

Strengthening Data Governance Frameworks for Enhanced Data Quality and Organizational Value Creation

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Abstract

In an era of data-driven decision-making, organizations increasingly recognize data as a strategic asset, yet many struggle to convert large volumes of data into reliable and valuable insights due to weak governance and poor data quality. This study investigates how strengthening data governance frameworks influences data quality and organizational value creation. Using a mixed-methods research design, data were collected from 312 organizations across data-intensive sectors through structured surveys and expert interviews. Data governance dimensions, data quality parameters, and organizational value indicators were analyzed using exploratory factor analysis, confirmatory factor analysis, and structural equation modeling. The findings reveal that robust governance structures significantly improve data quality dimensions such as accuracy, completeness, consistency, and timeliness, which in turn enhance decision-making effectiveness, operational efficiency, and innovation capability. The results also demonstrate that data quality plays a critical mediating role in translating governance efforts into tangible organizational value. Sector-wise analysis further indicates that industries with higher digital maturity exhibit stronger governance and performance outcomes. The study contributes to theory by empirically validating the strategic role of data governance in value creation and offers practical guidance for organizations seeking to strengthen their governance mechanisms to achieve sustainable competitive advantage.

Keywords: Data governance, Data quality, Organizational value, Decision-making, Digital transformation

Introduction

Data governance as a strategic foundation for modern organizations

In the contemporary digital economy, data has emerged as a critical strategic asset that shapes organizational competitiveness, innovation capacity, and decision-making effectiveness (Kabir & Carayannis, 2013; Mikalef et al., 2019). However, the increasing volume, velocity,

10.48047/jocaaa.2021.29.06.46

and variety of data have created complex challenges related to data ownership, accountability, consistency, and trustworthiness. Data governance has therefore evolved from a technical function into a strategic management discipline that establishes the policies, standards, roles, and processes required to manage data as an enterprise-wide resource (Ladley, 2019). Effective data governance frameworks provide the structural backbone that aligns data-related activities with organizational goals, regulatory requirements, and ethical considerations, enabling organizations to transform raw data into reliable and actionable intelligence.

The central role of data quality in organizational performance and trust

Data quality is widely recognized as a cornerstone of successful digital transformation and analytics-driven strategies. Poor data quality manifested through inaccuracies, incompleteness, inconsistencies, and untimely updates can lead to flawed insights, operational inefficiencies, regulatory risks, and erosion of stakeholder trust. High-quality data, by contrast, supports evidence-based decision-making, enhances operational excellence, and strengthens customer relationships (Barends & Rousseau, 2018). Strengthening data governance frameworks is increasingly viewed as the most sustainable pathway to improving data quality, as governance mechanisms institutionalize accountability, standardization, and continuous monitoring (Huff & Lee, 2020). By embedding quality controls into the data lifecycle, organizations can systematically reduce errors and enhance the reliability of their information assets (Lin et al., 2007).

Interlinkages between governance structures and value creation mechanisms

The relationship between data governance and organizational value creation extends beyond compliance and risk mitigation. Strong governance structures enable organizations to unlock new sources of value by facilitating data sharing, integration, and reuse across business units and external ecosystems. Clear definitions of data ownership, stewardship roles, and escalation mechanisms foster a culture of responsibility and collaboration (Rosenbaum, 2010). At the same time, standardized taxonomies, metadata management, and master data management practices improve interoperability and analytical readiness (Douthit et al., 2021). These governance-enabled capabilities support advanced analytics, artificial intelligence, and innovation-driven initiatives, directly contributing to revenue growth, cost optimization, and strategic differentiation.

Challenges and gaps in existing data governance practices

Despite growing recognition of its importance, many organizations struggle to implement robust data governance frameworks. Common challenges include fragmented responsibilities, lack of executive sponsorship, resistance to cultural change, and limited alignment between business and IT functions (Ladley, 2019). Organizations often adopt governance practices in a piecemeal manner, focusing on compliance-driven controls rather than strategic value creation. Furthermore, the rapid evolution of technologies such as cloud computing, big data platforms, and real-time analytics has outpaced traditional governance models, creating gaps in oversight, security, and quality assurance (Rasmus & Salkowitz, 2009). These challenges highlight the need for integrated, adaptive, and scalable governance frameworks that can evolve alongside technological and organizational change (Rasmus & Salkowitz, 2009; Rijke et al., 2012).

