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DIPIM model: Comprehensive Process for Opening Public Data

DOI: 10.7595/management.fon.2026.0005

Abstract:

Research Question: This paper investigates which concrete steps are essential for opening data in public institutions to ensure comprehensiveness, adaptability and sustainability of the process. **Motivation:** The global movement toward open data is gaining momentum, but public institutions often lack clear, actionable guidance for effective implementation. Building on foundational works by Penteadó, Maldonado and Isotani (2023), Charalabidis et al. (2018), and Zuiderwijk, Janssen, Choenni and Meijer (2014a), which highlight that existing frameworks are often overly technical, fragmented, and misaligned with institutional needs, this paper introduces the DIPIM model - a framework integrating international open data standards with Serbia's legal and administrative context. The proposed model offers a practical roadmap for opening public data in a comprehensive, adaptable, and sustainable way—enhancing transparency, fostering innovation, and strengthening trust in public administration. **Idea:** This paper explores how public institutions can implement open data initiatives through a process-based model grounded in international practices and adapted to local contexts. It identifies key steps via thematic analysis of existing guidelines and validates them through expert insights to ensure relevance and practical applicability. **Data:** The research analysed ten international and national open data guidelines, and also included semi-structured interviews with five domain experts who possess both technical and procedural knowledge of open data processes. **Tools:** The research process followed Design Science Research principles. A qualitative thematic analysis was used to extract common patterns from existing guidelines, which were then consolidated into a new model, further expanded and aligned with the local legal context, and finally validated through expert interviews. **Findings:** The five-phase, 21-step DIPIM model offers a clear, actionable framework for opening public data across diverse institutional settings. Unlike existing models, it combines international best practices with local legal contexts, enhancing practical relevance. Expert evaluations confirmed its clarity and long-term applicability. This study offers a policy-aligned, practice-oriented approach, helping governments effectively plan and sustain open data initiatives, with significant implications for promoting transparency, trust, and innovation in public administration. **Contribution:** This paper contributes to the literature by developing and validating the DIPIM model, a comprehensive and actionable framework for opening data in public institutions, aligned with international practices and the Serbian legal context.

Keywords: public sector, open data process, open government, data publication, data management

JEL Classification: H11, H41, H83, K23, L86, M15, O38, D02

1. Introduction

Imagine a world where vast amounts of information generated by public institutions are not buried in dusty archives but are readily accessible and continuously reusable. This world is within reach, as the key technical prerequisites have already been met thanks to digitized processes of data collection and generation (Cockalo, Tadic, Bakator, Stanisavljev & Makitan, 2024). However, even digital archives can gather dust, and data may remain unused and meaningless unless one crucial condition is fulfilled: we must open the data.

Open data are defined as data that can be freely used, shared, and reused, without significant legal, financial, or technical barriers (James, 2013). Open government data (OGD) initiatives began to appear around 2009, with important steps such as the Obama Executive Order, the European Commission's Digital Agenda, the

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Open Government Partnership, and the G8 Open Data Charter. The European Union is considered a leader in formalizing open data through a comprehensive regulatory framework, which requires member states to make high-value datasets available for re-use.

Over time, the practice of open data has evolved into a critical component of transparent public administration, innovation, and global economic development (Okunleye, 2024). According to the Open Data Inventory the number of countries engaging in open data initiatives increased from 77 in 2013 to 195 in 2023 (Open Data Watch, 2023). Across the globe, governments are increasingly recognizing the value of opening public data to promote transparency, accountability, and citizen participation, while also enabling economic innovation through data-driven services (Ham, Koo & Lee, 2019; Welle Donker & van Loenen, 2017). The European Commission estimates that the direct economic benefits of opening the Public Sector Information (PSI), or government data, could reach €40 billion annually (Zeleti & Ojo, 2017).

