Sinkron : Jurnal dan Penelitian Teknik Informatika
Volume 8, Number 1, January 2024
DOI : https://doi.org/10.33395/sinkron.v9i1.13194
e-ISSN : 2541-2019
p-ISSN : 2541-044X

Improvement Master Data Management : Case Study of the Directorate General of the Religious Courts of the Supreme Court of the Republic of Indonesia

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Submitted : Nov 23, 2023 | **Accepted** : Dec 5, 2023 | **Published** : Jan 1, 2024

Abstract: Implementation of Master Data Management (MDM) in an organization aims to help the process of consolidating and integrating various master data sources into one separate source of truth, as well as helping to overcome data complexity that occurs in the process of synchronizing, consolidating and cleaning data from redundancy. The main obstacle at DG Badilag is that data is spread across various systems, in different formats, and is not well integrated. The aim of this research is to improve master data management at the Directorate General of Badilag using MD3M which has an impact on a more transparent, efficient and just justice system . To improve master data management, it is necessary to measure the maturity level with use Master Data Management Maturity Model (MD3M) by Spruit and Pietzka. The focus areas for measurement are data models, data quality, use and ownership, data protection, maintenance. Measurement of the level of maturity in the focus area is carried out through interviews and observations. The results of the assessment show that the MDM maturity level at the Directorate General of Badilag is 0 with an implementation level of 73% (48 out of a total of 65) of implemented capabilities. From these results, recommendations were prepared to increase the maturity level of the Directorate General of Badilag to level 2 in the three designated focus areas, namely strengthening data management in all aspects, from data structure, data quality and data protection. DG Badilag already has awareness in master data management and can increase MDM maturity to a higher level by implementing capabilities that have not been implemented and implementing activities that have not been implemented.

Keyword : Master Data, MDM, Maturity Model, MD3M, Religious Justice.

INTRODUCTION

Data and information are important things for organizations. Organizations can use data and information to make better decisions, improve performance, and provide better services to society or customers (Mosley et al., 2009). An important component in data and information management is master data. Master data is a single source of truth for this data, so it can be used to produce accurate and consistent information (Spruit & Pietzka, 2015). Master data refers to the core or fundamental data used throughout an organization. By having well-organized master data, companies can increase operational efficiency. Good master data management helps company leaders make more informed, fact-based decisions (Mosley et al., 2009). To properly integrate data between units in an organization, Master Data Management (MDM) is needed. Master Data Management (MDM) is the foundation of operational

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efficiency and intelligent decision making. MDM has a key role in controlling the value of master data, which then enables consistent and shared use of data across the organization.

Master Data Management aims to ensure that master data is accurate, consistent and reliable . Effective Master Data Management will support the optimization of data utilization for better decision making, increasing the efficiency of the judicial process, and improving services to the public (Rishartati et al., 2019). If there is no Master Data Management , organizations will face the problem of inaccurate, inconsistent and unreliable data. This problem can have a negative impact on various aspects of the organization, such as errors in decision making, decreased employee performance, decreased levels of public satisfaction with services (Spruit & Pietzka, 2015).

The Directorate General of the Religious Courts of the Supreme Court of the Republic of Indonesia (Ditjen Badilag MA RI) has data in the form of reference data, transaction data and master data in accordance with Law Number 50 of 2009 concerning Religious Courts (RI, 2009). One example of master data used by the Directorate General of Badilag is case-related data which is also used by several institutions under the Supreme Court of the Republic of Indonesia, namely the General Court, Religious Court, Military Court and State Administrative Court . Master Data Management (MDM) Maturity Assessment involves many entities and various types of data (Pietzka, 2004). The main obstacle is that this data is often spread across multiple systems, in different formats, and is not always well integrated (Spruit & Pietzka, 2015).

In the context of case data, master data is used in transaction data such as trial schedules, payment of court fees, trial decisions, and so on. When this data is inaccurate, this can cause losses for the parties involved in the case and can also affect transparency and accountability. Apart from that, another impact that occurs is delays in legal services in Indonesia. Therefore, MDM becomes very important for justice institutions because there are various parts of the organization that use the same data (Krismawati et al., 2019).

