



Data Governance in Action: The Role of Data Norms in Smart Cities Innovation

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Abstract. This paper explores the role of data norms in the governance of smart cities, with a focus on how these norms shape innovation and collaborative value creation. Data norms are defined as the rules that govern the distribution of data control rights among stakeholders, particularly in relation to civic data sharing, data monetization, and personal data protection. Using the case of Rome's evolving smart city initiatives, including the Rome Data Platform, RomApp, and the newly launched Julia App, this study examines how these norms are enacted in practice. By analyzing these cases, we highlight the tensions and challenges that emerge when data governance initiatives are deployed in urban settings. The findings offer insights into how data norms influence the development and innovation of smart cities. Future research will expand on these themes through in-depth case studies, investigating the long-term impacts of data governance on the growth of smart cities.

Keywords: Smart City · Data Protection · Roma Data Platform · Data sharing · Monetization

1 Introduction

It is commonly accepted that smart cities feed on data, with circulation, sharing, portability and interoperability being their fundamental bases (Paolucci & Pollicino, 2023). Indeed, the contemporary smart cities rely on a continuous flow of data to deliver personalized and increasingly sophisticated services to citizens (Guggenberger et al., 2025; Vigorito, 2023; Tripodi 2024). This growing dependence on data brings to the forefront the critical issue of data governance – that is, how data are accessed, processed and stored across a complex network of public and private actors (Spagnoletti et al. 2025). The relevance of data governance in smart cities is further amplified by the central role that data play in AI-enabled urban architectures (Di Gregorio, 2025).

There is little doubt that the more data are collected and processed, the more effective and personalized the services offered to citizens become. In particular, personal data are of high value to smart cities, as they are rich in information essential for both the delivery and continuous optimization of urban services. It has been noted that collaboration, data sharing and coordination among stakeholders serve as an innovation engine for a smart city, especially through the data generated by various smart city applications (Voorwinden, 2021). Among other things, data collaborations make it possible

to direct data, which are in the domain of private entities (companies, in particular), toward instances of collective interest. Moreover, the companies that share their data in these inter-organizational and interaction forms also need new forms of governance (Kazemargi & Ceci, 2025). But these are still insufficiently tested practices, given that – especially in the private sector – data are predominantly used within organizations. It is noted that traditionally the exchange of data in the private sector is hindered by two main causes.¹ Companies tend to process data for their exclusive use and to maintain a competitive advantage over their competitors. After that, individuals keep the data they own within their organization and are unwilling to share it when the benefits to the public are unclear or when its use is not sufficiently rewarding with respect to their business missions (Grimaldi & Fernandez, 2019; Mossberger et al., 2023).

Therefore, to reverse this trend, in addition to putting pressure on companies (by improving the exchange of data according to the “Business to Government data sharing” and “Government to Business data sharing” formulas) the sharing of data directly by citizens (so-called “Civic data sharing”) should certainly be encouraged.² The latter, in fact, through the rights granted by the GDPR³ and now also by the Data Act⁴ (as will be seen below) can once again dispose of the data processed by companies (social networks, various applications, Telco, etc.) and can then dispose of them for the benefit of smart cities, also instead of companies. Their data, moreover, are strategic for the governance of smart cities, as they are rich in the information needed to improve their decision-making processes and to deliver and get better services. Smart cities must, then, strive to attract data empowerment from citizens by fructifying in the best possible way the data norms we will discuss and designing a participatory context where the citizens themselves aim at a shared goal of public interest, made desirable also a return in terms of economic, personal or collective benefits, such as better public health, less traffic, more efficient mobility, etc. (Mossberger et al., 2023).⁵

Moving, however, from theory to practice, there are many smart city projects that have not experimented with or have found it difficult to put into practice valid forms of

¹ European Commission. Towards a European strategy on business-to-government data sharing for the public interest. Final report prepared by the High-Level Expert Group on Business-to-Government Data Sharing (2020).

² As ENISA (2023) highlighted: “*Personal data protection is an integral element of the trust individuals and organizations should have in the development of data sharing ecosystems... Success will also rely on the establishment of a strong data governance and effective safeguards for the rights and interests of natural persons that are fully compliant with the GDPR. Data protection engineering ... can be a key factor for building a trusted sharing environment, where organizations may submit data without disclosing personal data or sensitive business information or disclosing personal data with an adequate level of protection*”.

³ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016.

⁴ Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023.

⁵ Casiddu et al. (2023) state that “*Citizen interaction and participation are key elements of evidence-based urban planning, as they are capable of providing tools for developing new personalized, adaptive and responsive services*”.

data sharing and, therefore, also to stably maintain their vocation of offering useful services to citizens and businesses by promoting data sharing among various stakeholders, characterized by trust, transparency and usefulness (Dameri & Bruzzone, 2023).

It often happens that many projects that go by the name of smart cities end up being implemented only as prototypes or have a short duration, which is why it is important to evaluate the development of concrete data-driven solutions that serve to give them stability and durability (Aguilera et al., 2017; Cicirelli et al., 2017; Lim et al., 2018).

In this paper, we investigate data governance in smart cities to examine how data norms shape the evolution of collaborative value creation. We define data norms as the rules that allocate data control rights among smart city stakeholders (Spagnoletti et al., 2025). Specifically, we argue that three types of data norms play a critical role in the governance of smart cities.

The one related to the European Data Strategy (Grimaldi & Fernandez, 2019; Mossberger et al., 2023; Caggiano, 2024); the one that recognizes the “monetization” and economic value of data (Ritala, 2024; Gambino, 2020; Bolognini, 2024); and, finally, the one related to the protection of personal data to be used in a virtuous way, rather than letting it be perceived and/or stand, in practice, as a brake on the development and improvement of our modern smart cities.

2 Data Norms for Smart City Data Collaboration

2.1 Civic Data Sharing

The norms related to the European Data Strategy (Data Governance Act and Data Act) create opportunities to stimulate innovation and development in smart cities by fostering the availability of more data, both from businesses and citizens (Di Gregorio, 2025), in the form of “data sharing,” i.e., the “*provision of data by a data subject or data owner to a data user for the purpose of joint or individual use of such data, on the basis of voluntary agreements or Union or national law, either directly or through an intermediary, e.g., under open or commercial licenses, for remuneration or free of charge*” (art. 2, par. 10 of the Data Governance Act, European Regulation 2022/868 of May 30, 2022). By the provision of a monetization, the European Data Strategy itself marks an important discontinuity in the data governance system, compared to the past in which – among others – incentives for data sharing were lacking (Poletti, 2024; Resta, 2023).

While the Data Governance Act can be leveraged to improve data sharing in the public sector (Government to Business Data Sharing) – which is a more tried practice than in the private sector but has nevertheless remained underutilized for a variety of reasons, including, lack of trust, obstacles, and little interest in sharing as such (without

some economic return or other utility)⁶ – the Data Act could, then, be usefully leveraged for Civic data sharing, which we are interested in.⁷

The article 5 of the Data Act states that “*Upon request by a user, or by a party acting on behalf of a user, the data holder shall make available readily available data, as well as the relevant metadata necessary to interpret and use those data, to a third party without undue delay, of the same quality as is available to the data holder, easily, securely, free of charge to the user, in a comprehensive, structured, commonly used and machine-readable format and, where relevant and technically feasible, continuously and in real-time*”.

Data subject’s right to share data with third parties under the Data Act is an extension of the right to portability, already provided for in art. 20 of the GDPR, and could have relevant applications in the context we are dealing with, strengthening the tools that individuals can use to get back possession of information about themselves and to dispose of it for the benefit of data users, through contractual instruments and/or acts of disposition alternative to traditional public-private partnership agreements, which are the forms of data sharing still most widely used in the context of smart cities.⁸

Ultimately, the above-mentioned regulation - aimed at stimulating the European economy through greater use of data and to position the EU competitively vis-à-vis the United States and China – also formalized the concept of the data intermediary. A few years later, this role was institutionalized, reflecting business models that had already emerged with early services like Lumeria and, two decades on, with the Italian app Weople, developed by the start-up Hoda. The app had a clear purpose: “*to use the right to data portability to make it so that any user could manage his or her data, digital capital, as he or she does with his or her money through the bank: that is, to keep it safely stored away or to make it profitable by investing it in the market. This symbology of the bank was not just a marketing gimmick. The Weople app, in fact, allowed the user to have his or her digital data held by any platform applied for in his or her name*

⁶ Data Governance Act states “*to share or jointly process data for, inter alia, the development of new products and services, scientific research or civil society initiatives. Data intermediation services could include bilateral or multilateral sharing of data or the creation of platforms or databases enabling the sharing or joint use of data, as well as the establishment of specific infrastructure for the interconnection of data subjects and data holders with data users*” (preamble 27).

