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Assessing Master Data Management Maturity in General Insurance Sector

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Abstract

As data becomes a strategic asset, organizations must adopt strong Master Data Management (MDM) practices to support governance, compliance, and decision-making. This study assesses the MDM maturity of a general insurance company in Indonesia using a qualitative case study approach. Data were gathered through interviews, document analysis, and field observations. The assessment used the Master Data Management Maturity Model (MD3M), which evaluates key domains of MDM practices. Findings show the company is still in the early stages of MDM maturity, characterized by fragmented processes, unclear roles, and limited data standardization. This study offers empirical insights into MDM maturity within the insurance sector, which remains underrepresented in current research. It also provides practical recommendations for improvement, such as defining data ownership, formalizing governance structures, and integrating customer data systems to enhance overall data management capabilities.

Keywords: *Master Data Management; MD3M; Maturity Assessment; General Insurance*

Abstrak

Seiring dengan meningkatnya peran data sebagai aset strategis, organisasi perlu menerapkan praktik *Master Data Management* (MDM) yang kuat untuk mendukung tata kelola, kepatuhan, dan pengambilan keputusan. Studi ini menilai tingkat kematangan MDM pada sebuah perusahaan asuransi umum di Indonesia dengan menggunakan pendekatan studi kasus kualitatif. Data dikumpulkan melalui wawancara, analisis dokumen, dan observasi lapangan. Penilaian dilakukan menggunakan kerangka *Master Data Management Maturity Model* (MD3M) yang mengevaluasi sejumlah domain utama dalam praktik MDM. Temuan menunjukkan bahwa tingkat kematangan MDM perusahaan masih berada pada tahap awal, ditandai dengan proses yang terfragmentasi, peran yang belum jelas, dan standar data yang belum konsisten. Studi ini memberikan wawasan empiris mengenai kematangan MDM di sektor asuransi, yang masih jarang diteliti. Selain itu, studi ini menawarkan rekomendasi praktis seperti penetapan kepemilikan data, pembentukan struktur tata kelola, dan integrasi sistem data nasabah.

Keywords: *Master Data Management; Master Data Management Maturity Model; Maturity Assessment; General Insurance*

1. Introduction

Data has emerged as a critical strategic asset in today's digital economy, and in driving innovation, it has become the source of competitive advantage [1]. The value of data extends beyond its role as an enabler of business transformation, it also presents risks when its quality is poor [2]. Issues such as duplication, incompleteness, or inconsistent records, can mislead decision-making, reduce operational efficiency, and compromise regulatory compliance [3]. The fact that data can represent both a valuable asset and a potential risk highlights the importance of implementing strong data governance and management practices. One widely adopted approach to ensuring the accuracy, consistency, and reliability of enterprise data is Master Data

Management (MDM). MDM aims to unify critical data entities such as customer, product, or supplier across systems, departments, and processes [4]. It has also been recognized as an effective strategy for resolving common data quality problems, including duplication, inconsistency, and inaccuracy, by establishing a single source of truth [5]. Although MDM offers recognized benefits, its implementation is frequently challenged by issues related to governance, integration, and data consolidation, indicating that practices vary widely across organizations [6].

PT ABC Insurance is currently facing demands to improve its data management practices in response to regulations. Requirements set by the Financial Services Authority in Indonesia (OJK) through POJK No. 8 of 2023 require financial services manage their customer data by creating a single customer identification file (CIF). Single CIF has a direct relationship with the concept of master data, as it requires a consistent and authoritative source of identity for each customer [7]. At present, PT ABC Insurance has yet to meet these requirements, as customer master data is still maintained separately across two distinct core systems within the organization. This siloed architecture has resulted in duplicated records and inconsistent customer data across systems, especially when data from both systems are consolidated without a reliable unique identifier due to data quality issues.

To address this, the organization must formulate a clear strategy for regulatory compliance that includes not only technical integration but also a commitment to effective and sustainable master data management. Rather than viewing compliance as a one-time task, it should be leveraged as an opportunity to build strong and continuous data governance [8]. Assessing the MDM maturity of an organization is critical to understanding MDM practices and areas for improvement. The Master Data Management Maturity Model (MD3M) by Spruit and Pietzka provides a structured framework covering five key domains: data model, data quality, usage and ownership, data protection, and maintenance [9]. It has been successfully implemented in hospitals [10], ministries [11], government [12], [13], and technology service provider [14], and has proven to be a practical tool for diagnosing maturity levels and guiding strategic improvements.

