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Challenges of Implementing Open Government Data Portals

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Abstract

Background: Open Government Data (OGD) is one of the government's initiatives to enhance transparency, accountability, and the use of public data. However, the increasing availability and publication of data through OGD portals have not necessarily been accompanied by corresponding improvements in data quality and utilization.
Objective: This study aims to analyze the state of Open Data on OGD portals and identify the challenges associated with its implementation.
Methods: This study employed a qualitative literature review approach. Relevant sources on OGD implementation were identified through a structured literature search and analyzed using data reduction, data presentation, and conclusion drawing.
Results: The findings show that the adoption of Open Data continues to expand, particularly in terms of the availability and publication of government data. However, progress has been uneven across several dimensions, including portal maturity, performance, and sustainability; data quality; usability; and data utilization and value creation. Furthermore, the challenges associated with Open Data implementation can be grouped into five categories: technical, data quality, institutional, regulatory and legislative, and end-user challenges. These five categories may arise simultaneously and are interrelated throughout the processes of data provision and utilization.
Conclusion: These findings indicate that the implementation of Open Data through OGD portals should be understood from a multidimensional perspective that considers technological, data-related, institutional, regulatory, and user-related aspects.

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INTRODUCTION

Public information disclosure in Indonesia has a legal basis in Law Number 14 of 2008 concerning Public Information Disclosure. This law regulates the obligation of Public Bodies to provide and/or publish Public Information under their authority, except for information that is exempt from disclosure in accordance with applicable laws and regulations. Public Bodies are also required to periodically announce certain Public Information and communicate it in a manner that is easily accessible to the public. These provisions establish information disclosure as an important component of government administration and public access to information. More specifically, Public Bodies are required to provide and/or publish information under their authority, except for information lawfully exempted from disclosure.

Fulfilling information disclosure obligations requires more than simply providing information; it also entails management practices that enable the public to access and use that information. Information disclosure in digital government has expanded alongside the use of government data as a source of public information. Government data are not only used to support

government administrative processes but can also be made openly available for public access and reuse. This development is closely associated with the concept of Open Government Data (OGD), which positions government data as a resource that can be accessed and utilized more widely (Fang et al., 2024; Gao, 2023; Meuleman, 2022).

The development of Open Data has subsequently become part of government agendas in various countries. Governments have increasingly made data openly available to enable public access and reuse. This practice has evolved through various OGD initiatives that extend beyond data openness to encourage data utilization, public participation, innovation, and value creation. These developments indicate that government data are no longer viewed solely as a source of administrative information but also as a resource that can generate value for society (Fang et al., 2024; de Magalhães Santos, 2024).

Although OGD offers various benefits, the availability of government portals and datasets does not automatically guarantee the achievement of data openness objectives. The literature indicates that OGD implementation continues to face various challenges related to data provision, management, access, and utilization (Ashahril, 2022; Ferreira et al., 2025). This suggests that OGD implementation should be evaluated not merely in terms of the existence of portals as publication channels but also in terms of their capacity to support effective data management and utilization. Therefore, a more comprehensive understanding of OGD implementation conditions and the associated challenges is necessary. In this manuscript, Open Data refers to the broader principle of making data accessible and reusable, whereas Open Government Data (OGD) specifically refers to data released by public-sector institutions. OGD portals constitute the digital infrastructure through which such government data are published and accessed. These terms are used consistently according to these distinctions.

The challenges of OGD implementation become increasingly apparent when growth in data availability is not accompanied by a comparable increase in data utilization. Previous studies have shown that although governments continue to promote data openness and provision through OGD portals, actual data utilization among users remains limited (Alexopoulos, 2025; Begany & Gil-Garcia, 2024). This indicates a gap between data provision and data use. Therefore, OGD implementation should be assessed not only in terms of data availability but also in terms of the extent to which data can be accessed, reused, and leveraged to generate value for users.

Previous research has examined OGD and the implementation of Open Data initiatives from various perspectives. Several studies have highlighted data quality and portal characteristics as factors supporting OGD utilization Hafidz et al. (2023), whereas others have focused on data use and user engagement (Begany & Gil-Garcia, 2024). Other research perspectives address legal aspects Kempeneer et al. (2023), factors affecting OGD performance Zhao et al. (2022), the development of platform ecosystems involving users Hein et al. (2023), and factors associated with the failure of Open Data platforms (Zuiderwijk et al., 2014). This diversity of research focuses demonstrates that OGD implementation is a multidimensional phenomenon examined across various perspectives and research contexts. Taken together, these research streams are complementary but remain analytically fragmented: studies on data quality and portals emphasize supply-side conditions; user-focused studies explain adoption and engagement; and research on legal, institutional, and ecosystem dimensions addresses governance and sustainability. Few studies integrate these dimensions to explain how portal conditions, governance arrangements, and user-side barriers collectively shape OGD implementation.

