2023). Coordination among these actors makes it possible to combine different resources, knowledge, and capabilities, strengthening the capacity to develop innovative solutions to address urban challenges (Clement et al., 2022).

However, the use of PPPs does not eliminate the challenges associated with the implementation of Smart Cities. The integration of different technologies and systems constitutes one of the main difficulties, as it requires coordination and technological management capabilities (Nam and Pardo, 2011). In this regard, the involvement of specialized private partners can contribute to the implementation and integration of these solutions, although outcomes depend on the characteristics of each project and on how the partnership is structured.

2.4 Network governance and Smart City development

Smart City development takes place in a context characterised by the increasing involvement of different actors in the definition and implementation of urban solutions. The complexity of contemporary urban challenges and the need to combine different forms of knowledge and resources make approaches based exclusively on the action of a single organisation increasingly insufficient (Pires and Pratschke, 2025). In this context, Smart City governance can be understood as a process involving different forms of collaboration and interaction among public, private, and civil society actors (Meijer and Bolívar, 2016). These authors emphasise that Smart City governance should not be reduced to the use of technology, but

should also be associated with the development of new forms of collaboration among different actors to achieve improved urban outcomes.

Collaborative governance has become increasingly relevant within public administration, particularly as governments confront complex public challenges that cannot be effectively addressed within the boundaries of individual organisations, sectors, or territorial jurisdictions. In such contexts, collective action often requires different organisations to coordinate their activities and combine resources, even in the absence of a hierarchical authority capable of unilaterally imposing decisions. Collaborative governance therefore provides a perspective for understanding how networks, joint decision-making processes, and inter-organisational interactions may contribute to public service provision and the creation of public value (Ansell and Gash, 2008; Emerson and Nabatchi, 2015; Mendes et al., 2026).

The literature on collaborative governance associates this form of governance with the establishment of inter-organisational networks, partnerships, and communities of practice, through formal and informal mechanisms that enable different actors to work collectively in addressing shared challenges and pursuing common objectives (Agranoff, 2007; Torfing et al., 2012). Among the most influential approaches, Ansell and Gash (2008) conceptualise collaborative governance as a process in which relevant actors participate directly in formal, deliberative, and consensus-oriented decision-making processes. This perspective therefore places interaction among different actors and the capacity to develop shared understandings at the centre of governance processes (Mendes et al., 2026).

The perspective of network governance further develops this understanding of interaction and collaboration among different actors. Rhodes (1996) defines governance networks as inter-organisational and self-organising networks that complement traditional mechanisms of market and hierarchy in the coordination and allocation of resources. From this perspective, governance does not depend exclusively on the formal authority of a single organisation, but also on the capacity of different actors to coordinate their actions and establish cooperative relationships. Rhodes (1996) also highlights the importance of trust and mutual adjustment in the functioning of such networks.

Network governance becomes particularly relevant when the problems to be addressed are complex and cannot be adequately resolved by a single actor. Klijn and Koppenjan (2016) characterise governance networks as contexts in which different public, private, and non-profit actors are interdependent because they depend on each other's resources and capabilities to address complex problems.

In this context, network collaboration does not imply that the different participants share the same objectives or contribute in the same way. Rather, the diversity of actors entails differences in resources, knowledge, interests, and capabilities (Ehwi et al., 2023). Coordination therefore becomes a central dimension of network governance, enabling interdependencies among participants to be managed and their different contributions to be articulated (Klijn and Koppenjan, 2016). Trust and sustained relationships among actors may also contribute to the stability of collaborative relationships and facilitate processes of learning and knowledge sharing (Chun et al., 2022).

This approach is particularly relevant in the context of Smart Cities, where collaboration among stakeholders constitutes an important dimension of the development of urban solutions (Korneć, 2020). Clement et al. (2022) conceptualise the Smart City as a collaborative ecosystem involving different stakeholders and emphasise that collaboration among these actors can contribute to addressing complex urban challenges.

Within this framework, local government assumes an important role in bringing together the different actors involved in Smart City development (Broccardo et al., 2019). Although network governance is not based exclusively on hierarchical relationships, public authorities may perform coordination and facilitation functions by promoting interaction among stakeholders and creating conditions for collaboration (Ben Yahia et al., 2021). Clement et al. (2022) reinforce this perspective by identifying local governments as central actors within Smart City ecosystems and demonstrating that particular municipal structures and strategies may support more intensive collaboration with other stakeholders.

Overall, network governance allows Smart City development to be understood as a collaborative and interdependent process in which different actors mobilise distinct resources and forms of knowledge and establish coordination relationships around shared objectives (Broccardo et al., 2019). This perspective shifts attention away from a view centred exclusively on individual organisations towards the relationships established among different participants and the conditions that enable these relationships to be sustained. Network governance therefore provides a relevant perspective for understanding how different actors can contribute to processes of innovation and urban development in Smart City contexts (Ben Yahia et al., 2021).

3 Materials and methods

3.1 Documentary analysis

The study adopts an exploratory qualitative single-case study design, focusing on the B-Smart Famalicão project, organised and implemented by the Municipality of Vila Nova de Famalicão, as an empirical case of public–private and multi-stakeholder collaboration in the development of Smart Cities. The empirical analysis combines documentary analysis with a semi-structured interview with a key informant and is informed by a review of the relevant academic literature. This methodological approach is justified by the complex and multidimensional nature of public–private partnerships (PPPs) and by the need to examine the institutional, organisational, and relational dynamics underlying cooperation between public and private actors in the context of Smart City development.

