

DATA QUALITY MANAGEMENT: A SINE QUA NON FOR SUSTAINABILITY AMONG FIRMS IN RIVERS STATE.

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Abstract

The purpose of this paper is to provide understanding about data quality management and sustainability as well as elaborate on the importance of data quality management for organizational sustainability. The baseline theory for this study was job characteristic theory, while the method used was the secondary methods where literatures were reviewed. The study elaborates on the necessity of data quality management for organizational sustainability. The study also found out that data quality management has a huge impact on sustainability as it improves decision-making, increased operational efficiency, and enhanced customer satisfaction. The study concluded that data quality management is a necessity for sustainability in any organizations. Based on the conclusion, the study suggested that organizations and business firms should facilitate active use of data quality management as it have a positively influence on organizational sustainability.

Keywords: Quality data, data quality management, sustainability, decision making, innovation customer satisfaction, and operational efficiency

Introduction

All facets of human life have been affected by the quick changes brought about by digitization in recent years. These shifts have encouraged businesses to adopt new business strategies in order to boost organizational procedures by putting in place reliable systems for increased productivity that can promote sustainability (Dulce et al., 2023). Sustainability, according to Bestman et al. (2022), refers to an organization's capacity to maintain consistency in its strategy in order to endure over an extended length of time. According to Funk (2003), sustainable organizations are those whose characteristics, operations, and decisions are anticipated to result in a favorable future state for all of their stakeholders. As a result, organization management has persisted in developing tactics aimed at enhancing effective and superior offerings within their respective organizations. Therefore, it is crucial for organizations to continuously analyze sustainable outcomes to make sure they meet their goals. People who view an organization's services through the lens of efficiency are more likely to return and use the company's services, and one way to do this is by advocating for policies that would have a positive impact on sustainability in organizations through required data quality management practices.

The prevalence of data quality management in the organization is pivotal as it ensures an organization holds track of needed insights to efficiently run their business. This is because data quality management culture in the organization impacts the successful administration of the organization's day-to-day operational activities. According to Crosby (2018), researchers are paying more attention to data quality management as it is integral towards maintaining a competitive edge and improving overall organizational outcomes. The rapid growth of data in this innovative era has led many companies to invest in digital platforms and solutions that store institutional records, paper-based records, and other electronic archives for more effective and efficient service delivery. In order to solve the issues of managerial and administrative responsiveness and data dependability inside the company, data quality management is recommended as a crucial component (Arikekpar & Bestman, 2023).

Making well-informed business decisions, enhancing resource coordination for tasks, and guaranteeing regulatory compliance all depend on data quality management. The efficient use of organizational resources towards the achievement of organizational goals is therefore a task assigned to administrators and managers of organizations, including profit and non-profit oriented organizations. A key to achieving these goals depends not so much on the data that is available to them, but rather on how this data can meet the requirements that have a positive impact on the organization's decision-making process. The U.S. National Institute of Statistical Sciences (2013) states that the standards of data quality management comprise two essential components of the data quality framework: data that is deemed both valuable and worthy of use, as well as the procedures used to generate it. Additionally, a number of variables, including the user, time, and the intended use of the data, affect data quality management. Since these elements are essential to the data quality management process, it is crucial for enterprises to make sure they are properly handled. Having high-quality data is crucial to increasing operational effectiveness. This is due to the fact that the corporation will own the fundamental building blocks that it used to propel its strategies and initiatives. As a result, they are able to administer the daily operations of the company in the proper manner. For businesses, data quality management is essential because it guarantees that decisions and actions are based on previously recorded data that has been gathered over time by the organization's many divisions. Since incomplete or insufficient data hinders an organization's ability to provide better and more effective services, Alexander and Critic (2018) contend that data should be appropriately assessed and analyzed to verify that it is fit for usage.

Studies have advanced different constructs in the context of data quality management. Previous study by Redman and Wang (2020), examined data quality management that can be used to implement activities and the monitoring of data to ensure that it continues to meet quality standards, which is key towards gaining improved organizational outcomes. Also, the Study conducted by Arikekpar and Bestman (2023), investigated data quality management and organizational responsiveness in indigenous oil and gas companies in Rivers State, Nigeria. However, to the best of our knowledge almost none of the reviewed studies examined data quality management that can be achieved through; data profiling, data visualization, data integration and meta data management towards organizational sustainability measures such as improved decision making and innovations. It is upon this background this research intends to fill the gap by exploring data quality management and organisational sustainability among firms in Rivers State, Nigeria.