Although previous studies have examined individual dimensions of OGD, the literature reviewed in this study rarely integrates three analytical tasks within a single synthesis: (1) characterizing the current implementation conditions of OGD portals, (2) classifying recurring challenges across technical, data quality, institutional, regulatory and legislative, and end-user dimensions, and (3) examining how these challenge categories co-occur and interact. This fragmentation limits understanding of how data- and portal-level conditions are interconnected with governance arrangements and user-side barriers.

Accordingly, this study synthesizes the literature to characterize current OGD portal implementation conditions, classify recurring implementation challenges, and explain how technical, data quality, institutional, regulatory and legislative, and end-user barriers interact. Its academic contribution lies in integrating implementation conditions and interrelationships

among challenges within a single analytical framework. Its practical contribution is to help governments and portal managers identify coordinated priorities for improving data quality, governance arrangements, portal design, and user engagement.

METHOD

This study employed a qualitative literature review approach to synthesize evidence on the implementation of Open Government Data (OGD) portals. The research materials comprised scientific journal articles, books, research reports, policy documents, and other academic sources relevant to OGD implementation. The literature was organized around portal conditions and recurring challenges concerning technical interoperability, data quality, institutional arrangements, regulatory and legislative issues, and end-user engagement. The analysis proceeded in three stages: data reduction, in which relevant information was selected and grouped by theme; data presentation, in which patterns across the literature were organized descriptively and systematically; and conclusion drawing, in which the identified patterns and relationships were synthesized to address the research objectives.

RESULTS AND DISCUSSION

Results

Open Data Conditions on the Open Government Data Portal

The results of the analysis indicate that the development of Open Data implementation on OGD portals is characterized by increased data availability and publication, although portal maturity, performance, sustainability, and adoption continue to vary across government contexts. Increased data availability is not necessarily accompanied by consistent data quality and usability, nor has it been followed by a comparable increase in data utilization. Based on the data reduction results, these conditions can be summarized into four patterns, as presented in Table 1.

Table 1

Pattern of Open Data Implementation Conditions on the OGD Portal

No	Condition Pattern	Key Findings	Supporting Research
1	Increased availability and publication of data	The number of initiatives and datasets published is constantly increasing; the number of datasets is used as one of the indicators of portal development	(Aziz et al., 2024; Begany & Gil-Garcia, 2024)
2	Variations in the maturity, performance, and sustainability of the portal	The development of portals is not uniform between countries and between governments; the results of the assessment are influenced by the indicators and methodologies used	(Aziz et al., 2024; Cingolani, 2021; Muñoz et al., 2022; Zhao et al., 2022; Zuiderwijk et al., 2014)
3	Varied data quality and usability	Problems with the completeness and quality of data and metadata were found; the design, function of the portal, and the way of presenting the data affect the ease of use	(Alogaiel & Alrwais, 2023; Hafidz et al., 2023; Matheus et al., 2023; Nogueras-Iso et al., 2021; Simonofski et al., 2022; Zainuddin & Akhir, 2024)
4	Utilization and creation of value that is not comparable	Large-scale data utilization and user engagement are not commensurate with the amount of data available	(Aziz et al., 2024; Begany & Gil-Garcia, 2024; Fang et al., 2024; Hein et al., 2023; Muñoz et al., 2022)

Source: Results of a literature review

The first pattern indicates an increase in data availability and publication through OGD portals. Governments have developed various Open Data initiatives to make data publicly accessible and available for reuse. Aziz et al. (2024) analyzed the development of 27 OGD portals in Europe between 2017 and 2021 and used the number of datasets as one of the indicators of

portal development. Their findings indicate that data availability is the most visible aspect of development in OGD implementation. However, Begany & Gil-Garcia (2024) point out that data provision needs to be accompanied by broader utilization to ensure that available data generates value for users.

The second pattern indicates that the maturity of OGD portals varies across governance contexts. These differences are reflected in portal adoption, performance, development, and sustainability in supporting data provision and utilization (Zuiderwijk et al., 2021). Aziz et al. (2024) found that OGD portal development across European countries was uneven, with some portals demonstrating higher levels of maturity while others exhibited more limited development. Muñoz et al. (2022) also identified variations in OGD performance and adoption associated with organizational conditions and the contexts in which the initiatives were implemented. Regarding sustainability, Cingolani (2021) demonstrated that not all open government platforms are able to survive over the long term. Meanwhile, Zuiderwijk et al. (2021) showed that a country's position in OGD assessments can vary depending on the dimensions evaluated, including progress, maturity, and performance, as well as the indicators and methodologies employed.

