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Analyze Critical Success Factors in Managing Data Silos to Prevent Poor Data Quality with a Case Study Research Approach

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ABSTRACT

In the context of data silo management in the government sector, Critical Success Factors (CSFs) in data quality are becoming increasingly important, especially for government agencies. Government organizations often face specific challenges in managing data silos in a report due to the complexity of their organizational structure and the large amount of report data that needs to be managed. This research aims to identify, analyze, and understand the relationship between Critical Success Factors (CSFs) in data quality to manage data and prevent data silos in organizations or agencies in report generation using work system theory and provide recommendations for developing strategies to improve data quality in reports. Through a qualitative approach, this research will explore the strategies and practices implemented by government agencies in identifying, preventing, and addressing data silos in reports. For the research methodology, it includes internal surveys with interviews of operators in the government agency. The evaluation results are expected to provide a positive contribution to public services, in the management of report data in the digital era, provide improvements in case of anomalies and deficiencies, and provide a deep understanding related to report generation in a relevant organization or agency.

Keywords: Critical Success Factors, Data silos, Work System Theory, Data Report

INTRODUCTION

In the era of digital transformation, quality data has become a cornerstone of effective governance. Government institutions worldwide rely on accurate, complete, and timely information to formulate policies, manage public services, and ensure accountability. Without reliable data, governments face the risk of inefficient resource allocation, diminished public trust, and suboptimal outcomes in decision-making processes. The importance of quality data extends beyond operational efficiency; it is integral to achieving transparency and fostering public confidence in governance systems.

This also applies to the Indonesian government, which continues to develop various digital initiatives in the field of data to support better decision-making and more effective public services. However, challenges related to data quality, such as fragmented information due to data silos and the lack of standardized data management practices, remain significant obstacles that must be addressed.

Therefore, ensuring high-quality data is a strategic step that is crucial to realizing modern, transparent, and trustworthy governance in Indonesia.

Data quality is a multifaceted concept that encompasses both technical and organizational dimensions. Respond to Verhoef et al., (2010) emphasize that ensuring high quality data requires not only a grasp of the types of information needed such as transactional data, customer touchpoint data, and retention data but also an understanding of how this information supports decision-making (Peltier et al., 2013). Define poor data quality as the extent to which data characteristics fail to meet requirements, often leading to significant organizational challenges. These definitions underline that data quality is not just a technical issue but a critical factor influencing strategic and operational success.

Despite its importance, data quality often remains an underprioritized aspect of organizational management, including in government contexts. In Madhikermi et al., (2016), industry experts point out that data quality is an area to which companies do not seem to give sufficient attention or the knowledge to deal with it efficiently (Lindström et al., 2023). For governments, this problem is compounded by the sheer volume and diversity of data they handle, from citizen records to financial audits. Governments must leverage such frameworks to overcome the persistent challenges posed by data silos and fragmented information systems.

In the context of modern governance, data silos remain a significant challenge, especially for government institutions handling vast amounts of heterogeneous data across departments. These silos lead to fragmented information systems, which hinder data integration and compromise overall data quality. Addressing this issue requires a structured approach to identify and manage the key elements that influence data quality. This research focuses on uncovering Critical Success Factors (CSFs) that can effectively guide government agencies in overcoming these challenges and achieving better data management outcomes.

Leidecker & Bruno, (1984) first introduced the concept of CSFs in strategic planning, providing a framework to pinpoint the essential activities that contribute to organizational success. Over time, this concept has been extended to various fields, including business strategy, knowledge management, and operational performance (Hawking & Sellitto, 2010). CSFs are defined as internal or external aspects that should be considered by the organization to define its scope or objectives (Ko, et al., 2023). These factors help organizations focus on specific areas that require constant attention to meet their performance objectives.

As articulated by (Gaardboe, 2018) “Critical success factors are, for any business, the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization.” These are the pivotal activities where "things must go right" for a business to thrive, and any inadequacy in these areas may compromise the organization's success (Gaardboe, 2018).