This study is conducted to evaluate the MDM maturity level of a general insurance company in Indonesia, a sector that highly dependent on accurate and integrated customer data. The main objectives are to (1) evaluate the company's current maturity level using MD3M framework, and (2) formulate strategies for ideal master data management that will also support compliance with regulatory requirements. The research adopts a qualitative case study approach using in-depth interviews, document analysis, and field observations as data sources. The unit of analysis is a single general insurance company operating nationally in the Indonesian market. Furthermore, the findings may serve as a reference for other insurance companies facing similar data management challenges, and contribute to the broader discourse on MDM maturity, particularly within the context of regulatory compliance and digital transformation in the Indonesian insurance industry.

2. Literature Review

Several previous studies have applied the Master Data Management Maturity Model (MD3M) developed by Spruit and Pietzka to evaluate how well organizations manage their master data and to identify areas for improvement. Qodarsih et al. [13] assessed the employee master data management at the Supreme Court of the Republic of Indonesia using MD3M through interviews and document analysis. The study employed a qualitative case study approach involving semi-structured interviews with subject matter experts and verification through document reviews. Their findings revealed that, although 63.1% of capabilities had been implemented, the overall maturity remained at level 1. The model helped uncover weaknesses in documentation, fragmented ownership, and inconsistent data validation practices across work units. Similarly, Aditya Rahman et al. [10] evaluated the maturity level of Pasar Rebo Public Hospital and found that despite 93.5% of capabilities being in place, the organization only reached level 3 due to the lack of formal governance policies, data stewards, and proactive quality controls. Their study used a questionnaire based on the MD3M framework, distributed to internal stakeholders, followed by a mapping of implemented capabilities across maturity levels.

In another public sector context, Pratama et al. [11] conducted an MD3M-based assessment at a unit under the Ministry of Education and Culture. This research applied a

descriptive qualitative method using MD3M questionnaires filled through group discussion sessions with relevant analysts. Their study concluded that the maturity level was 0, with only 42% of the model's capabilities implemented. MD3M proved useful in pinpointing deficiencies in data maintenance and lifecycle management, as well as the lack of coordination across systems. Meanwhile, Iqbal et al. [14] applied MD3M in a technology service provider supporting financial infrastructure. The study used a structured questionnaire adapted from MD3M and conducted group interviews with functional managers to interpret results in the context of cross-unit practices. Although 83% of capabilities were implemented, the organization still registered a maturity level of 0, mainly due to insufficient awareness of data quality issues and the absence of structured root-cause analysis. A more recent study by Ko et al. [12] applied MD3M at the Secretariat of the Presidential Advisory Council. Using group discussions and structured questionnaires, the study identified a maturity level of 1, with 61.3% of capabilities in place. Five respondents from different units participated in a facilitated group assessment session, where questionnaire responses were consolidated to assess maturity across domains. The model was instrumental in exposing gaps in documentation, user access management, and data quality monitoring, while also recognizing some progress in data protection and usage control.

Although the utility of MD3M in uncovering weaknesses in master data governance has been demonstrated in previous research, existing studies have largely focused on public sector organizations or technology-oriented enterprises. To date, no study has applied MD3M within the insurance industry, despite its critical reliance on accurate and integrated customer information. This research seeks to fill that gap by applying the MD3M framework in the context of an Indonesian insurance company, particularly as a strategic response to compliance requirements outlined in POJK No. 8 of 2023. Furthermore, this study introduces a targeted respondent mapping strategy by explicitly aligning each interview participant with their respective area of responsibility. This mapping is clearly documented in the research methods and ensures that maturity indicators within the MD3M framework are assessed by individuals with functional authority over domains such as data governance, information technology, and business operations. Such alignment enhances the validity and contextual accuracy of the assessment, which has not been explicitly demonstrated in previous MD3M studies.

3. Methods

This study adopts a qualitative single case study approach to evaluate the maturity of Master Data Management (MDM) within a selected organization. The case study design enables an in-depth examination of the organization's current master data management practices using the MD3M model [15].