The problem that occurred at the Directorate General of Badilag which prompted the need to carry out a Master Data Management (MDM) Maturity Assessment was the complexity of the religious justice system which involved many entities and various types of data (Pietzka, 2004). This system includes a variety of information, such as case data, litigant party data , case financial data, case decision data . There have been discrepancies in case financial data in work units under the Directorate General of Badilag several times because there has not been integration between case data of work units within the Directorate General of Badilag with case financial data in the Directorate General of Badilag. And also the problem is that data is spread across various systems, in different formats, and is not well integrated (Spruit & Pietzka, 2015).

MDM assessment is important because efficient and integrated data is a critical foundation in supporting fair litigation and decision making. Without a sufficient level of maturity in master data management, the risk of inaccurate, inconsistent, or unsafe data can disrupt operational efficiency and can also potentially threaten legal order.

Efforts to comply with regulations and standards relating to data management, as well as to answer demands for transparency and accountability in the religious justice system. By carrying out MDM maturity assessment , Directorate General Badilag can identify potential problems, optimize internal processes, improve data quality, and ensure that the data needed for legal decision making is available accurately and in a timely manner. This will have a positive impact on the efficiency, legal compliance, and quality of services provided by the religious justice system, which are the main objectives in maintaining public trust and justice (Vásquez et al., 2018).

Several studies related to MDM were carried out to measure the maturity level of master data in the organization. Aditya Rahman A. Et Al. carried out an assessment to measure MDM at Pasar Rebo Hospital using the master data management maturity model (MD3M) method from Spruit-Pietzka by collecting data using observation and questionnaire methods (Aditya Rahman et al., 2019). Dewi Krismawati Et Al. also carry out assessments at the Central Statistics Agency (BPS) to assess the maturity level in the Statistical Business Register (SBR). Data processing uses the MD3M model from Spruit-Pietzka to measure the maturity level of master data management in SBR (Krismawati et al., 2019). Chielsin Ko Et Al. conducting research at the Secretariat of the Presidential Advisory Council to assess the maturity level of master data during the COVID-19 pandemic. The research was conducted

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using the master data management maturity model (MD3M) method from Spruit-Pietzka (Ko et al., 2021). Research by Santoso et al., also proposes an approach to improve MDM implementation at the Directorate General of Taxes (DJP) . The research was conducted using the master data management maturity model (MD3M) method from Spruit-Pietzka. Increasing MDM implementation at DJP includes appropriate governance policies and architecture of the MDM system that supports the integration of master data, references and transactions as well as interoperability in a distributed system environment, so as to increase DJP's MDM capacity. [10]. Many studies related to MDM have been carried out using MD3M, therefore this research also uses MD3M from Spruitz and Pietzka .

This research uses the MD3M model by Spruitz and Pietzka because the focus area in this model is appropriate and relevant for assessment in government organizations. The author chose MD3M because this method focuses on 5 important areas which are very suitable for the needs of case master data assessment at the Directorate General of Badilag of the Supreme Court of the Republic of Indonesia, namely data models, data quality, use and ownership, data protection and maintenance. After that, the maturity models are compared to determine which model will be used in conducting the assessment. In this step it was decided that the model that would be used was the model defined by M. Spruit and K. Pietzka (Spruit & Pietzka, 2015).

The aim of this research is to improve master data management at the Directorate General of Badilag using MD3M which has an impact on a more transparent, efficient and just justice system. Good data management can help the justice system to increase transparency by providing wider access to information and increase efficiency by reducing duplication of data and processes. This research is expected to produce recommendations for the Directorate General of the Religious Courts of the Supreme Court of the Republic of Indonesia to improve master data management within their organization.

The systematics of research writing includes several main parts, namely introduction, literature review, research methodology, results and discussion , recommendations and conclusions.