The literature review provided the conceptual and analytical foundations of the study, particularly in relation to Public Administration, PPPs, Smart Cities, collaborative governance, and network governance. The empirical component, in turn, relied on documentary evidence and primary data obtained through the semi-structured interview. Documentary analysis was used both to reconstruct the development and institutional context of the B-Smart Famalicão project and to identify evidence relevant to the analytical dimensions adopted in the study.

The documentary corpus was purposively selected according to the relevance of each source to the B-Smart Famalicão project and its wider institutional and policy context. It comprised publicly available project and institutional web sources, project-related documentation, and national policy and institutional documents.

The documentary analysis focused on identifying and interpreting information concerning the project's strategic objectives, participating actors, governance arrangements, collaboration mechanisms, resources and capabilities, implementation processes, and institutional context. Attention was given to evidence relating to actor configuration, partnership arrangements, resource and capability complementarity, municipal coordination, data governance and control, accountability, and the protection of the public interest.

Rather than treating the documentary sources as merely descriptive material, the analysis considered their relevance to the conceptual dimensions established through the literature review. In this respect, the B-Smart Famalicão and B-Smart Alliance sources were particularly relevant for examining the configuration of actors and the institutional structure of the initiative, while the Bairro Digital documentation provided a more specific illustration of collaborative arrangements and local stakeholder involvement. The ENTI and AMA documentation were used primarily to situate the case within the broader Portuguese institutional and policy environment.

The documentary evidence was subsequently used to contextualise and triangulate the information obtained through the semi-structured interview. The combination of documentary and interview evidence enabled the researchers to compare formally documented institutional arrangements with the perceptions and accounts reported by the key informant. This triangulation was used to contextualise and corroborate evidence where possible, while recognising that the interview data reflect the perspective of a single informant and therefore do not support generalisation to all actors involved in the initiative.

3.2 Semi-structured interview and thematic analysis

B-Smart Famalicão was selected as an analytically relevant case because its Smart City strategy involves sustained interaction between municipal authorities and multiple non-state actors, including private companies, academic institutions, business associations, and other stakeholders. As a primary data source, a semi-structured interview was conducted with a qualified key informant from the Municipality of Vila Nova de Famalicão, working in the Innovation and Technology Division at the Urban Intelligence Centre. The interview was conducted on May 28, 2025, lasted 34 min, and was recorded and subsequently transcribed following prior authorization. It sought to understand the practical implementation of smart urban solutions through PPPs and multi-stakeholder arrangements, focusing on partnership structures, strategic objectives, resources and capabilities, municipal coordination, challenges, outcomes, data-related issues, accountability, and future prospects.

The interview and documentary data were analysed using qualitative content analysis, following the approach proposed by Bengtsson (2016). A deductive–inductive strategy was adopted. Initial coding was informed by dimensions identified in the literature, namely innovation, efficiency, sustainability, investment, service quality, risk management, and governance. These dimensions were used as initial analytical categories rather than as the final structure for presenting the findings. Through an iterative second stage of analysis, the initial codes were reviewed, compared, and aggregated into higher-order themes concerning actor configuration and modalities of collaboration, resource and accountability, coordination challenges, data governance, and public-interest safeguards. This process allowed the analysis to remain connected to the conceptual framework while also capturing themes that emerged from the empirical material.

Source	Type	Date	Purpose	Analytical contribution
B-Smart Famalicão	Official website	2025	To identify the objectives, development and main components of the B-Smart Famalicão initiative	Provides evidence on the emergence and evolution of the initiative, its strategic orientation, governance arrangements, and the role of the municipality
B-Smart Alliance	Institutional/web	2025	To identify the organisations involved in the B-Smart ecosystem and their areas of participation	Supports the analysis of actor configuration, stakeholder roles, forms of interaction, and the resources and capabilities associated with collaboration
Bairro Digital	Project documentation	2025	To examine a specific collaborative initiative involving the municipality and ACIF	Provides evidence on collaboration mechanisms, intermediary roles, local stakeholder involvement, and the development and implementation of digital urban solutions
ENTI—Estratégia Nacional para os Territórios Inteligentes	National policy/ institutional document	23/06/2025	To contextualise B-Smart Famalicão within the Portuguese policy framework for intelligent and digital territories	Provides evidence on the broader institutional and policy context in which municipal Smart City initiatives operate
AMA—Agência para a Modernização Administrativa	Institutional and technical documentation		To contextualise national digital transformation and Smart Territory policies and mechanisms	Supports the analysis of the institutional environment, governance framework, and policy conditions surrounding municipal digital initiatives

Source: own authorship.

The two empirical sources were then compared to identify convergences, complementarities, and divergences between formally documented institutional arrangements and the institutional perspective and experiences reported by the interviewee. Triangulation was therefore used to contextualise and corroborate evidence where possible, while recognising the limitations arising from the single-informant design. The literature review served as the conceptual and analytical foundation for interpreting the empirical material; theoretical expectations derived from the literature were not treated as empirical findings unless they were supported by documentary or interview evidence.

The study does not seek statistical generalisation but rather an in-depth understanding of the mechanisms, challenges, and critical factors associated with public–private collaboration in Smart City development that may be relevant to other urban contexts with similar characteristics.

