

(OPEN) DATA STEWARDSHIP IN THE PUBLIC SECTOR: EVIDENCE FROM A SURVEY OF SLOVENIAN PUBLIC ADMINISTRATION

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In the context of digital transformation and open government data initiatives, data have become a key strategic resource of contemporary public administration. Based on an online survey, this paper examines how (open) data stewardship is organised in Slovenian public administration. The findings show that data stewardship is present but weakly institutionalised. It is most often performed as an additional task rather than as a formal organisational role. Respondents primarily carry out operational tasks related to data collection, verification and user support, while more strategic responsibilities remain less developed. The results also reveal considerable training needs, particularly in areas such as legal compliance, data quality standards and mechanisms for opening data. This study provides empirical insights into organisational practices and capacity gaps relating to data stewardship in public administration.

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1 Introduction

In the context of digital transformation, data have become a key strategic resource of contemporary societies and public administration. Open government data (OGD), in particular, have attracted increasing attention due to their potential to support innovation, economic development and improved public service delivery (Ruijter et al., 2020; Wirtz et al., 2022). At the same time, OGD are recognised for their contribution to transparency, accountability and citizen participation, thereby strengthening democratic governance (Ruijter et al., 2020).

The growing importance of data has been reflected in international and European policy frameworks. The OECD emphasises that public sector data should be treated as a public good and made proactively available for reuse (OECD, 2020). Similarly, the European Union has placed data governance at the centre of its digital transformation agenda through initiatives such as the European Data Strategy and the Digital Decade (European Commission, 2020; 2021). These developments are complemented by a regulatory framework governing access to and reuse of public sector data. In Slovenia, these principles have been incorporated into national legislation and strategic documents, which further emphasise the role of data in public sector modernisation.

Despite these developments, research shows that the value of open data does not arise automatically from data publication alone. Simply releasing datasets rarely leads to societal or economic benefits without appropriate organisational capacities and active data use (Charalabidis et al., 2018; Hitz-Gamper et al., 2019). The creation of public value from OGD therefore depends not only on legal and technical frameworks, but also on organisational practices that ensure data quality, accessibility and reuse.

In this context, data stewardship plays an increasingly important role as a set of organisational practices and responsibilities supporting the management, quality control and (re)use of data. However, empirical knowledge about how data stewardship is organised in practice, particularly within public administration, remains limited. Existing literature also suggests that stewardship roles often remain heterogeneous and only partially formalised across organisational contexts,

reflecting the evolving nature of public sector data governance (Tammamaro et al., 2019; OECD, 2023).

To address this gap, this study examines how (open) data stewardship is organised in Slovenian public administration. Based on a survey conducted among public sector organisations, the study analyses the profile of employees involved in data stewardship, the organisational arrangements through which these activities are carried out, and the associated responsibilities and competencies.

The study addresses the following research question: How is (open) data stewardship organised in Slovenian public administration, particularly with regard to organisational arrangements, employee profiles, responsibilities, competencies and perceived strengths and improvement needs?

The remainder of the paper is structured as follows. Section 2 presents the conceptual framework of data stewardship. Section 3 describes the methodology and empirical results, while Section 4 concludes with key findings and implications.

2 Data Stewardship: Roles, Responsibilities and Competencies

The growing importance of data-driven governance and open data policies has increased the relevance of data stewardship in research and organisational contexts. Data stewardship is generally understood as a set of practices ensuring that data are properly managed, documented, preserved and made accessible throughout their lifecycle (Tammamaro et al., 2019). Despite its increasing importance, the role remains conceptually heterogeneous and not fully standardised, with different terms such as data steward, data curator or data custodian used across disciplinary and organisational contexts (Tammamaro et al., 2019; Tammamaro & Casarosa, 2014).

Nevertheless, there is broad agreement that effective data stewardship is essential for enabling data sharing, reuse and long-term value creation (Manu & Gala, 2021). Data stewards are typically responsible for managing data throughout the lifecycle while ensuring accessibility, reliability and reusability, and are expected to combine domain knowledge with an understanding of organisational processes (Tammamaro et al., 2019; Jablonski, 2022).

Given the limited literature on open data stewardship in public administration, this study draws on broader research on data stewardship and data curation. The literature review focused on scientific and professional publications from 2014 onwards. These were identified through searches in Google Scholar using combinations of the terms “data steward” or “data curator” with keywords such as “roles”, “responsibilities”, “profiles”, “skills” and “competencies”. Since the public administration-specific literature was relatively scarce, the analytical framework was built through a synthesis of more general stewardship literature and practice-oriented sources.