Further interpretations emphasize the multifaceted nature of CSFs. Ko and Francesconi (2008) define CSFs as a limited set of elements encompassing strategic, cultural, infrastructural, and knowledge-driven indicators critical for maintaining competitive performance and generating value. (Goteti et al., 2013) highlights the managerial aspect, identifying CSFs as key activities where favorable outcomes are essential for managers to achieve their goals.

This diverse body of work reflects the enduring relevance of CSFs in guiding organizations toward strategic success and operational excellence. By understanding and addressing these critical areas, organizations can align their efforts to thrive in competitive and dynamic environments.

In a government setting, identifying CSFs is particularly crucial given the complex interplay of technical, organizational, and political dimensions in managing data. In the same vein. Rowhinson (1999) confirms that critical success factors are those fundamental issues inherent in a project which must be maintained for team working to take place in an efficient and effective manner (Emmanuel, 2013).

This research employs qualitative methods to analyze the CSFs relevant to data silo management. The concept of Critical Success Factors (CSFs) promised a systematic way of identifying the key areas, or signposts, that require the constant and careful attention of management in order to achieve performance goals (Ram et al., 2014). This method provide a holistic understanding of the factors influencing data quality in public institutions. The analysis is further structured using thematic frameworks to identify recurring patterns and align them with the objectives of data quality improvement. This comprehensive approach ensures the development of practical recommendations tailored to the unique challenges faced by government entities. This research employs qualitative methods to analyze the CSFs relevant to data silo management. Data collection involves in-depth analysis of existing literature, examination of government policies, and interviews with subject matter experts in data management. These methods provide a holistic understanding of the factors influencing data quality in public institutions. The analysis is further structured using thematic frameworks to identify recurring patterns and align them with the objectives of data quality improvement. This comprehensive approach ensures the development of practical recommendations tailored to the unique challenges faced by government entities.

METHOD

The object of this study is a government-owned company operating in the industrial and trade sectors. This company will provide information and insights regarding the critical success factors in data silos, which will later become the focus of this research.

Qualitative research emphasizes that qualitative researchers study various phenomena in their natural settings, striving to understand and interpret them. Qualitative research also involves the use of diverse empirical materials such as case studies, personal experiences, introspection, life stories, interviews, observational data, historical data, interactions, and visual texts that depict moments and issues in individuals' lives (Abdussamad & Sik, 2021). The method used in this study is Qualitative Case Study Research (CSR). This study adopts a qualitative case study research approach. According to (Keutel et al., 2014) case study research is defined as an in-depth description and analysis of a bounded system—a system that cannot be separated from one case to another, as the case study reveals parts of the system that work integratively. This research employs an interpretive case study approach, meaning the researcher is directly involved in data collection, understanding the phenomenon, and analyzing data through close interaction with the phenomenon and participants (Elbardan et al., 2017).

This approach is used as a justification to identify and discover the critical success factors for government institutions in relation to data silos. This explanation clearly outlines the nature and approach of qualitative research, particularly emphasizing the use of case study research and the role of the researcher in an interpretive approach.

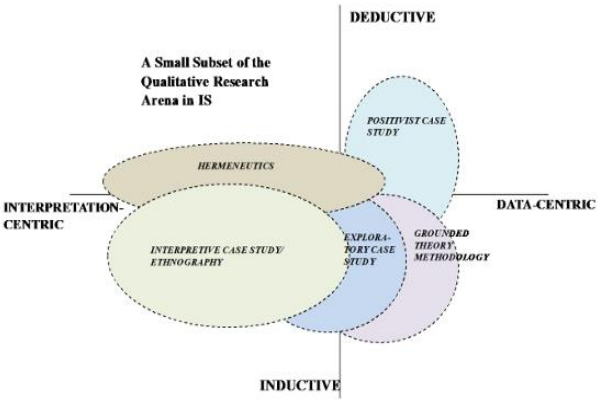

Figure 1. Relationship between research methods, epistemological orientation, and methodological focus

Interpretive case study is a type of qualitative research with a broad scope. In the discipline of Information Systems (IS), interpretive case study approaches different points that can vary with data, theory, analysis, and claims (Sarker et al., 2018).