⁷ Conversely, the Data Act cannot be used to support voluntary Business to Government type forms of data sharing. Indeed, on closer inspection, this long-awaited regulatory intervention does not introduce any new elements with respect to voluntary “Business to Government” type data sharing initiatives (see preambles 65 and 66), which remain excluded from its scope, focused on data sharing obligations for reasons of public emergency (Masnada, 2025).

⁸ Di Gregorio (2025) says “*The content of the activity of intermediaries thus concerns the use, reuse, exchange, sharing, and exploitation of data (including for consideration, see Art. 12 lett. b, regarding the conditions for the provision of intermediary services and Art. 20, for the altruism of data) between the entities identified in the new figures of the data holder and the data user who hold the data thanks to the right to portability (directly or from other companies that have acquired them) and who act on the basis of a contractual relationship that can be traced to the scheme of service contract or mandate*”.

under Article 20 and “safely and anonymously ‘deposit’ it with Weople’s servers, in a ‘personal bank account’ just as one does with money” (Rinaldi, 2025).

These models have, however, stopped in the face of skepticism from data protection authorities. In the request for an opinion on the subject of the commercialization of personal data and the right of portability, addressed by the Chair of the Italian Data Protection Authority to the Chair of the European Data Protection Board, it is stated that “(...) *this is a very relevant issue that, although it has come to the fore in Italy, calls for a general reflection that cannot be referred to individual data protection authorities. The case concerns the application of the right to data portability: in fact, an Italian company has proposed itself as an intermediary in the relationship between data controllers and data subjects by requesting, on the latter’s proxy, to obtain personal information held by important business entities, particularly in the large-scale retail sector in order to bring them together within its own database to be subjected to enrichment. The issue is thus related to the “marketability” of the data, with the added complication of the exercise by proxy of the right and the consequent not remote risk of possible duplication of the databases subject to portability (...)*”.⁹

The perplexities that had accompanied the introduction of this data sharing model were, therefore, definitively overcome, on the one hand, with article 5 of the Data Act, providing that the data subject can request, including through data intermediation services providers, that he be given a copy of the data concerning him and can dispose of it in favor of other users for the most varied purposes; on the other hand, by implementing the EU Directive 2019/770, which amends the Legislative Decree 206/2005, the so-called Consumer Code, providing without a doubt that digital services can also be paid with the provision of one’s personal data.

Moreover, precisely on the assumption that the services of social networks are only apparently “free,” the Milan Public Prosecutor’s Office charged Meta Platforms Ireland Limited and X Corporation with € 877 million and € 12.5 million in vat evasion, respectively, claiming that the provision of their digital services to users does not constitute a ‘free’ service but, in fact, realizes a “barter” in which the platforms’ digital services are paid with their users’ personal data (Galimberti, 2025; Carinci, 2025).

2.2 Data Monetization

The fact that the Consumer Code provides that digital services can be paid with personal data open the way for practices in which “*these data and the metadata associated with them*” can constitute “*an object good of economic and legal relations*” (Resta & Zencovich, 2018).

Pursuant to article 135 octies of the Legislative Decree. 206/2005, the provisions on digital content contracts “*shall also apply where the trader provides or undertakes to provide a digital content or digital service to the consumer and the consumer provides or undertakes to provide personal data to the trader, except where the personal data provided by the consumer are processed exclusively by the trader for the purpose of*

⁹ Letter by the Chair of Italian Supervisory Authority to the Chair of European Data Protection Board - Request for opinion on the subject of marketability of personal data and the right to data portability. www.garanteprivacy.it, doc. web 9126725, last accessed 2025/03/27 (2019).

providing the digital content or digital service in accordance with this chapter or to enable the performance of legal obligations to which the trader is subject and the trader does not process such data for purposes other than those intended”.