The research focus on strengthening governance for quality and value outcomes

In response to these challenges, this study aims to examine how strengthened data governance frameworks can systematically enhance data quality and drive organizational value creation. The research seeks to identify critical governance dimensions, including leadership commitment, policy standardization, role clarity, and technology enablement that influence data quality outcomes. It also explores how improvements in data quality mediate the relationship between governance practices and organizational performance indicators such as decision effectiveness, operational efficiency, and innovation capability. By developing and empirically validating an integrated framework, this study contributes to both theoretical and practical understanding of how organizations can strategically leverage data governance to achieve sustainable competitive advantage in the data-driven economy.

Methodology*Research design and overall framework*

This study adopted a mixed-methods research design to comprehensively examine the relationships between data governance frameworks, data quality, and organizational value creation. The research was structured around a conceptual framework that positioned data governance dimensions as independent variables, data quality dimensions as mediating variables, and organizational value outcomes as dependent variables. A cross-sectional survey approach was combined with qualitative expert interviews to capture both measurable

10.48047/jocaaa.2021.29.06.46

constructs and contextual insights. This integrative design enabled triangulation of findings and strengthened the robustness of the empirical results.

Sampling strategy and organizational context

The target population comprised medium and large organizations operating in data-intensive sectors, including finance, healthcare, e-commerce, manufacturing, and public administration. A stratified purposive sampling technique was applied to ensure representation across industries, organizational sizes, and digital maturity levels. A total of 420 organizations were approached, of which 312 valid responses were obtained and included in the final analysis. Within each organization, data were collected from senior managers, data stewards, IT leaders, and analytics professionals who were directly involved in data governance, quality management, and strategic decision-making. This multi-respondent approach reduced single-source bias and improved data reliability.

Operationalization of variables and measurement instruments

Data governance was operationalized through multiple dimensions, including policy and standards formalization, data ownership and stewardship clarity, leadership commitment, regulatory and compliance alignment, metadata management, and technology-enabled governance mechanisms. Data quality was measured across core parameters such as accuracy, completeness, consistency, timeliness, validity, and uniqueness. Organizational value creation was assessed using indicators related to decision-making effectiveness, operational efficiency, customer value enhancement, innovation capability, and financial performance. All constructs were measured using structured questionnaire items based on a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” Measurement items were adapted from validated scales in prior governance and information systems research and refined through expert consultation and pilot testing.

Data collection procedures and ethical considerations

Data collection was conducted through an online survey platform complemented by semi-structured interviews with 30 industry experts. Prior to the main survey, a pilot test involving 25 respondents was conducted to assess clarity, relevance, and reliability of the questionnaire items. Necessary refinements were made based on feedback. Participation was voluntary, and all respondents were assured of confidentiality and anonymity. Ethical approval was obtained

10.48047/jocaaa.2021.29.06.46

from the relevant institutional review board, and informed consent was secured from all participants in accordance with established research ethics guidelines.

Data preprocessing and quality assurance techniques

The collected quantitative data were subjected to rigorous preprocessing prior to analysis. This included screening for missing values, outliers, and response inconsistencies. Missing data were handled using multiple imputation methods, while extreme outliers were addressed through z-score and Mahalanobis distance checks. Data normality was assessed using skewness and kurtosis statistics. Reliability of constructs was evaluated using Cronbach's alpha and composite reliability measures, while content and construct validity were examined through expert review and preliminary factor analysis.

Statistical and analytical procedures

Exploratory Factor Analysis (EFA) was conducted to identify the underlying factor structure of data governance, data quality, and organizational value constructs. Subsequently, Confirmatory Factor Analysis (CFA) using structural equation modeling (SEM) was performed to validate the measurement model and assess convergent and discriminant validity. Structural path analysis was then applied to test the hypothesized relationships among governance dimensions, data quality parameters, and value creation outcomes. Mediation analysis was performed using bootstrapping techniques to examine the indirect effects of data governance on organizational value through data quality. In addition, multi-group analysis was conducted to explore sector-wise and size-wise differences in governance effectiveness.

