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Assessing BI Maturity: Government Financial Sector Case Study

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Abstract

This study assesses the implementation maturity of a Business Intelligence system within a government organization in the Indonesian financial sector. The primary objectives are to evaluate the current maturity level and to formulate evidence-based recommendations for enhancement. The research employs a mixed-methods approach, utilizing the Business Intelligence Maturity Model as the analytical framework. Data was gathered from organizational documents, direct observation, a questionnaire survey of 13 system users, and in-depth interviews with four key stakeholders. The results indicate an overall BI maturity at Level 3: Information Integration. Despite this, five sub-dimensions scored poorly: Technical Data Management, Analysis Functionality in Applications, Reporting Capability in Applications, System Availability, and Profitability Calculation, signifying suboptimal implementation in these areas. The study concludes that the BI implementation is only partially successful and has not reached its intended potential. To advance to a higher maturity level, the organization must address the identified weaknesses, particularly in data management, application functionality, and system governance. This study offers practical guidance for organizational improvement and enriches limited academic literature on BI maturity in developing-country public financial institutions.

Keywords: Business Intelligence, Maturity Level, Maturity Model, Public Sector, Analytical Framework.

1. Introduction

In the modern era, public and business organizations widely utilize data analysis as a cornerstone of decision-making [1]. Business Intelligence (BI) is a process of gathering the right information to deliver to the right people at the right time, enabling organizations to make data-driven decisions that enhance operational efficiency and competitive advantage [2] [3] [4]. The success of BI implementation is heavily dependent on meticulous planning and execution, which directly impacts decision-making processes and the achievement of strategic goals [5] [6]. Factors influencing the success of BI implementation can be categorized into organizational, technological, and human domains [1].

A government organization in the financial sector, operating under a national financial authority, has systematically utilized a Data Warehouse (DW) and BI to support its financial management functions. Since 2015, various dashboards have been employed, culminating in the development of an integrated BI system for financial management in 2022. This development was designated as a strategic initiative at the authority's level. The system is designed to assist the organization in using managed data for decisions related to financial management and budget execution.

A brief review of the literature reveals that assessing BI implementation is crucial for maximizing its value and ensuring a return on investment [1] [7]. Studies have employed various maturity models to gauge the effectiveness of BI initiatives. For example, the TDWI model was used by [8] to develop a BI governance framework in a university setting, demonstrating the need for structured oversight. The DWCMM model was applied by [2] to evaluate a data warehouse at a national agency, highlighting technical and process-oriented weaknesses. Furthermore, [9] utilized a domain-specific maturity model to assess a BI initiative at a large university, emphasizing the model's role in measuring progress and fostering reflective implementation practices. These studies collectively underscore the utility of maturity assessments in identifying systemic weaknesses and guiding strategic improvements across diverse sectors.

Despite the implementation of the integrated BI system and its supporting infrastructure, its utilization within the subject organization has not been optimal. A preliminary study identified several significant challenges. These include underutilized dashboards, which point to a potential misalignment with user needs or a lack of user adoption [8] persistent data integration problems, which compromise the reliability of insights; inaccurate reporting, which can lead to flawed decision-making [10] and insufficient user training, which limits the organization's ability to leverage the full capabilities of the system. These issues categorized into human resources, organizational, and technological domains indicate that the BI implementation is suboptimal [9] [11], hindering the achievement of its core objectives as a strategic and managerial decision-making tool.

The primary motivation for this study is to address the critical gap between the strategic investment in the BI system and its current operational reality. While existing literature provides various frameworks for assessing BI maturity [2] [12] [13], there is a scarcity of research specifically examining BI implementation

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for financial management within a public sector financial institution in Indonesia. This context is particularly unique due to challenges such as complex procurement processes, stringent data governance regulations specific to state finance, and a hierarchical culture that can impede agile technology adoption. The identified operational challenges suggest a significant disconnect between the system's potential and its actual contribution to organizational intelligence [14].

For this purpose, the Business Intelligence Maturity Model (biMM) was chosen as the analytical framework. The selection of biMM is justified by its robust and holistic nature. Unlike other models that may focus narrowly on technology or data warehousing, biMM provides a comprehensive assessment across functional, technological, and organizational perspectives [1]. This multi-faceted approach is particularly suitable for diagnosing the complex, interconnected issues identified in the preliminary study, which span technology, processes, and human factors [1]. Therefore, a formal maturity assessment using biMM is necessary to systematically diagnose the root causes of these issues.

This research aims to provide a clear and evidence-based evaluation of the current state of the Business Intelligence (BI) system and to offer targeted recommendations to address the identified gaps. By doing so, it seeks to enhance the system's effectiveness and ensure that the organization fully leverages its significant technological investment. The study explores the maturity level of the BI system implementation within the subject government organization and identifies recommendations that can be formulated to improve the system's implementation.

