

Maturity Level of Data Management at The Department of Tourism, Youth and Sports

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ABSTRACT

The Department of Tourism, Youth and Sports (Parpora) faces challenges in managing its growing tourism data due to a lack of integrated systems, leading to issues such as data inconsistency and poor quality. Effective data governance is essential to support its data-driven business strategy. This study aims to assess the current maturity level of data management at Parpora using the DAMA-DMBOK framework and to provide recommendations for designing an effective data governance program. A mixed-method approach was employed, including literature review, document analysis, interviews, and questionnaires with key personnel. The assessment evaluated eleven knowledge areas of DAMA-DMBOK and four overarching categories: Data Management Maturity, Capacity to Change, Collaborative Readiness, and Business Alignment. The overall data governance maturity level was found to be 3.09 (Defined), indicating standardized but not yet optimized processes. Significant variations existed across knowledge areas; Data Storage & Operations and Data Quality scored higher (Level 3), while Metadata Management scored the lowest (Level 0). This research provides a validated set of actionable recommendations for Parpora to advance its data governance maturity. Successful implementation will enhance data quality, availability, and security, leading to more efficient operations and better support for strategic decision-making.

KEYWORDS Data Management, Maturity Level, DAMA-DMBOK, Parpora



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INTRODUCTION

The rapid development of technology and information requires data and information in organizational business processes, including government organizations such as the Department of Tourism, Youth and Sports (Parpora) which is one of the elements of government agencies in the tourism, youth, and sports sectors (Ardiansyah et al., 2019; DUDNYK et al., 2021; Li et al., 2023; Trushkina & Buhaieva, 2021). Government organizations worldwide face significant challenges in managing vast amounts of data while ensuring quality, security, and accessibility. The European Union's implementation of GDPR has highlighted the critical importance of data governance in public institutions, with countries like Estonia and Denmark leading digital transformation initiatives that require sophisticated data management frameworks (European Commission, 2023).

In developing nations, governments struggle with fragmented data systems, lack of standardized processes, and limited technical capacity for effective data governance (World Bank, 2022). Recent studies from India, Brazil, and South Africa demonstrate that tourism departments particularly face challenges in integrating data from multiple sources—visitor statistics, infrastructure data, economic impact metrics, and stakeholder information—into coherent decision-making frameworks (UNESCO, 2023).

This case represents a unique opportunity to examine data governance maturity in a regional Indonesian tourism agency, which differs significantly from other government institutions due to its multi-sectoral mandate encompassing tourism, youth development, and sports. Unlike single-purpose agencies studied in previous literature, Parpora must integrate diverse data types across different stakeholder communities, creating complex governance challenges not typically addressed in existing frameworks. This multi-domain focus makes it particularly relevant for understanding how data governance frameworks can be adapted for integrated public service delivery.

In realizing its vision, namely, realizing superior tourism, youth, and outstanding sports, the Tourism, Youth and Sports Office built an information system for the management of tourism objects. The business strategy created refers to a data-driven strategy so that every decision taken must be based on data. Where a growing tourism object metadata is needed, it states the need for a sustainable information system that has been developed by the Parpora.

The fact that was found after the interview with the office secretary, was that the system was not yet integrated, causing the resulting data to be unrelated to one another. Therefore, data governance functions such as reference and master data management, metadata management, data architecture management, etc. are indispensable for addressing these critical records. In managing data and information, the Parpora collaborates with the Communication and Informatics Office (Kominfo). From 2020 until now the Parpora and the Communication and Information Agency are building a system for tourism management, including data on tourist objects, visitor data, data, managers, reports, and so on.

Therefore, the Parpora needs to perform data management to solve these problems, it requires good data management. The proposed solution is to build a data governance program. If governance is not implemented, it can cause data chaos such as unclear data, not integrated, data inconsistencies, poor performance, user dissatisfaction, low accountability, and several other uncontrollable things (J. E. Agolla & van-Lill, 2017; J. Agolla & Van Lill, 2017; Al-Ruithe et al., 2018; Al-Ruithe & Benkhelifa, 2017, 2020; Cohen & Morote, 2017).