Despite the recognized benefits, the process of opening data remains complex and often poorly understood (Zuiderwijk et al., 2014a). Public organizations face several challenges when publishing open data, including privacy concerns (Kulk & Loenen, 2012), stakeholders' involvement (Luthfi, Janssen & Crompvoets, 2020), challenges in deciding which datasets to open (Luthfi, 2021), organizational complexity (Charalabidis et al., 2018a), and a lack of clear processes. Ideally, datasets should be published by default, but in practice, numerous critical factors influence publication decisions, highlighting the need for clear, well-defined processes and procedures to guide data release (Zuiderwijk, Janssen, Choenni, Meijer & Sheikh Alibaks, 2012). Open data should be viewed not as a bureaucratic requirement, but as a strategic enabler of efficiency, public trust, and smarter decision-making in the public sector. In this regard, transformations are needed across technical, organizational, managerial, and political domains, influencing required competencies, policy development, and existing institutional frameworks (Charalabidis et al., 2018a).

Although many open data guidelines exist, they lack the practical detail needed for effective publishing, leaving institutions without clear support (Zuiderwijk et al., 2014a). Because of these impediments, the open data publishing process requires redesign and improvement. Accordingly, this paper addresses the central research question of which concrete steps are essential for opening data in public institutions in a way that ensures the comprehensiveness, adaptability, and long-term sustainability of the process. To address these challenges, this article develops an original DIPIM model for the open data publishing process model. Using the Design Science Research (DSR) methodology, the process was developed based on the world's leading open data guidelines for public institutions and subsequently evaluated by experts in the field, addressing the identified gaps in current practices.

2. Literature Review

2.1 Open Data and Open Government

Open data (OD) represents a cornerstone of transparency, accountability, and innovation in the public sector. It refers to data freely available for use, reuse, and redistribution (Zuiderwijk, Janssen, & Davis, 2014b). Conversely, non-open data includes information subject to legal, ethical, or security restrictions, such as personal data, proprietary business data, and classified government records. Access to such data is governed by legal frameworks, including data protection laws and confidentiality and cyber security policies (Krivokapić & Adamovic, 2018).

Open government, which encourages openness, citizen participation, and institutional cooperation, is closely related to open data. In order to empower stakeholders to make evidence-based decisions, it places a strong emphasis on proactive data release (Hardy & Maurushat, 2017). As a result, OD improves government accountability by lowering the possibility of corruption and allowing public monitoring of actions such as public spending (Kassen, 2013).

Additionally, by allowing businesses and researchers to create new products and innovations, OD promotes economic growth (Okunleye, 2024). Furthermore, better public service delivery and increases in public sector efficiency are positively correlated with OD initiatives (Okunleye, 2024). Finally, reliable data for scientific research and the political process addressing global issues such as climate change, public health and others supports the importance of OD (Mons, 2018).

2.2 Open Data regulatory framework

Based on the Public Sector Information (PSI) Directive, which was first introduced in 2003 and later expanded, the European Union (EU) has developed a strong regulatory framework for open data. In order to improve usability, the 2019 Open Data Directive (Directive (EU) 2019/1024) requires a proactive release of high-value datasets in machine-readable formats. This directive ensures public sector data remains accessible, promoting economic growth, transparency and innovation (Krivokapic & Adamovic, 2018). The EU emphasizes interoperability, standardization, and fair competition, guiding data licensing, accessibility, and reuse. The EU hopes to improve public administration efficiency and promote sectoral innovation by incorporating open data policies into broader digital strategies (Janssen, 2011).

Accordingly, Serbia has progressively aligned its open data policies with European standards, recognizing the strategic importance of data-driven governance. The legal basis was created by the 2018 Law on Electronic Government, which required that public institutions provide datasets in machine-readable formats to guarantee openness (Janev, Mijovic & Vranes, 2016). Serbia is currently developing a new law and related regulations to advance its open data regulatory framework. These new laws are intended to improve monitoring and compliance systems, define explicit obligations for public institutions, and expedite the data publication process.