This research is expected to provide significant benefits, both practically for the organization under study and theoretically for the advancement of knowledge [15]. On a practical level, the findings offer a diagnostic overview by presenting a comprehensive snapshot of the current maturity level of the BI system implementation within the organization, serving as an objective baseline for internal evaluation [16]. Furthermore, the study identifies specific weaknesses in areas such as technology, functionality, and organizational aspects where maturity levels are low [17]. This targeted identification enables management to concentrate resources on the most critical areas for improvement. Building on this diagnosis, the research offers a set of actionable recommendations aimed at enhancing BI capabilities, ultimately allowing the organization to maximize its return on investment (ROI) [18].

On a theoretical level, this research contributes to the academic literature by addressing a gap related to the assessment of Business Intelligence (BI) maturity, particularly within the public financial sector in a developing country such as Indonesia [19]. In addition, the findings and methodology of this study can serve as a valuable reference for future research, offering guidance for scholars who wish to explore similar topics in different organizational contexts [20].

2. Research Method

This study employs a case study approach using a mixed-method research design. The case study methodology is appropriate for gaining an in-depth, real-world understanding of the BI implementation within the specific context of the subject government organization. A mixed-method design was chosen to leverage the strengths of both quantitative and qualitative data, allowing for a more complete and nuanced picture of the situation [15]. This approach facilitates a robust triangulation of data, where findings from one method are cross-verified and contextualized with findings from another. For instance, the quantitative results from the survey questionnaire identify *what* the specific maturity levels are across different dimensions. This is then enriched and explained by the qualitative data from interviews and document analysis, which reveal *why* these levels are as they are, uncovering the underlying processes, opinions, and organizational factors. This integration allows the qualitative findings (the 'why') to explain and add depth to the quantitative maturity scores (the 'what'). For instance, a low quantitative score in 'System Availability' is contextualized through interview data revealing the absence of a formal Service Level Agreement (SLA), thus providing a more complete and actionable diagnosis.

The study was conducted through a systematic sequence of phases to ensure a structured and rigorous investigation. The process began with problem identification and scoping, where the main issues were clearly defined, and the boundaries of the research were established. This was followed by a literature review and framework selection to explore previous studies, identify relevant theories, and construct an appropriate conceptual framework. Subsequently, the instrument design and validation phase involved developing research tools and ensuring their reliability and validity. Once the instruments were finalized, the data collection phase was carried out to gather the necessary information from relevant sources. The collected data were then processed during the data analysis and synthesis stage, where patterns were identified, and meaningful interpretations were drawn. Finally, the study concluded with the formulation of conclusions and recommendations, providing insights and practical suggestions based on the research findings.

3. Result and Discussion

The overall maturity level of BI implementation at the organization is Level 3: Information Integration, with a calculated average score of 3.15. This level is characterized by the establishment of a data warehouse to harmonize data and the alignment of BI initiatives with the IT strategy. Figure 1 illustrates the maturity scores for each of the three perspectives. The Functional perspective scored the highest (3.40),

followed by the Organizational (3.22) and Technological (2.84) perspectives. This suggests that while the organization has been relatively successful in defining the business use cases for BI, it faces more significant challenges in the underlying technology and the organizational structures required to support it [1].

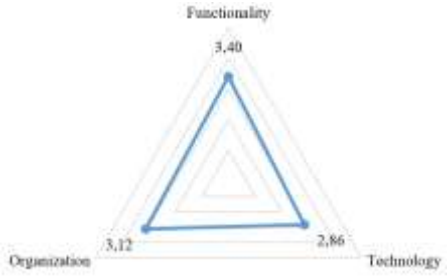

Figure 1. BI Maturity Level by Perspective

Although the overall maturity is at Level 3, this aggregate score conceals significant underlying weaknesses as shown in Figure 2. A more granular analysis reveals that several sub-dimensions fall well below this average, indicating foundational gaps that likely impede progress toward higher maturity. Specifically, critical issues are present in both organizational and technological governance.

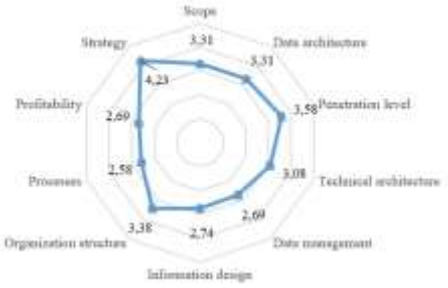

Figure 2. BI Maturity Level by Dimension

Table 1 summarizes Functional Perspective (Score: 3.40 - Level 3: Focusing). The functional perspective at the organization has reached a "Focusing" stage. BI solutions are used across all sub-directorates, and a high degree of integration with relevant business processes is evident. Data consolidation is managed at the sub-directorate level, ensuring a consistent understanding of data within those units. The impact of BI is recognized, and it is viewed as a necessary tool for analysis, even if some analyses are still conducted outside the BI system.

