



## Smart City Governance and the Challenge of Digital Platforms Within the Public Sector

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# Smart City Governance and the challenge of digital platforms within the public sector

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**Abstract**—This paper focuses on a compared analysis of the ongoing “platformization” and on the so-called Government-as-a-Platform (GaaP) approach applied to Smart City-paradigm. Specifically, the digital transformation of the public sector is observed under the light of the main challenges that have been introduced by digital platforms for traditional local governance models.

**Keywords**—Smart City, Platformization, digital transformation of public administration, Government-as-a-Platform, digital e-Government platforms, national strategic platforms, EU-Single Digital Gateway.

## I. INTRODUCTION

Since the advent of the second digital revolution, governments are forced to seek ways for their cities to become more ethical, inclusive, intelligent, and sustainable in order to address the challenges of the digital society. The use of Artificial intelligence (AI) [1], Machine Learning (ML), [2] Data Mining [3] and Big Data Analysis [4], [5] in public administration’s activities, as well as algorithmic decision-making [6], impact on the relation between fundamental right and public power by requiring new reasonable paradigms, which consider “virtues and vices” of the use of such technologies for driving public administration’s decisioning [7], [8]. The pressure for digitalized bureaucracy and collaborative value creation changes the nature of traditional

administrative decision-making processes [9]. At the same time, this emphasise that technology cannot replace human responsibility in the governance process; but shall represent an integrated means to solve complex problems by providing greater interactivity, quality, and efficiency of public administrations [10]. Besides that, the public sector is facing significant challenges linked to the ongoing changes in demography, politics, the climate, the global economy, and technology that need new urban development models, improved organisational and institutional response [11]. To that extend, Smart Cities provide an ideal opportunity for exploring how new digital technologies impact on traditional governance models by leading to an important transformation in the way cities and territories are governed [12]. In fact, the integration of Information and Communication Technologies (ICTs) within the public administration introduces new challenges to the traditional territorial-based governance models since, in the most cases, these are not suitable anymore for the challenges of the “smart community” [13]. This latter is considered as a basis for developing smart governance through the application of emergent ICTs that improve administrative decision-making processes and collaboration among governments, citizens, and other stakeholders [14]. Furthermore, the ongoing digitalization of the public sector also transforms the way in which the public interest is to be conceived. This emerges more and more rapidly in the fields of online services that public administrations are required to

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guarantee to their citizens and enterprises [15] by increasing the need of empowering horizontal-based governance models focused on collaboration with non-state actors [16]. Within this framework, digital platforms begun to be applied to the city context. This is the case of the emerging “platform urbanism” [17] aimed at addressing various urbanization problems with the assistance of open data, participatory innovation opportunity, and collective knowledge to support local governance efforts in the development of smarter cities [18]. Contemporary models of public governance advocate the creation of public value through articulated initiatives involving governments and society, where the opening of data and the mobilization of collective knowledge is becoming important to enable the sustainable solutions for local administrations, while spreading innovation [19]. The aim of this paper is to give food for thoughts to the question on how the application of digital platforms within the public sector can effectively support smart governance models. Particular attention will be given to the issues of co-creation and co-participation to public services and activities, where the Government-as-a-Platform (GaaP) approach becomes a possible strategy for the fostering of innovation.

## II. CONCEPT OF ANALYSIS

In attempt to achieve the research objective, the apply-research methodology is applied. This implies a preliminary focus on the linkage between the use of digital platform with public administration and the fostering of inclusive, innovative smart governance models. In the following section the evolution of digital e-Government Platforms is analyzed by crossing the concepts of t-Government and lean-Government. This reconstruction aims at showing how the e-Government conception regarding the role of digital platforms within the public sector has changed over time, and how this paved the way to the Government-as-a-Platform approach. An in-depth analysis of GaaP will help at understanding how ICTs and digitalization strategies can change the nature of e-government platforms from static means to provide electronic communication and data flows to real ecosystems of data, actors, and information. In paragraph 4, these findings are applied to the Smart Cities context by understanding the implication of GaaP approach in efficiency and transparency for the fostering of smart governance. The next sections will describe some of the main GaaP implementations (such as the national strategic platforms X-Road and Portalverbund) and takes the EU Single Digital Gateway as example of possible application of GaaP at European level. The paper ends with some concluding remarks.