This means admitting, in general, that users’ personal data have economic value and that they can dispose of it to purchase goods and services. After all, data have become an extremely important resource for the economies of our Countries and, with good reason, have been called the “new oil”,¹⁰ although – compared to this precious natural resource – data have the characteristic of being intangible assets that do not consume and can be used and reused simultaneously by multiple parties and for multiple purposes, without the use of one excluding that of the other (Rinaldi, 2025; Ducuing, 2024).

Although it may seem difficult to admit that personal data can be used as a bargaining chip, since they also constitute attributes of the person,¹¹ it should not be forgotten that the right to the image also undoubtedly constitutes a right of the person but it is, likewise, established that it equally constitutes an asset that can be exploited in its patrimonial values for commercial purposes, at least for famous people.¹²

However, there are many business models, involving personal data, that exploit their monetization potential and are finding increasing diffusion and application. Ultimately, they can be traced to three types (Ducci, 2025): the “zero cost” model, typical of social networks; the “personal data economy” model, which consists of the direct exchange of data for a monetary consideration, as in the case of the Weople App; and the “pay or consent” model, typically applied by online newspapers (Trovato, 2022). It has, however, been highlighted that these models, in order to be applicable, must comply with GDPR, on the protection of personal data, as a necessary condition of lawfulness (Moretti, 2022).

All of these models are also abstractly useful and usable in smart city data sharing ecosystems to encourage citizens’ data empowerment (Civic data sharing) or a virtuous exchange of their data with public administrations that provide services and companies (d’Ippolito, 2022; Bravo, 2021). It has been in this regard correctly noted that the “*the transformation into a data monetizing system creates a tremendous opportunity for all the stakeholders and a motivation for city officials to collect and feed appropriate data into the system*” (Samuel & Gupta, 2022).

2.3 Data Protection

There is no doubt that different frameworks of data sharing work in smart cities if they also ensure the protection of citizens’ personal data.

So, new data norms and data sharing tools that implement the European strategy for data and its monetization are welcome – provided that people’s fundamental rights

¹⁰ The Economist: The World’s Most Valuable Resource Is No Longer Oil, but Data. <https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data>, last accessed 2025/03/29 (2017).

¹¹ European Data Protection Supervisor: Opinion 4/2017 on the Proposal for a Directive on certain aspects concerning contracts for the supply of digital content. https://www.edps.europa.eu/sites/default/files/publication/17-03-14_opinion_digital_content_en.pdf, last accessed 2025/03/20 (2017).

¹² Ex multis Trib. Monza 20 June, 1999. *Dir. Autore*, 74–78 (2021).

are always safeguarded in the smart city (Turci, 2023). After all - by the express will of the European legislator - the GDPR remains fully applicable and protected, without being limited or overridden by other intersecting legislation. Ultimately, the European legislator aimed to strengthen the instruments that enable broader access to data, while at the same time preserving the centrality of fundamental rights. Among these, the right to the protection of personal data – and the corollary rights that allow individuals to maintain control over their data – are positioned to play a primary role (Di Gregorio, 2025).

Precisely, in order to avoid the complexities of GDPR compliance – a data norm often, though mistakenly, perceived as an obstacle to the development of data ecosystems - a model based solely on anonymized data is frequently adopted. This model applies “privacy” measures, rather than security measures, to safeguard the confidentiality, availability and integrity of data. While such an approach certainly eliminates any concerns regarding data protection – since anonymized data do not qualify as personal data and therefore fall outside the scope of the GDPR – it also raises questions about the broader implications for accountability and data governance.

It was, however, noted that – even with respect to anonymized data – not every issue of personal data protection is always resolved, if sufficiently robust techniques aimed at eliminating the identification component of the data are not implemented, as the risk of reidentification of data subjects may remain high.

For instance, users were reidentified against data that were believed to have been irreversibly anonymized, due to incidents involving some databases on users’ browsing data (in Germany), health data (in Italy and in Australia), and public transport data (in Latvia) (De Cordes, 2019).

It was, then, further pointed out that anonymization of data leads to the loss of much important information. Ultimately, anonymized data become less rich in information and, therefore, less useful for smart city goals (De Cordes, 2019).

