

Data Governance - Introduction

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The importance of data in the digital age is undisputed. Similarly, the need for smart cities to collect, analyze and share data to identify problems, measure progress and make informed decisions about resource allocation has become fundamental [1]. Data also enable citizen participation and a high degree of citizen centricity and data-driven decision-making to improve citizens' quality of life [2]. Smart cities encompass a variety of data sources from different actors, making them cross-sector, socio-technical data ecosystems [3]. In such data ecosystems, data is a strategic resource, which is exchanged, shared, (re-)used, and monetized between the actors [4]. The various actors perform different data-specific functions in the ecosystem, for instance data provision, data exchange, data processing or data usage [5]. Accordingly, municipal data ecosystems include various stakeholders such as municipalities, private entities, research institutions as well as individuals and enable data exchange and innovation, with data becoming a strategic asset.

In the course of this development, data governance has a prioritized role, as it provides a mandate to organize data and information in a targeted manner [6]. The goal is to establish strategic importance of data as an asset on an organizational level and to maximize the value of data for the organization by improving the quality of decision-making [7]. Practical oriented perspectives on data governance include elements that emphasize the importance of data as a strategic resource, or valuable asset, that aims at maximizing the value of data [8, 9]. Thus, data governance focuses on how to set up organizational structures, use governance mechanisms to improve data quality, manage resources across the organization and define guidelines for the management of data [10, 11]. Another purpose is to ensure the provision of decision rights and accountabilities for the management and use of data [9]. For this sake, the formalized guidelines for data resources are

the strategic frame for operative data management [11]. A data governance framework includes norms and data standards, which may result from legal or organizational requirements, methods and standards to ensure the ongoing evaluation and further development of the data strategy, concrete policies for managing the data lifecycle, and the structure of the data organization in the form of responsibilities within the organization [11–13]. Hence, data governance is implemented in terms of personnel through designated data roles (in hierarchal structures) – e.g. data owner, data steward, chief data officer –, councils or committees within the organization [14]. Integrating data governance principles within the data strategy ensures consistent management of data across the organization and along the data lifecycle. At the same time, data governance provides the necessary rigor when changes result from the context of the data strategy for the organization [13].

Within a municipal data ecosystem, data governance plays a central role at different levels, such as the technical, organizational, regulatory, and ethical dimensions [11, 15]. At the technical level, data governance establishes standards for data collection, storage, integration, and interoperability, ensuring that municipal systems can efficiently exchange and process data. Within the organizational layer data governance defines roles, responsibilities, and processes for managing data within municipalities. This includes the collaboration among departments, streamlines decision-making, and creates accountability structures for data-related actions. Additionally, data governance ensures compliance with laws and regulations (e.g., Data Act and Data Governance Act), such as personal data protection (e.g., GDPR) and it guides municipalities in managing sensitive information while balancing transparency and confidentiality. Finally, data governance establishes principles for fair, inclusive, and non-discriminatory use of data.

Smart city initiatives and projects seeking to deliver sustainable urban development require engagement with stakeholders to collaboratively identify, collect, generate, and use data [16]. Therefore, the "Data 4 All" project includes data governance as one central aspect to enable municipalities to create value from data by effectively managing data in their respective data ecosystem.

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