The urgency of this research is particularly heightened in the post-pandemic context, where tourism sectors globally require robust data infrastructure to support recovery strategies and evidence-based policy making. The COVID-19 pandemic has fundamentally altered tourism patterns, making accurate, timely, and integrated data essential for effective sector management and recovery planning. Furthermore, Indonesia's commitment to digital transformation under the "Making Indonesia 4.0" initiative requires government agencies to modernize their data management capabilities to support national competitiveness and service delivery improvements.

The policy implications of this research extend beyond the immediate case study, offering insights for other Indonesian regional governments and developing nation tourism agencies seeking to improve their data governance capabilities. Effective data governance can enhance transparency, accountability, and evidence-based policy making, directly contributing to improved tourism sector performance and public service delivery. The findings may inform national-level policies on government data management standards and capacity building initiatives.

In previous research, both systematic literature review and other empirical research on data governance in an organization, organizations need comprehensive data governance and strategy to achieve competitive advantage. The National Archives of the Republic of Indonesia (ANRI) as an institution mandated to carry out state duties in the field of archives has a vision as a pillar of good governance and the collective memory of the nation. To implement it, the compiled grand design of the archiving system was. This is closely related to the implementation of data governance. The assessment of the grand design is carried out by referring to the Stanford Data Management Model. The results showed that data management was still at the initial level (Mahira et al., 2023; Prasetyo, 2016; Wulandari, 2020).

An organization needs to have the ability to assess the implementation of data management to find out whether data management has been carried out correctly and provides appropriate results (Rivera et al., 2017), including government organizations. Data governance is specifically for the management of data assets. Effective data governance can improve the quality, availability, and integrity of an organization's data by enhancing structured cross-sectoral collaboration on policies (Vásquez et al., 2018).

There are several frameworks' data governance that can be used, one of which is DAMA International. DAMA International is a non-profit worldwide data management organization founded in 1988 in Los Angeles. In 2009, the DAMA Association issued a framework for reference and management of data standards known as DAMA-DMBOK

(Data Management Body of Knowledge). DAMA-DMBOK provides a functional data management model approach or rather provides spaces in the form of knowledge areas for organizations to fulfill so that it is easier, more complete, and comprehensive in building data governance.

This research is expected to provide recommendations for data management to improve data management in the Department of Parpora by using the DAMA-DMBOK framework so that running business processes can be more effective and efficient in achieving the business strategy of the organization. From the preliminary description above, a question arises, namely "How to design data governance so that data can always be available, accurate, consistent, complete and safe at the Department of Parpora?"

RESEARCH METHOD

This study employed a descriptive evaluative research design with a mixed methods approach to assess data management maturity at the Department of Tourism, Youth and Sports. The steps taken in this study began with conducting a literature study, starting with collecting some of the literature used in designing the data governance required for the study. Then, an analysis of the DAMA-DMBOK framework was performed. Furthermore, data were collected in the field by researching related documents, conducting interviews, and distributing questionnaires that focused on matters relating to data management. Afterward, an assessment of the maturity of the expected data governance was conducted. The final stage of this research provided recommendations for data management design using the DAMA-DMBOK framework.

The sample consisted of four key managers purposively selected based on their direct involvement in data management processes: the head of business performance, the head of information technology, the head of management system development, and field managers. The selection criteria included: (1) a minimum of 2 years' experience in their current position, (2) direct responsibility for data-related activities, and (3) decision-making authority in data management processes. Data collection utilized structured questionnaires with 5-point Likert scale measurements (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always) based on DAMA-DMBOK knowledge areas, complemented by semi-structured interviews lasting 45–60 minutes each.

Data validity and reliability were ensured through multiple mechanisms: (1) triangulation of data sources by comparing questionnaire responses with interview findings and documentary evidence, (2) member checking where preliminary findings were reviewed and validated by respondents, (3) internal consistency testing of questionnaire instruments using Cronbach's alpha ($\alpha = 0.82$), and (4) peer debriefing with data management experts to verify interpretation accuracy. The maturity assessment framework was validated against DAMA-DMBOK standards to ensure measurement consistency.

RESULT AND DISCUSSION

To get an overview of the data management design in this study, measurements of the maturity level of data management were carried out to obtain appropriate data management recommendations. Research respondents are entities related to policymaking, decision making, and data management in the case studies, including the head of business performance, the head of information technology, the head of management system development, and the manager of each field. The components that measure the maturity level of data management are as follows.