LITERATURE REVIEW

Master Data

Master Data is data that describes all the objects involved in a business process. It could be said that master data is basic data as source data that is able to provide additional information regarding the next data management process that will be carried out (Pratama et al., 2019). Master data is required by several business processes and a company's information technology system. Therefore, it is critical to standardize master data formats, synchronize values, and manage data properly to realize successful integration into the system (Mosley et al., 2009).

The most common master data categories in an organization are: related parties (individuals and organizations and their roles), products (commodities traded between parties), financial structure (assets, accounts and documents) and location (sales areas, branches and office) (Mosley et al., 2009). Master data is usually non-transactional in nature, such as case data in SIPP which provides all information related to the case handling process starting from case registration information, case costs, information on the composition of the panel of judges, case number, trial schedule, decision date. Master data is often grouped into master record datasets, which include reference data associated with them (Mosley et al., 2009).

Master Data Management

Master Data Management (MDM) is the technology, tools, and processes that ensure master data is coordinated across the enterprise. MDM provides unified master data services that deliver accurate, consistent, and complete master data across the enterprise and to business partners (Mosley et al., 2009). MDM is not just about technology. In many cases, fundamental changes to business processes will be required to maintain clean master data and some of the most difficult MDM issues, are usually more political than technical. Depending on the technology used, MDM can cover one domain (customer, product, location, or other) or multiple domains. The benefits of multi-domain MDM include a consistent data management experience, minimized technology footprint, ability to share reference data

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e-ISSN : 2541-2019
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across domains, lower total cost of ownership, and higher return on investment (Permana & Suroso, 2018).

Master Data Management Maturity Model

Master Data Management Maturity Model (MD3M) is a tool to measure the entire *Master Data Management process* including a data perspective and also focuses on the entire operational process (Spruit & Pietzka, 2015). *Maturity models* can be understood as artifacts that function to solve problems and define the current status of organizations based on their capabilities and obtain the means to make *improvements* (Becker et al., 2009). MD3M can also be a measure of an organization's ability to improve *Master Data Management* (MDM) on an ongoing basis. MD3M was chosen because this method focuses on 5 important areas which are very suitable for the needs of case master data assessment at the Directorate General of Badilag of the Supreme Court of the Republic of Indonesia, namely data models, data quality, use and ownership, data protection and data maintenance. The purpose of assessing the maturity level of MDM implementation is to provide an opportunity for organizations to evaluate the maturity level and benchmark MDM against other organizations. The higher the value of MDM implementation, the more optimal the organization is in preparing and managing quality (Hikmawati et al., 2021)*master data* . There are several models for measuring *the maturity* of *master data*, namely Dataflux by David Loshin, Oracle MDM, Kumar, and Spruit and Pietzka. Based on the comparison results of several *maturity models* examined by previous research (Krismawati et al., 2019). MD3M Spruitz and Pietzka are the best models that can be used to measure *the maturity level of an organization's master data* management because they cover all aspects (Mosley et al., 2009)

Table 1. Comparison of Maturity Models(Hikmawati et al., 2021)

References	Maturity levels/stages	Dimensions	Lack
Dataflux	1. Initial 2. Reactive 3. Managed 4. Proactive 5. Strategic Performance	1. Architecture 2. Governance 3. Management 4. Identify 6. Business Process Management	There are differences in the focus of area models in dataflux
Oracle	1. Marginal 2. Stable 3. Best Practices 4. Transformational	1. Create a data source profile 2. Determine the strategy 3. Determine the data consolidation plan 4. data maintenance 5. Data utilization	The structure is not perfect and in accordance with the maturity model, because it only provides areas of interest
Kumar	0. Ignorant 1. Initial 2. Isolated 3. Organized 4. Unified 5. Optimized		Focus weak areas
Spruitz and Pietzka	1. Initial 2. Repeatable 3. Define Process 4. Manage and Measurable 5. Define Process	1. Data Models 2. Data Quality 3. Use and Ownership 4. Data Protection 5. Maintenance	

MD3M Spruitz and Pietzka have 5 keys The topics identified are as listed in Table 1, namely data models, data quality, use and ownership, data protection, and maintenance . Each key Topics have their

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own focus areas with a total of 13 focus areas. To achieve the best maturity level, it means that all needs at each stage must be met .

