Volume 8 Nomor 3 (2025)
ISSN : 2615-0913 (Media Online)
Terakreditasi

Open Government Data Maturity Assessment at the General Elections Commission of Indonesia Using the OD-MM Model

Salma Sa'adah, Sidik Pramono*
Universitas Indonesia, Depok, Indonesia
*sidik.pramono18@ui.ac.id

Abstract

The General Elections Commission of the Republic of Indonesia (KPU RI) plays a crucial role in ensuring electoral transparency through data openness. In response to growing demands for openness, KPU RI launched the Open Data KPU platform. However, in the context of the 2024 General Elections, challenges such as data leakage, fragmented portals, system inaccuracies, and the absence of unified regulations under the One Data Indonesia initiative continue to hinder the effectiveness of open government data (OGD) implementation. These issues not only obstruct data governance but also risk undermining public trust in electoral integrity. To address this, the study assesses KPU RI's OGD maturity using the Open Data Maturity Model (OD-MM) by Solar et al., through a qualitative approach combining expert interviews and document analysis. The findings reveal that KPU RI's OGD maturity level remains at Level 2, categorized as Emerging Capacities, which indicates that capabilities to meet the required criteria have begun to appear, with similar procedures being carried out, but without formal standards or documented processes. By applying the OD-MM framework in an electoral data context, this research offers insights for improving OGD governance in public institutions and enhancing the effectiveness of digital democracy initiatives.

Keywords: Election Data; General Elections Commission of the Republic of Indonesia; Open Data; Open Data Maturity Model; Open Government Data

Introduction

According to Law Number 7 of 2017 on General Elections, the General Elections Commission of the Republic of Indonesia (KPU RI) is required to provide election information to the public. As the institution responsible for administering elections, KPU RI manages essential data such as voter lists, election results, campaign finance reports, and other related data. In the 2014 General Elections, KPU RI began sharing election data online following pressure from the public and political parties to enhance electoral transparency. The KPU decided to publish the tabulation result forms from various election levels, which were then scanned and uploaded to their website, to improve transparency and prevent potential fraud. In 2021, the KPU made a significant step by launching its Open Data portal, which hosts 160 datasets in formats such as JSON, CSV, and XLS—marking an effort to align electoral data practices with open data standards. These initiatives form part of the broader implementation of Open Government Data (OGD) within the electoral sector, aimed at enhancing transparency and public participation.

However, in developing countries, the implementation of OGD often faces structural barriers, including limited technical capacity, weak inter-agency coordination, and lack of sustainable political commitment (Zuiderwijk & Janssen, 2014). OGD implementation at KPU RI continues to face various challenges. Despite the portal's presence, issues such as inconsistent data formats, lack of machine-readability, fragmented data platforms, limited user engagement, and increasing concerns about data

security and the risk of data leakage persist (The Indonesian Institute, 2021; DPR RI, 2024). These challenges not only hinder public access and reuse of electoral data, as stated by Davies & Bawa (2012) that Beyond data availability, the design and usability of OGD platforms are critical in shaping citizens' willingness to engage with public data.

In terms of data format, not all election data provided by KPU RI is available in machine-readable formats. In practice, however, some of KPU's election data is still presented in scanned documents or PDFs, which limits automated processing and public reuse. In addition to format issues, KPU's data is also fragmented across several platforms, such as SIDALIH (voter registration), SIPOL (political party information), and SIREKAP (digital vote recapitulation). This fragmentation can confuse users and hinder effective public engagement, as data is dispersed and lacks integration. Another pressing concern relates to data security. In mid-2023, an anonymous hacker known as "Jimbo" claimed to have breached the KPU website and accessed voter registration data. The attacker reported obtaining 252 million records, which, after filtering duplicates, resulted in around 204 million unique entries—nearly identical to the number of voters listed in the official final voter list (Daftar Pemilih Tetap or DPT), which includes around 204 million voters from 514 districts and cities in Indonesia and 128 overseas electoral areas (DPR RI, 2024). This incident highlights the vulnerability of electoral data systems and raises serious concerns about the adequacy of KPU's data protection mechanisms.