4 Results and discussion

4.1 The case of Vila Nova de Famalicão and the B-Smart project

Vila Nova de Famalicão, located in the Braga district and within the Ave sub-region, has a strong industrial and entrepreneurial tradition. This territorial profile has contributed to the development of municipal initiatives aimed at promoting entrepreneurship, innovation, and collaboration with local economic actors. Among these initiatives, Famalicão Made In, launched in 2014, seeks to support startups, promote entrepreneurship, and strengthen the municipality's industrial sectors (Municipality of Vila Nova de Famalicão, 2026). This local ecosystem provides an important context for understanding the emergence of B-Smart Famalicão, launched in 2021.

The emergence of B-Smart Famalicão can therefore be understood in relation to the municipality's broader strategy of using innovation and technology to respond to local challenges and improve urban management. According to the interviewee, the programme seeks to "place the citizen at the centre", with technology understood primarily as a means of improving citizens' well-being rather than as an objective in itself. This orientation is reflected in the development of different digital and technological solutions, including access control systems, smart bollards, incident management platforms, and other urban monitoring tools.

This territorial embeddedness is relevant because Smart City initiatives do not develop independently of their local institutional and socioeconomic environments. Smart City ecosystems emerge from the interaction between technological developments, territorial characteristics, and the actors embedded within a particular context (Kociuba et al., 2023). Similarly, Clement et al. (2022) demonstrate that collaboration among Smart City stakeholders varies according to the organisational and institutional characteristics of each local context.

In Famalicão, the municipality's industrial base, business ecosystem, and existing relationships with companies and entrepreneurial organisations constitute an important contextual background to the emergence of B-Smart. The emergence of B-Smart should therefore not be interpreted simply as the introduction of new technological solutions, but as part of an existing local ecosystem in which the municipality had already developed relationships with economic and innovation-oriented actors.

The case also illustrates the importance of adapting Smart City initiatives to local circumstances. Quan and Solheim (2023) identify local context, stakeholder complexity, tensions among actors, and trust-building as important factors shaping Smart City initiatives. In this sense, B-Smart emerged from the intersection between technological opportunities and locally identified needs, with the municipality acting as an important institutional actor in translating these opportunities into urban applications.

4.2 Actor configuration, roles and modes of collaboration

The development of B-Smart does not result exclusively from municipal action. Instead, the initiative involves a network of public, private, academic, associative, and other actors. This configuration moves beyond a conventional bilateral PPP between a municipality and a single private company and is more appropriately understood as a broader collaborative ecosystem.

The interview evidence indicates the involvement of companies, startups, associations, and other organisations in different stages of the development of urban solutions. Examples include FOCOS BC, ACIF—Associação Comercial e Industrial de Famalicão, Continental Mabor, Leica, and the European Space Agency. These actors do not perform identical functions. Rather, their involvement reflects different forms of expertise, technological capabilities, territorial knowledge, networks, and organisational resources.

This configuration is consistent with the literature on Smart City governance. Broccardo et al. (2019) argue that collaboration among multiple actors is instrumental to Smart City development, particularly during the design and implementation of smart city initiatives. The authors also show that collaboration among multiple actors creates challenges requiring the integration of political, technical, and cultural dimensions.

Similarly, Korneć (2020) highlights the importance of different stakeholder groups in shaping smart solutions, identifying local governments as particularly important actors while also recognising the contribution of local communities, economic entities, and research institutions. This supports the interpretation of B-Smart as an ecosystem in which different stakeholders participate according to their specific capabilities and positions within the local context.

The Bairro Digital initiative provides a particularly relevant example of this configuration. Developed in collaboration with ACIF, the project involved solutions such as smart bollards for loading and unloading, access control systems, and digital applications supporting local commerce. ACIF's participation provided a connection between the municipality and local businesses, allowing the perspectives and needs of local traders to be incorporated into the development of solutions. The association therefore performed a bridging function between public objectives and local economic actors.

The B-Smart Alliance further illustrates this network configuration. By bringing together companies and organisations with different technical and strategic capabilities, the Alliance extends collaboration beyond a direct municipality–company relationship. Its participants contribute different forms of technological expertise, data, knowledge, and organisational capacity. This type of configuration is consistent

10.3389/fpos.2026.1983336

Actor	Role	Evidence source	Main resources	Modes of interaction	Contribution to B-Smart
FOCOS BC	Technology and innovation partner	Interview	Technological expertise, innovation capabilities, and knowledge of digital solutions	Collaboration with the municipality and other ecosystem actors	Supports the development and implementation of technology-based urban solutions
ACIF—Associação Comercial e Industrial de Famalicão	Bridging and intermediary actor	Interview	Knowledge of local businesses, business networks, and territorial relationships	Interaction between the municipality, local businesses, and other stakeholders	Connects municipal objectives with the needs and perspectives of the local business community
Continental Mabor	Industrial and technological actor	Interview	Industrial expertise, technological capabilities, and organisational resources	Collaboration within the wider B-Smart ecosystem	Contributes industrial and technological knowledge relevant to smart-city solutions
Leica	Technology and innovation actor	Interview	Technical expertise and technological capabilities	Collaboration with public and other private actors	Contributes technological knowledge and capabilities to the development of smart solutins
European Space Agency	Institutional and knowledge partner	Interview	Expertise, institutional networks, and space-related technological knowledge	Institutional and knowledge-based collaboration	Provides access to specialised knowledge and technological capabilities relevant to innovative urban applications
B-Smart Alliance participants	Collaborative network of organisations	Interview	Complementary technological, organisational, and knowledge resources	Network-based collaboration and co-development	Broadens the ecosystem of partners and facilitates the combination of complementary capabilities
Bairro Digital partners	Local implementation and business-network actors	Interview	Local knowledge, business relationships, and digital capabilities	Municipality–business collaboration	Supports the implementation of digital and smart solutions in the local commercial area

Source: Authors' elaboration based on the semi-structured interview and case-study material.

with the concept of collaborative networks for Smart City co-governance proposed by Ben Yahia et al. (2021).

