Application Data Governance in Enterprise Information System

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Abstract—**The centrality of data and information in enterprises really benefits organizations as it improves the accuracy and quality of the data. In today's data-driven landscape, effective data governance plays a pivotal role in ensuring data quality, security, and compliance within enterprise information systems. This paper provides an overview of the data governance, role of data governance , data breach which are the challenges in enterprise information systems and data management.**

Keywords—Data governance, enterprise information systems, data quality, compliance, framework

I. INTRODUCTION

Nowadays, there is a lot of data produced by a company across departments day by day. The data produced serves as a valuable asset that can drive innovation, efficiency, and competitiveness, ultimately leading to improved performance and success. Recently, most companies have integrated their data across departments into a centralized system, often referred to as Enterprise Resource Planning (ERP). However, the lack of a centralized system can lead to data silos, where the information is isolated and inaccessible to other parts of the organization. This fragmentation not only hinders the efficient use of data but also poses significant challenges to data governance, including data quality, privacy, and security. In this context, the concept of data governance becomes crucial. Data governance is important because it defines policies and procedures to ensure proactive and effective data management [1]. Industry experts and thought leaders emphasize the importance of data governance. This concept revolves around managing data availability, usability, integrity, and security within enterprise systems. It involves defining internal standards, policies, and controls to ensure consistent and trustworthy data usage. Data governance is not just about protection; it's also about managing sensitive data throughout its lifecycle—from intake to disposal. Influential voices stress that well-designed data governance aligns with an organization's current needs while remaining adaptable to future changes [2]. The aim of this research paper is to elaborate on application data governance in enterprise information systems.

II. THE ROLE OF DATA GOVERNANCE

The roles of data governance in business are really important as it plays a critical role in determining the success of one business. Each of the designated people play a pivotal role and hold a huge responsibility to align the business strategy and ensure effective implementation. In the next paragraph, we will discuss the roles in data governance and the responsibilities of each role based on the article **"Data Governance Roles and Responsibilities"** [3].

A. Executive Level

The Executive level plays an important role in data governance. Usually it is a senior leader who responsible for:

- Strategic Alignment: Ensure the data governance aligns with company goals and strategy.
- Resource Allocation: Allocating budget for data governance initiatives.
- Decision Authorization: Responsible for authorizing a critical decision related to data policies and enforcement.

B. Data Governance Lead (Support Level)

Oversees the implementation of data governance including:

- Program vision: Defining the vision and goals of the data governance initiatives.
- Cross Functional Collaboration: Promoting adherence to data governance policies and the practices.
- Continuous Improvement: Keep up to date with the development of data governance.

C. Data Governance Council (Strategic Level)

This consists of key stakeholders who make critical data governance decisions:

- Conflict Resolution: Resolve conflicts related to data governance.
- Representation: Members of the council represent different business units to ensure diverse perspectives from different stakeholders.

D. Subject Matter Experts (Tactical Level)

- Resolve challenges: Act as facilitators bridging data-related issues across different business units.
- Decision making: Have the authority to make decisions related to data governance issues.

E. Data Steward (Operational Level)

Manages day to day data quality and compliance.

- Quality assurance: Maintain data quality standards and resolve issues.
- Data documentation: Documenting metadata and

lineage.
- Collaboration: Interacting with data owners.

III. COMPARATIVE STUDIES

Data governance has radically changed the marketplace as human trade has progressed from basic bartering to sophisticated e-commerce throughout history. Trade depended on personal connections and trust in the past before developing into centralized marketplaces where local expertise drove deals. But data governance has emerged and transformed trade, especially with the move to e-commerce. Businesses may use data for efficient transactions, pricing plans, and customized experiences thanks to data governance. By providing precise criteria for data collection, storage, and use, it also improves trust and security and gives consumers more confidence when making purchases online.