2.1 Responsibilities of Data Stewards

Data stewardship is a multidimensional practice encompassing technical, organisational and governance-related activities. Core responsibilities include ensuring data access, preservation, quality assurance and compliance with relevant standards, policies and legal frameworks (Tammaro et al., 2019; The Turing Way Community, 2022).

Across the data lifecycle, data stewards are involved in activities such as data collection, storage, maintenance, validation and metadata management, which support data discoverability and reuse (Manu & Gala, 2021). Metadata management is particularly important for enabling accessibility and reuse, while compliance with regulatory frameworks, including data protection requirements, represents a key responsibility.

In addition, data stewards contribute to organisational data governance by supporting the development of standards, monitoring data management practices and facilitating data publication and reuse (The Turing Way Community, 2022). They also play a role in promoting good data practices through training, awareness-raising and support for colleagues.

An important aspect of the role is coordination across organisational actors. Data stewards often act as intermediaries between data producers, users and other stakeholders, facilitating communication and fostering a data-driven organisational culture (Manu & Gala, 2021). Operational responsibilities may also include defining procedures for data collection, managing access rights and security levels,

monitoring data usage and supporting the standardisation of data practices (DataGalaxy, 2023).

2.2 Skills and Competencies of Data Stewards

The literature highlights a diverse set of competencies required for effective data stewardship, combining technical and soft skills. Technical competencies include data management, data analysis, database systems and metadata standards, as well as the ability to ensure data quality and maintain data infrastructures (Demchenko, 2016).

At the same time, data stewardship requires strong organisational and interpersonal competencies. These include communication, collaboration, problem-solving and project management, which are essential for operating across technical and organisational domains (Feng & Richards, 2018; Murillo & Yoon, 2024). Soft skills are particularly important for explaining complex data-related issues to non-technical stakeholders and supporting coordination among actors.

Legal and policy-related knowledge is also critical, especially in public sector contexts. Data stewards must understand regulatory frameworks, including data protection requirements and rules governing access to public sector information (Fitsilis et al., 2024). In addition, understanding organisational processes and data governance arrangements is emphasised as a key competence in the public sector (OECD, 2023).

Overall, the role of the data steward is inherently multidimensional, combining technical expertise, organisational coordination and legal awareness. Despite its growing importance, empirical evidence on how these responsibilities and competencies are implemented in public administration remains limited. This gap motivates the present study, which examines (open) data stewardship in Slovenian public administration.

3 Empirical Assessment of (Open) Data Stewardship in Slovenian Public Administration

3.1 Methodological framework

Based on the reviewed literature, a conceptual framework of data stewardship responsibilities and competencies was developed and used to design the survey instrument.

The survey aimed to analyse the profile of (open) data stewards, existing organisational arrangements for data stewardship, and the associated responsibilities and competencies in Slovenian public administration.

The questionnaire was developed based on a synthesis of scientific and professional literature on data stewardship and data curation (e.g., Tammaro et al., 2019; Hudson-Vitale et al., 2017; The Turing Way Community, 2022). Responsibilities were grouped into thematic categories reflecting activities across the data lifecycle, while the competency framework included technical, organisational, legal and soft skills. The questionnaire consisted of 46 questions (117 variables) organised into four sections: (1) respondent profile and organisational context, (2) responsibilities of data stewards, including self-assessed competence and training needs, (3) understanding of the data ecosystem, and (4) soft skills and personal attributes.

Data were collected in January 2025 through an online survey distributed to municipalities (212), ministries (19), bodies within ministries (41), government offices (14), and public agencies (18). The survey link was sent to general organisational e-mail addresses with a request for internal distribution to employees involved in (open) data stewardship. Participation was anonymous, and multiple respondents from the same organisation were possible.

A total of 96 responses were included in the analysis (44 partially and 52 fully completed questionnaires). Since the survey was distributed indirectly via organisations, the total number of potential respondents could not be determined and the response rate could not be calculated. The questionnaire included multiple thematic sections and item batteries, and not all respondents answered every question. Consequently, the number of valid responses varies across individual items

and tables. Partial responses were retained in the analysis in order to preserve available information, particularly because some respondents may not have been familiar with specific stewardship tasks or organisational practices. Therefore, the reported mean values are based on valid responses for each individual item.

Among respondents, 48% were employed in ministries or bodies within ministries, 38% in municipalities, 8% in government offices and 6% in public agencies. Among municipal respondents, the largest shares came from municipalities with up to 5,000 inhabitants (13%) and those with 5,001–15,000 inhabitants (17%).