The case therefore illustrates that collaboration in B-Smart does not imply that all actors pursue identical interests or contribute equivalent resources. Rather, its value lies precisely in the complementarity between different capabilities. This is consistent with the network governance perspective, according to which actors are interdependent because they possess resources and capabilities that others require to address complex problems (Klijn and Koppenjan, 2016).

4.3 Resources and capabilities mobilised through partnerships

The configuration of actors described above is relevant because collaboration allows B-Smart to mobilise resources and capabilities that would not necessarily be available within the municipality alone. These include technological expertise, specialised knowledge, financial resources, territorial knowledge, innovation capabilities, experimentation capacity, and access to networks.

The interview evidence indicates that private-sector participation contributed to the development of technological solutions adapted to municipal needs. In particular, collaboration with companies from the early stages of solution development enabled the municipality to benefit from specialised technical expertise while simultaneously reducing some of the costs associated with technological experimentation (Ferraris et al., 2018).

The partnerships also facilitate the mobilisation of knowledge and innovation capabilities (Wang et al., 2018). Private companies contribute technological expertise and market knowledge, while associations such as ACIF provide access to local businesses and knowledge of territorial needs. Other actors contribute specialised technical or scientific capabilities. The combination of these resources creates opportunities for experimentation and co-development that would be more difficult to achieve through a single organisational structure.

This finding is consistent with Hodge and Greve (2007), who argue that collaboration between public authorities and businesses cannot be understood exclusively as a contractual relationship. It is also consistent with Kitchin's (2014b) analysis of the increasing role of private actors in the production of data-driven urban solutions.

The B-Smart case therefore illustrates that the contribution of partnerships extends beyond private financing. The resources mobilised include technology, knowledge, networks, data, innovation capabilities, and opportunities for experimentation. This reinforces the argument that the value of public–private collaboration in Smart Cities depends not only on the amount of resources mobilised but also

on the capacity to combine complementary resources across organisational boundaries (Wu et al., 2026).

The evidence also points towards processes of knowledge sharing and joint problem-solving. Solutions are not simply purchased as predefined products; rather, the involvement of private actors from earlier stages enables adaptation and experimentation (Ansell and Torfing, 2021). This reflects the collaborative dimension identified by Broccardo et al. (2019), who emphasise the importance of collaboration during both the design and implementation of Smart City initiatives.

4.4 Municipal coordination, data control and protection of the public interest

Although B-Smart involves multiple actors, the municipality remains a central actor in coordinating the ecosystem and ensuring that collaboration remains aligned with public objectives. This dimension is particularly important because network governance does not eliminate the role of public authorities (Sørensen and Torfing, 2009).

Clement et al. (2022) identify local governments as central actors within Smart City collaborative ecosystems and emphasise the importance of municipal organisational capacity and formal strategies in shaping collaboration. Similarly, Korneć (2020) highlights the leading role of local governments in the conceptualisation, implementation, and management of smart solutions.

The B-Smart case reflects this central role. The municipality does not provide all technological capabilities internally, but it establishes the framework within which different actors contribute their resources and expertise. Its role is therefore not limited to commissioning or purchasing technological solutions. Rather, it involves identifying local needs, coordinating stakeholders, defining priorities, and ensuring that technological development remains connected to public objectives (Brunetti et al., 2020).

This coordinating function is particularly important given the diversity of stakeholders involved. As Klijn and Koppenjan (2016) argue, network governance involves interdependent actors whose resources and interests are distributed across organisational boundaries.

Data governance constitutes a particularly important dimension of this municipal role (van Zoonen, 2020). The involvement of private actors in Smart City initiatives can involve access to, processing, and management of urban data, creating potential concerns regarding accountability, control, and the protection of the public interest.

This arrangement suggests that collaboration does not imply the transfer of public control to private actors (Kivleniece and Quélin, 2012). Rather, the municipality seeks to combine external technological capabilities with institutional control over strategically relevant information. The involvement of private actors in Smart City development may raise governance questions concerning innovation, commercial interests, transparency, and public accountability. In the B-Smart case, these dimensions provide relevant analytical considerations; however, the available evidence does not establish that they have resulted in concrete conflicts between participating actors.

The findings therefore suggest that municipal capacity is not only relevant for initiating collaboration but also for governing it. The municipality's ability to coordinate stakeholders, establish rules concerning information, and safeguard the public interest constitutes an important condition for deriving public value from collaborative arrangements (Skelcher et al., 2005).

4.5 Tensions, accountability and protection of the public interest

The B-Smart case highlights the governance implications of collaboration among public, private, academic, and associative actors. The interview and case-study material identifies a diverse network of organisations contributing different technological capabilities, knowledge, and resources to the development of urban solutions. However, the available evidence does not allow us to establish concrete conflicts between actors, nor does it document specific episodes of disagreement concerning organisational objectives, commercial interests, data control, or accountability. These issues should therefore be understood as potential governance challenges rather than as empirically demonstrated tensions within B-Smart.