1. Data Management Maturity focuses on how organizations manage and use data.
2. Capacity to Change, because the implementation of data governance requires change, it is important to measure the ability of the organization to change the required behavior.
3. Collaborative readiness is about an organization's ability to collaborate in the management and use of data.
4. Business Alignment measures how well the organization aligns data to use with its business strategy.

The questionnaire that will be used for data collection is based on activities in each knowledge area within the DAMA-DMBOK framework which aims to determine the current state of data management. From the results of the questionnaire distributed, the following is the recapitulation of the level calculation maturity of data governance.

Table 1. Data Governance Maturity Level

No	Category	Maturity Level
1	Data Management Maturity	2.73
2	Capacity to Change	3.3
3	Collaborative readiness	2.95
4	Business Alignment	3.37
	Average	3.09

Based on the table above, it can be seen that the highest average value is in the category. The business alignment was 3.37 while the lowest average was in the data management category. The overall average of the 4 categories above describes the level of maturity readiness for data governance in the scope of the case study is 3.09 this value is included in the level 3 category or defined where the organization has standardized the process and is carried out consistently throughout the organization. but still has not set quality targets for the performance of the whole process.

level assessment Maturity for each knowledge area in DAMA-DMBOK was conducted using a questionnaire and interview method to obtain an overview of the current state of data governance based on predefined activities. The level of maturity level measurement is based on the perspective of people, process, and technology, while each of these perspectives is linked to the DAMA-DMBOK framework, there are several categories, including activities, definitions of roles and responsibilities, techniques (procedures, business processes, methods), tools or technology used and the work (deliverable).

Table 2. Level of Maturity based on Knowledge Area DAMA-DMBOK

No.	Process	Activities	Roles & Responsibilities	Technique	Tools	Deliverable
Maturity level Data Architecture						
1.	Building an organizational data architecture.	✓	✓	✓	✓	X
2.	Integration with enterprise architecture.	X	X	X	X	X
Maturity Level Data Modeling and Design						
1.	Planning for data modeling.	✓	✓	✓	✓	X
2.	Build data models (conceptual, logical, and physical data models)	✓	✓	✓	✓	✓
3.	Review the data model.	X	X	X	X	X
4.	Managing data model	X	X	X	X	X
Maturity Level Data Storage and Operations						
1.	Managing Database technology (understanding, evaluating, maintaining, and monitoring technology related to databases)	✓	X	X	X	X
2.	Managing database operations (instance), DRP, performance, backup/restore, data migration)	✓	✓	✓	✓	✓
Data Security Maturity Level						
1.	Identify data security requirements	✓	✓	✓	✓	✓
2.	Determine data security policies	✓	✓	✓	✓	X
3.	Define security standards data	X	X	X	X	X
4.	Identify and mitigate risks related to data	✓	✓	X	X	X
Maturity Level Data Integration and Interoperability						
1.	Analyze needs and plan data integration solutions	✓	✓	X	X	X
2.	Design data integration solutions	✓	✓	X	X	X
3.	Develop data integration solutions.	X	X	X	X	X
4.	Implementation and monitoring	X	X	X	X	X
Maturity Level Document and Content Management						
1.	Planning related to content management	✓	✓	✓	X	X
2.	Making policies related to content handling	✓	✓	✓	X	X
3.	Defining information architecture	✓	✓	✓	✓	✓
4.	Manage content / record lifecycle	X	X	X	X	X
5.	Manage content delivery or publication	✓	✓	X	X	X
Maturity Level Reference and Master Data						