Table 1. Maturity Level of Functional Perspectives

Dimension	Sub-Dimension	Maturity Level				
		1	2	3	4	5
Scope	Use				X	
	Diffusion in application areas and business processes			X		
Data architecture	Content consolidation			X		
	Business data management				X	
Penetration level	Impact of BI			X		
	Use of synergies				X	

Table 2 reflects Technological Perspective (Score: 2.84 - Level 3: Data Warehousing). The Technological perspective is hampered by critical deficiencies. The Data Management dimension (2.69) is particularly weak, driven by a very low score in Technical Data Management (2.38). Qualitative data confirms this issue stems from manual data quality checks and a lack of data standardization. An internal evaluation document of a key data input system explicitly cited "poor quality of the rowset data" and "inconsistent report formats" as major obstacles. This was further corroborated in an interview with a lead IT developer (N2), who stated, *"External data quality is checked with SQL scripts. For BI, the validation and reliability are handled by the organization itself,"* highlighting a decentralized and manual validation process that compromises data integrity.

Furthermore, the Information Design dimension (2.74) is weakened by low scores in Analysis Functionality (2.46) and Reporting Capability (2.31). This reflects an over-reliance on external tools for analysis and a lack of automated reporting. A functional user (N3) confirmed this, noting, *"Analysis is already supported by BI, but there is still analysis that is done manually [in Excel]."* This reliance on external tools indicates that the BI system's native functionalities are not yet sufficient or user-friendly enough to meet analytical demands, reducing the return on investment for BI software licenses.

Table 2. Maturity Level of Technological Perspectives

Dimension	Sub-Dimension	Maturity Level				
		1	2	3	4	5
Technical architecture	Architecture			X		
	Utilization of tools			X		
	Integration of/with operational processes			X		
Data management	Data integration			X		
	Technical data management		X			
Information design	Analysis functionality		X			
	Reporting		X			
	Information channels			X		

Table 3 represents Organizational Perspective (Score: 3.22 - Level 3: Separate BI Organization). Within the Organizational perspective, the Processes dimension (2.58) contains the single weakest sub-dimension in the entire assessment: System Availability (2.08). The extremely low score is directly attributable to the absence of a formal, documented Service Level Agreement (SLA). This was unequivocally confirmed across stakeholder interviews. The lead IT developer (N2), for instance, stated, *"It is not written; there is a PIC that can be accessed directly according to the agreement,"* highlighting the informal nature of service guarantees that creates ambiguity and undermines user confidence.

The Profitability dimension (2.69) is also critically low, dragged down by Profitability Calculation (2.15). Stakeholders confirmed that no systematic post-implementation calculation of Return on Investment (ROI) or business value has been conducted. A manager (N4) confirmed this gap, stating, *"As far as I know, a calculation of benefits in the form of a study does not yet exist,"* indicating that value assessment

remains anecdotal rather than systematic. A project lead (N5) elaborated that benefit analysis is typically confined to pre-project justification documents. This focus on pre-project approval over post-project value demonstration makes it difficult to strategically manage investments and prove the tangible value of the BI program, likely contributing to the underutilization of its outputs.

Table 3. Maturity Level of Organizational Perspectives

Dimension	Sub-Dimension	Maturity Level				
		1	2	3	4	5
Organization structure	BI Governance				X	
	BI organizational structure			X		
	Data ownership			X		
Processes	Processes			X		
	(System) Availability		X			
Profitability	Profitability calculations		X			
	Cost allocation			X		
Strategy	BI Strategy				X	

4. Conclusion

This study concludes that the BI implementation at the subject government organization is at Level 3: Information Integration. While foundational capabilities are in place, the implementation's success is partial, hindered by significant, interconnected weaknesses in technological and organizational domains. Five sub-dimensions require immediate intervention: Technical Data Management, Analysis Functionality, Reporting Capability, System Availability, and Profitability Calculation. These findings resonate with the unique context of the Indonesian public sector. The challenges in Profitability Calculation and formalizing an SLA may reflect a bureaucratic culture that often prioritizes budgetary compliance and informal agreements over systematic performance measurement and formal accountability. Similarly, the difficulties in Technical Data Management could be exacerbated by rigid data silos and governance structures common in large government entities. Addressing these issues requires not only technical solutions but also a cultural shift towards data-driven accountability and process formalization.

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