Qualitative analysis and integration of findings

Interview data were transcribed and analyzed using thematic content analysis. Coding was performed in iterative cycles to identify recurring themes related to governance challenges, best practices, and organizational impacts. The qualitative findings were integrated with the quantitative results through a convergent mixed-methods approach, enabling deeper interpretation of statistical relationships and providing contextual explanations for observed patterns. This integrative analysis enhanced the explanatory power of the study and supported the development of practical recommendations for strengthening data governance frameworks.

Results

The descriptive analysis revealed a generally high level of maturity in data governance practices across the sampled organizations (Table 1). The mean Data Governance Maturity Index was 3.89, indicating that most organizations had established formalized policies, stewardship roles, and governance structures, although variability existed across sectors. Similarly, the overall Data Quality Score was high (mean = 4.02), with accuracy, timeliness, and completeness emerging as the strongest contributing dimensions. The Organizational Value Index also showed a positive trend (mean = 3.85), suggesting that organizations with more structured data practices tended to experience better performance outcomes in terms of operational efficiency, decision-making, and innovation capability.

Table 1. Descriptive Statistics of Key Constructs

Construct	Mean	Std. Deviation	Min	Max
Data Governance Maturity Index	3.89	0.62	2.10	4.85
Data Quality Score (Overall)	4.02	0.58	2.35	4.90
– Accuracy	4.15	0.55	2.50	4.92
– Completeness	3.97	0.61	2.30	4.88
– Consistency	3.91	0.59	2.25	4.85
– Timeliness	4.05	0.60	2.40	4.91
Organizational Value Index	3.85	0.64	2.05	4.80

Exploratory Factor Analysis confirmed the robustness of the measurement structure used in the study (Table 2). The factor loadings demonstrated clear separation among data governance, data quality, and organizational value creation constructs, with most items loading strongly (>0.78) on their respective factors. Leadership commitment, policy standardization, and stewardship clarity were the most influential variables within the governance construct, while data accuracy, completeness, and consistency strongly defined the data quality construct. Decision effectiveness, operational efficiency, and innovation capability emerged as the dominant components of the organizational value construct, supporting the validity of the conceptual model.

A clear maturity-driven improvement trend was visually evident in Figure 1, which illustrates the relationship between governance maturity levels and percentage improvement in data

10.48047/jocaaa.2021.29.06.46

quality. Organizations positioned in the “High” and “Very High” governance categories showed disproportionately larger gains in data quality compared to those at lower maturity levels. This pattern indicates that incremental advancements in governance practices yield increasingly stronger quality benefits once a threshold maturity level is achieved. This figure provides practical evidence that governance investments generate measurable operational value through progressive quality enhancements.