3.2 Survey Results

3.2.1 Organisational Knowledge and Time Allocation for Data Stewardship

The results indicate a high level of familiarity with organisational context, with average scores between 5.0 and 5.3 on a six-point scale. Respondents reported the highest familiarity with organisational purpose and mission (5.3) and sector (5.2), followed by organisational processes and roles in policy and service delivery (5.0). This suggests that most respondents have a solid understanding of their organisational environment.

At the same time, data stewardship is rarely a full-time role. Most respondents (66%) reported devoting up to 10% of their working time to these tasks, with only a small minority exceeding 30%. This indicates that data stewardship is typically performed as an additional responsibility, pointing to a fragmented and weakly institutionalised approach.

3.2.2 Employees Involved in (Open) Data Stewardship

The results show that data stewardship is typically performed by a small number of employees. Among organisations with at least one responsible employee, most reported between one and four staff involved, indicating limited capacity and low formalisation.

Stewardship activities are most frequently located in IT or digitalisation departments (37%), although respondents also come from a wide range of administrative and sector-specific units. This confirms the cross-cutting nature of data stewardship, while also indicating the absence of a clearly defined organisational “home”.

In terms of job positions, data stewardship tasks are most often carried out by mid-level and senior staff, such as advisers, (under)secretaries and heads of units. The diversity of roles further suggests that stewardship is not yet established as a formal function but is performed on an ad hoc basis depending on organisational context.

3.2.3 Assessment of Organisational Stewardship Systems

Respondents identified several key advantages of existing data stewardship arrangements, including improved data accessibility and transparency, support for decision-making, and benefits related to digitalisation and automation. Some also highlighted clearer organisational structures, improved data quality and increased standardisation.

At the same time, important improvement needs were identified. These include technological upgrades and automation, clearer allocation of responsibilities, additional staffing and training, and stronger coordination and exchange of good practices. Respondents also emphasised the need to improve data quality, traceability and security, as well as to increase awareness and engagement among staff.

3.2.4 Responsibilities of (Open) Data Stewards

Respondents assessed the extent to which 21 different tasks represented their actual responsibilities on a six-point Likert scale. None of the tasks reached the maximum possible score, and the averages ranged from 1.9 to 4.0 on a six-point scale (Table 1).

The most strongly represented responsibilities were checking data reliability (4.0), cooperating with and assisting users (3.9), collecting data (3.6), detecting and correcting inconsistencies (3.6), data storage (3.5), and ensuring legal compliance (3.5). These findings show that respondents are primarily engaged in operational and

support-oriented tasks related to data handling, quality control and assistance to users.

Moderately frequent responsibilities included developing internal data management plans and strategies (3.4), documentation management (3.3), anonymisation (3.3), participation in drafting regulations (3.2), promoting open data (3.2), and monitoring developments in the field (3.1). These tasks have a more strategic character, but they still do not appear to be dominant components of the role.

The least frequently reported tasks were more specialised responsibilities, such as metadata management (2.9), indexing (2.5), implementing quality standards (2.4), establishing permanent repositories (2.1), and managing usage rights (1.9). These tasks are highly specialised, while respondents represent very heterogeneous professional backgrounds, which may partly explain this result.

Table 1: Responsibilities of Data Stewards in the Slovenian Public Administration Context (n = 51–55*)

Responsibilities / Tasks	Mean
Verifying data reliability	4.0
Cooperation with and support for users	3.9
Data acquisition / collection	3.6
Identifying and resolving inconsistencies	3.6
Data storage	3.5
Ensuring compliance with applicable legislation	3.5
Developing plans and strategies for data management within the organisation	3.4
Documentation management	3.3
Data anonymisation	3.3
Participation in the development of regulations	3.2
Promoting the use of open data	3.2
Monitoring developments in the field of (open) data management	3.1
Maintaining data integrity and security	3.1
Implementing mechanisms for opening data	3.0
Monitoring access and conditions of use	2.9
Metadata management	2.9
Ensuring and implementing data removal / deletion protocols	2.8
Indexing	2.5
Implementing quality standards	2.4
Establishing persistent repositories	2.1
Managing usage rights	1.9

* Note: n varies across items due to item non-response.