Beyond the technical issues surrounding the KPU's open data portal, challenges also emerge in terms of leadership and political commitment. One major issue is the inconsistency of vision and commitment among stakeholders. For instance, changes in leadership within the KPU can lead to shifts in institutional priorities. The Indonesian Institute (2021) found that such leadership transitions may disrupt the continuity of KPU's commitment to implementing open election data. As a result, previously established policies—particularly those concerning technical regulations for open election data formats—can be weakened or abandoned altogether, undermining long-term progress in open data implementation.

In addition to leadership dynamics, regulatory limitations also pose significant challenges. While legal frameworks for open data exist at the national level, their implementation remains uneven across sectors. The electoral sector, in particular, illustrates several of these gaps. Presidential Regulation No. 39/2019 on One Data Indonesia (Perpres Satu Data Indonesia) reinforces the national open data policy by promoting data standardization, interoperability, and accessibility. However, the legal foundation for open data in electoral governance remains limited. Although Law No. 7/2017 on General Elections includes a provision obligating the General Elections Commission (KPU RI) to disclose information related to election implementation, it lacks detailed operational guidelines. Bernot et al. (2024) found that despite Indonesia being an early advocate of OGD, the initiative is still in the early stages and faces several policy and administrative obstacles. This regulatory gap weakens the institutional mandate needed to operationalize open data principles within the electoral domain, because the success of OGD initiatives is largely determined by institutional enablers such as leadership support, interdepartmental collaboration, and regulatory clarity (Ruijer et al., 2017).

These institutional and regulatory challenges become even more pressing in the face of growing public demand for transparency and accountability—particularly in the lead-up to the 2024 General Elections. In this context, the pressure on KPU RI to release election data that is free to use and reuse by the public has intensified. This aligns with the concept of Open Government Data (OGD), as defined by Susha et al. (2014), which refers to the proactive release of government data for public access and reuse. OGD is

rooted in the principles of transparency, accountability, and citizen participation. has also been increasingly recognized as a tool to foster electoral integrity by reducing information asymmetry and enhancing public oversight in democratic processes (Carolan & Wolf, 2017).

OGD is often viewed as an essential pillar of smart governance and digital transformation, particularly in the context of sustainable development, smart cities, and evidence-based policymaking (Arief & Sensuse, 2018). Rooted in the principles of transparency, accountability, and citizen participation, OGD initiatives aim to foster civic engagement, spur innovation, and enhance public trust in institutions (Okamoto, 2017; Ubaldi, 2013).

However, despite its transformative potential, citizen uptake of OGD remains limited. As shown by Wirtz et al. (2019), factors such as ease of use, perceived usefulness, and expectations around transparency and collaboration significantly influence citizens' intention to engage with OGD platforms. Transparency through OGD is also shown to positively influence public trust in government, particularly when accompanied by clear communication and institutional responsiveness (Grimmelikhuijsen et al., 2013). These findings emphasize the importance of designing OGD services that meet user expectations to maximize public participation and impact.

To address these implementation challenges and improve the effectiveness of OGD initiatives, scholars have developed various maturity models to evaluate how well public institutions adopt open data principles. A model particularly suited for developing country contexts is the Open Data Maturity Model (OD-MM) by Solar et al. (2012, 2014), which assesses institutional, technological, and participatory capacities. This multidimensional approach makes it particularly suitable for assessing OGD maturity in complex institutional settings such as KPU RI.

Other maturity models tend to focus on more specific components of OGD. For example, Lee & Kwak (2012) emphasize public engagement via social media, while Dodds & Newman (2015) concentrate on organizational capacities such as skills development and strategic oversight. Country-specific models like DGABr (Silva & Pinheiro, 2018) in Brazil and Kalampokis et al. (2011) in the European Union show how maturity frameworks can be adapted to suit different governance contexts. Nonetheless, the OD-MM is chosen in this study for its broad applicability, practical orientation, and successful implementation in developing countries—making it a fitting choice for assessing OGD implementation at KPU RI.