Here, then, a part of the doctrine proposes the use of synthetic data, understood as “a privacy optimization technology (PET), since it serves as a mechanism to implement a data protection approach by design in scenarios that require the processing of personal data”, that is, data that allow for the implementation of even sufficiently complex treatments, eliminating the need to use real personal data (D’Acquisto, 2024; Brozzetti, 2024; Finocchiaro, 2024).¹³ Although tested in other sectors (healthcare, pharmacology, training of artificial intelligence and machine learning algorithms), synthetic data could be a valid alternative tool to data anonymization (of which, moreover, recurring limitations have been highlighted), allowing work with rich datasets of information and attributes and eliminating the risks of reidentification of data subjects.

Synthetic data could, then, also be used by data intermediation services providers as measures to facilitate the exchange of data in smart cities, improving governance and personal data protection outcomes (art. 12, lett. e) of the Data Governance act).

¹³ ENISA (2022): “Synthetic data is a new area of data processing in which data are elaborated in a way that they realistically resemble real data (both personal and non-personal), but actually they do not refer to any specific identified or identifiable individual, or to the real measure of an observable parameter in the case of non-personal data”.

Furthermore, synthetic data could be not only a means to protect personal information of data subjects,¹⁴ but also a measure to promote the innovation and progress we are seeking in smart cities.

An alternative model to the one above consists in the definition of specific contractual agreements on data, which define the subjects and the responsibilities related to the processing of personal data. In this model, “privacy” issues remain in all their scope and require the enforcement of the GDPR, defining the roles of the subjects involved in the processing of personal data, the information to be given to the interested parties, the legal bases necessary to process the data, the impact assessments on the protection of the rights and fundamental freedoms of the interested parties (de Montjoye, 2018).

Compared to the approaches seen above, there are additional solutions that promote the exchange of data in smart cities under the control of users, who will be able to selectively choose the companies or public entities that will have access to all or part of their data, as well as the duration of their use and all other conditions for using them (De Cordes, 2019). It is the model seen above of the Weople App¹⁵ and data vaults in which interested parties collect and archive their data which are then used and valued on the market, in various forms, by giving a mandate to the data intermediary, now explicitly provided for by the European legislature (Thopam et al., 2023). It is, in fact, the same model proposed by the Data Governance Act.¹⁶ In any case, through the exercise of the rights of interested parties (articles 15–22 of the GDPR) citizens will be able, after their provision, to follow their data and also control how they are used.

Achieving the right balance between protection of data subjects’ personal data and optimizing the forms of data sharing remains, in fact, a considerable challenge in the landscape of smart city development, still poorly addressed from a theoretical point of view and even less from a concrete point of view (Joyce & Javidroozi, 2024).

3 Data Norms in Action: Insights from the City of Rome

To explore how data norms take shape in practice and to uncover the tensions that may arise during their implementation, we examine the case of data governance in the city of Rome. Drawing on three key components of the city’s data ecosystem – the Rome Data Platform, the RomApp, and the Julia App – we illustrate how different data norms are instantiated, negotiated, and sometimes contested. These examples provide empirical grounding for the theoretical categories introduced above, offering insights into the complex interplay between civic data sharing, data monetization, and data protection in a smart city context.

¹⁴ Finocchiaro, G. et al. (2024) state that synthetic data “represent the result of synthesizing processes that exploit machine learning and artificial intelligence algorithms to create novel datasets that ‘mimic’ the characteristics and statistical relationships of real datasets, but do not contain any direct identifying features. In other words, synthetic data, when properly generated, not only faithfully reflect the distribution, trends and patterns of the original data, but do so in a way that negates any risk of tracing information back to individuals”.

¹⁵ Available at <https://weople.space/>, last accessed 2025/03/23.

¹⁶ Data Governance Act, “Data intermediation services providers should be allowed to offer additional specific tools and services to data holders or data subjects for the specific purpose of facilitating the exchange of data, such as temporary storage, curation, conversion, anonymization and pseudonymization” (preamble 32).