The literature provides a useful framework for interpreting these potential challenges. Quan and Solheim (2023) identify stakeholder complexity, tensions among actors, and trust-building as relevant dimensions of Smart City initiatives. Similarly, Broccardo et al. (2019) highlight the challenges associated with integrating political, technical, and cultural dimensions in multi-actor collaboration. These contributions suggest that the diversity of actors involved in B-Smart may require coordination mechanisms capable of accommodating different organisational perspectives and ensuring that collaboration remains aligned with public objectives. Nevertheless, the existence of such requirements does not, in itself, demonstrate that conflicts have occurred in this particular case.

Trust and sustained relationships may also be relevant to the development of collaboration over time. Chun et al. (2022), in their study of collaboration between a Smart City consortium and the Hong Kong Government, identify interpersonal and inter-organisational trust, leadership, and collaborative knowledge management as factors contributing to successful collaboration. Applied cautiously to B-Smart, this perspective highlights the potential importance of maintaining relationships and facilitating knowledge exchange among participating organisations. However, the available evidence does not support a definitive assessment of the levels of trust between B-Smart participants or of their influence on specific project outcomes.

Finally, the case underlines the importance of interpreting Smart City collaboration in its territorial and institutional context. Famalicão's industrial profile, entrepreneurial ecosystem, and existing relationships with local businesses provide relevant conditions for understanding the configuration of B-Smart. As Quan and Solheim (2023) and Kociuba et al. (2023) argue, Smart City initiatives are shaped by local institutional, organisational, and socioeconomic characteristics. The implications of B-Smart for other municipalities should therefore be considered in relation to their specific governance capacities and territorial circumstances, rather than through the assumption that the same collaborative configuration can be replicated elsewhere.

5 Conclusion

This study examined how collaboration between municipal authorities, private companies, associations, and other stakeholders contributes to Smart City development, using B-Smart Famalicão as an exploratory qualitative case study. The findings suggest that the relationships underlying the initiative cannot be fully described through

the lens of conventional contractual public–private partnerships alone. Instead, the case involves a combination of contractual, relational, and network-based forms of coordination, through which public and non-public actors contribute different resources, knowledge, technological capabilities, territorial expertise, and opportunities for experimentation.

The findings indicate that the role of private and non-public actors in B-Smart is closely associated with the institutional and organisational arrangements established by the municipality. Rather than demonstrating a general causal relationship between institutional conditions and the outcomes of public–private collaboration, the case provides an empirical illustration of how municipal coordination may shape the way external contributions are incorporated into a Smart City initiative. In the B-Smart case, the interview evidence points to an active municipal role in identifying local needs, connecting actors with complementary capabilities, facilitating experimentation, and maintaining strategic involvement in key processes and data. These observations suggest that collaborative flexibility can coexist with continued public coordination and responsibility.

This role is particularly relevant to the management of technological capabilities and urban data. The B-Smart case illustrates how a municipality may draw on external technological expertise while seeking to retain control over strategically relevant information and decision-making processes. The municipal emphasis on data ownership and technological processes, as reported in the empirical material, highlights the relevance of public-sector capacity in addressing questions of accountability, data protection, and public-interest considerations. However, because these findings are primarily derived from the perspective of one municipal informant, they should be understood as an interpretation of the case rather than as evidence of a general pattern across Smart City initiatives.

The findings also reinforce the importance of local context. B-Smart Famalicão developed within a municipality characterised by a strong industrial and entrepreneurial base, previous experience with innovation-oriented policies, established relationships with local economic actors, and organisational capacity to coordinate different stakeholders. These characteristics may have facilitated the development of the collaborative arrangements observed in the case. However, the research does not establish that these conditions are necessary or sufficient for successful Smart City collaboration. Rather, they provide contextual characteristics that should be considered when interpreting the case and when investigating similar initiatives elsewhere.

The concept of hybrid forms of collaboration is particularly relevant to interpreting these findings. As discussed in the theoretical framework, Smart City initiatives may combine elements associated with conventional public–private partnerships, procurement, co-creation, and network governance rather than conforming to a single governance model. The B-Smart case provides an empirical illustration of this hybridity. Different relationships within the initiative appear to involve different degrees of contractual formalisation, relational coordination, and network-based interaction. This configuration may provide flexibility for experimentation and knowledge exchange while also creating challenges concerning the allocation of responsibilities, performance expectations, and accountability.

The case therefore contributes to the Smart City governance literature by illustrating how public–private collaboration can operate through multiple and overlapping governance mechanisms. Rather than suggesting that hybrid arrangements are inherently more effective than conventional PPPs, the findings indicate that their implications depend on how responsibilities, resources, coordination mechanisms, and public accountability are organised within a particular institutional context. This interpretation is consistent with the network governance perspective, in which public authorities interact with interdependent actors while retaining responsibilities that cannot necessarily be delegated to external partners.

Several limitations should be considered when interpreting these findings. First, the study is based on a single exploratory case, B-Smart Famalicão. The case provides contextual and analytical insights into one municipal setting, but it does not permit statistical generalisation or establish that the observed governance arrangements would produce similar results in municipalities with different institutional, economic, technological, or administrative characteristics.

Second, the empirical evidence relies primarily on documentary material complemented by one key-informant interview from the municipal organisation. This provides an important institutional perspective but does not capture the potentially different perceptions and experiences of private companies, associations, citizens, technology providers, or other stakeholders involved in the initiative. Consequently, interpretations concerning actor roles, municipal orchestration, data governance, and collaboration mechanisms should be regarded as provisional and subject to further empirical validation.