Given these considerations, assessing the maturity of OGD implementation at KPU RI becomes particularly relevant—especially during a pivotal moment like the 2024 election year, when public demand for electoral transparency and accountability is at its peak. Despite the increasing relevance of OGD in Indonesia, existing research has yet to adequately explore its application in the electoral domain. While studies on OGD have expanded in recent years, most focus on conceptual discussions or administrative contexts. A systematic literature review using VOSviewer revealed that terms like "maturity" and "election" are largely absent from the current discourse. This reveals a critical gap in empirical studies on OGD maturity in electoral governance. As Susha et al. (2014) observed, many OGD studies tend to emphasize public value creation—such as transparency and accountability—without critically examining how mature or institutionalized those initiatives are in practice.

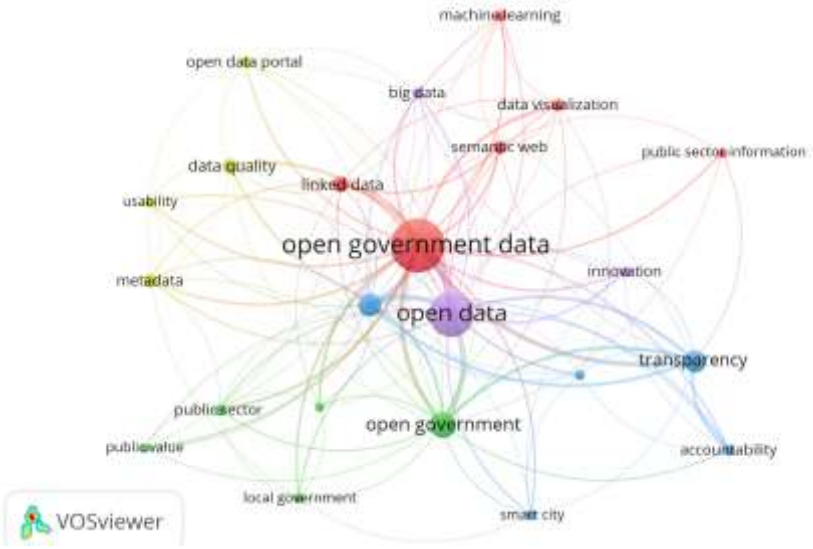

Figure 1. Mapping of Previous Research on Open Government Data
Source: Processed by Researchers (2024)

To address this gap, this study applies the Open Data Maturity Model (OD-MM) developed by Solar et al. (2012, 2014) to assess the maturity of OGD implementation at the General Elections Commission of the Republic of Indonesia (KPU RI). The objective is to assess the institutional, technological, and participatory capacities of KPU RI in managing open electoral data and to identify key strengths and areas for improvement. By focusing on a national-level electoral body during a critical election period, this research contributes empirical insights to the growing body of OGD literature and provides actionable recommendations for strengthening data openness in electoral governance.

Method

This study employs a qualitative descriptive approach with a post-positivist paradigm to assess the maturity level of Open Government Data (OGD) implementation at the General Elections Commission of Indonesia (KPU RI). The data sources consist of primary data obtained through semi-structured interviews with Subject Matter Experts (SMEs) directly involved in the implementation of OGD at KPU RI, and secondary data collected through document analysis of official regulations, organizational reports, open data portals, journal articles, and relevant news publications. Informants were selected purposively based on their roles and expertise in open data. The analysis was conducted by mapping responses and documents to the Open Data Maturity Model (OD-MM), which consist of three domains: Establishment and Legal Perspective, Technological Perspective, and Citizen and Entrepreneurial Perspective, encompassing a total of 9 subdomains (SD) and 33 critical variables. Each subdomain (SD) has a capacity attribute, which is measured by the Capacity Level (CL) of each Critical Variable (*Vi*). The Capacity Level (CL) for each variable is assigned a value on a scale from 1 to 4. This value represents the ability of each variable to fulfill specific requirements. The Capacity Level (CL) for each subdomain is then calculated by summing the products of the weight of each variable (*Wi*) and its corresponding CL value, with Critical Variables being the components within the same subdomain. The capacity level for each subdomain is given by the following equation $CL_{SD} = \sum_{i=1}^{n}(CL(Vi\ x\ Wi)$. After determining the Capacity Level of each subdomain (SD), the next step is to assess the level of the Maturity Level (ML). The Maturity Level (ML) is determined by a specific set of values of the Capacity Level (CL) of each subdomain (SD).