Additionally, a number of international organizations and civil society initiatives have developed best practices and principles for responsible data usage and publication. Organizations like the World Bank, Open Data Charter, and United Nations have set global OD standards promoting transparency, accessibility, and ethical considerations (Charalabidis et al., 2018b). Among these, the Open Data Charter principles and the FAIR Principles (Findability, Accessibility, Interoperability, and Reusability) are commonly used and provide structured guidelines for ethical open data governance. These principles guarantee that datasets remain discoverable, accessible, and effectively used across sectors (Mons, 2018; Open Data Charter, n.d.).

2.3 Open Data process

In contrast to the process of disseminating information of public interest, the OD process in the public sector can be either proactive or passive (Krivokapic & Adamovic, 2019). Mature open data ecosystems improve decision-making in fields like public spending and urban services by transforming raw data into actionable insights. Their success depends on data availability, quality, legal clarity, public involvement, and socioeconomic impact (Welle Donker & van Loenen, 2017). Accordingly, while countries like the US, the UK, and Canada have centralized portals and legal frameworks, emerging economies struggle with standardization and enforcement (Zuiderwijk & Janssen, 2014).

Despite the recognized benefits, public institutions often hesitate to open their data due to security concerns, legal limitations, insufficient organizational capacity to manage and sustain open data initiatives, and resistance to change. Furthermore, inconsistent datasets and outdated IT systems hinder integration, while unclear guidelines on data protection and confidentiality and intellectual property further limit OD publication (Zuiderwijk & Janssen, 2014). Davies (2014) states that many OGD initiatives resemble each other, using similar portals and selecting alike datasets for their initial launch. On the other hand, Zuiderwijk et al. (2014a) emphasize that existing data publication processes are inconsistent, poorly coordinated, and not optimized for reuse. Employees typically publish data after their acquisition, often without accompanying metadata and with inconsistent storage practices. Accordingly, a well-defined open data framework requires standardized processes, automation, stakeholder engagement, and continuous improvement to ensure sustainability and maximize impact (Zuiderwijk, 2014b).

Furthermore, the open data process should be agile (Zeleti & Ojo, 2019). In order to develop such a model, Grimmlikhuijsen and Feeney (2017) recommend integrating organizational, technological, and societal elements to support seamless data publication, enrichment, and feedback mechanisms. A comprehensive model that connects theoretical understanding with real-world application is necessary to ensure the sustainability and adaptability of these processes (Grimmlikhuijsen & Feeney, 2017).

Effective OD process should involve steps like publishing data online, discovering, evaluating, and visualizing it, as well as analysing, linking, and providing feedback (Zuiderwijk et al., 2014b). Existing frameworks for data opening primarily address challenges related to data quality, validation, and governance (Penteado et al., 2023). These frameworks emphasize metadata standardization, semantic enrichment, and data integration with external sources. However, gaps remain in areas such as data modelling, validation, and user

engagement (Penteado et al., 2023). Therefore, public institutions should integrate different approaches to develop comprehensive and effective OD processes. Even though OGD efforts can be difficult to implement, these procedures should be flexible and agile in order to maximize their impact on society and the economy.

3. Methodology

This paper's goal is to develop a comprehensive, flexible, and sustainable process model for opening data in public institutions. The study uses the Design Science Research (DSR) methodology which focuses on creating and assessing artifacts such as frameworks, models, processes, or systems in order to solve real-world problems (Siedhoff, 2019). Among the six DSR research approaches, this study follows the Design Science Research Process Model (DSRPM), as outlined by Venable, Pries-Heje and Baskerville (2017), due to its strong focus on the iterative development and assessment of artifacts.

3.1 Problem awareness

To identify the main challenges and gaps in the current procedures for opening data in public organizations, the first stage of this study involved a qualitative literature review (Wilson & Anagnostopoulos, 2021). The literature search was conducted in March 2025 using the Web of Science, IEEE Xplore, Springer Link, and Google Scholar databases. The search strategy was based on a set of relevant keywords: open data, open government, government data, *data publication* and open data process. The selection included open access journal articles, review papers, book chapters, and theses. Exclusion criteria were applied to filter out: (1) articles not published in English, (2) those without full-text access, (3) publications that did not describe a structured open data publishing process, (4) articles focused solely on a single step or specific sector, and (5) those addressing open data in a general context rather than the publication process itself.