Speaking about the methodology used to gain useful insights from the field, primary data were collected that consisted of discussions and meetings with key figures involved in the projects in order to gain a comprehensive understanding of the phased development and their operation in terms of system design and data governance. Primary data collection was also particularly valuable in understanding the challenges, current limitations of the system, and recognizing areas that need to be addressed and current barriers that have prevented RDP and other applications from operating at full capacity. Secondary data, on the other hand, consisted of an extensive literature review on the topics of data sharing (especially, in the form of Civic data sharing), data monetization, and personal data protection, and the tools that enact them to fully absolve the development and progress of smart cities.

Rome Data Platform. The Rome Data Platform (hereinafter for brevity, “RDP”) is a digital smart city platform of the City of Rome. The RDP has its own infrastructure, its own datasets, its own data processing logics, and sensors distributed across the territory. It can collect and process different kinds of data and is a useful governance tool for the Municipality of Rome. The RDP consists of a centralized “dashboard” for observing and managing information related to essential aspects of daily urban life in the city of Rome (Ariano, 2021).

The Rome Data Platform was launched in 2020, precisely with the ambitious goal of becoming the city’s dashboard and enhancing the vast amounts of information produced by the City of Rome and its citizens using connected devices. The purpose of RDP was evidently to improve the data-driven governance of the city, making it evolve at great speed.

Designed to support multiple frameworks of data sharing, not only between public entities but also with companies, the RDP has an ICT architecture capable of collecting, recording and integrating multiple streams of information from different sources, managing to incorporate them into a single system. All this information is processed by the RDP, which returns “data insights” that are useful for city governance and for the citizens themselves. In fact, the further goal of the RDP was precisely to promote the active participation of citizens in data sharing (Civic data sharing), so that this participation could add value for the entire data ecosystem, further supporting smart city governance and its services.

However, over the years, its use has been limited to city governance, lacking direct interoperability and connections with external actors. The current configuration, databases and interoperability between IoT systems are effective only for internal use and do not communicate adequately with each other.

In 2024, however, in collaboration with key figures involved in the creation and administration of the platform, it was possible to conduct a strategic assessment of its capabilities and the possibility of opening to the exchange of data with external entities such as private organizations, companies and, above all, citizens, as well as to define suitable measures to encourage it. Ultimately, RDP intends to extend its scope to an interconnected system of data sharing among various entities, to improve its services to citizens by harnessing public information (stored now in a large “distributed data lake”), but also by attracting the contribution of data from private entities and, above all, citizens. It will, then, be interesting to see whether the new “Evoluzione Roma Data

Platform” project (relaunched by the City of Rome in December 2024) will take these assessments into account and how it will want to and/or succeed in using data norms to push innovation and development in its smart city.

At the moment, the pages of the City’s website report that the goal of this new project is to “*create an enabling tool for the Smart City, operating as a Decision Support System (DSS) to support administrative and stakeholder activities. The platform acts as a centralized” virtual repository “of data generated by Roma Capitale, allowing their aggregation and exchange with other systems in an organized way. The RDP makes digital services available to citizens, such as apps, data visualization dashboards, APIs and web services. (...) The RDP project will have an impact also extended to the municipalities involved, providing a solid basis for improving administrative and economic management. Data interoperability will create an ecosystem of cooperation between municipalities, allowing the development of data-driven strategies. City users will benefit from updated digital services based on forecasts and actual data, enriching the experience of residents, tourists and pilgrims, especially in view of the Jubilee of 2025”.*¹⁷

RomApp. RomApp was, on the other hand, an application that allowed citizens to actively participate in the governance of the city by reporting various urban problems and needs (e.g., need to remove bulky waste; existence of potholes and other issues related to roads, transportation, and so on).

RomApp allowed, as well, to acquire information about the state of the city and services, which was useful for interpreting data provided by other ecosystems (economy, transportation, culture, tourism, welfare, and others) and IoT sensors. RomApp was fully integrated into the overall design and standards of RDP and had functional modules that supported the entire process, from report collection to data processing and analysis. Available for Apple and Android users, it featured a simple design and a strong call-to-action for submitting reports and proposals.

Its uniqueness lay in the fact that there was no need to register and any form of tracking was absent, which encouraged massive citizen adherence and the collection of anonymous, but sufficiently large, data to build models based on which to define citizens’ needs and feelings of liking or disliking. RomApp, was shut down on 20 September 2024, due to operating costs. Despite the support of citizens who helped solve multiple problems and successes in improving services, the closure was inevitable. The group that managed the App expressed deep gratitude for the many active participation and the hope that other similar initiatives will continue this path of civic collaboration for the improvement of the city.