3.2.5 Competence Gaps, Training Needs, and Skills

Table 2: Comparison of Reported Responsibilities, Self-Assessed Capabilities and Training Needs Across Data Stewardship Tasks (n = 51–55*)

	Responsibility	Capability	Need for training	Difference Responsibility vs. Capability	Difference Capability vs. Need for training
Verifying data reliability	4.0	4.3	4.4	-0.2	-0.1
Identifying and resolving inconsistencies	3.6	3.8	4.3	-0.2	-0.5
Performing data anonymisation	3.3	3.7	4.2	-0.4	-0.5
Data storage	3.5	3.6	4.1	0.0	-0.5
Metadata management	2.9	3.1	4.1	-0.2	-1.0
Implementing quality standards	2.4	2.4	4.3	0.0	-2.0
Data acquisition / collection	3.6	3.8	4.2	-0.2	-0.3
Maintaining data integrity and security	3.1	3.0	4.2	0.0	-1.2
Implementing mechanisms for opening data	3.0	2.9	4.3	0.1	-1.4
Ensuring and implementing data removal / deletion protocols	2.8	3.1	4.1	-0.3	-1.0
Documentation management	3.3	3.5	4.1	-0.3	-0.5
Indexing	2.5	2.6	4.2	-0.1	-1.6
Establishing persistent repositories	2.1	2.2	4.0	-0.1	-1.8
Managing usage rights	1.9	2.0	3.6	-0.1	-1.6
Monitoring access and conditions of use	2.9	3.1	4.0	-0.1	-0.9
Cooperation with and support for users	3.9	4.0	4.2	-0.2	-0.2
Developing plans and strategies for data management within the organisation	3.4	3.3	4.3	0.0	-0.9
Ensuring compliance with applicable legislation	3.5	3.4	4.4	0.2	-1.0
Participation in the development of regulations	3.2	3.2	4.2	0.0	-1.0
Monitoring developments in the field of (open) data management	3.1	2.9	4.3	0.2	-1.3

* Note: n varies across items due to item non-response.

Respondents' perceived abilities were generally closely aligned with their responsibilities, although some discrepancies were observed (Table 2). In several areas, such as metadata management, anonymisation and data collection, respondents reported slightly higher capability than responsibility, suggesting some underutilised capacity. Conversely, slightly lower self-assessed capabilities were observed in more strategic and risk-sensitive areas, including data integrity and

security, legal compliance, opening data and the development of internal data management strategies.

Training needs were consistently high across tasks, particularly in legal compliance, data quality standards, opening data and strategic data management. The largest gaps between current capability and training needs were observed in more specialised areas, especially quality standards, persistent repositories, indexing and usage rights.

Overall, the results indicate a systematic need for competence development, especially in strategic, legal and technically specialised aspects of data stewardship.

Additional question blocks showed that respondents generally reported a high understanding of the data ecosystem in which they operate, with means ranging from 4.9 to 5.2. They also rated their soft skills positively, especially problem-solving (5.0), self-initiative attitude (5.0), analytical thinking (4.9), teamwork (4.8), and adaptability (4.8). By contrast, they rated themselves lower in explaining complex IT content (3.7), inspiring others (4.1), and leadership (4.2).

Finally, although respondents reported relatively strong understanding of new technologies such as artificial intelligence and the Internet of Things (4.8) and a solid awareness of information and cybersecurity concepts (4.5), they rated themselves lower in terms of familiarity with digital and data projects outside their own organisation (4.1) and outside their own sector (4.2). This points to limited cross-organisational and cross-sectoral awareness, suggesting that broader networking and exchange of practice could strengthen stewardship capacity further.

Overall, the results portray open data stewardship in Slovenian public administration as a function that is present but weakly institutionalised, largely operational, unevenly distributed across organisations, and marked by substantial unmet training needs.

4 Conclusion

This study addressed the research question of how (open) data stewardship is organised in Slovenian public administration, particularly in terms of organisational arrangements, employee profiles, responsibilities, competencies and perceived improvement needs.

The findings show that (open) data stewardship is present across a wide range of public administration organisations but remains weakly institutionalised. In most cases, stewardship activities are performed as an additional responsibility rather than as a distinct organisational function. The role is most often located within IT or digitalisation departments, although it also appears across various administrative and sector-specific units, reflecting the cross-cutting nature of data stewardship.

The results further show that respondents are primarily engaged in operational tasks related to data collection, verification, storage and user support, while more specialised and strategic responsibilities appear less developed. Respondents identified strengths related to improved data accessibility, transparency and support for decision-making, but also highlighted several improvement needs, including clearer allocation of responsibilities, additional staffing and training, stronger coordination, and improvements in data quality management. Considerable training needs were identified particularly in areas such as legal compliance, data quality standards, mechanisms for opening data and the development of data management strategies.

Overall, the findings point to the need for a more structured and strategic approach to (open) data stewardship in Slovenian public administration, including clearer role definition, stronger institutional support and systematic competence development.

The study contributes to the emerging literature on public sector data governance by providing empirical evidence on data stewardship practices in a national public administration context. However, the findings should be interpreted with caution due to the use of self-reported data and the possibility of multiple respondents from the same organisation. Future research could further explore data stewardship arrangements through comparative and longitudinal approaches.

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