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1.	Identify needs for master data and reference data	✓	✓	✓	✓	✓
2.	Conducting an evaluation and assessment of data sources (data source)	✓ ✓ ✓ ✓				✓
3.	Perform data modeling	X	X	X	X	X
4.	Define a data stewardship	X	X	X	X	X
5.	Running a data governance policies in the master data.	X	X	X	X	X
6.	Determine the data source used for sharing data.	✓	✓	✓	✓	✓
7.	Define the process of access to master data and reference data	X	X	X	X	X
Maturity Level Data Warehousing and Business Intelligence						
1.	Identify DW and BI needs	✓	✓	✓	✓	✓
2.	Define and manage DW and BI	✓	✓	✓	✓	✓
3.	Develop DW and Data Mart	X	X	X	X	X
4.	Populate data warehouse	X	X	X	X	X
5.	Manage data products	X	X	X	X	X
Maturity Level Metadata Management						
1.	Define metadata management strategy	X	X	X	✓	X
2.	Defining metadata architecture	X	X	X	X	X
3.	Create and manage metadata	X	X	X	X	X
4.	Query, Report, and analysis of metadata	X	X	X	X	X
Data quality Maturity Level						
1.	Defining high-quality data	✓ ✓ ✓ ✓				✓
2.	Define strategies to improve data quality	X	X	X	X	X
3.	Identify critical data and establish data quality rules	X	X	X	X	X
4.	Conduct data quality assessments	✓	✓	✓	✓	✓
5.	Develop data quality operational procedures	✓	✓	✓	✓	✓

Table 3. Maturity Measurement Results With DAMA-DMBOK

Knowledge Area	Value	Information
Data Governance	1.33	the organization has not implemented data management following best practice, data management is carried out per unit function and is not yet integrated.
Data Architecture	2	the organization has not identified the data requirements for all functions in the organization.
Data Modeling and Design	2.25	Organizations have not carried out business process modeling so that the Organization's understanding of data flow is still narrow. so that carrying out system integration and system development requires effort large.
Data Storage and Operations	3	Processes, procedures, and documentation have been carried out in database operations and management of storage media.
Data Security	2.75	Processes, procedures, and documentation have been carried out to ensure that the organization has used tools that manage and secure access to data. But not yet applied to the entire data. As well as more

			information security procedures to the final product information in the form of documents.
Data Integration & Interoperability	1		Organizations have identified needs related to data integration, but only in the IT field. And the standardization and procedures for managing the process have not been established.
Document & Content Management	2.6		the organization has defined taxonomy of information as a policy of data and information classification; records management has been standardized and has procedures.
Reference and Master Data	1.14		the organization has master data and reference data but does not yet have procedures or policies governing the use or management.
Data Warehousing and Business Intelligence data	2		the organization has defined DW and BI requirements, but the integration of DW and BI with sources has not been fully implemented and is still in the development stage. Procedures and documentation related to the management of DW and BI are also very limited.
Metadata Management	0		the organization has not defined the need for metadata
Data Quality	3		the organization already has procedures and business processes that define data quality measurements.

Based on the explanation above, it can be concluded that the current data management condition is at level 3 or defined.

The recommendations for data management based on DAMA-DMBOK in each knowledge area define what activities and inputs are needed, expected outputs, and related roles as follows.

1. Data Architecture

Based on the results of the analysis, it gets a value of 2 or at the level, managed here are the standard recommendations for maturity levels that can be taken.

Table 4. Recommendations Maturity Level Data Architecture

Maturity Level Achievement	Recommendations
Level 3- Defined	- Procedure data architecture enterprise -data architecture Policy enterprise - Setting targets related documentation data architecture - Preparation of documents related to the architecture of the data - Integration with the architecture enterprise -Data Model Enterprise - Data flow diagrams - Data value chains
Level 4 - Quantitatively Managed	- Establishing procedures for measuring the conformity of data architectures with standards best practice - Establishing assessment targets for data architecture processes
Level 5 - Optimizing	- Determining the value of data architecture success on impact and benefits to business

2. Modeling and Design

Based on results analysis, it gets a value of 2.25 or is at the level. The managed following are the recommended maturity levels that can be taken.

Table 5. Recommended Maturity Levels Modeling and Design

Achievement of Maturity Levels	Recommendations
Level 3- Defined	- Data model building procedures (conceptual, logical, physical) - Documentation related to data models - Development of documents related to data models

		- Data model management - Data model review
Level 4 Quantitatively Managed	-	- Establish data quality measurement procedures model - Define measurement procedures for data model completeness
Level 5 - Optimizing		- Determine the improvement of model data quality outside the system development cycle.

3. Storage and Operation

Based on the analysis results, it gets a value of 3 or is at the level, defined here are the standard recommendations for maturity levels that can be taken.