Results and Discussion

1. Establishment and Legal Perspective

a. Strategy, Leadership and Establishment

The Strategy, Leadership, and Establishment sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. Although the Data and Information Center has been designated as the responsible unit and initial procedures are in place, the absence of formal internal regulations on Satu Data Indonesia (SDI) limits institutional effectiveness. Therefore, the value of capacity level in the strategy variable is 2 (CL = 2). Leadership commitment remains weak, with minimal involvement from high-level officials and a leadership selection process lacking transparency. Therefore, the value of capacity level in the leadership variable is 2 (CL = 2). KPU lags behind Bawaslu, which has formalized internal SDI regulations. Although a general SPBE regulation exists, no specific policy on open data has been issued. Coordination remains informal, and alignment with national strategies is not yet institutionalized. As a result, the capacity level for establishment variable is assessed at 2 (CL = 2). Overall, the sub-dimension demonstrates a basic capacity to implement open data practices, but significant gaps remain in strategic direction and formal institutional commitment.

b. Laws and Regulations

The Laws and Regulations sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities, indicating the absence of clearly defined, documented, and well-communicated procedures. For external regulations (CL = 2), KPU demonstrates initial compliance with overarching legal frameworks—such as the Public Information Disclosure Act and the Personal Data Protection Law—yet gaps persist in interpretation and consistent application, particularly regarding the publication of candidate data. In terms of internal regulations (CL = 2), KPU has issued its own rules on public information management; however, it has not fully met obligations outlined in national frameworks like the Presidential Regulation on Satu Data Indonesia. Furthermore, licensing mechanisms (CL = 2) are absent, as data on KPU's portal is published without a formal license, limiting legal clarity and alignment with open data principles. Overall, while regulatory awareness is growing, the lack of formal mechanisms continues to hinder effective and accountable implementation.

c. Management

The Management sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. In terms of training (CL = 2), although the institution has designated personnel for open data management, it lacks formal and structured training programs, and staff competencies remain limited—primarily focused on technical operations rather than statistical analysis or open data principles. Regarding project management (CL = 2), the absence of written standard operating procedures (SOPs), fixed data publication schedules, and systematic workflows indicates an ad hoc and reactive approach to managing open data initiatives. For performance assessment (CL = 2), while external evaluations are conducted by Open Government Indonesia (OGI) and Satu Data Indonesia (SDI), KPU's participation has been inconsistent, and internal monitoring mechanisms are underdeveloped. Overall, the management of open data at KPU remains in the early stages of development, requiring significant institutional improvements in capacity building, procedural standardization, and performance evaluation to ensure a more effective and accountable open data system.

2. Technological Perspective

a. Safety and Availability

The Safety and Availability sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. Regarding safety systems (CL = 3), KPU has implemented data protection procedures and collaborates with the National Cyber and Crypto Agency (BSSN) and the Cyber Crime Division under the Indonesian National Police (Siber Polri) to secure its systems. However, in terms of data availability (CL = 2), challenges remain in ensuring timely access, as data publication is often reactive and lacks a fixed schedule. The mechanism for data updating (CL = 2) is still largely manual and not governed by formal protocols, limiting consistency and reliability. As for tools for measuring the level of use (CL = 2), although such tools exist, access to usage statistics is restricted and not publicly available, undermining transparency and accountability. Overall, while KPU has made key efforts to protect and manage its open data infrastructure, the institution must adopt more structured, proactive, and transparent practices to strengthen its technological readiness.

b. Access

The Access sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. Automated access to data (CL = 3) has been facilitated through a documented API system, and metadata (CL = 4) is already well-established to support discoverability and reuse. However, categorization and discovery facilities (CL = 2) remain inconsistent, as users encounter redundant or overlapping data categories that hinder usability despite the presence of search and filter functions. Additionally, the use of semantic technologies (CL = 1), such as linked data frameworks or RDF, has not yet been implemented, limiting dataset interoperability and contextual richness. Overall, although foundational components for accessibility are in place, the sub-dimension lacks structural integration of advanced technologies and user-centered navigation, suggesting that KPU's open data accessibility requires more systematic and future-oriented improvements.