## III. THE TRANSITIONS OF SMART GOVERNANCE AND E-GOVERNMENT THROUGH THE APPLICATION OF DIGITAL PLATFORMS WITHIN THE PUBLIC SECTOR

### A. Digital platforms and smart governance

The issue of Smart Governance focuses on the institutional changing through the application of emergent ICTs for governing and improving decision-making processes that generates better collaboration among different stakeholders. In recent years, there has been an increasing interest in public administration platforms and on how this model drastically transforms the processes by which public activities and services are carried out. As known, Smart Government can be considered as a basis for developing Smart Governance through the application of emergent technologies for governing, whereas Smart Governance recalls the intelligent use of ICT to improve decision-making through better collaboration among different stakeholders. Therefore, the digitalization of the public sector is prodromal to the “smartification” of traditional decision-making processes. Here comes the attention to the role of digital platforms not only as part of the digitalization strategy (smart government), but also – and foremost – as fundamental component to spread innovation into governance structures (smart governance). In this regard, it is possible to state that Governance plays a crucial role for the structuring of platform ecosystems, and, within this scenario, digital platforms can increase the digitalization level of public administrations while leveraging citizen engagement. To address this challenge, it is important to stress that the current diversity of digital platforms applied to the public sector reflects a diversity of approaches to the smart governance agenda, and in turn reveals how particular city governments are operating within the wider data economies of their cities [20]. From urban-data platforms [21] to media-platforms [22] and e-government platforms, all these tools offer the capability of creating innovative governance structures. Another fundamental element that is associated to the implementation of digital platform for smart government (so-called e-government platform) can be seen in the role of the public administration, which becomes central in facilitating wider access to government's open data and encouraging external users to co-design government digital services. In the scope of governance, digital platforms can thus enhance co-creation by means of outside-in, inside-out and coupled streams of data and information that widen the innovation process in administrative activities and services [23], [24]. As result, the government act as a “platform of platforms”.

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## B. E-Government platforms' conceptions

The use of ICTs to improve the activities of public sector organizations – which is incardinated by e-Government [25], [26], [27] – constitutes an extensive area of knowledge, principles and policies, wherein services are designed from the perspective of the end-user. Failures in implementing e-government interventions suggest the lack of an integrated approach in understanding e-Government as a discipline. Nevertheless, from its evolution over time it is possible to identify a radical change in the idea of ICTs application to the public sector. More specifically, to different e-Government perspectives are linked different platforms' conceptions. E-Government has been primarily discussed from the technological perspective and focused on creating citizen-centric service provisioning, often without any clear connections to the public sector core values and objectives [28]. Since this approach did not regard to the ICTs integration in a functional perspective, over the years e-Government policies and research have adopted a less techno-centric approach. The focus shifted to viewing citizens in their “customer role” and to creating customer-driven services. During this phase, digital e-Government structures have been developed to provide public information dissemination, accept electronic document submissions, manage them via e-protocol and support the processing phases with appropriate electronic structure characterized by easy communication among the organization's departments [29]. This includes tools serving communicational and informative governmental functions through a user-friendly, interoperable, and distributed web-based architecture [30]. Therefore, the first application of e-Government was oriented at supporting administrative processes by means of electronic communication and dematerialization. A second wave of e-Government research focused on transformational government (t-Government) theme [31], which has been envisioned to reform and transform bureaucracy. This impacted foremost the public services, which (besides being