For every organization to be sustainable, data quality management is essential. Without data quality management, businesses could find it difficult to perform administrative and service tasks effectively, which could result in bad decisions and subpar service delivery. Inaccurate data that could influence corporate choices, lead to customer loss, and waste resources are all consequences of improper data quality management in enterprises. But in recent years, businesses in Rivers State, Nigeria, have become increasingly concerned about the integrity of their data management. Businesses in Rivers State, Nigeria nowadays face a variety of challenges when it comes to managing their records. These challenges include questionable documentation procedures, extensive record-keeping, regrettable information filing, and regrettable data recovery. The challenges stand in the way of properly and effectively managing the way services are provided. For enterprises, data quality management is essential because it guarantees that all strategies, techniques, and resources are used to offer accurate and comprehensive data to improve sustainability.

Literature Review

Theoretical Framework

Richard Hackman and Greg Oldham (1976) developed the job characteristic theory which serves as the theoretical cornerstone of this investigation. The relationship between job features and an individual's reaction to their employment is explained by the job characteristics theory. The hypothesis identifies what

makes a job engaging, fulfilling, and motivating for employees. For better work delivery, the theory guarantees appropriate administration of pertinent knowledge. Therefore, the model can be applied to the job content when team productivity and individual employee outcomes are declining, which is typically caused by a lack of the necessary information and knowledge to create desired results.

This theory is significantly impacted by this notion. Organizational sustainability and data quality management, since it will allow managers and administrators to set an example and exert the necessary influence to enable the collective realization of data quality management for increased efficiency that will improve sustainability. Employees will therefore be aware of this role in relation to upholding standards in the data management process as part of their employment. And as a result, workers are motivated, engaged, and content to complete a variety of tasks. They also recognize data that meets the necessary data quality standards, which in turn serve as the foundation for ongoing team and individual employee performance and improvement, leading to overall efficiency in the provision of organizational services.

Concept of Data Quality Management

In the modern corporate environment, managing the quality of data is crucial for any company since it is necessary for efficient administration and service provision. Any business process is thought to require data quality management, or DQM. Wang argued that data quality management can be a significant advantage for companies (Pipino, Lee, & Wang, 2002). They defined data quality management as a measure of the data's accuracy, completeness, and integrity as well as its capacity to satisfy customer needs. Furthermore, Data quality management is defined by Ariekpar and Bestman (2023), as the accuracy, completeness, consistency, timeliness, and relevance of data. Therefore, a collection of skills, tactics, procedures, and practices that guarantee the delivery of precise, comprehensive, and up-to-date data is known as data quality management. According to Pipino, Lee, and Wang (2002), data quality management is critical for organizations because it helps managers make decisions inside the company, improves their capacity to recognize and resolve problems with data quality, and allows them to monitor performance precisely. However, Data quality, according to DQLABS (2024), is the dependability of data as measured by its capacity to fulfill its intended function. Loshin (2010) identifies three primary approaches that companies can employ to guarantee the quality of their data. These tactics include creating data governance procedures, putting data profiling and integration procedures into place, and defining and enforcing data standards. As a result, data integration, data visualization, data profiling, and meta data management are all components of the data quality management process.

Data Profiling

A variety of techniques for effectively analyzing a particular data set are included in data profiling. Data profiling, according to Abadi (2007), is the process of looking through the data that is available in an existing data source and gathering information and statistics about that data. From a more sophisticated standpoint, methods like sorting, creating structured queries, looking for keywords in data sets, and even using specialized data profiling tools. Despite extensive research on individual components in the past, the field itself is neither established nor defined in any coherent way, which is one of the two main reasons data profiling is so crucial in data quality management. Second, a growing amount of data outside of the conventional relational databases is being generated and eagerly awaits profiling (Felix, 2014). According to this study, data profiling is the act of looking over, evaluating, and producing a helpful summary of data. This therefore aims to get rid of mistakes in the process of managing quality data. The processes used to evaluate data sets and the realization of metadata are captured by data profiling. By identifying the proportion of records that do not meet predetermined criteria, for example, profiling results can also be used to gauge and track the overall quality of a data set (Felix, 2014).

Data Visualization

Effective information realization and insight production have been greatly aided by data visualization tools. Data visualization techniques, approaches, and applications have advanced significantly in today's dynamic business world, to the point where many companies and organizations view them as their main tool for analyzing and interpreting data. Nguyen, Gardner, and Sheridan (2020) assert that data visualization is essential to better decision-making. Prior to According to studies on the use of data visualization, over 57% of companies used data visualization in some capacity to produce business insights (Stodder 2013). The method that data is presented for simple interpretation and comprehension is known as data visualization. In this context, tools like maps, charts, and graphs are used. Since data visualization is one of the most sought-after job needs across enterprises worldwide today and is recognized as a crucial ability for data-centric employment, it is an essential component of visual analytics (Ryan et al., 2019).