Third, the study does not systematically compare the B-Smart experience with other municipalities or Smart City initiatives. Comparative research involving municipalities with different levels of digital maturity, administrative capacity, economic structures, and institutional arrangements could help determine which elements of the B-Smart configuration are context-specific and which may be observed more broadly.

Future research should therefore incorporate the perspectives of private partners, intermediary organisations, citizens, and other stakeholders through multiple interviews or focus groups, while also expanding documentary and potentially observational evidence. Comparative case studies would be particularly valuable for examining how different combinations of contractual, relational, and network-based governance operate across municipalities. Such research could further investigate when hybrid forms of collaboration facilitate innovation and knowledge sharing and when they may create coordination, accountability, dependency, or capacity risks. Longitudinal research would also be useful for examining how actor configurations, responsibilities, and governance mechanisms evolve as Smart City initiatives move from experimentation and implementation towards longer-term operation.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

DF: Project administration, Validation, Methodology, Supervision, Writing – review & editing. CR: Visualization, Resources, Validation,

Formal analysis, Investigation, Data curation, Writing – original draft, Methodology, Conceptualization. AS: Validation, Writing – review & editing, Formal analysis, Conceptualization, Funding acquisition, Supervision.

Funding

The author(s) declared that financial support was not received for this work and/or its publication.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that Generative AI was used in the creation of this manuscript. ChatGPT5.6 was used by the authors for English language proofreading of the article prior to submission.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Agranoff, R. (2007). *Managing within Networks: Adding Value to Public Organizations*. Washington, D.C: Georgetown University Press.

Almarri, K., and Boussabaine, H. (2025). Critical success factors for public–private partnerships in smart city infrastructure projects. *Constr. Innov.* 25, 224–247. doi: 10.1108/CI-04-2022-0072

Anjos, M. L. (2019). O mecanismo de gestão e regulação nas Parcerias Público-Privadas – PPP's: Ações necessárias. *Rev. Humanidades Tecnol.* 18, 172–192.

Ansell, C., and Gash, A. (2008). Collaborative governance in theory and practice. *J. Public Adm. Res. Theory* 18, 543–571. doi: 10.1093/jopart/mum032

Ansell, C., and Torfing, J. (2021). Co-creation: the new kid on the block in public governance. *Policy Polit.* 49, 211–230. doi: 10.1332/030557321X16115951196045

Asensio, M. (2023). La transferencia del aprendizaje en el contexto de la Administración Pública: una revisión sistemática de la literatura empírica. *Rev. CLAD Reforma Democr.* 86, 257–290. doi: 10.69733/clad.ryd.n86.a8

Ben Yahia, N., Eljaoued, W., Bellamine Ben Saoud, N., and Colomo-Palacios, R. (2021). Towards sustainable collaborative networks for smart cities co-governance. *Int. J. Inf. Manag.* 56:102037. doi: 10.1016/j.ijinfomgt.2019.11.005

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open* 2, 8–14. doi: 10.1016/j.npls.2016.01.001

Broccardo, L., Culasso, F., and Mauro, S. G. (2019). Smart city governance: exploring the institutional work of multiple actors towards collaboration. *Int. J. Public Sect. Manag.* 32, 367–387. doi: 10.1108/IJPSM-05-2018-0126

Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., and Orzes, G. (2020). Digital transformation challenges: strategies emerging from a multi-stakeholder approach. *TQM J.* 32, 697–724. doi: 10.1108/TQM-12-2019-0309

Cardoso, A. J. B., Almeida, J. U.de, and Marcos, R. A. (2023) O papel da administração pública no desenvolvimento social e econômico: Uma revisão *Rev. Foco* 16:e1724 doi: 10.54751/revistafoco.v16n5-002

Casady, C. B., Eriksson, K., Levitt, R. E., and Scott, W. R. (2020). (Re)defining public-private partnerships (PPPs) in the new public governance (NPG) paradigm: an institutional maturity perspective. *Public Manag. Rev.* 22, 161–183. doi: 10.1080/14719037.2019.1577909

Castelnovo, W., Misuraca, G., and Savoldelli, A. (2016). Smart cities governance: the need for a holistic approach to assessing urban participatory policy making. *Soc. Sci. Comput. Rev.* 34, 724–739. doi: 10.1177/0894439315611103

Chun, D. J. Y., Nabsiah, W. A., and Tan, C. L. (2022). Successful collaboration between smart city consortium and Hong Kong government in COVID-19 dashboard: the case of leadership in practice. *Int. J. Organ. Anal.* 30, 1172–1187. doi: 10.1108/IJOA-01-2021-2604

Clement, J., Manjon, M., and Crutzen, N. (2022). Factors for collaboration amongst smart city stakeholders: a local government perspective. *Gov. Inf. Q.* 39:101746. doi: 10.1016/j.giq.2022.101746

Correia, P. M. A. R., Pedro, R. L. D., Mendes, I. d. O., and Serra, A. D. C. S. (2024). The challenges of artificial intelligence in public administration in the framework of smart cities: reflections and legal issues. *Soc. Sci.* 13:75. doi: 10.3390/socsci13020075

Cruz, C., and Sarmento, J. (2019). *Manual de Parcerias Público-Privadas e Concessões*. Lisboa: Edições Sílabo, Lda.

Dameri, R. P. (2016). "The conceptual idea of Smart City: university, industry, and government vision," in *Smart City Implementation*, eds. R. P. Dameri and C. Rosenthal-Sabroux (London, UK: Springer), 23–43.