delivered through e-Government platforms) started to be coproduced thanks to the engagement of social players [32]. In this regard, digital e-government platforms act as digital commons, where the society and public agents interact and collaborate [33]. This marked the shift from platforms conceived as tools serving communication and information to real interaction infrastructures for the empowerment of smart governance model. To that extent, it is important to emphasize that platformization processes in the public sector have peculiar characteristics due to the regulations and structures that public organizations must adhere to. In this regard, an interesting field of research that is connected to t-Government is certainly the public procurement [34], [35], [36], where the application digital e-procurement platforms together with big data centers can increase transparency, efficiency and effectiveness of public spending, as well as the quality of the interaction between economic operators and the public administration, by transforming the structure of such function. The third wave focused on taking advantage of technological developments by viewing the government within its environment [37]. A growing number of scholars recognized that value is defined and co-created by citizens, and that citizens must be involved in the service delivery process to improve the quality and efficacy of public services [38], [39], [40], [41]. In this perspective, the spreading out of digital e-Government platforms includes the restructuring and reengineering of administrative organizations and their services through the increased exploitation of ICTs and Internet of Things in order to trigger and expand the possibilities of co-production of public services and co-participation to administrative decision-making processes. This paved the way to the Government-as-a-Platform Approach.

## C. The Government-as-a-Platform Approach

In city administration, government and society partnership is sought through the configuration of an ecosystem that

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combines technological infrastructure, made available by the platform owner (government), with a wide range of external participants (individuals and companies), who can participate or even complement the platform with innovative services and applications, using data provided by the government [42]. Platforms are thus required to encompass technical elements, as well as social ones, *i.e.* participation of stakeholders in the development of services and public policies that generate value to society [43]. According to the newest e-Government platform conception, digital platforms applied to the public sector enable the creation of a network of services (ecosystems), which are built upon data and services in the frame of platforms that process big data with distributed autonomic and intelligent systems. Each ecosystem has different characteristics and requires different boundary resources, which evolve as result of the activity of orchestration of the data production and are used to address the generativity of ecosystems [44]. Within this context, the concept of Government-as-a-Platform [45] envisages a new coordination structure among all administrative levels from closed relationships into open, flat, and unstructured relationship by means of shared software and data that open the service production process to actors who traditionally play an external role to public administration [46]. Consequently, the Government should function as a facilitator and manager of its interactions with society, and its role becomes the one of platform. The public administration is thus seen as a convener and an enabler [47]: it acts as an intermediary that unfolds collaboration. Therefore, the GaaP represents a new platform-based approach, which is strictly associated, on the one hand, to the idea of co-production in the public sector (with particular regard to new public services and, more generally, in government's activities). On the other hand, such approach cannot be separated from the application of digital technologies to spread innovation. Indeed, the digitalization of public administration is often described as an "organizational moment" of the administrative action which not only innovates traditional administrative function and services, but also leads to the creation of so-called born-digital functions and born-digital public services [48]. This shows how the GaaP approach is aimed at transforming the traditional governance model by radically changing the role of the government. The ongoing "platformization" of public administrations'

activities can thus be conceptualized as a model of sociotechnical governance supported by digital architecture technologies with open and modular standards that guarantee the connection between government and society while increasing public value. A central distinction can be made between "Platform for Government" and "Government as Platform": while the former refers to the use of digital e-government platforms in the public sector (including public service portals for online forms and platforms), the latter refers to platforms as an approach, *i.e.* something that is based on certain mechanisms leading to the opening of public administration to society and business as well as participation and co-creation of platform content [49]. Nevertheless, these two elements are strictly intertwined, since the assimilation of platform principles such as openness, modularization and co-creation within the public administration's governance model begins with fully digitalized administrative procedures and services. To that end – besides the IoT, the Cloud Computing and the Digital Infrastructures – Governments shall be able to integrate digital platforms into their structures. Hence, GaaP claims to deliver a new level of stakeholder participation in the production of public services and in the decision-making process, marking the transition from centralized management to so-called "representative governance" [50] aimed at promoting "smart community" [51]. In the light of these considerations, the GaaP approach recalls the idea of e-Government as a structure of socially inclusive, hyper-integrated ICT platforms that are built with evolutionary systems architecture to ensure the efficient delivery of government services with transparency, efficiency and accountability [52].