Several relevant studies were selected as primary papers, highlighting recurring issues such as the lack of well-defined processes and procedures, privacy concerns, limited stakeholder involvement, difficulties in selecting datasets for publication, and organizational complexity and the absence of detailed foundations and guiding principles for designing the open data publishing process (Kulk & Loenen, 2012; Zuiderwijk et al., 2012; Luthfi, 2021; Charalabidis et al., 2018a; Zuiderwijk et al., 2014a; Luthfi et al., 2020; Penteado et al., 2023).

3.2 Guides comparison

The selection of the guidelines followed a two-step procedure. First, an initial pool of 22 documents was identified through keyword-based searches using relevant academic and institutional sources. From this pool, 10 guidelines were selected based on their relevance to public sector data publication, the presence of structured process descriptions, and the credibility of the issuing organizations, including public institutions and internationally recognized bodies. These 10 documents were then subjected to thematic analysis in order to identify recurring process elements used in public sector open data initiatives. Since terminology and structure varied across sources, themes were abstracted based on the core intent of each step, rather than on identical wording. The analysis resulted in the identification of 15 core themes that consistently appeared across the reviewed documents (Table 1). These themes were used as the foundation for the development of the proposed process model. The methodology is evidence-based rather than arbitrary because each stage is based on a thematic structure developed from international best practices. It also reflects real-world practices seen in several open data guidelines. Additionally, the steps can be directly linked to Serbia's legal system as well as the main issues noted in the literature review.

Table 1: Guides comparison - thematic analysis

THEMES	LITERATURE										Total
	(United Nations ESCWA, 2021)	(Capgemini Consulting, 2018)	(Government of Ireland, n.d.)	(Government of South Australia, 2014)	(New South Wales Department of Planning and Environment, n.d.)	(City of Seattle, 2016)	(Government Technology Agency of Singapore, 2021)	(Treasury Board of Canada Secretariat, 2023)	(Krivokapic, Adamovic, Milosevic & Kosmina, 2019)	(Lusa, 2022)	
Assessment of Institutional Readiness	✓	✓							✓		3
Team Formation and Responsibilities	✓			✓	✓	✓		✓		✓	6
Strategic Planning	✓	✓								✓	3
Dataset Classification and Selection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
Metadata Description	✓	✓	✓	✓		✓		✓		✓	7
Legal and Licensing Aspects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10
Format and Standards for Publication	✓	✓	✓	✓		✓	✓	✓	✓	✓	9
Open Data Platforms	✓	✓		✓				✓	✓		5
Data Publication Process	✓	✓	✓	✓		✓			✓	✓	7
Open Data Costs and Funding				✓							1
Data Maintenance and Updating	✓	✓	✓	✓	✓	✓		✓	✓	✓	9
Promotion								✓	✓	✓	3
User Feedback and Engagement		✓	✓	✓							3
Impact Monitoring and Reporting	✓	✓	✓	✓	✓						5
Compliance with Regulatory Frameworks	✓	✓									2

3.3 Evaluation

Five experts with technical expertise in open data and knowledge of public sector process design participated in semi-structured interviews to assess the model. Due to the specificity of this profile, the number of suitable participants was limited. The model’s structure and clarity, its adaptability to various public institutions, and its long-term applicability were the main topics of discussion during the interviews. Experts were also asked for recommendations on how to improve the model as well as for advice for institutions opening data for the first time. The information acquired helped validate the model’s relevance and identify areas for further refinement.

4. Results & Discussion

4.1 DIPIM model

Based on the results of the thematic analysis of international open data guidelines (Figure 1) and the legal framework of the Republic of Serbia—particularly the Decree on the Open Data Portal—a structured process model was developed. The model was designed to address the key challenges identified in current literature.