Data Integration

Databases were first introduced and are still being used by administrators and companies worldwide. One of the main areas of study in the field is data integration. The process of bringing together data from multiple sources in one location to provide consumers with a nearly cohesive representation of all the data is known as data integration. From a commercial perspective, integrating data from various heterogeneous sources is crucial since it guarantees that the firm can do data analysis in one location. The process of arranging historical, current, or real-time data that comes from various locations or formats (syntax or semantics) into a single structure so that the user can see it as a single entity regardless of its location or syntax or semantics is known as data integration. Because of the reports that are produced from the data that is available within the business, effective data integration enables firms to respond intelligently (Sagar & Pravin, 2016).

The goal of data integration design goes beyond the definition of the global schema. It mostly focuses on the types of restrictions that can be expressed on the data and the appropriate data model to apply. Furthermore, it is necessary to establish the relationship between the global schema and the data sources. For a given collection of existing information systems, an integrated perspective might be forged to speed information access and reuse through a single avenue or access point. This is one of the two main reasons why data integration is crucial in data quality management. Additionally, data from several information systems is gathered for a specific information need in order to obtain a more comprehensive foundation for the requirement (Gal, 2006). Accordingly, firms can use the findings from their investigation to inform important choices that will benefit the company. Various errors, redundancies, or inconsistencies may be created when data is transferred from its source system to a data warehouse. To enable the data warehouse to give its users a reconciled representation of the data, these redundancies or inconsistencies must be eliminated. Data integration is essential since it affects how well client needs are met. The global schema, a single picture of the data aggregated from multiple sources, is provided by the data integration system. An integrated, controlled, and virtual view of the underlying sources is offered by the global schema (Sagar & Pravin, 2016).

Meta Data Management

The fitting of meta data that guarantees the necessary data is found for reporting and analysis is known as meta data management. It enables a company to see how data relate to one another and make potential inferences about the data in their database. Information dimensions that are produced, saved, and disseminated to comprehend the worth and contextual significance of a data resource are referred to as metadata. Since metadata affects the effective delivery of data quality management that supports better decision making in the organization, its significance cannot be overstated due to the development of information technology, the World Wide Web, and more recently, the social semantic web (Satija, Mayukh & Daniel, 2020). In information management and research, the term "meta" refers to structured data—more precisely, a list of descriptor-value pairs—that characterizes the attributes of entities that contain information. The terms "data about data" and "information about information resource," which succinctly convey its essence, are frequently used to describe it. Two essential functions in granting access to an organization's electronic resources are made possible by the efficient management of its meta data. These

responsibilities also include identifying and discovering resources during real-time search, as well as organizing digital data. Standardizing the organization of metadata records in terms of consistency, appropriateness, and relevance of their tags has become necessary due to the technological advancements that have enabled remote access to digital information resources supported by metadata tags. Several metadata models, sometimes known as metadata schemas (standard, if recommended by an authorized international body), have been introduced as a result of studies on data quality management.

Concept Of Organizational Sustainability`

"Keeping the business going" is the popular meaning of sustainability, according to Colbert and Kurucz (2007). Another term that is commonly used in this context is "future proofing" enterprises. "Achieving success today without compromising the needs of the future" (Boudreau and Ramstad 2005). Organizational sustainability is referred to as "adopting organizational strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future" (Deloitte & Touche, 1992). Bestman et al (2022), defined organizational sustainability can also be seen as the ability of organizations to be consistent in their mode of operation in order to survive over a long period of time. According to Funk (2003), sustainable organizations are those whose characteristics, operations, and decisions are anticipated to result in a favorable future state for all of their stakeholders. A company model that generates value in line with the long-term preservation and improvement of financial, environmental, and social capital is referred to as sustainable growth.

Measures of Organizational Sustainability

Improved Decision Making

Improved decision making refers to the process of weighing several options to identify the best one that will produce the best results. The ability of a manager or administrator to decide on behalf of their organizations and choose the best course of action to achieve the desired outcome or address the current issue. Maintaining focus and following established standards requires the usage of organized choice guidelines. The paper by James and Edwin (2017), explains these rules, which are collectively referred to as decision-making processes. The process of making better decisions by utilizing a variety of methods, resources, and approaches is known as "improved decision making." This may entail obtaining and evaluating pertinent data, taking into account other viewpoints, assessing possible outcomes, and reducing prejudices or cognitive errors. In both personal and professional contexts, improved decision-making frequently produces more effective and efficient outcomes. Using efficient techniques, methods, and resources to improve the caliber of decisions or judgments made by individuals or organizations is known as improved decision making. It includes procedures including obtaining pertinent information, evaluating data, weighing options, estimating risks, and reducing biases in order to get better results.