#### IV. APPLYING THE GAAP APPROACH TO THE SMART CITY CONTEXT

##### A. Implication on transparency and efficiency

According to recent literature on Smart Cities [53], [54], [55], [56], a city can be defined "smart" when it "invests in its human and social capital in conjunction with the communication and information infrastructure to fuel sustainable economic growth and improve the population's quality of life" [57]. Its main characteristics concerns infrastructure network, which allows good connectivity;

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strategic vision to develop the city's competitiveness through new technologies and the involvement of multiple actors; and the adoption of a sustainable and inclusive urban development approach that emphasizes social capital in urban development [58]. Smart Cities initiatives, in fact, require complex interactions between governments, citizens and a plethora of other stakeholders by addressing the challenges of the digital society, collaborative governance, information sharing, citizen engagement, transparency and openness. To that extent, institutional openness can be regarded as the use of purposive inflows and outflows of knowledge, data and information [59]. When these flows are channeled into platforms, they foster fluid and synergistic interaction among public administrations, institutions and citizen by means of four basic city assets, *i.e.* people, data, infrastructure and technology [60]. Unlike the private sector, the motivating reasons for the adoption of platforms by the government focus on how to serve citizens efficiently in the era of rapid technological, social, and economical changes [61]. It is a matter of articulating new competences in order to guarantee a dynamic, agile and innovative administration and the definition of public policies meeting citizen's needs. This represents an important step toward innovative smart governance implementation, wherein digital platforms represent an essential tool for enabling open and participatory models. Nevertheless, this cannot, *per se*, be enough for reaching real positive implications on openness and efficiency of public administrations' activities. If the application of digital e-Government platforms simply leads traditional governance dynamics to digital world, no smartness can be effectively created and, consequently, no Smart Governance can be properly generated. In order to reveal the full potential of digital platforms within the public sector, the GaaP approach shall be applied to the Smart City context. This means that the Government should drive his institutional role towards innovative dynamics. From the legal point of view, this implies a renewed look into the principle of citizen participation into public administrations' activities [62]: the idea of participation as a way for the government to better understand the needs of the public and for the public to monitor governmental operations [63] becomes fundamental and structural part of the "smart governing". This implies a new classification of citizen participation that, from a key element of democracy [64], becomes an indispensable prerogative to manage complex society in terms of institutional trust and transparency, which are strictly connected to the idea of effectiveness of the public administration [65], [66]. In other words, the GaaP approach makes of participation in the digital era something more than

an element of democracy, *i.e.* an essential component of good administration [67].

### B. GaaP applications by means of strategic national platforms

Some applications of GaaP are already implemented in most European Countries by means of strategic national platforms such as X-Road [68], Portalverbund (National portal network) [69], etc. X-Road is a system of registries whereby each layer has an authorized owner of the data that is responsible for its maintenance and security. The system relies on a unique 16-digit personal identifier for every person which can be used to retrieve personal data from any registry, as well as a number of other identifiers for businesses, properties, vehicles and so on. The result is like a peer-to-peer network, where any data in transit is encrypted. Every X-Road environment is managed by a competent organization (centre) that defines the applied security policy and manages the information of its ecosystem members. With the introduction of X-Road platform, most of State services begun to be delivered online, including e-Police, e-Business that links to a data registry of all legal entities registered in Estonia, e-Health, e-School, etc. Therefore, this portal platform constitutes a technical and organizational environment enabling secure data exchange between various information systems, where public and private actors can connect their de-centrally organized information systems with the central component. It can be considered as a federation with the capability to connect different information systems that may include a variety of services. For what concerns the German application of the GaaP approach, it must be stressed out that the German digital government agency (FITKO) [70], applies GaaP to its architecture management of the federal IT infrastructure. The aim is to deliver over 575 public services online through the National portal network by the end of 2022. Therefore, the joint digital portal-structure represent the heart of GaaP implementation in Germany and takes the form of the portal platform named *Portalverbund*, which provides the technical linkages to the sixteen *Länder* administrative portals and their municipalities by ensuring interoperability between all administrative levels. It creates a network of portals serving as an informational signpost directing citizens to whichever authority conducts the services, regardless of which landing page they access through. The sharing of data in a decentralized manner is guaranteed by requiring all administrative portals to provide similar search and pay components as well as user accounts and mailing function.