A. Traditional Marketplace

Based on the article "**How online marketplaces are transforming traditional services models.**" [7], the world has started to focus on including data governance in the marketplace. Though data governance is not used in the traditional marketplace in a formal setting, it still has similarity based on the implementation mainly about the management and related to the goods, services and transaction. Here is how the traditional marketplace works:

In the past, word-of-mouth, reputation, and personal connections were major sources of information for buyers and dealers about goods and services. In this informal approach to data governance, information regarding the availability, cost, and quality of commodities was shared. People developed trust and made wise decisions through these channels, which served as the foundation for numerous transactions. But as technology advanced and the world went digital, more structured data governance procedures frequently took the place of these conventional approaches.

While data security is not a major problem in our modern world, it used to be really important in earlier times. Traders understand that they need to protect information about sources, prices and the customers to maintain the competitiveness between each other. Although the methods were rudimentary compared to today's standard, the concept of protecting data is still there and one of the main factors of development of data governance nowadays.

Traders in the past maintained basic transaction records, although not as detailed as modern records. These records usually included information about goods traded, quantities, prices and the customers. While they may not be as diverse as modern standards, it still served its purpose of keeping the records. These records can be accessed by the trader to use in the future trading to maintain the stability of the business.

B. Current Marketplace

Based on previous studies entitled "**Data Governance: Framework and Approaches in the current marketplace**", this article delves into the complex realm of data governance, aiming to shed light on the evolving landscape of data management and utilization [8]. By examining diverse frameworks and approaches, we seek to provide valuable insights into best practices for navigating the complexities of data governance in organizations.

At its core, the foundation of good data governance is the development of an environment that values accountability and responsibility for data assets. Organizations may protect data integrity, reduce risks, and promote confidence in data-driven decision-making processes by putting in place explicit policies and procedures. Furthermore, strong data governance frameworks guarantee regulatory compliance and act as a safeguard against possible data breaches.

Throughout this exploration, data governance plays a pivotal role in driving operation efficiency and enhancing decision-making. A business has a full potential to grow if the enterprise use their data assets to its finest. However, their data assets must be minimizing the inherent risks associated with data misuse or mishandling.

Furthermore, this article advocates for a proactive approach towards data governance, emphasizing its significance in today's data-centric business landscape. Data governance principles need to be embraced so that the organization can not only optimize their data management practices but also fortify their competitive edge in an increasingly data-driven world.

C. Advantages and Disadvantages of Past and Current Marketplace

The traditional marketplace relied heavily on informal methods of data governance, such as word-of-mouth, reputation, and personal connections, to share information about goods and services. This approach, while effective in its time, lacked the structure and formalization seen in the current marketplace. In contrast, the current marketplace emphasizes the importance of structured data governance, with explicit policies and procedures in place to protect data integrity, reduce risks, and ensure regulatory compliance.

Data security was a significant concern in the traditional marketplace, where traders understood the need to protect information about sources, prices, and customers to maintain competitiveness. While the methods were rudimentary compared to today's standards, the concept of protecting data was present. In the current marketplace, data governance frameworks act as a safeguard against data breaches, emphasizing the importance of protecting data assets in a more structured and comprehensive manner.

In terms of transaction records, traders in the past maintained basic records that were not as detailed as modern records. These records served their purpose of keeping track of goods traded, quantities, prices, and customers. In contrast, the current marketplace emphasizes the importance of detailed transaction records, which can be accessed and utilized to maintain business stability and optimize data management practices.

Overall, the traditional marketplace relied on informal data governance methods, while the current marketplace emphasizes structured data governance frameworks and approaches to optimize data management practices, reduce risks, and enhance decision-making processes in an increasingly data-driven world.

IV. CRITICAL ANALYSIS AND OPINION

The shift from traditional marketplace practices to the current marketplace in terms of data governance can be attributed to several key factors.

Firstly, advancements in technology have played a significant role. The modern era has enabled the collection, storage, and analysis of vast amounts of data, which has required more structured and formalized approaches to data governance to ensure its security, integrity, and compliance with regulations.