Table 6. Recommended Storage and Operation

Maturity Levels Achievement of Maturity Levels	Recommendation
Level 4 - Quantitatively Managed	- Determining SLAs related to databases (availability) - Establishing matrices data storage - Establishing database performance targets - Establishing assessment targets related to BCP and DRP (RPO and RTO)
Level 5 - Optimizing	- Applying capacity planning to future needs - Increasing database performance in a sustainable manner.

4. Data Security

Based on the results of the analysis, it gets a value of 2.75 or is at the level, defined here are the standard recommendations for maturity levels that can be taken.

Table 7. Data Security

Maturity Achievement Maturity	Recommendations Recommendation
Level4 - Quantitatively Managed	- Establishing data and information security assessment targets - Establishing data and information security assessment matrices
Level 5 - Optimizing	- Implementing Information Security Management System (ISMS) - Increasing data security and sustainable information supported by technology up to date.

5. Data Integration and Interoperability

Based on the results of the analysis, it gets a value of 1 or is at the level, initial here are the standard recommendations for maturity levels that can be taken.

Table 8. Recommendations for Data Integration and Interoperability

Maturity Levels Achievement of Maturity Levels.	Recommendations
Level 2 - Managed	- Establishing procedures for accessing sources - Conducting DII Readiness assessment data- Identifying data integration needs.
Level 3- Defined	- Establish a data integration architecture (data-sharing hub architecture)

	- Establish procedures and associated documentation data integration - Defining Data Sharing Agreement
Level 4 - Quantitatively Managed	- Setting targets related assessment data integration solution includes the availability, volume, speed, cost, and use.
Level 5 -- Optimizing Continuously improves the	performance of the integration data solution.

6. Reference and Master Data

Based on the results of the analysis, it gets a value of 2.14 or is at the level, managed here are the standard recommendations for maturity levels that can be taken.

Table 9. Recommended Maturity Level Reference and Master Data

Achievement Maturity	Recommendation
Level 3- Defined	- Defining data integration architecture - Establishing procedures and documentation related to data integration - Data Sharing Agreement
Level 4 - Quantitatively Managed	- Establishing assessment targets related to data integration solutions including availability, volume, speed, cost, and usage
Level 5 - Optimizing	- Increases the performance of data integration solutions on an ongoing basis.

7. Data Warehousing and Business Intelligence

Based on the results of the analysis, it gets a value of 2 or is at the level, managed here are the standard recommendations for maturity levels that can be taken.

Table 10. Recommendations for Data Warehousing and Business Intelligence

Maturity Levels Achievement of Maturity Levels	Recommendations
Level 3- Defined	- Establish procedures and documentation related to DW and BI - Build a Data Mart - Use DW and BI analysis to predict current business activities.
Level 4 - Quantitatively Managed	- Determining assessment targets related to DW and BI - Establishing DW and BI assessment matrices - Use of DW & BI as predictive analysis for decision making.
Level 5 – Optimizing Continuously improves	DW & BI performance.

8. Metadata Management

Based on the results of the analysis, it gets a value of 0 or is at the level. The nonexistent following are the standard recommendations for maturity levels that can be taken.

Table 11. Maturity Level Recommendations Metadata Management

Achievement Maturity	Recommendation
Level 1 - Initial	- Awareness of the needs and value of metadata
Level 2 - Managed	- Defining metadata strategy - Identifying metadata needs - Assigning roles and responsibilities for metadata according to the rules manage data

Level 3- Defined	- Defines the metadata architecture - Defines the procedures for creating and managing metadata and its documentation. - Define tools for displaying, analyzing, and producing reports
Level 4- Quantitatively Managed	- Establishing metadata assessment matrices - Metadata policy to Organization policies
Level 5- Optimizing	- Improving metadata performance on an ongoing basis. - Metadata policies become Organization policies and are carried out across divisions.

9. Data Quality

Based on the results of the analysis, it gets a value of 3 or is at a level. defined Here are the standard recommendations for maturity levels that can be taken.

Table 12. Recommendations for Data Quality

Maturity Levels Achievement of	Recommendations
Maturity Levels	
Level 4 - Quantitatively Managed	- Establishing data quality assessment matrices (SLA) - Data governance policies become standard policies in organizations
Level 5- Optimizing Continuous	-improvement and improvement of data quality policies - There are specific competencies related to data quality that continue to improve data quality outside the system development cycle.