The model was developed by refining the 15 core themes identified during the comparative analysis into 21 concrete and operational steps. The steps are aligned with international best practices established by W3C (2017). They are grouped by phases, which allows the model to be referred to as the DIPIM - the DIPIM (Define, Identify, Plan, Implement, Maintain) model. This model could serve as an excellent starting point for public institutions to tailor the process of opening-up the data to their specific needs. It is important to note that not all steps are mandatory, and the model is adaptable to the organization’s capacities and needs.

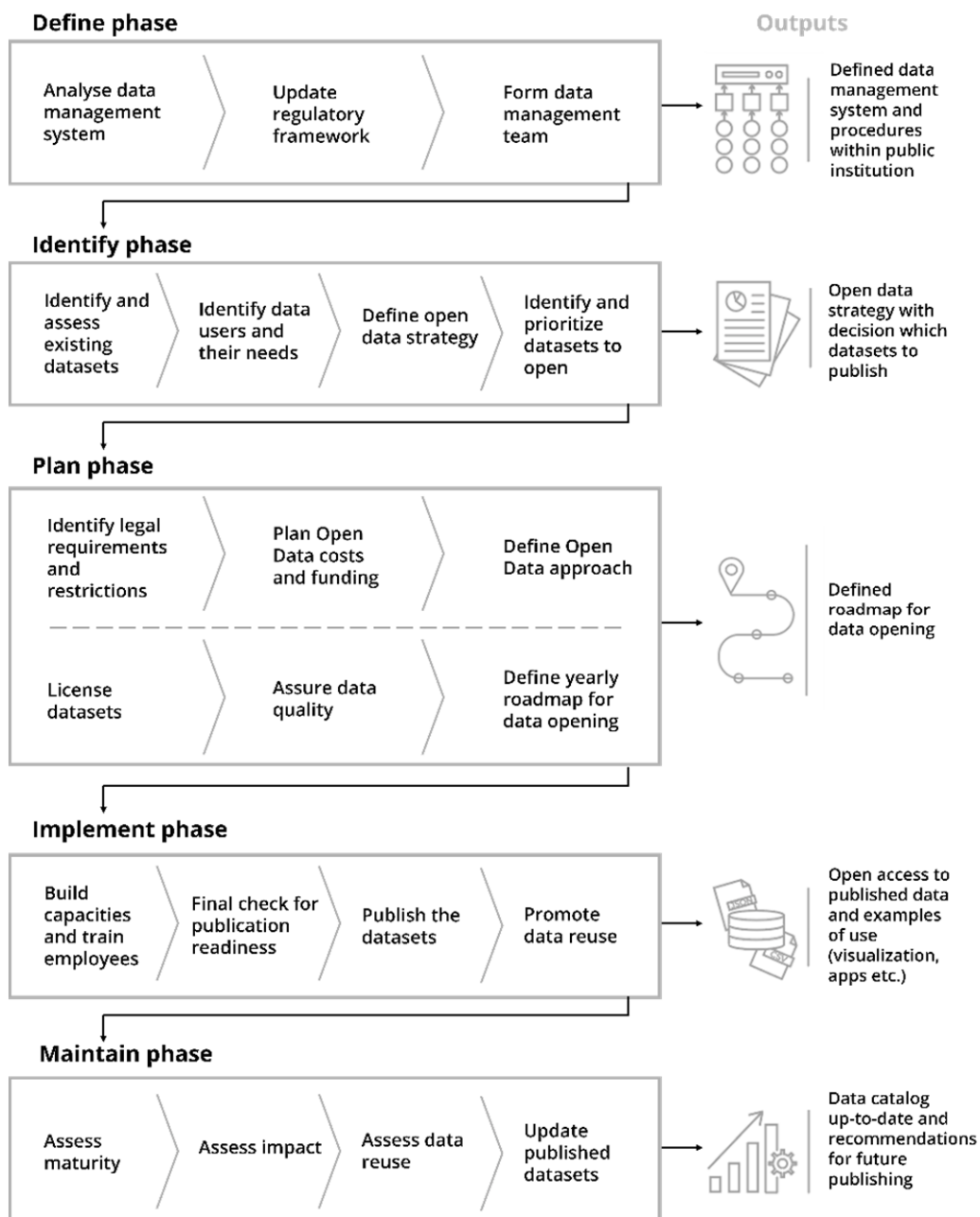


Figure 1: DIPIM model for opening public sector data

The first phase of the model is called Define phase and sets the foundation for the entire process. This phase is crucial, as setting up a structured system and clearly defining responsibilities is a prerequisite for the success of initiatives such as data openness (Vancauwenberghe & Crompvoets, 2018). It begins by analysing the current data management system within the institution, understanding its strengths and weaknesses. Alongside this, updating the documents (policies, systematisation acts etc.) that build-up the regulatory framework of a public institution is next crucial step. To streamline the whole process, a dedicated data management team has to be established, responsible for overseeing the smooth execution of the process steps.

Responsibility for the overall process can be assigned to two key roles, named Administrator and Data Editor, same as it is prescribed by Serbian legislation. However, to improve efficiency, it is recommended that these roles are supported by additional positions, such as Open Data Coordinator, Data Specialist, Data Manager, Legal Advisor, and/or Information Security Advisor (Government of South Australia, 2014). Define phase culminates in the creation of a well-defined system and procedures for managing data within the institution.

In the Identify phase, the focus shifts toward understanding the existing datasets and determining which ones are suitable for opening. This involves a thorough assessment of available data, considering both their quality and potential value or limitations. After that, data users' needs are determined to make sure that the datasets meet their expectations. A best practice recommendation is to open all datasets that can be made public (Capgemini Consulting, 2018). Key output of the Identify phase is the development of an open data strategy that outlines which datasets should be published first, based on their limitations, relevance and demand.