Secondly, the rise of e-commerce and online marketplaces has transformed the way businesses are conducted. These platforms heavily rely on data to personalized user experience, advertising, and the operations optimization.

Thirdly, the increasing awareness and importance of data privacy and security have also contributed to the shift. With data breaches and privacy scandals becoming more common, consumers are demanding stricter management regarding the use of personal data. This has led to the development of more stringent data governance practices to ensure compliance with data protection laws and regulations.

In our opinion, the transition from old to current marketplace practices in data governance is a normal development propelled by the changes of business environment and technology advancements. Even if conventional approaches may have been useful in the past, they are insufficient in the data-driven economy of today. Adopting contemporary data governance principles is essential for companies looking to maintain their competitive edge, win over consumers, and protect the security and integrity of their data assets.

V. DATA QUALITY MANAGEMENT

High-quality data is essential for effective data governance, serving as the cornerstone for informed decision-making, regulatory compliance, operational efficiency, and trustworthiness between parties. Therefore, organizations should prioritize investing in data quality management as a fundamental aspect of their data governance strategy.

Fig 1: 5 Quality management challenges

A. Techniques for Accessing Data Quality

Firstly, data profiling is one of the methods for accessing data quality involved in cleansing, analyzing, monitoring, and reviewing data from existing databases and other sources for various data-related [4]. Data profiling helps uncover anomalies, inconsistencies, and errors by examining metadata and statistical summaries.

B. Data Quality Assessment

Applying data quality assessment ensures effective data governance in organizational information systems, and this is a crucial area to concentrate on. It involves employing various techniques and methodologies to analyze the structure, content, and relationships within datasets. In quantitative data quality assessment, descriptive surveys and data audits are predominantly employed, whereas qualitative data quality assessment methods primarily consist of interviews, documentation reviews, and field observations [5].

C. Data Quality Metrics

Data quality metrics play a crucial role in evaluating the suitability of data for its intended use within enterprise information systems. Data quality metrics offer measurements that correlate with different levels of data quality, where higher metric values indicate superior data quality, while lower values signify lower quality. Each level of data quality is uniquely represented by a specific metric value [6]. These metrics cover a range of factors that are essential for evaluating the quality of data, such as completeness, validity, accuracy, consistency, and timeliness.

A. *Completeness*
Completeness measures the presence of data elements and identifies any missing values, ensuring a comprehensive dataset.

B. *Validity*
In ensuring data reliability and relevance, validity determines whether the data adheres to predefined rules, constraints, or standards.

C. *Accuracy*
Accuracy evaluates the degree to which data faithfully represents real-world entities or events, crucial for reliable decision-making.

D. *Consistency*
The coherence and agreement of data across different sources or within the dataset must be consistent

E. *Timeliness*
For a decision to be meaningful and helpful, relevance in the decision-making process is crucial. Timeliness measures how current and useful the data is in relation to its relevance and ability to help make decisions.

Organizations may efficiently evaluate and monitor data quality over time by defining quantitative measures for various aspects. This allows them to determine the areas that require improvement and prioritize the required remedial actions.

CONCLUSION

In conclusion, the modern business landscape is characterized by an exponential growth in data generation, emphasizing its role as a critical asset driving innovation and competitiveness. Despite the widespread integration of data into centralized systems like Enterprise Resource Planning (ERP), challenges persist due to the existence of data silos. To address these challenges, data governance emerges as a pivotal concept, offering a framework for proactive and effective data management. By establishing policies and procedures to ensure data quality, privacy, and security, data governance facilitates consistent and reliable data usage throughout its lifecycle within enterprise systems. It is crucial for organizations to adopt adaptable data governance frameworks that can evolve with changing organizational needs while remaining flexible to accommodate future changes. As businesses navigate the complexities of data management, robust data governance practices will increasingly become essential for achieving success and resilience in the digital age.

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