Ehwi, R. J., Holmes, H., Maslova, S., and Burgess, G. (2023). Towards a co-creative stakeholder engagement in Smart City projects: a life-cycle approach. *Innov. Eur. J. Soc. Sci. Res.* 36, 774–799. doi: 10.1080/13511610.2023.2266579

Emerson, K., and Nabatchi, T. (2015). *Collaborative Governance Regimes*. Washington, D.C.: Georgetown University Press.

European Court of Auditors. (2018). Public Private Partnerships in the EU: Widespread Shortcomings and Limited Benefits. (Special Report No. 09/2018). Available online at: https://www.eca.europa.eu/pt/publications?did=45153 (Accessed December 5, 2025)

Ferraris, A., Santoro, G., and Papa, A. (2018). The cities of the future: hybrid alliances for open innovation projects. *Futures* 103, 51–60. doi: 10.1016/j.futures.2018.03.012

Firmino, S. I. (2018). Fatores críticos de sucesso das Parcerias Público-Privadas: Aspetos político-institucionais. Estudo de caso das rodovias em Portugal. *Rev. Adm. Pública* 52, 1270–1281. doi: 10.1590/0034-761220170228

Fortini, C. (2021) Solução extrajudicial de conflitos com a administração pública: O hoje e o porvir Consultor Jurídico. Available online at: https://www.conjur.com.br/2021-mar-04/interesse-publico-solucao-extrajudicial-conflitosadministracao-publica (Accessed December 5, 2025)

Genauch, C. D., and Silva, R. d. F. (2023). Inovação no setor público: Revisão sistemática de literatura. *Braz. J. Dev.* 9, 2955–2975. doi: 10.34117/bjdv9n1-206

Giffinger, R., Fertner, C., Kramar, H., and Meijers, E. (2007) Smart Cities: Ranking of European Medium-sized Cities. Centre of Regional Science, Vienna University of Technology. Available online at: http://www.smart-cities.eu/download/city_ranking_final.pdf (Accessed December 5, 2025)

Harrison, C., and Donnelly, I. A. (2011) A theory of smart cities proceedings of the 55th annual meeting of the ISSS 55. Available online at: https://journals.isss.org/index.php/proceedings55th/article/view/1703 (Accessed December 5, 2025)

Hodge, G., and Greve, C. (2007). Public–private partnerships: an international performance review. *Public Adm. Rev.* 67, 545–558. doi: 10.1111/j.1540-6210.2007.00736.x

Hood, C. (1991). A public administration for all seasons? *Public Adm.* 69, 3–19.

Kitchin, R. (2014a). *The Data Revolution: Big Data, Open Data, Data Infrastructures and their Consequences*. Califórnia, EUA: Sage Publications.

Kitchin, R. (2014b). The real-time city? Big data and smart urbanism. *GeoJournal* 79, 1–14. doi: 10.1007/s10708-013-9516-8

Kitchin, R. (2016). The ethics of smart cities and urban science. *Philos. Trans. R. Soc. A Math. Phys. Eng. Sci.* 374:20160115. doi: 10.1098/rsta.2016.0115

Kivleniece, I., and Quélin, B. V. (2012). Creating and capturing value in public-private ties: a private actor's perspective. *Acad. Manag. Rev.* 37, 272–299. doi: 10.5465/amr.2011.0004

Klijn, E. H. (2010). "Public-private partnerships: deciphering meaning, message and phenomenon," in *International Handbook on Public-Private Partnerships*, eds. G. Hodge, C. Greve and A. Boardman (Rotterdam, The Netherlands: Edward Elgar), 68–80.

Klijn, E. H., and Koppenjan, J. (2016). *Governance Networks in the Public Sector*. London, UK: Routledge.

Kociuba, D., Sagan, M., and Kociuba, W. (2023). Toward the smart city ecosystem model. *Energies* 16:2795. doi: 10.3390/en16062795

Korneć, R. (2020). The role of stakeholders in shaping smart solutions in polish cities. *Entrepreneurship Sustain. Issues* 7, 1981–1995. doi: 10.9770/jesi.2020.7.3(36)

Lapuente, V., and van de Walle, S. (2020). The effects of new public management on the quality of public services. *Governance* 33, 461–475. doi: 10.1111/gove.12502

Lazzaretti, K., Sehnem, S., Bencke, F. F., and Machado, H. P. V. (2019). Smart Cities: insights e contribuições das pesquisas brasileiras. *urbe. Revista Brasileira de Gestão Urbana* 11:e20190118. doi: 10.1590/2175-3369.011.e20190118

Lee, J. H., Hancock, M. G., and Hu, M. C. (2014). Towards an effective framework for building smart cities: lessons from Seoul and San Francisco. *Technol. Forecast. Soc. Change* 89, 80–99. doi: 10.1016/j.techfore.2013.08.033

Linhares, J. E., and Santos, G. D. (2024). Governança e Smart Cities: Uma revisão do estado da arte utilizando o método Knowledge Development Process–Constructivist (PROKNOW-C). *Rev Brasileira de Planejamento e Desenvolvimento*, 13, 574–618. Available online at: https://revistas.utfpr.edu.br/rbpd/article/view/15627 (Accessed December 5, 2025)

Ma, L., Hu, Y., Zhu, L., and Ke, Y. (2023). Are public–private partnerships still an answer for social infrastructure? A systematic literature review. *Front. Eng. Manag.* 10, 467–482. doi: 10.1007/s42524-023-0249-1