The third pattern indicates variations in the data quality and usability of OGD portals. Several studies have identified problems related to the completeness and quality of data and metadata available on OGD portals (Nogueras-Iso et al., 2021). Hafidz et al. (2023) developed an Open Data portal quality assessment framework and applied it to local governments in Indonesia, demonstrating that portal quality issues are also relevant in the national context. Regarding portal usability, Matheus et al. (2023) demonstrated that portal design and functionality, as well as data presentation, influence how easily users can find, understand, and utilize data.

The fourth pattern indicates that increased Open Data availability has not necessarily been accompanied by comparable levels of data utilization and value creation. Fang et al. (2024) found that although the OGD movement continues to evolve and large volumes of datasets are available, large-scale data utilization and value creation have not yet achieved the expected outcomes. Begany & Gil-Garcia (2024) also emphasized the importance of broader and more extensive data utilization in generating value from OGD. Regarding user engagement, Hein et al. (2023) demonstrated that increased data and portal availability has not always been accompanied by adequate levels of user engagement.

Challenges of Implementing Open Data on Open Government Data Portals

Following the identification of the conditions of Open Data implementation on OGD portals, the subsequent analysis focused on the challenges associated with its implementation. The findings from the selected studies indicate that these challenges are multidimensional and extend beyond technological aspects. Based on similarities in their substantive content, the findings were grouped into five main categories: technical, data quality, institutional, regulatory/legislative, and end-user challenges. The distribution of studies across these categories is presented in Table 2.

Table 2

Categories of challenges for the implementation of Open Data on the OGD Portal

No	Categories	Challenge Focus	Study	Number of Research
1	Technical	Interoperability, standardization of data formats and structures, and portal functions and design	(Alogaiel & Alrwais, 2023; Enriquez-Reyes et al., 2021; Ferreira et al., 2025; Hafidz et al., 2023; Matheus et al., 2023; Simonofski et al., 2022)	6
2	Data quality	Completeness, consistency, data timeliness, and metadata quality	(Alogaiel & Alrwais, 2023; Ferreira et al., 2025; Hafidz et al., 2023; Nogueras-Iso et al., 2021; Zainuddin & Akhir, 2024)	5
3	Institutional	Organizational arrangements, coordination	(Cingolani, 2021; Ferreira et al., 2025; Hein et al., 2023; Muñoz et	5

		and involvement between actors, adoption, and sustainability management	al., 2022; Zhao et al., 2022)	
4	Regulation/legislation	Legal and policy frameworks related to access, reuse, privacy, and copyright	(Ferreira et al., 2025; Kempeneer et al., 2023; Zhao et al., 2022)	3
5	End users	Portal fit with user needs, trust and privacy, and user engagement	(Aziz et al., 2024; Chen et al., 2023; Ferreira et al., 2025; Hein et al., 2023; Matheus et al., 2023; Simonofski et al., 2022)	6

Source: Results of a literature analysis. A single study can be classified into more than one category.

Table 2 shows that challenges in implementing Open Data on OGD portals are not concentrated in a single category. Technical and end-user challenges were identified in six studies each, data quality and institutional challenges in five studies each, and regulatory/legislative challenges in three studies. Furthermore, a single study may identify challenges belonging to multiple categories. The number of studies in each category describes the distribution of findings across the analyzed literature and does not indicate the relative importance or severity of each category. Accordingly, each category is discussed in further detail below.

Technical challenges relate to data interoperability and standardization, as well as the technical capabilities of portals to support data access and reuse (Enriquez-Reyes et al., 2021). Differences in data formats and structures can limit interoperability and data reuse, while portal functionality and design influence how easily users can find, access, and utilize data (Matheus et al., 2023). Simonofski et al. (2022) specifically emphasized the importance of portal design that accommodates users with different levels of technical proficiency.

Data quality challenges relate to the completeness, consistency, timeliness, and quality of metadata associated with published data (Nogueras-Iso et al., 2021). Incomplete data, insufficiently updated datasets, or inadequate metadata make it difficult for users to understand and reuse available information. Hafidz et al. (2023) identified data quality as one of the assessment dimensions in their OGD portal quality assessment framework, while Ferreira et al. (2025) classified data quality as one of the categories of limitations affecting open data platforms.