The preparation needed for data publication is thus the main emphasis of the Plan phase. Financial and legal factors are looked at, such as funding and expenses related to opening datasets, as well as any limitations on data sharing. Additionally, the open data approach should be defined to cover topics such as data quality criteria, enriching data, metadata, data standards, open formats and licensing. The development of annual plans for data release is the outcome of all the preceding procedures. These plans should also include a roadmap that outlines the timeline and steps for data publication.

The Implement phase involves building the necessary internal capacity, such as training staff on managing and publishing open data according to previously defined yearly plans. It is suggested to perform the final check before data publishing, to ensure that the datasets are fully ready for publication, and that they meet all technical and legal standards. After the data are published, the efforts are made to promote their reuse. In this regard, visualizations and tools that help both technical and non-technical users better engage with the data are most commonly used. This method emphasizes why it is important to open up public sector data, making them more impactful and successful (Ansari, Barati & Martin, 2022; Roa, Loza-Aguirre & Flores, 2019).

The Maintain phase is all about keeping the open data initiative thriving over time. This stage is crucial as it focuses on ensuring that the published datasets stay relevant and useful. It involves gathering user feedback and setting up a solid framework to assess how well the initiative is doing. Research by Johnson (2016) and Solar, Concha & Meijueiro (2012) highlights the importance of measuring success through passive and active tracking methods, using maturity models and specific success metrics. On the other hand, the DIPIM model provides a thorough framework that bring together maturity assessment, impact evaluation, and reuse measurement to guarantee the ongoing success of open data initiatives. Following a clearly defined evaluation framework, published datasets are regularly updated to ensure they remain relevant, accurate, and current, while a data catalogue is kept up to date with suggestions for future data releases.

The DIPIM model can be seen as a cycle, where each step from define to maintenance phases builds upon and complements the previous ones, enabling incremental and continuous improvements in its usability for the community and public institutions in future iterations. Therefore, as a comprehensive model grounded in practical knowledge and experience, we recommend it as a reference for public administration practitioners

Several steps in the model are broadly applicable across public administration contexts. These include analysing the data management system, identifying and assessing existing datasets, identifying data users and their needs, prioritising datasets for opening, as well as the entire Maintain phase. Such activities reflect widely accepted principles of open data management and are not tied to a specific national setting.