DMBOK

DMBOK is a comprehensive framework for data management practices. This framework provides guidance for organizations to develop and implement effective data management programs. DMBOK defines data management as the process of planning, organizing, and controlling data assets to maximize their value to an organization. Master Data Management is one of the 11 knowledge areas of DMBOK. Master data management provides a framework for managing master data, which is an authoritative source of information about an organization's key entities (Dyche et al., 2017).

RESEARCH METHOD

This research methodology is designed to improve master data management at the Directorate General of Badilag . This research methodology is designed to provide structured and systematic guidance in improving master data management at the Directorate General of Badilag as shown in Fig.1:

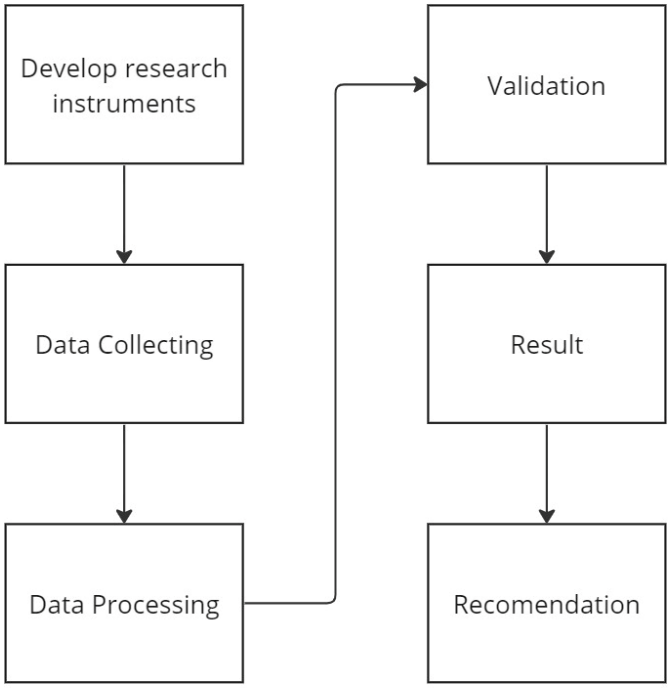

Fig 1. Research Flow Chart

Develop research instruments

The stage of preparing the research instrument begins with the creation of a questionnaire related to the Spruitz and Pietzka model. The questionnaire consists of 65 different questions, originating from 5 questions for each capability in each focus area. In total, there are 13 capabilities. Spruitz and Pietzka divided the questions into two sets because there are some aspects related to the organization's capability to manage master data that do not align with the conditions specified in the questionnaire, making the assessment not applicable to those areas. The first set of questions includes inquiries about factors influencing the organization, covering organizational size, interactions with external parties, and the number of systems used by the organization. The second set of questions contains inquiries about the organization's ability to perform master data management.

Table 2. Questions About Factors Influencing Organizations and Their Impact on Assessment

Question	Impact

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Does your company belong to the group and does your company need to interact regularly with other internal members of the group and exchange data?	If the answer is "Yes", then the "Master data definition" -E capability will be enabled
Is your company a non-profit organization, and/or a government or military organization?	If the answer is "Yes", then the "Master data definition" -E capability will be enabled
Does your company have employees of around 250 people or more? (Including employees of group companies at lower levels)	If the answer is "Yes", then the "Master data definition" -C capability will be enabled
Do employees need to work with many different systems to carry out their daily work and have to follow different processes when doing the work?	If the answer is "Yes", then the "Master data definition" -E capability will be enabled

Table 2 indicates questions related to influential organizational factors. The first question will affect the organization's ability to exchange data with other organizations in the same group. The second question will impact an organization's ability to assess the non-financial impact of data, classify financial impact, and determine whether data will impact the organization's reputation. The third question will impact the organization's ability to assess data quality considering the data quality needs of each business unit. The fourth question will impact the organization's ability to manage data resources across all systems according to the organization's data landscape.