Institutional challenges relate to organizational arrangements, coordination and stakeholder involvement, adoption processes, and the sustainability of OGD initiative management (Ferreira et al., 2025). Zhao et al. (2022) demonstrated that organizational arrangements are associated with OGD performance, particularly in terms of authority, coordination, and the existence of units responsible for OGD implementation. Hein et al. (2023) emphasized the importance of stakeholder involvement from the early stages of development, as well as sustained adaptation in developing the OGD platform ecosystem. Regarding sustainability, Cingolani (2021) identified differences in the sustainability of open government platforms according to the type of organization or actor initiating them, while Muñoz et al. (2022) identified factors associated with the adoption of open government initiatives in local governments.

Regulatory/legislative challenges relate to the legal and policy frameworks governing data provision, access, protection, and reuse (Kempeneer et al., 2023). Kempeneer et al. (2023) demonstrated that the legal framework for OGD encompasses various aspects, including information access and reuse, as well as the protection of interests that may conflict with openness, particularly privacy and copyright. Zhao et al. (2022) indicated that legal and policy factors are associated with OGD performance and provide guidelines for its implementation. Meanwhile, Ferreira et al. (2025) identified legislative issues as one of the challenge categories affecting open data platforms.

End-user challenges relate to the alignment of portals with user needs, factors influencing usage, and user engagement (Ferreira et al., 2025). Simonofski et al. (2022) found that OGD portals tend to be designed primarily for expert users, whereas members of the general public have different needs when accessing and understanding data. Chen et al. (2023) demonstrated that factors such as trust, affect, and privacy concerns are associated with users' intentions to use

OGD. Matheus et al. (2023) provided insights into the perceived usefulness, ease of use, and efficiency of portal use, while Hein et al. (2023) emphasized the importance of user involvement in the development and utilization of OGD initiatives.

Linkages Between Challenge Categories

The results of further analysis indicate that the five challenge categories are not entirely independent but frequently occur simultaneously within the same study. Ferreira et al. (2025) identified all five challenge categories in a single conceptual model of open data platform failures. A combination of technical and data quality challenges was identified in Hafidz et al. (2023) while technical and end-user challenges were jointly identified in (Matheus et al., 2023). Institutional and regulatory/legislative challenges were jointly identified in Zhao et al. (2022), whereas institutional and end-user challenges were identified together in (Hein et al., 2023). These patterns of co-occurrence indicate that challenges in implementing Open Data on OGD portals are interconnected throughout the processes of data provision and utilization.

Discussion

The results indicate that the development of Open Data implementation on OGD portals remains predominantly characterized by increased data availability and publication, whereas data quality, portal maturity, and data utilization have not developed at comparable rates. These findings reinforce the argument that data provision is a necessary but insufficient condition for achieving the objectives of data openness. Zuiderwijk et al. (2014) conceptualize Open Data as an ecosystem that encompasses not only data publication but also data discovery, utilization, interaction, and feedback between data providers and users. When OGD implementation focuses primarily on publication, other elements of the ecosystem may not develop adequately, preventing available data from being transformed into information, services, or societal value, as discussed by (Fang et al., 2024).

The gap between data provision and utilization can also be understood in terms of how OGD success is measured. Using the number of datasets as an indicator of portal development may encourage portal managers to prioritize the quantity of published datasets. Conversely, Zuiderwijk et al. (2021) demonstrated that a country's position in OGD assessments is highly dependent on the indicators and methodologies employed. This suggests that supply-side-oriented indicators may provide an incomplete picture of OGD success. Therefore, OGD portal evaluations should incorporate indicators related to data quality, usability, and utilization rates, consistent with the argument of Begany & Gil-Garcia (2024) that the value of OGD depends on the extent to which available data is actually used.

Technical and data quality challenges can be regarded as foundational barriers to data utilization. Data that lack interoperability, are incomplete or outdated, or are not supported by adequate metadata can make it difficult for users to discover, understand, and integrate datasets with information from other sources (Nogueras-Iso et al., 2021). These conditions have a greater impact on ordinary users who lack the technical skills required to process raw data (Simonofski et al., 2022). Furthermore, poor data quality can undermine user trust in OGD, even though trust is one of the factors associated with users' intentions to use OGD (Chen et al., 2023). Thus, technical and data quality issues on the provider side are directly associated with low levels of data utilization on the user side.

Institutional and regulatory/legislative challenges can be understood as structural factors underlying technical and data quality challenges. The absence of designated responsible units, weak interagency coordination, and a lack of policy guidelines may lead government agencies to publish data using different formats, standards, and update frequencies (Zhao et al., 2022). A regulatory framework is also necessary to establish clear boundaries for data disclosure, particularly when openness must be balanced against other interests, such as privacy and copyright protection (Kempeneer et al., 2023). Without such clarity, data managers may adopt a cautious approach and restrict data publication. Regarding sustainability, Cingolani (2021) demonstrated that the sustainability of open government platforms depends on the commitment of the initiating organization or actor. This indicates that OGD portals should not be treated merely as technology projects but should instead be integrated into sustainable government data

governance.