c. Data Quality

The Data Quality sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 3: Existent Capacities. The portal successfully provides data in non-proprietary formats such as CSV and JSON (CL = 4), and all datasets are publicly accessible free of charge (CL = 3), in line with Indonesia's Freedom of Information Law. While many datasets qualify as primary data (CL = 3)—such as voter participation logs—others, like election results, are only available in aggregated form, limiting their value as original sources. Furthermore, critical datasets, particularly final vote tallies and invalid ballots, are not yet fully disclosed or bundled comprehensively, reflecting limitations in data completeness (CL = 2). Although the technical foundations have been laid, KPU still needs to strengthen data coverage and transparency, especially for high-value electoral datasets. Overall, this sub-dimension shows encouraging progress, but achieving advanced data quality will require more consistent publication of raw, complete datasets aligned with open data standards.

3. Citizen and Entrepreneurial Perspective

a. Data Reuse

The Data Reuse sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. Public election data has been utilized in various civic and governmental programs, including platforms such as Kawal Pemilu (Purwanto et al., 2018, 2020) and Bijak Memilih (Aisyah et al., 2024), demonstrating its relevance to public oversight and political education (CL = 3). However, dataset publication lacks consistency, with a sharp decline in quantity over

recent years (CL = 2), signaling weak data management practices. Although the Open Data KPU portal functions as a single access point for many datasets (CL = 3), some election-related information remains fragmented across different systems. Additionally, while data access is tracked internally (CL = 3), the statistics are not publicly available and are not used to inform improvements in data quality or usability. These findings suggest that although reuse potential is present, it has yet to be fully leveraged due to irregular publication and the absence of user-informed feedback mechanisms.

b. Developers

The Developers sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. The portal successfully ensures open access by allowing users to download and utilize data without any cost (CL = 4), effectively removing financial barriers to information use. However, efforts to promote data reuse remain limited (CL = 2), with few structured activities to encourage broader engagement beyond initial portal promotion events. Similarly, mechanisms to handle user complaints or issues with data access and interpretation are not yet institutionalized (CL = 2), relying instead on informal and manual processes. While KPU has allocated internal resources to support open data operations and received external funding from international partners (CL = 3), the scale of investment remains insufficient to fully support infrastructure and long-term innovation. Overall, this sub-dimension reflects early-stage institutional readiness, with fundamental structures in place but requiring more consistent initiatives and investment to foster a sustainable and participatory open data ecosystem.

c. Participation and Collaboration

The Participation and Collaboration sub-dimension in KPU's Open Government Data (OGD) implementation is assessed at Level 2: Emerging Capacities. KPU has established basic two-way communication channels (CL = 3), particularly through its collaboration with civil society organizations like Persatuan Pemilu dan Demokrasi (Perludem) under the Open Government Indonesia (OGI) action plans. While this reflects a degree of stakeholder engagement, the collaboration has lacked consistency and follow-up, especially in recent years. Public transparency regarding participation remains limited (CL = 2), as the Open Data portal does not feature a dashboard for complaints or user feedback, with only partial data available through the PPID platform. Similarly, although some complaint-handling procedures exist via the PPID, they are not clearly integrated into the Open Data portal, and responses to public queries—particularly through social media—remain inconsistent (CL = 2). Moreover, KPU has not yet developed a system to monitor the reuse or impact of its published datasets (CL = 1), hindering evaluation of data utility. Overall, while there are early efforts to foster participatory and collaborative open data practices, a more structured, responsive, and measurable approach is necessary to ensure deeper public engagement and accountability.