Data Collection

Data collection by collecting data from the completed questionnaires. Filling out the questionnaire was carried out accompanied by direct interviews with 3 IT managers at the Directorate General of Badilag. The results of the questionnaire are then compared with the results of observations to validate the truth according to the facts in the field. If there are any contradictions, reconfirmation will be carried out with the respondent.

Data Processing

Data processing is carried out by analyzing the data from the conducted questionnaire, which is then mapped into tables to identify the maturity level. If the answer is "Yes," it means that the organization has implemented that specific focus area. If the answer is "No," it means that the organization has not implemented that focus area. The second set of questions includes inquiries about the organization's ability to manage master data. The second set contains 5 questions for each focus area, making a total of 65 questions. These second set questions will be asked if the respondent answers "Yes." The data from the questionnaire results are processed using spreadsheet tools, namely Microsoft Excel, to calculate the answers into a maturity matrix. To determine the maturity level, the following rules are established: if three IT managers respond to the questionnaire, and two of them answer "Yes" while one answers "No," the result will be considered an average answer, which is "Yes," and will be assigned a value of 1 to indicate implementation. Conversely, if two people answer "No" and one person answers "Yes," the "No" answer will be taken, and a value of 0 will be assigned, indicating that it has not been implemented.

Validity of Answers

Validating answers from questionnaires and observations is a critical process in research to ensure that the data obtained is accurate and reliable. The steps taken to validate the answers from the questionnaire results and observations, namely:

1. Data Verification

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In the questionnaire, verify the data by involving respondents. This can be done by calling them back to double check or clarify their answers if necessary. It is important to ensure that the data obtained accurately reflects the views or experiences of respondents.

2. Cross-Check with External Sources
   Checking the results of questionnaires or observations with external or independent data sources.
3. Statistical Analysis
   Using statistical analysis to check the correlation or suitability between questionnaire data and observation results. This analysis can identify any anomalies or inconsistencies that would otherwise emerge.
4. Error Analysis

Error analysis is carried out by finding out the types of errors that will occur during data collection.

Result

To determine the maturity level of master data management at the Directorate General of Badilag, an assessment was carried out using questionnaires and observations. The MDM maturity level consists of five levels, namely level 0, has no capabilities, meaning there are no organized data management practices or formal company processes for managing data. Level 1, initial/Ad Hoc, general data management using a limited set of tools, with little or no clear management. Data handling relies heavily on several experts. Level 2, repeatable, is the emergence of consistent tools and role definitions to support process implementation. Level 3, defined developing data management capabilities. Level 3, Defined, looks at the introduction and institutionalization of scalable data management processes and views DM as an organizational enabler. Level 4, Managed, i.e. Institutional knowledge gained from growth in Levels 1-3 allows organizations to predict outcomes when approaching new projects and tasks and begin to manage data-related risks. Level 5, Optimization, i.e. when data management practices are optimized, they are highly predictable, due to process automation and technological change management.

Recommendation

Recommendations based on the results of answers from IT managers at the Directorate General of Badilag to the questionnaire. The resulting recommendations refer to DMBOK [15]. Then from these recommendations it can be proposed to create a policy regarding master data management at the Directorate General of Badilag.

RESULT AND DISCUSSIONS

Based on Law of the Republic of Indonesia Number 50 of 2009 concerning the Second Amendment to Law Number 7 of 1989 concerning Religious Courts, the Directorate General of the Religious Courts of the Supreme Court of the Republic of Indonesia is a government organization that does not operate to seek profit. Below, the first set of questions contains questions regarding factors that influence the organization, including the size of the organization, interaction with external parties and the number of systems used by the Directorate General of Badilag. The questions asked and created this questionnaire based on [16] can be seen in table 3.