Nutt (2008), a renowned scholar and professor of decision-making, has made important advances in our knowledge of and ability to enhance organizational decision-making. According to Nutt's theories and research, almost half of organizational decisions go wrong, resulting in losses and other unfavorable outcomes. He suggests that in order to enhance decision-making procedures and results, it is necessary to comprehend the causes of choice failures. Organizations are also criticized by Nutt for depending on faulty decision-making procedures that include presumptions, biases, and incomplete facts. He recommends a more methodical and planned strategy instead, one that takes into account many viewpoints, explores a range of options, and evaluates potential risks and repercussions. Therefore, improved decision-making in organization can result in several advantages that support organizational success. First, since decisions are based on current and correct information, it can result in more effective and efficient operations. Profitability may increase and expenses may be decreased as a result. Second, since decisions are made with the needs of customers in mind, better decision-making can result in greater customer service. In addition to helping to draw in and keep clients, this may result in higher levels of client satisfaction and

loyalty. Third, because businesses are better equipped to see and seize new opportunities, better decision-making can result in increased innovation.

Innovation

The Latin term "innovare," which means "to renew, to make new, or to alter," is where the word innovation originates. A company must endure the competitive and tumultuous market, where the life cycle of products, technologies, rivals, regulations, and even entire societies undergo fast change, in order to maintain success. Businesses must safeguard both their material and immaterial assets from market fluctuations (Davila et al., 2006). Innovation enables the company to change and grow in response to shifting consumer needs and market conditions. People, Process, and Product are all involved, and it is universally accepted as a crucial component of successful productivity. According to a recent definition by Knowles et al. (2008), innovation is the launch of new goods, procedures, or corporate systems. The acceptance or development of new goods, procedures, or business systems may lead to such an introduction. Innovation is "an idea, practice, or object that is perceived as new to an individual or another unit of adoption," according to Rogers (2003). According to the definitions given, innovation is a new procedure, product, or business system. Implementing a new or greatly enhanced product (good or service), process, marketing strategy, or organizational approach in business operations, workplace structures, or external relations is known as innovation. A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in the technical specifications, components and materials, incorporated software, user-friendliness or other functional characteristics. This conceptual framework is hereby proposed.

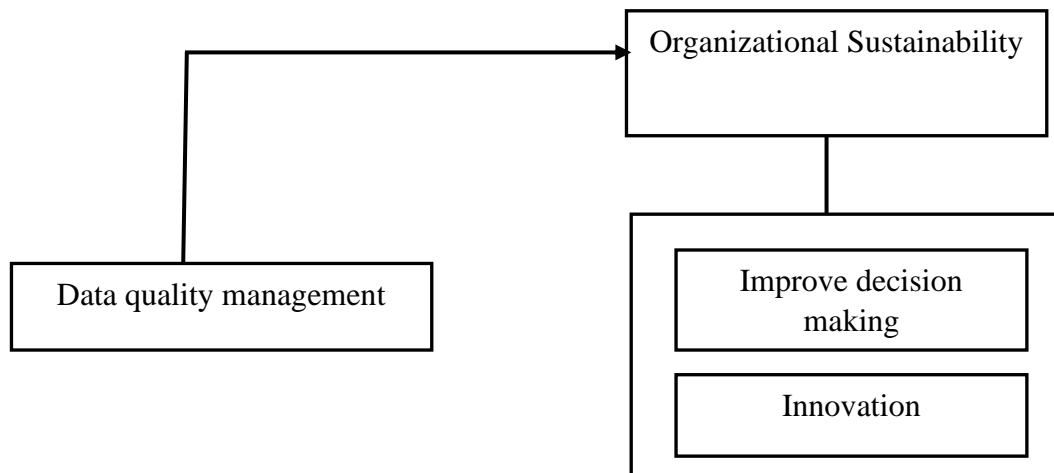


Fig. 1.1: Conceptual framework of data quality management and organizational sustainability among organizations in Rivers State.

Source: Research desk (2024)

Empirical Review

According to Pipino, Lee, and Wang (2002), data quality management is critical for organizations because it helps managers make decisions inside the company, improves their capacity to recognize and resolve problems with data quality, and allows them to monitor performance precisely. Furthermore, the authors argued that DQM can enhance data quality by decreasing errors, enhancing accuracy, and boosting data completeness. Businesses must implement efficient data quality management procedures in order to be competitive in the contemporary market and to make better judgments more rapidly and precisely. The appropriateness and significance of data quality management in business were eloquently demonstrated by

Pipino, Lee, and Wang (2002). Without this technology, businesses might not be able to make better judgments, which could result in subpar customer service.