Taking advantage of data norms related to data sharing, monetization, and data protection (moreover, already adequately considered in terms of data anonymization and lack of any tracking of user activities), new development scenarios could also be opened for RomApp.

App Julia. Julia is the City of Rome’s new virtual assistant, which uses generative Artificial Intelligence algorithms to help visitors to explore the city and experience it in

¹⁷ Available at <https://www.comune.roma.it/web/it/attivita-progetto.page?contentId=PRG1163717>, last accessed 2025/03/27.

an easy and pleasant way.¹⁸ Julia also constitutes an interesting application in which it is intended to enhance the sharing and exchange of data among various stakeholders while safeguarding the protection of personal data, above all, using data norms (in this case, also the AI Act)¹⁹ to shelter citizens and users from cognitive bias and hallucinations of the artificial intelligence system used (Spagnoletti & Baskerville, 2025).

Specifically, Julia is based on the generative Artificial Intelligence of OpenAI/ChatGPT, developed through the collaboration of the City of Rome, assisted by the Foundation for Attraction and partners such as Microsoft /OpenAI, Ntt Data and Intellera. Julia allows direct entry of information by operators (hosts, restaurant owners, municipal offices, etc.) and is queried by users through questions posed through special chatbot. Julia represents a unique opportunity for the city's merchants who can enter special databases and actively participate in its platform designed to optimize the management of tourist flows, improve visitor satisfaction and strengthen Rome's image as a destination of excellence and sustainability. Thanks to Julia, Rome can offer tourists a personalized and innovative welcome, and local operators can promote their services more effectively and immediately.

The information and responses Julia provides are generated through direct and guaranteed control of data sources, which should ensure relevance, completeness, and accuracy. Julia relies, then, in addition to the RDP's significant information assets (drawing from its large "data lake"), on data sharing by various stakeholders and claims to operate in compliance with data protection regulations (Palmieri, 2025).

At the time of writing, the Julia App has just been released and represents a promising example of innovation enabled by collaborative data governance (Spagnoletti & Volpentesta, 2024; Manzocchi & Spagnoletti, 2024) The App allows users to query databases from different actors—such as those related to mobility, commerce, and other urban services—using natural language. However, given its recent deployment, it is not yet possible to assess the limitations of this solution. Future research will be needed to critically evaluate its long-term implications and effectiveness.

4 Conclusions and Future Developments

The recent data norms, relating to the European Data Strategy (the Data Act and the Data Governance Act), provide useful means to incentivize data sharing in smart cities, as demonstrated by the activities that are assigned to data intermediation services providers, which can certainly be directed to converge citizens' data towards the implementation of the collective interests of modern smart cities (mobility, tourism, healthcare).

This article considers, then, the Civic data sharing which – if effectively utilized – can make an important contribution to the needs of modern, crowded urban areas. Specifically, it is noted that by taking advantage of the norms governing data collaborations (the Data Act, in particular), sharing activities can be made attractive and interesting to citizens as well, leading to the desirable result of overcoming the abandonment of many

¹⁸ Available at <https://julia.comune.roma.it/it/>, last accessed 2025/03/27.

¹⁹ Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024.

smart city projects that are observed in practice because they are not very profitable or not very attractive to the administrations implementing them.

The monetization of data can also be a useful lever to encourage the exchange and collection of large volumes of data (big data), which – as mentioned above – are the “main engine” of smart city governance and the AI algorithms that make them work.

The above solutions, in any case, cannot absolutely ignore the application of the data protection regulation (the GDPR and national law on the personal data protection), both in terms of their anchoring to solid principles that justify positive conclusions regarding the legitimacy of the economic exploitation of personal data, and in terms of the definition of forms of data sharing that will also have to rigorously apply the data norms on the personal data protection.

Future developments of this research will further explore these themes by conducting in-depth case studies within the evolving smart city ecosystem of Rome. Particular attention will be given to how data norms related to data sharing, monetization, and personal data protection are being applied in emerging initiatives – such as the evolution of the Rome Data Platform and the Julia App – and to what extent they influence the development and innovation of smart cities.

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