3.1 Master Data Management Maturity Model

Master data can be described as core informational elements that define the principal entities relevant to an organization's operations, providing essential context for both business transactions and analytical activities [3]. When effectively governed and supervised, master data can be established as a consolidated and reliable data asset that ensures consistent and high-quality information across all applications [7]. Master Data Management (MDM) establishes control over master data values and identifiers to ensure accurate and consistent usage, aiming to deliver timely, reliable information while minimizing inconsistency and ambiguity [3]. As information systems evolve in complexity due to organizational growth, business transformations, and technological change, achieving consistency and integrity in enterprise-wide master data has become increasingly difficult [4]. Assessing MDM maturity allows organizations to evaluate their current state, identify gaps, and plan structured improvements over time [9].

Various maturity models have been developed to help organizations assess the effectiveness and progression of their Master Data Management (MDM) initiatives. Among these, two widely recognized models are the Oracle MDM Maturity Model [16] and the Master Data Management Maturity Model (MD3M) [9]. The Oracle MDM Maturity Model provides a framework based on five key areas, primarily emphasizing technical aspects of implementation. While it offers a structured view of MDM development, the model is more aligned with technological frameworks rather than broader organizational or strategic dimensions [17]. In contrast, MD3M offers a structured and context-sensitive framework whose key topics and focus

areas can be aligned with actual organizational practices [18]. Its applicability has been demonstrated in various domains [10], [11], [12], [13], [14].

The MD3M model developed by Spruit and Pietzka (2015) offers an extensive and empirically validated framework for evaluating the maturity of Master Data Management practices in organizations. The model is arranged into five principal areas, which include Data Model, Data Quality, Usage and Ownership, Data Protection, and Maintenance. Each topic consists of several focus areas that represent specific aspects of MDM that should be evaluated. The complete structure of topics and focus areas is presented in Table 1.

Table 1. MD3M Key Topics and Focus Areas

Key Topic	Focus Area
Data Model	Definition of master data
	Master data model
	Data landscape
Data Quality	Assessment of data quality
	Impact on business
	Awareness of quality gaps
	Improvement
Usage & Ownership	Data usage
	Data ownership
	Data access
Data Protection	Data protection
Maintenance	Storage
	Data lifecycle

In addition to its topical structure, MD3M defines five levels of maturity that describe how extensively MDM capabilities are implemented across the organization. These levels range from initial awareness to full optimization, allowing organizations to measure both their current position and their potential areas of improvement. The definitions of each level are summarized in Table 2.

Table 2. MD3M Maturity Levels

Level	Description
1 – Initial	Awareness of MDM issues begins and initial individual efforts are emerging
2 – Repeatable	Uncoordinated measures are taken by individuals to address isolated problems
3 – Defined Process	Cross-unit collaboration begins and processes start to be aligned tactically
4 – Managed & Measurable	Best practices are adopted and formally defined processes are implemented
5 - Optimized	MDM processes are fully integrated, optimized, and continuously improved

3.2 Data Collection and Analysis

The research employs a combination of primary and secondary data sources:

- Primary data collection was carried out through the use of a structured questionnaire based on the MD3M model and followed by in-depth interviews with key respondents.
- Secondary data includes internal organizational documents, such as standard operating procedures (SOPs), data governance policies, system architecture diagrams, and past audit reports related to data quality and management. These documents were used to triangulate and substantiate the information obtained from primary sources.

The data obtained from both primary and secondary sources were analyzed using a triangulation approach to enhance the validity and depth of the findings. Insights from the structured questionnaire and follow-up interviews (primary data) were cross-checked against supporting internal documents such as SOPs, governance policies, and system records (secondary data). This triangulated analysis enabled a comprehensive understanding of the

organization's actual Master Data Management practices. The combined results were subsequently aligned with the MD3M maturity matrix, with each capability item assessed against predefined maturity levels from Level 1 (Initial) to Level 5 (Optimized).