Data must be promptly available in order for business processes to be successfully coordinated. Strategies to improve quality must be put in place to guarantee that data is accessible when and where it is required. Organization-wide tactics can be used to guarantee timely data availability, claim Pappaioanou et al. (2003). Developing a framework for decision-making, enhancing the quality of current data, and using technology for data storage, manipulation, and transmission are a few of the tactics. Initiatives to increase quality should focus on increasing the completeness, correctness, and clarity of data.

Mathieu and Zajac (2002), stated that data management has been utilized to implement activities and functions that boost reaction from participants in organizational functions, which are extremely necessary for worthwhile performance. The degree to which data is suitable for data consumers to use for their intended purposes is a measure of data quality (Redman and Wang, 2008). Therefore, the goal of data quality management is to make sure that data satisfies the requirements of its intended consumers, whether they are internal or external to the company. Improved decision-making, increased operational efficiency, and improved customer satisfaction are just a few of the many advantages that organizations can reap from effective data quality management, which calls for a dedication to continuous improvement and an internal data quality culture.

Felix (2014) states that the outcomes of successful data profiling can also be used to gauge and track the overall quality of a data set, for example, by identifying the proportion of records that do not fit into predetermined constraints. The author claims that the use of methods like query optimization and data purification will contribute to more trustworthy data profiling results. According to the author, since data profiling would enhance work results, the company has to promote a sustainable data profiling culture which helps to improve organizational efficiency.

Anvesha (2022), When an organization has a lot of databases but doesn't know what to do with them, administrators can use data visualization tools to improve their decision-making skills by better understanding what they need to do to improve administrative outcomes. According to Anvesha (2022), data visualization makes sure that essential insights are clearly displayed so that end users, including those without extensive expertise of data management, can comprehend the contents of the data. The author claims that when data visualization is presented correctly, it tells a story about the data's contents for ease of understanding. Since it captures important data areas to enable subsequent actions, data visualization storytelling is an essential part of data quality management.

According to Joseph and Rebecca (2023), Integrating data is essential to enhancing organizational results. The authors confirmed that effective administrative outcomes at work have been guided by data integration, particularly with the growth in data required for proactive organization management. Additionally, the authors argued that in order to handle this change in data lifecycle management, it is necessary to establish the necessary arrangements for the structured integration of an organization's data from several sources. In order to make sure they make well-informed business decisions, they also advised firms to develop more creative data integration policies and initiatives.

Methodology

The study's methodology is a survey of the body of existing literature. Several works of literature were examined in order to further illustrate the study's topic and give a better comprehension of the subject, both empirical and non-empirical literature were studied in order to provide insight on the topic of data quality management: a sine qua non for sustainability among businesses in Rivers State.

Conclusion and Recommendations

Every organization's effectiveness is logically dependent on the management's data quality management procedures. Businesses' technology is always evolving. To support management in their efforts to improve sustainability, a strong data quality management system is essential for maintaining real-time service and adaptability in the face of technological advancements. Consequently, the study demonstrated the connection between the organizational sustainability metrics and the data quality management dimension. As a result, the methodology and study approach were developed in a manner that suggests the accomplishment of the study's goals. According to the study's findings, improved decision-making and innovation are greatly impacted by data quality management achieved through the use of data profiling, data visualization, data integration, and metadata management.

The following recommendations are hereby made:

- i. Businesses should employ data quality management more skillfully and efficiently in order to boost organizational sustainability and efficiency.
- ii. Standard data visualization systems should be used by businesses as a means of maintaining and enhancing their sustainability since they make it simple for them to understand data and make wise decisions.
- iii. Since data quality management helps the company to improve work outcomes and increase its sustainability, it should receive more attention.

Contribution to Knowledge

This study having theoretically and empirically validated the purpose of this study, which is to provide understanding on the concept of data quality management: a sine qua non for sustainability among firms in Rivers State, thus contributes to the existing body of knowledge. Consequently, this study will be of immense benefit to the following:

- Firms in Rivers State will take advantage of the data quality management in their organization to incorporate the needed policies and practices which will be immensely essential towards sustainability.
- Also, to make relevant budgetary allocations for the training and development of staff members on up-to-date data quality management tools and data requirement to enhance efficient delivery of work outcomes across the departments, units and teams in the organization.

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