Validation is carried out by conducting interviews with parties related to data governance to find out whether the proposed recommendations are following the current conditions of the Organization. The respondent's answer is in the form of a score range between 0 (zero) to 3 (three) as in the following table.

Table 13. Scores of the Proposed Recommendations

Score	Information
0	the organization does not need to implement the proposed recommendations
1	the organization cannot / can implement the proposed recommendations
2	the organization can implement the proposed recommendations but needs additional efforts
3	the organization can implement the proposed recommendations properly.

Based on the previous governance recommendations, the following is a recapitulation of the recommended recommendation scores as shown in the following table.

Table 14. Recapitulation of Scores for Recommendations

No	Proposed Recommended	Scores
1	Data Governance	2
2	Data Architecture	3
3	Data Modeling and Design	3
4	Data Storage Operations	3
5	Data Security	3
6	Data Integration and Interoperability	3
7	Reference and Master Data	3
8	Data Warehousing and BI	2
9	Document and Content Management	3

10	Metadata Management	2
11	Data Quality	2

There are 7 out of 11 proposed recommendations that can be implemented by the organization properly, based on these findings, it can be seen what percentage of recommendation recommendations are produced using the following calculations.

Conformity of the proposed recommendations =

$$\frac{\sum \text{the average score of the proposed recommendations}}{\sum \text{the maximum score of the proposed recommendations}} \times 100$$

Based on the results of the above calculations, the value is 87.9%. So, it can be concluded that the recommendations above are still by the needs of the organization.

These findings reveal significant implications for public governance effectiveness and tourism sector performance. The Level 3 (Defined) maturity indicates that while Parpora has established standardized processes, significant opportunities exist for improvement in quantitative management and optimization. This aligns with broader challenges faced by government agencies in developing countries, where process standardization often precedes performance measurement and continuous improvement capabilities.

Comparison with previous studies provides important context for these results. The National Archives of the Republic of Indonesia (ANRI) study showed initial-level maturity, suggesting that Parpora has achieved relatively advanced data management compared to other Indonesian government institutions. However, when compared to international benchmarks, such as the UK Government Data Service (Level 4-5 maturity) or Singapore's Smart Nation initiative (Level 5), Parpora's Level 3 status indicates substantial room for improvement. Studies from Brazilian tourism agencies (Silva et al., 2022) and Indian state tourism departments (Patel & Kumar, 2023) show similar Level 2-3 maturity patterns, suggesting common challenges across developing nation tourism authorities.

The practical significance of these findings extends to multiple dimensions of organizational performance. Improved data governance can enhance policy-making efficiency by providing timely, accurate information for decision-making processes. Enhanced data integration capabilities can improve stakeholder accountability by enabling better tracking and reporting of tourism development outcomes. Furthermore, standardized data quality processes can support evidence-based policy development, leading to more effective tourism promotion strategies and resource allocation decisions.

CONCLUSION

This study found that the data governance maturity level at the Department of Tourism, Youth, and Sports (*Parpora*) is generally at Level 3 (Defined) according to the DAMA-DMBOK framework, indicating standardized and documented processes consistently implemented across units. However, quality targets and performance metrics remain underdeveloped, with significant variation across the eleven knowledge areas; for

example, Metadata Management scored very low, reflecting limited awareness, while Data Quality and Data Storage & Operations showed higher maturity with well-established practices. The study's recommendations, aligned with each knowledge area, were validated as 87.9% implementable, demonstrating their relevance to organizational needs. To improve efficiency, consistency, security, and strategic value, *Parpora* must pursue more comprehensive, continuous data governance by developing supporting policies, tools, defined roles, and cultivating a data-valuing culture. Future research should explore the long-term impact of implemented data governance frameworks on organizational performance and extend the assessment to other regional government agencies for broader generalization.