Table 1. Capacity Level Value of Critical Variable and Sub Domain

Domain	Subdomain	Variables	Mode value of capacity level variable CL(Vi)	Weight (Wi)	Capacity level value of sub domain CLSD = $\sum_{i=1}^{n}(CL(Vi\ x\ wi)$	Capacity level (CL) of maturity
Establishment and Legal Perspective	Strategy, Leadership and Establishment	Strategy	2	30%	2	2
		Leadership	2	40%		
		Establishment	2	30%		

	Laws and Regulatios	External Regulations	2	20%	2	2
		Internal Regulations	2	40%		
		Licenses	2	40%		
	Management	Training	2	30%	2	2
		Project Management	2	30%		
		Performance Assessment	2	40%		
Technological Perspective	Safety and Availability	Safety Systems	3	20%	2.2	2
		Data Availability	2	30%		
		Data Updating	2	30%		
		Tools for Measuring the Level of Use	2	20%		
	Access	Automated Data Reading	3	30%	2.7	2
		Metadata	4	30%		
		Categorization and Discovery Facilities	2	20%		
		Use of Semantic Technologies	1	20%		
	Data Quality	Data Format	4	30%	3.1	3
		Free Data	3	25%		
		Primary Data	3	25%		
		Data Completeness	2	20%		
Citizen and Entrepreneurial Perspective	Data Reuse	Open Data Developed Initiatives	3	30%	2.7	2
		Number of Open Data Available	2	30%		
		Single Access Point	3	20%		
		Data Access Measurement	3	20%		
	Developers	Data Gratuitousness	4	20%	2.6	2
		Reuse Encouragement	2	40%		
		Complains and Conflicts Resolution	2	20%		
		RISP Project Financing	3	20%		
	Participation and	Participation and	3	30%	2.1	2

Collaboration	Collaboration Means		
	Participative Transparency	2	20%
	Active Listening	2	30%
	Data Use Measurement (Applications)	1	20%

Source: Processed by Researchers (2024)

Figure 2. Spider Chart Capacity Level of Sub Dimension
Source: Processed by Researchers (2024)

After determining the Capacity Level of each subdomain (SD), the next step is to assess the level of the Maturity Level (ML). The Maturity Level (ML) is determined by a specific set of values of the Capacity Level (CL) of each subdomain (SD), as outlined in table 2.

Table 2. Maturity Level Determination Matrix

Domain	Subdomain	ML 1	ML 2	ML 3	ML 4	The Capacity Level of Sub Domain	*OGD Maturity Level*
Establishment and Legal Perspective	Strategy, Leadership and Establishment			2	3	2	2
	Laws and Regulations			3	4	2	
	Management		2	3	4	2	

Technological Perspective	Safety and Availability		2	3	2
	Access	2	3	4	2
	Data Quality		2	3	3
Citizen and Entrepreneurial Perspective	Data Reuse	2	3	4	2
	Developers	2	3	4	2
	Participation and Collaboration	2	3	4	2

Source: Processed by Researchers (2024)

Based on the comparison between the Capacity Level (CL) scores of KPU RI and the minimum requirements for each Maturity Level (ML), it is concluded that OGD KPU RI is currently at Maturity Level 2: Emerging Capacities. This is because all subdomains that serve as minimum requirements for ML2—namely Management, Access, Data Reuse, Developers, and Participation and Collaboration—have each achieved a CL of 2. Meanwhile, KPU RI has not yet met several key thresholds required for ML3, such as Laws and Regulations, Management, Access, Data Reuse, Developers, and Participation and Collaboration, which demand higher capacity levels. Although some subdomains, like Data Quality, have already reached CL 3, the overall maturity level cannot progress unless all minimum criteria for the next level are fulfilled. This indicates that while foundational capacities for open government data are in place, there are still gaps in strategic alignment, legal frameworks, and stakeholder engagement that hinder advancement to a higher maturity stage.

Conclusion

Based on the assessment results using the Open Data Maturity Model (OD-MM) theory by Solar et al. (2012), the maturity level of Open Government Data at the General Election Commission of the Republic of Indonesia (KPU RI) is at Level 2: Emerging Capacities. This level reflects that KPU has initiated basic efforts to implement open data practices, such as assigning responsible units, collaborating with relevant stakeholders, and providing public access to some datasets. However, these practices are still inconsistent, lack standard operating procedures, and are not yet institutionalized across the organization. Coordination remains informal, leadership engagement is limited, and regulatory frameworks are incomplete. As a result, while early capabilities have started to emerge, the absence of standardized, documented, and organization-wide procedures hinders KPU from reaching a higher maturity level in its open data governance.