Meijer, A., and Bolívar, M. P. R. (2016). Governing the smart city: a review of the literature on smart urban governance. *Int. Rev. Adm. Sci.* 82, 392–408. doi: 10.1177/0020852314564308

Mendes, I., Carvalho, E., and Teles, F. (2026). The commitment to collaborate: a conceptual framework for analysing collaborative governance in inter-municipal settings. *Urban Res. Pract.* 1–13, 1–13. doi: 10.1080/17535069.2026.2720625

Municipality of Vila Nova de Famalicão. (2026). Famalicão Made IN. Available online at: https://www.famalicaomadein.pt/_famalicao_madein (Accessed December 5, 2025)

Nam, T., and Pardo, T. (2011) Conceptualizing Smart City with dimensions of technology, people, and institutions *Proceedings of the 12th annual international digital government research conference* 282–291 ACM

OECD. (2008). Organisation for Economic Co-Operation and Development. Public-Private Partnership: in Pursuit of Risk Sharing and Value for Money. OCDE, Ed. June, 2008. 142

Pardo, T. A., Gil-Garcia, J. R., and Luna-Reyes, L. F. (2010). "Envisioning networked and IT-enabled public administration," in *The Future of Public Administration around the World: The Minnowbrook Perspective*, eds. R. O'Leary, D. M. Slyke and S. Kim (Washington, D.C: Georgetown University Press), 129–139.

Paskarina, C., Mustofa, M. U., Hermawati, R., Purnomo, D., Wicaksono, F., and Ramdani, R. R. (2026). Digital governmentality in local governance: policy rationalities in designing smart city. *Front. Polit. Sci.* 8:1777136. doi: 10.3389/fpos.2026.1777136

Pires, I. B., and Pratschke, A. (2025). "Governança adaptativa e planejamento urbano participativo: Estratégias para a transformação socioecológica nas cidades médias," in *Desafios urbanos no século XXI: Inovação, sustentabilidade e políticas para cidades resilientes*, (Guarujá/SP: Editora Científica Digital), 7–25.

Pla-Castells, M., Martinez-Durá, J. J., Samper Zapater, J. J., and Cirilo Gimeno, R. V. (2015) Use of ICT in Smart Cities: a practical case applied to traffic management in the city of Valencia *Proceedings of the Smart Cities symposium Prague 2015* 1–6 IEEE

Pollitt, C. (1995). Justifications for the choice of management instruments: an empirical review. *Public Adm.* 73, 403–424.

Quan, X., and Solheim, M. C. W. (2023). Public-private partnerships in smart cities: a critical survey and research agenda. *City Cult. Soc.* 32:100491. doi: 10.1016/j.ccs.2022.10049

Rhodes, R. A. W. (1996). The new governance: governing without government. *Polit. Stud.* 44, 652–667. doi: 10.1111/j.1467-9248.1996.tb01747.x

Serra, A. D., de Oliveira Mendes, I., de Carvalho, E. R., and Fonseca, P. A. (2026). Bibliometric analysis on the conceptualization of smart cities in public administration from 2014 to 2024. *Cities: Smart Futures*. doi: 10.1016/j.citiesf.2026.100002

Silva, A. L. C., Benini, S. M., and Godoy, J. A. R. d. (2024). Smart Cities e cidades sustentáveis: Contradições e sinergia para a construção de um modelo integrado. *Bol. Conjunt.* 20, 350–382. doi: 10.5281/zenodo.14533176

Skelcher, C., Mathur, N., and Smith, M. (2005). The public governance of collaborative spaces: discourse, design and democracy. *Public Adm.* 83, 573–596. doi: 10.1111/j.0033-3298.2005.00463.x

Smith, S. A. (2023). US state government privatization: implications for social equity and inequality? *Public Adm. Rev.* 83, 35–50. doi: 10.1111/puar.13565

Sørensen, E., and Torfing, J. (2009). Making governance networks effective and democratic through metagovernance. *Public Adm.* 87, 234–258. doi: 10.1111/j.1467-9299.2009.01753.x

Stroparo, T. R. (2021). Smart Cities, mobilidade urbana e envelhecimento humano em tempos de pandemia: Exclusão e isolamento. *Bol. Conjunt.* 5, 102–109. doi: 10.5281/zenodo.4515117

Tavares, J. F. F. (2005). *A ponderação de interesses na gestão pública vs. gestão privada*. Almedina: Lisboa.

Torfing, J., Peters, B. G., Pierre, J., and Sørensen, E. (2012). *Interactive Governance: Advancing the Paradigm*. Oxford University Press.

van Zoonen, L. (2020). Data governance and citizen participation in the digital welfare state. *Data & Policy* 2:e10. doi: 10.1017/dap.2020.10

Wall, A., and Connolly, C. (2009). The private finance initiative: an evolving research agenda? *Public Manag. Rev.* 11, 707–724. doi: 10.1080/14719030902798172

Wang, M.-C., Chen, P.-C., and Fang, S.-C. (2018). A critical view of knowledge networks and innovation performance: the mediation role of firms' knowledge integration capability. *J. Bus. Res.* 88, 222–233. doi: 10.1016/j.jbusres.2018.03.034

Wu, G., Li, J., and Zha, Y. (2026). Navigating the digital transformation: unravelling the dynamic evolution of smart city collaborative governance networks. *Public Management Review.*, 1–30. doi: 10.1080/14719037.2026.2714119

Yescombe, E. R. (2007). *Public-Private Partnerships: Principles of Policy and Finance*. London, UK: Butterworth-Heinemann.