3.3 Instrument

The main instrument used in this study is an assessment framework derived from the MD3M model. This framework serves as a structured tool to evaluate the maturity of master data management implementation across key organizational dimensions. The assessment instrument takes the form of a questionnaire consisting of 69 items, which are systematically divided into two main sections [9]:

1) Influential factors: These are contextual variables that describe structural and organizational characteristics which may influence how master data management is implemented and evolves. Influential factors consist of four questions designed to capture key aspects such as group affiliation, sector type, company size, and system complexity.
2) Capability factors: These are the core of the maturity assessment. Each capability factor represents a specific competence, practice, or process related to master data management. There are 65 capability items, each corresponding to a unique aspect of maturity within one of the 13 focus areas under the five key topics of MD3M. Each capability is assessed on a five-point maturity scale, from Initial (Level 1) to Optimized (Level 5), with indicators provided to support qualitative evaluation.

The influential factors not only provide contextual background but also affect the selection and interpretation of specific capability items in the maturity assessment. Depending on the responses to the influential factor questions, certain capability items are required to be included in the evaluation to ensure consistency between the organization's structural context and the expected maturity level. The conditional relationship between influential factors and required capability items is summarized in Table 3.

Table 3. Influential Factors Question

Question	Condition	Impact
Is your company included in the group and your company needs to interact regularly with other internal members of the group and exchange data?	Yes	Include capability Definition of Master Data, point E
Is your company a non-profit organization, government, or military organization?	No	Include capability Impact on Business, points D and E
Does your company have more than 250 employees?	Yes	Include capability Assessment of Data Quality, point C
Do employees need to work with many different systems to carry out their daily work and must follow a different process when doing this?	Yes	Include capability Data Landscape, point E

3.4 Respondents

The primary data in this study was collected from selected internal respondents who are directly involved in Master Data Management (MDM) activities within the organization. Consistent with the principles of qualitative case study research, a purposive sampling strategy was employed to ensure that only individuals with relevant experience and domain-specific expertise were engaged. These respondents were chosen based on their roles and responsibilities in managing, governing, or supporting master data-related processes. To ensure validity, the assessment results were further consolidated through internal discussions and cross-unit validation sessions involving relevant stakeholders [9], [19].

The assessment instrument, consisting of 65 capability items from the MD3M questionnaire, was not distributed uniformly. Instead, each item was assigned to respondents based on their specific area of competence. This approach allowed for focused and contextually informed responses. The study involved three primary organizational units: the Information Technology Division (DTI), the Policy Administration Division (DPA), and the Data Management Division (DMD). Each respondent was only asked to evaluate capability items that are relevant

to their respective roles, responsibilities, and knowledge domains. The mapping of respondents to the five key domains of the MD3M model is presented in Table 4.

Table 4. Mapping of MD3M Respondents

Key Topic	Focus Area	Primary Respondent	Optional Respondent
Data Model	Definition of master data	DMD	DPA
	Master data model	DMD	DTI
	Data landscape	DTI	DMD
Data Quality	Assessment of data quality	DMD	DPA
	Impact on business	DMD	DPA
	Awareness of quality gaps	DMD	DTI
	Improvement	DMD	DPA
Usage & Ownership	Data usage	DMD	DPA
	Data ownership	DMD	DPA
	Data access	DTI	DPA
Data Protection	Data protection	DTI	-
Maintenance	Storage	DTI	-
	Data lifecycle	DTI	DMD

4. Result and Discussion

4.1 Organization Profile

The organization analyzed in this case study is anonymized under the name PT ABC Insurance, a nationally scaled general insurance company that operates as part of a global insurance and asset management group. PT ABC Insurance serves both individual and corporate clients through various distribution channels and offers a diverse product portfolio, including property insurance, health insurance, travel insurance, marine cargo insurance, and other general insurance products. PT ABC Insurance is widely recognized for its strong brand reputation in the Indonesian insurance market.

4.2 MDM Maturity Result

The assessment process began by evaluating the influential factors, which provide contextual insight into the organization's structure and operational complexity. These factors serve as a foundation for interpreting the capability-based maturity ratings and identifying specific capability items that must be included in the evaluation. As outlined in the methodology, the influential factors address aspects such as organizational size, group affiliation, system complexity, and sector type. The results of this initial step are summarized in Table 5, which presents the organization's responses to the four contextual questions and the corresponding implications for capability inclusion in the maturity assessment.