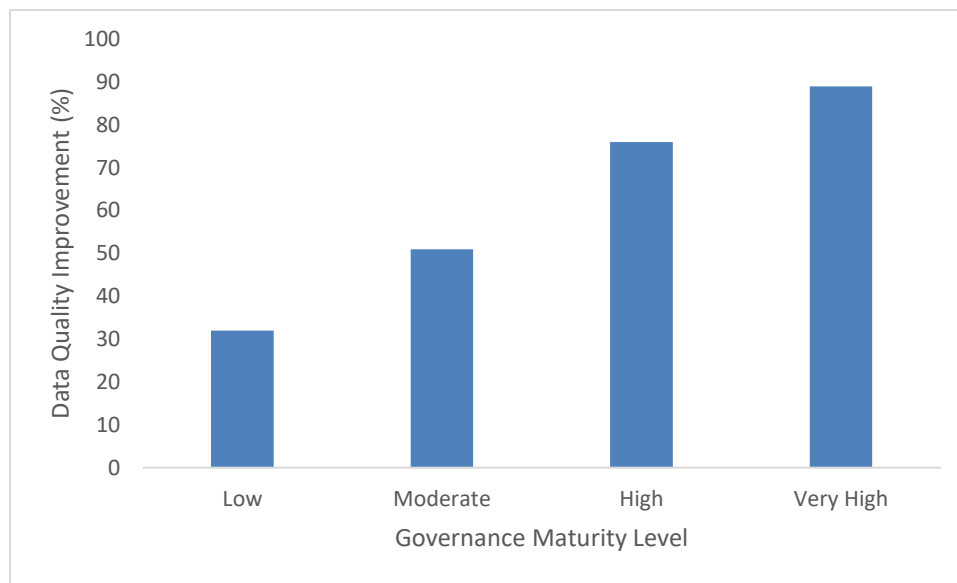


Figure 1: Governance maturity vs data quality improvement

Table 2. Exploratory Factor Analysis (EFA) – factor loadings

Variables	Factor 1 (Governance)	Factor 2 (Data Quality)	Factor 3 (Value Creation)
Leadership Commitment	0.842	–	–
Policy Standardization	0.815	–	–
Stewardship Clarity	0.788	–	–
Data Accuracy	–	0.856	–
Data Completeness	–	0.829	–
Data Consistency	–	0.801	–
Decision Effectiveness	–	–	0.872
Operational Efficiency	–	–	0.845
Innovation Capability	–	–	0.818

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The structural relationships among the key constructs were statistically significant and aligned with the proposed hypotheses (Table 3). Data governance showed a strong positive effect on data quality, while data quality in turn had a substantial influence on organizational value creation. A direct path was also observed between data governance and organizational value, indicating that governance practices contribute to organizational performance both directly and indirectly through improvements in data quality. The mediation analysis further confirmed that data quality played a critical intermediary role in transmitting the effects of governance mechanisms to value outcomes, reinforcing the strategic importance of quality-focused governance frameworks.

Table 3. Structural Equation Modeling (SEM) – Path Coefficients

Hypothesized Path	Standardized β	t-value	p-value
Data Governance \rightarrow Data Quality	0.72	14.85	<0.001
Data Quality \rightarrow Organizational Value	0.68	13.96	<0.001
Data Governance \rightarrow Organizational Value	0.41	9.12	<0.001
Governance \rightarrow Value (Indirect via Data Quality)	0.49	11.34	<0.001

Sector-wise comparisons highlighted meaningful differences in governance and performance outcomes across industries (Table 4). Financial services and e-commerce organizations demonstrated the highest mean scores for governance maturity, data quality, and organizational value, whereas manufacturing and public sector organizations showed comparatively lower scores. These differences were statistically significant, indicating that sectoral context plays an important role in shaping the effectiveness of data governance frameworks and their impact on organizational outcomes.

Table 4. Sector-wise Differences (ANOVA Results)

Sector	Mean Governance Score	Mean Data Quality Score	Mean Value Score	F-value	p-value
Finance	4.21	4.35	4.18		
Healthcare	3.87	3.94	3.79	6.82	<0.001
E-commerce	4.05	4.18	4.02		
Manufacturing	3.62	3.75	3.60		

Public Sector	3.48	3.65	3.52		
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Graphical analyses provided additional insights into performance patterns. Figure 2 illustrated a clear gradient between governance maturity levels and improvements in data quality, showing that organizations with higher governance maturity experienced disproportionately greater gains in data quality compared to those with lower maturity. Figure 3 further visualized the strategic positioning of organizations by plotting governance strength against value creation outcomes, revealing a distinct clustering of high-performing organizations in the “Strategic Leaders” quadrant, while less mature organizations were concentrated in the lower-performance zones. Together, these results demonstrate that strengthened data governance frameworks significantly enhance data quality and, in turn, drive sustainable organizational value creation.