References

Aisyah, T., Londo, N., Aurellia, R., & Firman. (2024). Pengaruh Platform Digital Bijak Memilih terhadap Keputusan Pemilih pada Pemilu 2024. *Jurnal ISO: Jurnal Ilmu Sosial, Politik Dan Humaniora*, *4*(2), 1–11.

Arief, A., & Sensuse, D. I. (2018). Designing A Conceptual Model for Smart Government in Indonesia using Delphi 2nd Round Validity. *2018 International Conference on Advanced Computer Science and Information Systems (ICACSIS)*, 93–98.

Bernot, A., Tjondronegoro, D., Rifai, B., Hasan, R., Liew, A. W.-C., Verhelst, T., & Tiwari, M. (2024). Institutional Dimensions in Open Government Data: A Deep Dive Into Indonesia's Satu Data Initiative and Its Implications for Developing Countries. *Public Performance & Management Review*, *47*(6), 1399–1429.

Carolan, L., & Wolf, P. (2017). *Open Data in Electoral Administration*. International Institute for Democracy and Electoral Assistance (International IDEA).

Davies, T. G., & Bawa, Z. A. (2012). The Promises and Perils of Open Government Data (OGD). *The Journal of Community Informatics*, *8*(2).

Dodds, L., & Newman, A. (2015). *Open Data Maturity Model Guide*. Open Data Institute.

Grimmelikhuijsen, S., Porumbescu, G., Hong, B., & Im, T. (2013). The Effect of Transparency on Trust in Government: A Cross-National Comparative Experiment. *Public Administration Review*, *73*(4), 575–586.

Kalampokis, E., Tambouris, E., & Tarabanis, K. (2011). Open Government Data: A Stage Model. In M. Janssen, H. J. Scholl, & M. A. Wimmer (Eds.), *Lecture Notes in Computer Science* (pp. 235–246). Springer, Berlin, Heidelberg.

Lee, G., & Kwak, Y. H. (2012). An open government maturity model for social media-based public engagement. *Government Information Quarterly*, *29*(4), 492–503.

Okamoto, K. (2017). Introducing Open Government Data. *Reference Librarian*, *58*(2), 111 – 123.

Purwanto, A., Zuiderwijk, A., & Janssen, M. (2018). Citizen engagement in an open election data initiative: a case study of Indonesian's "Kawal Pemilu." *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*.

Purwanto, A., Zuiderwijk, A., & Janssen, M. (2020). Citizen engagement with open government data. *Transforming Government: People, Process and Policy*, *14*(1), 1–30.

Ruijer, E., Grimmelikhuijsen, S., & Meijer, A. (2017). Open data for democracy: Developing a theoretical framework for open data use. *Government Information Quarterly*, *34*(1), 45–52.

Silva, P. N., & Pinheiro, M. K. (2018). DGABr: Metric for Evaluating Brazilian Open Government Data. *Informação & Sociedade: Estudos*, *28*.

Solar, M., Concha, G., & Meijueiro, L. (2012). *A Model to Assess Open Government Data in Public Agencies* (pp. 210–221).

Solar, M., Meijueiro, L., & Daniels, F. (2014). *A guide to implement open data in public agencies* (pp. 75–86).

Susha, I., Zuiderwijk, A., Janssen, M., & Grönlund, Å. (2015). Benchmarks for Evaluating the Progress of Open Data Adoption: Usage, Limitations, and Lessons Learned. *Social Science Computer Review*, *33*(5), 613-630.

Ubaldi, B. (2013). *Open Government Data: Towards Empirical Analysis of Open Government Data Initiatives*.

Wirtz, B. W., Weyerer, J. C., & Rösch, M. (2019). Open Government And Citizen Participation: an Empirical Analysis Of Citizen Expectancy Towards Open Government Data. *International Review of Administrative Sciences*, *85*(3), 566–586.

Zuiderwijk, A., & Janssen, M. (2014). Open Data Policies, Their Implementation And Impact: A Framework For Comparison. *Government Information Quarterly*, *31*(1), 17–29.