Table 5. Influential Factors Result

Question	Answer	Reason
Is your company included in the group and your company needs to interact regularly with other internal members of the group and exchange data?	Yes	PT ABC is part of a multinational insurance company group, and has a need to exchange data regularly.
Is your company a non-profit organization, government, or military organization?	No	PT ABC is a company that runs its business with the main aim of making a profit.
Does your company have more than 250 employees?	Yes	The number of employees of PT ABC is more than 250 people.
Do employees need to work with many different systems to carry out their daily work and must follow a different process when doing this?	Yes	PT ABC has various systems that support operational activities (multiple core insurance systems)

Based on the responses provided in the influential factors section, PT ABC Insurance is identified as a member of a corporate group with routine data exchange requirements across

affiliated entities. The company employs more than 250 personnel, indicating a medium-to-large organizational scale. Additionally, employees interact with multiple information systems and follow varied business processes in their daily operations. It is also noted that PT ABC does not operate as a nonprofit, government, or military organization. Given this organizational profile, several capability areas within the MD3M model such as Definition of Master Data, Assessment of Data Quality, Data Landscape, and Impact on Business are considered relevant and thus included in the maturity evaluation. These conditions justify the activation of all 65 capability items to ensure that the maturity assessment comprehensively reflects the complexity and operational needs of the organization.

Following the identification of relevant capability areas, the assessment proceeded with the evaluation of all 65 capability items as defined in the MD3M model. Each item was rated using a five-level maturity scale, ranging from Initial (L1) to Optimized (L5), based on evidence gathered through interviews, document reviews, and internal validation sessions. A summary of the maturity level is presented in Table 6.

Table 6. Assessment Result using MD3M Matrix

Focus Area	L1	L2	L3	L4	L5
Data Model					
Definition of master data	1	1	1	0	1
Master data model	1	1	1	0	0
Data landscape	1	0	0	0	0
Data Quality					
Assessment of data quality	1	1	0	0	0
Impact on business	1	1	0	1	0
Awareness of quality gaps	1	1	1	0	1
Improvement	1	1	0	1	0
Usage & Ownership					
Data usage	1	0	1	0	0
Data ownership	0	0	0	0	0
Data access	1	1	0	0	0
Data Protection					
Data protection	1	1	1	1	1
Maintenance					
Storage	0	1	0	0	0
Data lifecycle	1	1	0	0	1

The results reveal that the organization's overall master data management maturity level is still low. Among all assessed capabilities, only Data protection reached the maximum level of maturity (Level 5), while most other focus areas are concentrated at Level 1-3. Although certain indicators such as Definition of Master Data, Impact on Business, and Data Lifecycle show evidence of higher-level practices, these cannot be formally acknowledged in the maturity scoring due to unfulfilled requirements at preceding levels. Usage & Ownership and Maintenance emerged as the weakest key topic with a maturity level for this focus area at level 0. Overall, 33 out of 65 capabilities were found to be implemented to some degree, representing approximately 50.8% of the total assessed items.

In the MD3M model, the overall maturity level of an organization is determined by the lowest maturity level observed among the five key capability domains [9]. Based on this principle, it can be concluded that the overall master data management maturity within the organization is positioned at Level 0. A summary of the maturity ratings across each of the five key topics is presented in Table 7.

Table 7. Summary Maturity Level

Key Topic	Maturity Level	Findings
Data Model	1	Lacks a complete system landscape and duplication review
Data Quality	2	No standardized and continuous process for measuring, evaluating, and improving data quality
Usage & Ownership	0	Absence of a formal data ownership structure and weak governance over data usage
Data Protection	5	Data protection systems are fully implemented, well-documented, and supported by security awareness at all organizational levels
Maintenance	0	Distributed and non-centralized storage systems hinder efficiency and optimal data management

4.3 Discussion

The organization is targeted at achieving Level 3 (Defined Process) as a minimum threshold for MDM maturity. This level is considered a strategic milestone in MDM maturity, as it reflects that data-related processes are not only documented but also implemented consistently across organizational units. Moreover, it indicates the presence of standardized roles, responsibilities, and operational procedures in data governance. The findings for each domain and MDM improvement strategies are analyzed and described in the descriptions below. These strategies are formulated based on the maturity questionnaire that have not yet been achieved [9], and supported by insights from previous studies highlighting the critical importance of addressing these specific gaps in order to ensure effective and sustainable master data management.