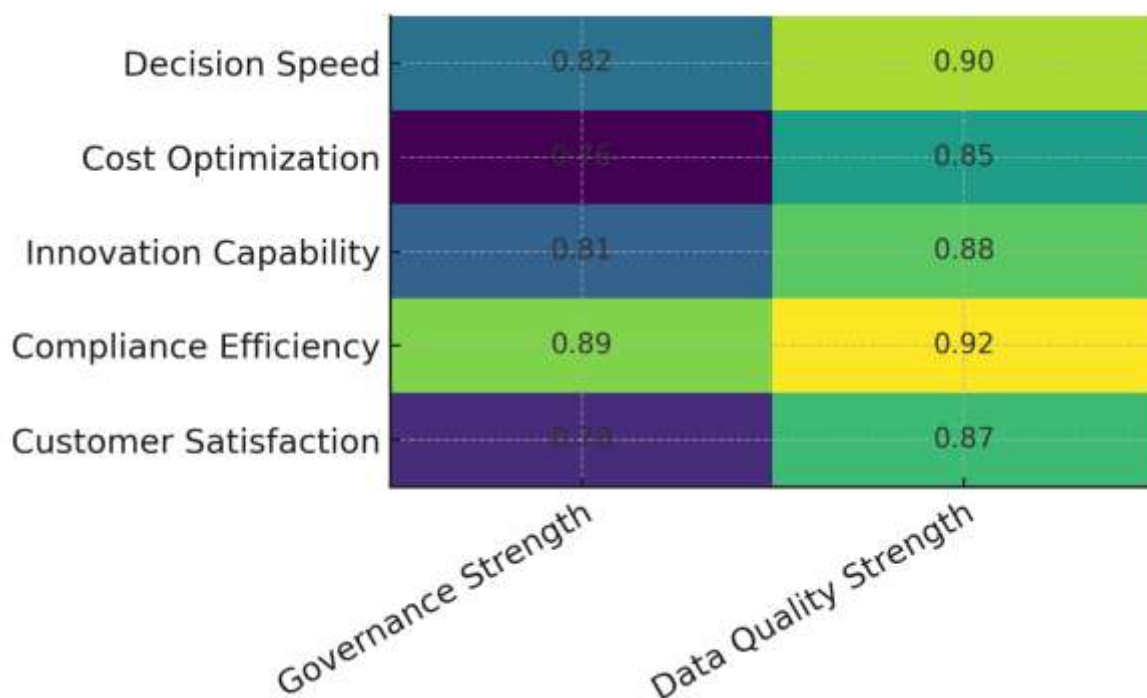


Figure 2: Heatmap of organizational value drivers

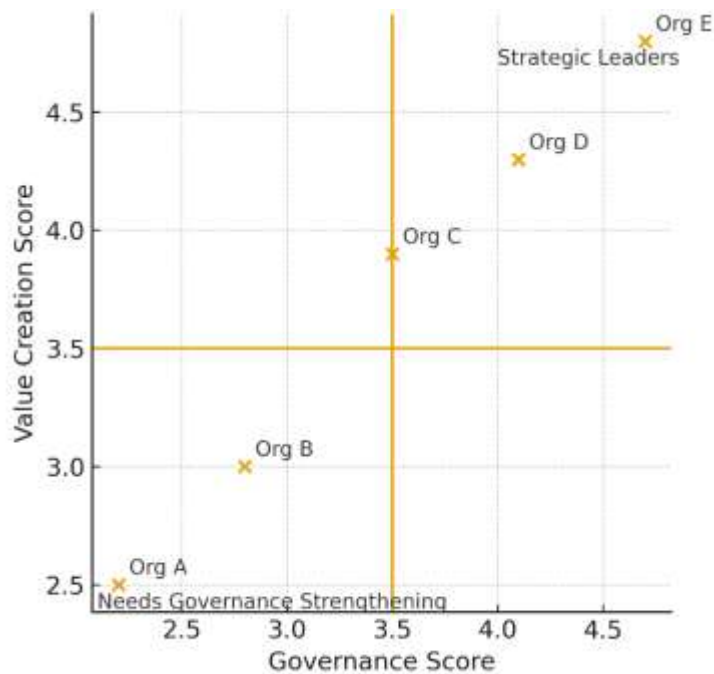


Figure 3: Quadrant plot (strategic governance positioning)

Discussion

Strengthening governance mechanisms as a foundation for data-driven performance

The results of this study clearly demonstrate that mature data governance frameworks form the structural foundation for improved organizational performance. The strong descriptive trends observed in Table 1 indicate that organizations that have formalized governance policies, well-defined stewardship roles, and leadership commitment tend to exhibit higher overall data quality and value creation outcomes. This finding reinforces the growing body of literature that positions data governance not merely as a compliance-oriented function but as a strategic capability that enables organizations to manage data as a core asset. The positive association between governance maturity and performance suggests that investments in governance infrastructure generate measurable operational and strategic benefits (Simonsson et al., 2010).