The first step in this study is to create and develop an interview instrument to assist in data collection. Subsequently, the questions are structured based on the work system theory, referring to the critical success factors in data silos. The complete interview instrument is then presented in the table.

Data collection was carried out through structured interviews with respondents who are staff members responsible for preparing reports within the relevant government departments. The data obtained from these interviews were analyzed using the open coding method, a process within data analysis that involves identifying, labeling, categorizing, and describing phenomena found in interview texts, observations, and the researcher's field notes (Fitria, 2024) Grounded Theory Method in a Practical Approach). Subsequently, the data identified through open coding were further developed to provide explanations related to the research focus.

Validation was performed within the local government departments used as case studies to confirm the findings and ensure a diverse range of data sources. This step was crucial to enable the research results to be traced and reviewed more effectively and clearly, ensuring the accuracy and reliability of the conclusions. The data analysis process began with open coding, where each line of the interview transcripts was carefully examined to identify significant concepts and assign initial codes that accurately represent the participants' perspectives and experiences.

RESULT AND DISCUSSION

At this stage, conclusions and recommendations will be made regarding the research conducted. The conclusions are based on the analysis and discussion results derived from the data, which is then processed as the final outcome of this research. The recommendations are provided to address any data silos found in this study, contributing to the government agency for better data management in report generation. Here are the results of the data analysis obtained from interviews with the local government departments, identifying the Critical Success Factors related to existing data silos and categorizing them using open coding based on the Critical Success Factors and their causes.

The analysis results show that six critical success factors were identified within the relevant government department. This is supported by statements from staff who mentioned that the department has a centralized system for report generation. Additionally, the data used must be real-time, accurate, and current. In the report creation process, the data must adhere to a standardized format that has been established by government regulations (Ram & Corkindale, 2014).

Then, there are the results of data analysis obtained from interviews with staff from the local government department to identify the causes of data silos within the organization. Based on the case study analysis of the local government department, several causes were identified, such as activity reports based on the budget, the impact of data on decision-making, format differences, data discrepancies over time, and report approval based on organizational structure. These causes will be linked to the six Critical Success Factors (CSFs), namely: centralized system, real-time data, accuracy, standardized format, up-to-date data, and compliance with regulations (Gheni et al., 2017).

This research aims to produce an a priori construct as its output. Such research output is expected to reveal significant insights into the foundational framework that can guide related studies. Through thorough analysis, this research can elucidate the established structure and concepts. The findings aim to enhance understanding of the theoretical foundations and basic principles governing the studied phenomenon, and the explanation of the a priori construct can provide a basis for subsequent empirical investigations. This research is also expected to provide an understanding of the importance of Critical Success Factors in managing data within government agencies and its impact on the quality of report data.

CONCLUSION

Based on the findings of the study on Critical Success Factors (CSFs) in managing data silos to prevent poor data quality, several key conclusions can be drawn The study identified six critical success factors essential for effective data silo management in government institutions. These include a centralized system, real-time data, data accuracy, standardized format, up-to-date data, and compliance with regulations. These factors are considered vital components for ensuring well-managed and reliable report data. The importance of a centralized system and real-time data cannot be overstated. A centralized system enables better data integration across departments, while real-time data ensures that reports reflect the most current conditions. This is crucial for making timely and accurate decisions. Standardization and regulatory compliance form the foundation for producing consistent and regulation-compliant reports. A uniform data format facilitates data consolidation and minimizes errors. Poor data quality resulting from data silos can lead to less accurate decisions and hinder public service efficiency. Therefore, effective data management directly contributes to improved services and increased public trust. To address data silo challenges, it is recommended that government institutions enhance information system integration, strengthen staff training on data management, and conduct regular data audits to ensure compliance and optimal data quality. By understanding and applying these six CSFs, government agencies are expected to manage report data more effectively, improve data accuracy and integration, and support better decision-making in public service delivery.

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