1) Data Model

In the Data Model domain, two key issues were identified. First, the existing system landscape is incomplete because certain platforms developed independently by business units, such as reporting tools created by the reporting division to generate customer data were built without coordination with the IT department and therefore are not reflected in the official IT architecture. Second, the organization does not have a standard operating procedure to regularly review whether master data is being stored or accessed redundantly across systems. This absence of governance increases the risk of undetected data duplication and undermines efforts to maintain data consistency and reliability.

To achieve the target of Level 3, the organization should enhance the data landscape by ensuring that the system architecture blueprint covers all platforms that store or access master data, including those developed independently by business units and currently excluded from formal documentation. This requires active coordination between IT and business users to identify and integrate shadow systems into the enterprise architecture [20]. In addition, the organization should develop a formal, recurring standard operating procedure (SOP) to review and monitor potential duplication of master data across systems, ensuring consistent and reliable data usage throughout the organization.

2) Data Quality

In the Data Quality domain, it was found that the criteria for master data quality are defined solely by the compliance division, primarily based on regulatory requirements such as those issued by OJK. The formulation process does not involve input from other business units, which may limit the relevance and applicability of the criteria to broader operational or strategic needs. Additionally, the organization has never conducted an assessment to estimate the financial losses caused by poor data quality such as missed sales opportunities or increased operational costs, indicating a lack of awareness regarding the business impact of data issues. Furthermore, there is currently no enterprise-wide system in place to objectively measure data quality.

To enhance capabilities in the Data Quality domain and reach Level 3 maturity, the organization must establish a comprehensive data quality measurement framework that applies consistently across all business units [21]. This framework should include the definition of objective quality benchmarks such as accuracy, completeness, and consistency, and the

implementation of regular monitoring systems. Furthermore, the organization should begin linking data quality to business performance indicators by formally assessing both the operational and financial impacts of poor data quality. In parallel, data quality improvement initiatives must be formalized into documented action plans with measurable effectiveness, integrated into the organization's routine operational cycle.

3) Usage & Ownership

In the domain of Usage and Ownership, the assessment reveals varied maturity levels. For data usage, the organization is currently at a basic level. While access rights to customer master data have been governed by functional segregation as outlined in internal policy documents, there has been no evaluation of how effectively the data is utilized. The absence of such an assessment hinders progress toward higher maturity, as it remains unclear whether the available data aligns with the operational needs of other units. In terms of data ownership, the organization has yet to establish a formal structure or mechanism that assigns accountability for data management. No roles such as data owners or data stewards have been designated, resulting in fragmented responsibility across departments and uncoordinated data-related decision-making.

To improve capabilities in the Usage and Ownership domain, which is currently at Level 0, the organization must begin by establishing a formal data governance structure [8]. The first step involves assigning data owners and data stewards for each master data domain. Data owners are responsible for ensuring the accuracy, completeness, and appropriate use of data within their respective business areas, while data stewards are accountable for the day-to-day operational maintenance of the data [3]. To promote transparency in data usage, the organization should also implement a documented and accessible master data catalog or repository, enabling employees to identify the relevant data sources they require. Regular evaluations of data usage patterns are necessary to ensure that access aligns with operational needs and to detect any potential misuse of data.

4) Data Protection

The organization has implemented a comprehensive and sustainable data protection system. All criteria across the maturity levels have been fulfilled, starting from the use of updated security solutions such as firewalls to protect data from external threats, as outlined in internal policy documents, to data encryption policies for mitigating internal risks, and access control mechanisms that require official requests and approval from authorized personnel. In addition, access to sensitive data is secured through authentication systems that mandate regularly updated passwords in accordance with prevailing security standards. Equally important, employees have demonstrated awareness of the importance of data security in their daily activities, for example, by avoiding leaving computers unattended and unsecured. These achievements indicate that the organization has implemented data protection practices at an optimal level of maturity.

Although the Data Protection domain has reached the highest level of maturity, the organization must continue to ensure the sustainability of its established best practices through regular evaluations, internal audits, and the refinement of policies in response to evolving regulatory and technological developments [22]. In addition, the organization is encouraged to share its knowledge and successful experiences with other units or entities within the corporate group as part of a broader strategy to strengthen cross-domain capabilities and foster organizational learning.