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[69] Web: <https://www.bmi.bund.de/DE/themen/moderneverwaltung/verwaltungsmodernisierung/portalverbund/portalverbund-node.html>, accessed 2/8/2022.

[70] Web: <https://www.fitko.de>, accessed 2/8/2022.

Despite the success of GaaP is arguably bound to the context of the Country in which it is implemented, there are some common elements that can be embedded within the GaaP approach, i.e. the adoption of open-source software platforms and open data structures, allowing the combination of products and services that are oriented to meet the current demands of society; the autonomy that offers participants ways to create, generate, implement, or produce new content, without additional help or information from the platform's original creators; the idea of participatory design, bringing clear rules and interoperable systems architecture, with an emphasis on standardization, modularity, and component reuse, which facilitates the assembly line of new applications; as well as innovation and exploration of user behaviour (such as data mining) [71].

### C. The European Single Digital Gateway as an example of a multi-level GaaP approach

At European level, the EU Regulation n. 1724/2018 establishing the Single Digital Gateway [ 72 ] indicates mandatory quality parameters that websites of Member States' public administrations shall comply with to enable overall higher quality of information on the Single Market and accessibility of administrative procedures for cross-border users. Article 14 of the Single Digital Gateway Regulation (SDG Regulation) mandates a list of 21 services for both citizens and businesses that must be provided cross-border within the Digital Single Market by the end of 2023. Specifically, the SDG is a portal platform designed to guide citizens and businesses to find information on European and national rules, rights, and procedures with links to the sites where these can be done online, making fully transnationally accessible national online services [73]. Art. 2 of the SDG Regulation also provides that the SDG shall consist of a common user interface managed by the Commission that is accessible in all official languages of the Union and is integrated into the Your Europe portal [74] that gives access to relevant Union and national webpages. In this regard, the SDG shall give access to information on rights, obligations and rules laid down in Union and national law; information on online and offline procedures and links to online procedures; information on the assistance and problem-solving service. This requires heightened awareness of users and allocating new resources to overcome adoption barriers [75]. The European strategy, initially geared toward the realization of the Digital Single Market and focused on the development of networks and access to digital goods and services to foster the growth of the digital economy, has progressively evolved with the ambitious goal of shaping the

digital future of Europe by considering digital technologies as an enabler for the improvement of citizens' quality of life, to provide new opportunities for businesses, and also to combat climate change in combination with the Europe's green transition [76]. Therefore, it can be embedded into the European Smart City agenda. To that extent, the EU Commission aims at interconnecting services on a national and European level according to the GaaP approach, and the SDG Regulation can be regarded as a strategic tool for putting the citizen in the centre by eliminating the burdens in access to public services by means of innovative internal processes as well as strengthened cooperation between public bodies. To that extent, the Single Digital Gateway works through the consolidation of so-called "dialogue system" capable to facilitate and improve online access to up-to-date information, administrative procedures, and assistance services. In line with the GaaP idea, it is aimed at streamlining interactions between citizens, enterprises, and competent administrative authorities by reducing the amount of administrative burden [77].

### V. CONCLUDING REMARKS

Open innovation constitutes a fundamental paradigm for the transformation of the public sector towards digital public administrations and smart governance models. This latter becomes the backbone of Smart Cities implementation by allowing governments to take advantage of the experience of the citizens to develop "smart" digital services and to guide the decision-making process [ 78 ]. Nonetheless, digital technologies require consensual, transparent, and inclusive governance to promote open spaces for collaboration [79]. This also stressed out the pivotal role of the digital transformation towards Smart Governance models focused on co-participation, co-decision, transparency, and efficiency. E-Government reforms have always aimed at automating public service delivery models. In their first application, digital e-government platforms mirrored the traditional government structure. Thanks to the use of a wide range of digital technologies for recording, processing, and delivering public information to citizens and other public bodies at various institutional levels, the application of such platform began to transform procedures and governance processes. This led to the institutional awareness that the use of digital platform into the public sector could really impact on governance system by allowing "dynamic and synergistic ecosystems of participation" [80]. Nevertheless, although the automation and digitalization of public administration activities represents an indispensable prerequisite, it does not generate smart governance. To reach that goal, digitalization strategies shall be steered by a holistic and integrated approach, which brings