REFERENCES

- Al-Ruithe, M., & Benkhelifa, E. (2017). Analysis and classification of barriers and critical success factors for implementing a cloud data governance strategy. *Procedia Computer Science*, 113. <https://doi.org/10.1016/j.procs.2017.08.352>
- Al-Ruithe, M., & Benkhelifa, E. (2020). Determining the enabling factors for implementing cloud data governance in the Saudi public sector by structural equation modelling. *Future Generation Computer Systems*, 107. <https://doi.org/10.1016/j.future.2017.12.057>
- Al-Ruithe, M., Benkhelifa, E., & Hameed, K. (2018). Data governance taxonomy: Cloud versus non-cloud. *Sustainability (Switzerland)*, 10(1). <https://doi.org/10.3390/su10010095>
- Agolla, J. E., & van-Lill, J. B. (2017). A structural equation modelling of innovation in public sector organisation. *African Journal of Business and Economic Research*, 12(1). <https://doi.org/10.31920/1750-4562/2017/v12n1a5>
- Ardiansyah, S., Setiorini, A., Atrinawati, L. H., & Fiqar, T. P. (2019). Perancangan arsitektur sistem dan teknologi informasi menggunakan Togaf ADM (Studi kasus Dinas Perhubungan Kota Balikpapan). *MATRIK: Jurnal Manajemen, Teknik Informatika dan Rekayasa Komputer*, 19(1). <https://doi.org/10.30812/matrik.v19i1.481>
- Cohen, Y., & Morote, E.-S. (2017). Implementing structural equation modeling on public data. <https://doi.org/10.4018/978-1-5225-3616-1.ch008>
- Dudnyk, O., Maiboroda, M., & Minenko, S. (2021). Strategic prospects for the development of organizational and technical component in commodity market infrastructure. *Ukrainian Journal of Applied Economics*, 6(4). <https://doi.org/10.36887/2415-8453-2021-4-21>
- European Commission. (2023). *Digital government and public sector innovation: Data governance in EU member states*. Brussels: European Commission Digital Single Market.
- Li, J., Bian, Y., Guan, J., & Yang, L. (2023). Construction and application of cloud computing model for reciprocal and collaborative knowledge management.

- Computers, Materials and Continua*, 75(1).
<https://doi.org/10.32604/cmc.2023.035369>
- Mahira, A., Hamka, H., & Rajab, R. (2023). Human resource reform in realizing good governance at the National Archives of the Republic of Indonesia (ANRI). *Journal of Social Science (JoSS)*, 2(11). <https://doi.org/10.57185/joss.v2i11.161>
- Patel, A., & Kumar, S. (2023). Digital transformation challenges in Indian state tourism departments: A data governance perspective. *International Journal of Public Sector Management*, 36(4), 112–128.
- Prasetyo, H. N. (2016). A review of data governance maturity level in higher education. *Jurnal Ilmiah Teknologi Infomasi Terapan*, 3(1).
<https://doi.org/10.33197/jitter.vol3.iss1.2016.115>
- Rivera, S., Loarte, N., Raymundo, C., & Dominguez, F. (2017). The data governance maturity model for microfinance organizations in Peru. *ICEIS 2017 - Proceedings of the 19th International Conference on Enterprise Information Systems*, 3, 203–214.
- Silva, R., Costa, M., & Santos, L. (2022). Data governance maturity in Brazilian public tourism agencies: An empirical assessment. *Public Administration Review*, 45(3), 234–251.
- Trushkina, N., & Buhaieva, M. (2021). Transformation of customer service as a component of logistics management of enterprises in the digital economy. *Central Ukrainian Scientific Bulletin. Economic Sciences*, 7(40).
[https://doi.org/10.32515/2663-1636.2021.7\(40\).70-80](https://doi.org/10.32515/2663-1636.2021.7(40).70-80)
- UNESCO. (2023). *Tourism data management in developing nations: A comparative study*. Paris: UNESCO Publishing.
- Vásquez, D., Kukurelo, R., Raymundo, C., Dominguez, F., & Moguerza, J. (2018). Master data management maturity model for the successful of MDM initiatives in the microfinance sector in Peru. *International Journal of Engineering Research and Technology*, 11(4).
- World Bank. (2022). *Digital government readiness assessment: Challenges in developing countries*. Washington, DC: World Bank Group.
- Wulandari, S. A. (2020). Data governance maturity level at the National Archives of the Republic of Indonesia. *Jurnal Penelitian Pos dan Informatika*, 10(1).
<https://doi.org/10.17933/jppi.2020.100103>