At the same time, some elements are generally relevant but require adaptation to the legal and institutional contexts in which they are implemented. For example, updating the regulatory framework and defining an open data strategy are necessary steps in most settings, but their specific content depends on national requirements, and institutional arrangements. This need for adaptation is particularly evident in the Plan phase, especially regarding costs and funding, as well as the definition of the data approach.

Several elements of the model are more closely linked to the Serbian institutional and legal context. While the formation of a data management team is generally relevant and necessary, the specification of roles such as Administrator and Data Editor reflects arrangements defined within the Serbian regulatory framework rather than universally established open data roles. The implementation phase is particularly context-dependent, as it includes the use of the national Open Data Portal, which represents a country-specific infrastructural component. Finally, although legal review and licensing are integral to any open data process, their concrete application depends on national legislation, administrative procedures, and locally available licensing mechanisms, making these elements especially sensitive to context in practice.

4.2 Experts' evaluation

The expert evaluation of the developed OD model included five representatives from key public sector institutions in Serbia that are members of national OD group, such as local self-governments, universities, National Academy for Public Administration, the Republic Statistical Office and the United Nations Development Programme. The respondents were primarily mid-level managers, with 10 to 20 years of experience in public administration and 3-15 years of working with open data. Most participants had prior involvement in open data initiatives and their average familiarity with the legal framework for open data was rated 4.6 on a scale of 1 to 5, indicating a solid understanding but also room for improvement.

Participants received a written questionnaire consisting of demographic questions and eight open-ended questions used for the evaluation. The model was assessed according to key criteria for evaluating the efficiency and effectiveness of business processes, namely: structure and clarity, adaptability, and long-term sustainability (Viegas & Costa, 2023). Prior to completing the evaluation, participants were provided with all relevant materials, including a detailed 105-page explanation of the model, which, at the time of the evaluation, was being prepared for publication as the *Guide to Open Data*. Respondents reviewed these materials before submitting their responses. Table 2 provides an overview of the key results from the evaluation of the proposed OD model.

Table 2: Experts' evaluation of the model

Expert	Public Institution	Role	Years of Experience in OD	Model Evaluation	Comments
1	National Academy for Public Administration	Database and IT Group Manager	3 years	<p>Structure and Clarity: <i>The model is very clear with precise steps that are arranged chronologically. There are no superfluous steps.</i></p> <p>Adaptability: <i>The model is flexible enough to be implemented in institutions of different sizes and capacities. The challenge for smaller institutions may be primarily human capacity, and support from senior management.</i></p> <p>Sustainability: <i>Key factors that could threaten the long-term sustainability of the proposed model are staff turnover and resistance to change.</i></p>	<p><i>The government should create a network of open data administrators to foster knowledge exchange and support. An annual open data plan should be mandatory in institutions' medium-term plans. Each institution should have an open data promoter to ensure continuous engagement in this activity.</i></p>
2	Republic Statistical Office	Director assistant	15 years	<p>Structure and Clarity: <i>The model is well structured without unnecessary steps. All steps are detailed and clear.</i></p> <p>Adaptability: <i>The steps of the model are flexible and easily adaptable to any institution. However, a key obstacle may be the quality and capacity of human resources in this area.</i></p> <p>Sustainability: <i>Long-term sustainability relies on skilled personnel, effective change management during process implementation, and the successful integration of new technologies in public institutions.</i></p>	<p><i>It is important to form an institutional system that will be maintained by quality people, in which the process of opening up data will be just one of a series of established processes within the institution.</i></p>