[71] Z. S. Ageed, et al., "A survey of data mining implementation in smart city applications", *Qubahan Academic Journal*, Vol. 1, No. 6, 2021, 91-99.

[72] Regulation EU 2018/1724 of 2 October 2018 establishing a single digital gateway to provide access to information, to procedures and to assistance and problem-solving services and amending Regulation (EU) No 1024/2012 – hereinafter SDG Regulation.

[73] H. Graux, "The Single Digital Gateway Regulation as an Enabler and Constraint of Once-Only in Europe", *The Once-only Principle*, R. Krimmer et al. Eds., Springer, 2021, 83 ff. (86-89).

[74] Web: <https://europa.eu/youreurope/>, accessed 03/08/2022.

[75] C. Schmidt, R. Krimmer, "How to implement the European digital single market: identifying the catalyst for digital transformation", *Journal of European Integration*, vol. 4, Issue 1, 2022, 59-80.

[76] R. Bhattacharai, I. Pappel, et al., "The Impact of the Single Digital Gateway Regulation from the Citizens' Perspective", *Procedia Computer Science*, Vol. 164, 2019, 159-167.

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[78] K.A. Paskaleva, "The smart city: A nexus for open innovation?", *Intell. Build. Int.*, 2011, issue 3, 153-171.

[79] A. J. Meijer, M.P. Bolívar, "Governing the smart city: A review of the literature on smart urban governance", *Int. Rev. Adm. Sci.*, 2016, Issue 82, 392-408.

[80] T. O'Reilly, "Government as a Platform", *cit.*, 37.



ICTs tools into the public value generation chain. Within this context, the GaaP approach comes as a possible solution. Based on a digital foundation for government to share data and services, such approach encloses a new way of designing digital public services using a collaborative development model for the benefit of the society at various levels (city, regional, national) [81]. By leading to a paradigm-shift concerning the role of government in providing public services and activities [82], GaaP applications based on strategic national e-government platforms – such as portal platforms – pave the ways to a real reengineering action for traditional administrative procedures and services. This implies the adoption of open-source software platforms and open data structures, allowing the combination of products and services that are oriented to meet the current demands of society. Another interesting GaaP application within the European Smart City agenda consists in the SDG Regulation, which creates a horizontal, non-sector specific legal

framework for the direct interaction between public administrations, citizens and businesses in the different Member States by creating a shared legal basis and establishing trust [83]. None of such challenges can be adequately addressed without a strengthened European integration [84] aimed at consolidating the Digital Single Market for sustainable development [85], where data become a strategic resource for managing the future Cities. This is the main reason why governments among Europe are evolving towards platform-like Single Point of Contacts, where citizens and businesses can complete most public administration procedures fully online.

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[81] H. Margetts, A. Naumann, “Government as a Platform: what can Estonia show the world?”, online: [https://www.ospi.es/export/sites/ospi/documents/documentos/Government-as-a-platform\\_Estonia.pdf](https://www.ospi.es/export/sites/ospi/documents/documentos/Government-as-a-platform_Estonia.pdf), (accessed on 1/8/2022).

[82] J. Chevallier, “Vers l’État-plateforme?”, *Revue française d’administration publique*, vol. 167, no. 3, 2018, 627-637.

[83] D. U. Galetta, “La Pubblica Amministrazione nell’era delle ICT: sportello digitale unico e intelligenza artificiale al servizio della trasparenza e dei cittadini?” (Public Administration in the era of ICT: single digital gateway and artificial intelligence at the service of transparency and citizens), *Cyberspazio e Diritto*, Issue 3, 2018, 319-336.

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