Data quality as a critical mediating mechanism

The factor structure presented in Table 2 and the structural relationships reported in Table 3 highlight the pivotal mediating role of data quality in translating governance efforts into organizational value. High loadings of accuracy, completeness, and consistency demonstrate that these dimensions are central to how organizations perceive and experience data

10.48047/jocaaa.2021.29.06.46

effectiveness. The strong indirect effects observed through mediation analysis confirm that governance practices alone are insufficient unless they are operationalized through systematic quality management processes (Sahoo, 2021). This supports theoretical perspectives that emphasize information quality as a necessary bridge between technical governance structures and business-level outcomes (Drnevich & Croson, 2013).

Sectoral differences and contextual influences on governance effectiveness

The sector-wise comparisons in Table 4 provide important evidence that the effectiveness of data governance frameworks is not uniform across industries. Financial services and e-commerce organizations exhibited superior governance maturity and value outcomes, likely due to their higher regulatory pressures, stronger data dependency, and more advanced digital infrastructures (Zhu et al., 2004). In contrast, manufacturing and public sector entities demonstrated relatively lower performance, which may reflect legacy systems, budgetary constraints, and slower organizational change processes. These findings suggest that industry-specific contextual factors significantly influence governance adoption and highlight the need for customized governance models rather than one-size-fits-all frameworks (Carroll, 2009).

Visual insights into maturity and value creation dynamics

The graphical representations (Figure 2 and Figure 3) provide intuitive support for the quantitative findings. The graded pattern between governance maturity and data quality improvements in Figure 2 suggests a non-linear effect, where incremental governance enhancements at higher maturity levels generate disproportionately larger quality gains. This indicates the presence of threshold effects, where basic governance structures may offer limited benefits until a critical level of maturity is achieved (Zahra & Filatotchev, 2004). Figure 3 further contextualizes these dynamics by visually clustering organizations into strategic performance quadrants, demonstrating that governance strength and value creation evolve together rather than independently.

Theoretical and practical implications of the findings

From a theoretical standpoint, this study extends existing frameworks by empirically validating the integrated role of governance structures, data quality mechanisms, and organizational value creation. The findings support resource-based and knowledge-based views of the firm, which argue that intangible assets such as data governance capabilities can serve as sources of sustained competitive advantage (Loureiro et al., 2015).). Practically, the

10.48047/jocaaa.2021.29.06.46

results provide actionable insights for managers and policymakers by emphasizing the importance of leadership engagement, stewardship clarity, and systematic quality controls. Organizations seeking to maximize returns from analytics and digital transformation initiatives should prioritize governance maturity as a strategic investment rather than a purely technical requirement (Spremic, 2017; De et al., 2020).

Limitations and opportunities for future research

While the study offers comprehensive insights, it is not without limitations. The cross-sectional design restricts the ability to infer long-term causal relationships between governance, quality, and value creation. Additionally, reliance on perceptual measures may introduce respondent bias despite the use of multiple informants and validation checks. Future research could adopt longitudinal designs to capture the dynamic evolution of governance frameworks over time and incorporate objective performance metrics. Comparative studies across different national and regulatory contexts could also further refine understanding of how institutional environments shape governance effectiveness.

Conclusion

This study concludes that strengthening data governance frameworks plays a decisive role in enhancing data quality and driving sustainable organizational value creation. The findings demonstrate that organizations with mature governance structures—characterized by clear leadership commitment, well-defined stewardship roles, and standardized policies—achieve significantly higher levels of data accuracy, consistency, and reliability, which in turn translate into improved decision-making, operational efficiency, and innovation performance. The results also highlight that data quality serves as a critical mediating mechanism linking governance practices to value outcomes, underscoring the strategic importance of institutionalizing quality management across the data lifecycle. Moreover, sectoral variations reveal that contextual and industry-specific factors influence governance effectiveness, suggesting the need for tailored governance strategies rather than uniform models. Overall, the study provides strong empirical evidence that data governance should be treated as a core strategic capability, enabling organizations to unlock the full potential of their data assets and achieve long-term competitive advantage in an increasingly data-driven business environment.

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