Table 3. Influencing Factors Question

Question	Answer
Does your company belong to a group and your company needs to regularly interact with other internal members of the group and exchange data?	Yes
Is your company a non-profit organization, and/or a government or military organization?	Yes
Does your company have around 250 employees or more? (Including group company employees at lower levels)	Yes
Do employees need to work with many different systems to carry out their daily work and must follow different processes when performing that work?	Yes

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Table 3 shows a summary of the assessment questions. The activities carried out have been categorized for each focus area . From the amount of data entered, the largest is taken to determine the results in each focus area , where 1 means it has been implemented and 0 means it has not been implemented in the organization that is the research object . From the recap results in Table 3, an assessment was carried out. maturity, by looking at the lowest level implemented in each focus area, this level shows the position of the maturity level in the organization. The summary results from this table can help researchers identify factors that have a significant impact on data management maturity in the institution. The results are shown in table 4.

Table 4. Assessment Results. MD3M

Topic	L1	L2	L3	L4	L5
Data Models					
Definition of Master Data	1	1	1	1	1
Master Data Model	1	0	0	1	1
Landscape Data	1	1	0	1	1
Data Quality					
Assessment. of Data Quality	1	0	1	1	0
Impact on Business	0	1	0	0	1
Awareness of Quality Gaps	1	1	1	1	0
Improvements	1	1	1	1	1
Usage & Ownership					
Data Usage	1	1	1	0	1
Ownership Data	1	1	1	0	0
Data Access	1	1	1	1	1
Data Protection					
DataSecurity	0	1	1	1	0
Maintenance					
Storage	1	1	1	0	0
Data Lifecycle	1	1	1	1	1

Table 4 shows that the maturity level in the data model is 1, data quality is 0 , data usage & ownership is 3, data protection is 0, and maintenance level is 3. The maturity level is determined based on the lowest maturity in all focus areas. Thus, the overall maturity level is 0. A maturity level of 0 indicates that this institution is experiencing serious problems in terms of data management, which could include a lack of structure, weak policies, or even errors in data collection and storage . And at this agency, there are no organized data management practices or formal processes for managing data . Therefore, prompt corrective and remedial action is required (Pratama et al., 2019). The maturity level at the Directorate General of Badilag can be seen in table 5.

Table 5. Ditjen Badilag Maturity Level

Key T opic	Maturity Level
Data Models	1
Data Quality	0
Usage & Ownership	3
Data Protection	0
Maintenance	3
Overall Maturity Level	**0**

Based on interviews with three IT managers at the Directorate General of Badilag, maturity levels that have not yet reached level 2 need to be increased. Focus _ Areas that must be improved are data models, data quality, and data protection. Levels maturity in these three focus areas shows the organization's attention regarding the master data management process . Meanwhile, usage and ownership and maintenance data show maturity level 3 which means the process has been defined and there is collaboration between units to resolve problems related to the Master Data Management process. As a reference for improvement, this focus area can be improved, especially the two focus areas that

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still have maturity value 0 , and one focus area still has a maturity value of 1. Even though the maturity level is low in the three focus areas, the implementation of activities is quite good. This can be seen in table 6.

Table 6. Number of Implementations of Master Data Management Activities at Ditjen Badilag

Maturity Level	Total	Implemented	Not Yet Implemented
1	13 (100%)	11 (85%)	2 (15%)
2	13 (100%)	10 (77%)	3 (23%)
3	13 (100%)	10 (77%)	3 (23%)
4	13 (100%)	9 (70%)	4 (30%)
5	13 (100%)	8 (62%)	5 (38%)
Total	65 (100%)	48 (73%)	17 (27%)

Table 6 shows the percentage of activities that have been carried out and implemented and those that have not been carried out or implemented. The table shows that the implementation level for all activities is 73%, as many as 48 out of 65 activities have been implemented. Additional implementation of activities will increase the maturity level of the organization.