5) Maintenance

In this domain, the organization shows partial alignment with regulatory expectations and internal policies. The customer data stored in the core system already accommodates most of the data specifications outlined in POJK No. 8 of 2023. However, certain fields such as mother's maiden name are currently excluded based on the compliance team's assessment that such information is not required for general insurance products, which do not involve investments like those in life insurance. In parallel, policies related to data archiving and data deletion are still under development at the time of this study. This ongoing effort is largely driven by the need to comply with the Personal Data Protection Law (UU-PDP), which mandates well-defined governance over the retention and deletion of personal data. Furthermore, the presence

of siloed systems across different applications indicates that data storage has not yet achieved an effective, centralized state.

To enhance capabilities in this area, the organization should begin by consolidating master data storage, which is currently distributed across multiple core systems [11], [14]. Furthermore, a formal data lifecycle management policy needs to be developed, covering all stages from data creation, usage, and updating, to archiving and deletion. This policy should be supported by standardized operational procedures for each stage to ensure consistency, accountability, and compliance in the management of master data over time.

The following table summarizes the recommended improvement strategies for each domain:

Table 8. Summary of Improvement Strategies

MDM Domain	Recommended Improvement Strategies
Data Model	• Integrate all platforms that store or access master data, including independently developed shadow systems, into the official enterprise architecture through active coordination between IT and business units. • Develop a formal, recurring Standard Operating Procedure (SOP) to review and monitor potential duplication of master data across systems.
Data Quality	• Establish an enterprise-wide data quality measurement framework with clear benchmarks • Implement regular monitoring processes. • Link data quality metrics to business performance by formally assessing the operational and financial impacts of poor data quality. • Document data quality improvement plans with measurable effectiveness, integrated into routine operations.
Usage & Ownership	• Establish a formal data governance structure, including the designation of data owners and data stewards for each master data domain. • Create a documented and accessible master data catalog to improve transparency. • Conduct regular evaluations of data usage patterns to ensure alignment with operational needs and to detect potential misuse.
Data Protection	• Sustain mature data protection practices through periodic evaluations, internal audits, and continuous policy refinement aligned with evolving regulatory and technological developments.
Data Maintenance	• Consolidate master data storage into a centralized repository to reduce fragmentation. • Establish a comprehensive policy for managing the data lifecycle, covering every stage such as creation, usage, update, deletion, and archiving. • Support the policy with standardized SOPs for each lifecycle stage to ensure accountability, consistency, and regulatory compliance.

By implementing these recommended strategies, PT ABC is expected to gain substantial benefits beyond merely complying with regulatory requirements. A more integrated and well-governed master data environment will support improved decision-making, reduce operational inefficiencies caused by duplicated or inaccurate data, and enhance customer service through more reliable and consistent information [5]. Additionally, the establishment of clear ownership, measurement, and monitoring mechanisms will enable greater organizational accountability and data transparency [18]. In the long term, these improvements will strengthen PT ABC's readiness for digital transformation initiatives, support the scalability of business operations, and increase trust among both internal stakeholders and customers. Ultimately, a mature MDM capability not only fulfills compliance obligations but also serves as a strategic enabler for business agility and competitive advantage.

5. Conclusion

The results of this research show that the MD3M model offers a thorough and organized framework for assessing an organization's master data management maturity level. By assessing capabilities across five key domains and thirteen focus areas, the model enables organizations to identify specific gaps, strengths, and areas requiring improvement. In addition to serving as a diagnostic tool, MD3M also functions as a strategic guide for planning targeted interventions, aligning organizational resources, and prioritizing capability development. As such, the model not only measures current maturity but also facilitates the formulation of actionable strategies to advance toward higher levels of data governance, quality, and integration. This study contributes to the existing literature on data governance and maturity assessment by applying the MD3M model in the context of a general insurance company, a sector in which empirical case studies on master data management maturity remain limited. While insightful, the study is limited to a single case and relies on self-assessed data, which may affect generalizability and introduce response bias. For future research, it is recommended to extend the application of MD3M across a broader range of organizations within the financial services industry, including life insurance and banking, to examine potential variations in maturity patterns and influencing factors. Additionally, further studies could be conducted to monitor the progression of maturity levels over time and to evaluate the effectiveness of improvement strategies informed by MD3M assessments.

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