Expert	Public Institution	Role	Years of Experience in OD	Model Evaluation	Comments
3	City Administration of Novi Pazar	Manager of IT Office	10 years	<p>Structure and Clarity: The model is clear and well-structured, but some steps (Forming a team, Creating plans and policies) may be too ambitious for smaller institutions lacking adequate staff or formal processes.</p> <p>Adaptability: The model allows adaptability but lacks clear guidance for small, resource-limited institutions.</p> <p>Sustainability: Sustainability depends on leadership support, clear roles, training, automation, and continuous monitoring through structured plans and shared resources.</p>	<p>Providing a quick-start guide and showcasing good practices can really support institutions. Starting with small, manageable steps builds confidence and sets the stage for long-term success in opening data.</p>
4	United Nations Development Programme (UNDP)	Advisor for digital technologies	6 years	<p>Structure and Clarity: The model is logically structured and clearly described, offering a comprehensive framework public sector OD initiative.</p> <p>Adaptability: The model supports gradual, iterative implementation, adaptable to various institutions, with steps scalable by depth and participants, considering typical constraints in smaller, resource-limited institutions.</p> <p>Sustainability: Key factors for long-term sustainability include leadership support, dedicated resources, integration into core processes, user feedback loops, success indicators, partnerships, and periodic progress reviews.</p>	<p>Institutions should begin opening data and adopting digital technologies promptly and fearlessly. Smaller institutions can skip some model steps or implement them as part of existing processes, while deferring more demanding actions until resources and timing allow.</p>
5	Faculty of Organizational Sciences	Associate Professor	10 years	<p>Structure and Clarity: Each phase is logically sequenced and clearly labelled, ensuring transparency and ease of understanding for all stakeholders.</p> <p>Adaptability: The modular design enables tailoring to institutions of various sizes, though smaller ones may need to simplify certain steps.</p> <p>Sustainability: Inclusion of a dedicated maintenance phase supports continuous evaluation and updating, essential for long-term sustainability.</p>	<p>A well-structured, comprehensive model that balances strategic planning with operational execution -highly useful for institutions beginning open data initiatives.</p>

Conclusion

This paper aimed to address the lack of structured and practical guidance for opening data in public institutions. Using the Design Science Research methodology, the study identified key challenges - such as unclear procedures, privacy concerns, and the absence of comprehensive guidance - through a qualitative literature review. Building on these findings, and supported by a comparative analysis of existing open data guidelines, the research resulted in the development of a comprehensive process model, DIPIM, consisting of five phases (Define, Identify, Plan, Implement, Maintain) and 21 steps. The model is grounded in international best practices and tailored to the legal and institutional context of Serbia. Its relevance, clarity, sustainability, and adaptability were confirmed through expert validation.

The study directly addresses both theoretical and practical gaps. While existing literature offers multiple frameworks and guidelines for open data publication, these are often fragmented and focused on specific aspects (such as technical standards, data quality, or governance) rather than providing a fully integrated process perspective. The contribution of the proposed model lies not only in consolidating these elements, but in structuring them into a coherent and operational framework. By integrating 15 core themes and extending them into 21 actionable steps, the model addresses key challenges identified in the literature, such as unclear procedures, and the lack of comprehensive guidance. Privacy concerns are addressed by embedding legal and compliance checks as explicit steps in the process. Practically, the model provides a structured and actionable framework that supports step-by-step implementation of open data initiatives in public institutions.

This study has several limitations that should be acknowledged. The DIPIM model was evaluated only through expert feedback, which reflects subjective assessments. The research did not include practical implementation of the model, nor empirical measurement of its effects on the quality, efficiency, or consistency of open data publishing. The limited number of evaluators and the specific national context also restrict the generalizability of the findings. Future research should focus on broader empirical validation of the model, including comparative studies across different administrative and regulatory settings. It should also examine the relationships between individual process phases and dimensions such as clarity, adaptability, and sustainability, as well as explore possible extensions or refinements of the model based on evidence from different institutional contexts.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this manuscript, the authors used Grammarly to improve the overall quality and clarity of the English language. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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Received: 2025-06-05

Revision requested: 2025-11-25

Revised: 2026-04-02 (2 revisions)

Accepted: 2026-04-28

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