The interconnectedness of the challenge categories also suggests the possibility of mutually reinforcing cycles. Poor data quality and usability can reduce data utilization, while low utilization can result in limited feedback from users. The lack of feedback may further weaken the incentives for government agencies to allocate resources to improving data quality and developing portals, thereby perpetuating poor data quality and usability. This cycle helps explain why increased data availability does not automatically lead to increased utilization. Breaking this cycle requires an approach that involves users from the early stages of development and incorporates continuous adaptation, as proposed by Hein et al. (2023) in their discussion of the OGD platform ecosystem.

The findings of this study are consistent with Ferreira et al. (2025), who grouped the causes of open data platform failures into five categories: technical, data quality, institutional, legislative, and end-user challenges. This study extends their findings by connecting these challenge categories with the identified patterns of Open Data implementation conditions on OGD portals. The analysis indicates that each condition pattern is associated with particular challenge categories. Variations in portal maturity and sustainability are associated with institutional and regulatory challenges, while variations in data quality and usability are associated with technical and data quality challenges. Meanwhile, limited data utilization and value creation are associated with end-user challenges and are also influenced by the other four categories.

In the Indonesian context, these findings are relevant to the government's efforts to advance data openness. In addition to Law Number 14 of 2008 concerning Public Information Disclosure, Presidential Regulation Number 39 of 2019 concerning One Data Indonesia establishes principles governing data standards, metadata, interoperability, and reference codes, while also defining the roles of data coaches, data guardians, and data producers. These provisions address several of the technical, data quality, and institutional challenges identified in this study. However, the findings of Hafidz et al. (2023) regarding the quality of Open Data portals in local governments in Indonesia demonstrate that the existence of regulations does not necessarily guarantee effective implementation at the operational level. Therefore, the effectiveness of OGD implementation in Indonesia depends considerably on coordination between central and regional governments, the capacity of data managers, and efforts to encourage data utilization by the public.

From a practical perspective, the findings suggest that OGD portal development needs to shift from an emphasis on data provision toward an emphasis on data utilization. Several measures that governments and portal managers could consider include implementing data format and metadata standards to improve interoperability; establishing mechanisms for periodic data quality assurance and updates; designating clear organizational units and authorities for data management; developing regulatory guidelines that balance openness with privacy protection; and designing portals that accommodate the needs of ordinary users. In addition, providing feedback mechanisms and conducting evaluations based on data utilization levels are necessary to ensure that portal development responds to user needs. From a theoretical perspective, the five challenge categories identified in this study can serve as a foundation for developing a more comprehensive evaluation framework for Open Data implementation.

CONCLUSION

This study identifies two central patterns in OGD portal implementation. First, growth in dataset availability and publication is not consistently accompanied by improvements in data quality, usability, user uptake, or value creation. Second, implementation barriers are multidimensional and interdependent, encompassing technical, data quality, institutional, regulatory/legislative, and end-user dimensions. These findings indicate that OGD performance should be assessed beyond publication volume and managed as part of an integrated data governance ecosystem. This study contributes to the literature by connecting observed implementation conditions with interacting challenge categories. From a practical perspective, the findings indicate that governments and portal managers should integrate data quality assurance, interoperable standards, institutional coordination, regulatory clarity, and user-oriented portal development to promote the meaningful reuse of public data.

This study has several limitations. Its findings are derived from an analysis of studies that met the established selection criteria; therefore, the results depend on the scope of the literature reviewed and do not directly represent the conditions of Open Data implementation in any particular government context. Further research could involve empirical investigations in specific countries or government institutions to examine whether the conditions and challenges identified in this study apply across different contexts. Studies in developing countries, including Indonesia, could also investigate Open Data implementation by considering its technical, data quality, institutional, regulatory, and user-related dimensions. Furthermore, future research could focus on developing and testing an evaluation framework that integrates these dimensions to assess Open Data implementation more comprehensively.

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AUTHOR CONTRIBUTION STATEMENT

Ridwan Gustam Effendi contributed to the conceptualization of research, literature search and selection, data analysis through the stages of data reduction, data presentation, and conclusion drawing, preparation of analysis results tables, and writing of initial draft manuscripts. Indra Sensuse contributed to research supervision, validation of methodologies and analysis results, as well as critical review and manuscript editing. All authors have read and approved the final version of this manuscript.

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