The practical implication is that Ditjen Badilag already has a strong foundation for building their data management maturity. With 48 activities implemented, the organization has gained valuable experience in managing data. Therefore, the next focus should be on improving the implementation of activities that have not yet been implemented.

For the data model focus area, the organization has a formal process or system for managing master data. The current condition is that data related to religious court cases, applicants, and decisions are scattered across various systems without good coordination. Information such as applicant name , case type, and decision is stored in a non-standardized format. To increase the maturity level to level 2, the organization needs to form an MDM team consisting of representatives of the appellate court and court of first instance, and an IT management unit in each work unit under the Directorate General of Badilag. This team is responsible for designing policies, procedures and standards related to data management. Identify key data entities such as judicial cases, applicants, and decisions. Build a data model that includes relationships between key entities. Then implement an MDM solution to manage and maintain core data, such as applicant data and case data. Ensure good integration with existing systems in religious courts.

In the data quality focus area, organizations do not yet have or have not adopted formal practices in managing primary data. Current conditions, there is no special attention to data quality. Data such as the applicant's name , trial date and case decision are verified and standardized, but there is still duplication. To improve data quality to level 2, organizations need to form a special team to focus on data quality management. This team must have representatives from the religious justice unit, IT, and those responsible for data policy. Define quality criteria for key data such as applicant name , hearing date, and decision type, for example, define standards for name formatting or hearing date validation. Use mapping and profiling techniques to identify data quality issues, such as duplication or formatting discrepancies. Provide training to staff working with data to ensure a good understanding of the importance of data quality.

Then in the data protection focus area, currently there is no special attention to data protection. Personal information of applicants, witnesses or related parties may be de-identified and managed specifically to minimize the risk of leak or misuse. To improve data security, organizations need to conduct data security audits to identify security gaps that need to be fixed. Applying the concept of need to know (need-to-know) in granting access rights. consider using anonymization techniques to reduce the risk of identifying individual data. Establish procedures for reporting and handling data security incidents. Provide training to employees on best practices in data protection and information security.

From the 3 focus areas that were improved, 13 recommendations were produced. Any activity related to master management data must be carefully evaluated, and concrete steps must be taken to ensure implementation in accordance with proposed recommendations . Furthermore, it is necessary to monitor and evaluate the impact of each activity implemented, so that it can be measured how this increase contributes to increasing maturity level _ whole.

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CONCLUSION

In order to increase the effectiveness of master data management at the Directorate General of Badilag, research was conducted to measure the level of maturity using the MD3M approach. The research results show that the maturity level is currently at level 0, indicating the potential for significant improvements in master data management in this organization. The main focus of improvement is directed at the data model, data quality and data protection aspects. With an implementation level of 73%, where 48 of 65 activities have been implemented, improving data models, quality and data protection is a priority to reach maturity level to level 2. Therefore, steps such as understanding and documenting data models, identification and updating data quality policies, as well as implementing strict access controls and data protection technologies according to the guidelines provided by DMBOK. The research has the potential to provide in-depth insight into the challenges and opportunities in developing mature MDM in the justice sector. The findings from this research can be a valuable guide for related parties in taking the necessary steps to improve data management at the Directorate General of Badilag. Organizations can carry out regular assessments to maintain levels maturity and can improve the level its maturity . Improvements in one main focus area will have an impact on other focus areas, so it is possible that small improvements can have a significant impact on the assessment results . Thus, this research not only becomes a basis for concrete improvement efforts in the master data management of the Directorate General of Badilag, but also provides a strong foundation for the development of mature MDM in the justice sector as a whole. It is hoped that the findings and recommendations from this research will be able to provide a theoretical contribution to broadening the perspective on how master data management is carried out in judicial services, especially in the Directorate General of Badilag of the Supreme Court of the Republic of Indonesia as well as being a valuable guide for related parties, enabling the Directorate General of Badilag to continue to improve and maintain the level of maturity master data, creates a significant positive impact on assessment results and overall operational efficiency.

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