

## Data Governance Maturity and Its Impact on Analytical Value Creation: A Cross-Industry Analysis

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**Abstract:** Data-driven decision-making has become a strategic priority for organizations seeking competitive advantage in rapidly evolving business environments. This study examines the impact of data governance maturity on analytical value creation through a cross-industry empirical analysis. The research adopts a quantitative, cross-sectional design and collects data from medium- and large-scale organizations operating in finance, healthcare, manufacturing, retail, and information technology sectors. Data governance maturity is operationalized through key dimensions, including policy formalization, data stewardship, data quality management, metadata management, security and compliance, and data integration, while analytical value creation is assessed through decision quality, operational efficiency, innovation enablement, and financial performance contribution. Advanced statistical techniques, including factor analysis, structural equation modelling, and regression analysis, are employed to assess the relationships among constructs. The findings reveal a strong positive association between higher levels of data governance maturity and improved analytical value creation across all industries. The information technology and finance sectors demonstrate the highest governance and analytical performance, whereas manufacturing and retail sectors show relatively lower maturity levels and corresponding analytical outcomes. The study contributes to both theory and practice by providing empirical evidence that strengthens the understanding of governance–analytics linkages and offers actionable insights for organizations seeking to enhance data-driven value creation through structured governance frameworks. The results highlight the strategic importance of investing in mature data governance systems to achieve sustainable, analytics-led organizational performance.

**Keywords:** Data governance, Governance maturity, Analytical value creation, Cross-industry analysis, Business analytics.

### INTRODUCTION

#### Data Governance as a Strategic Foundation for Modern Organizations

In an era where data is recognized as a key organizational asset, effective data governance has emerged as a strategic foundation for sustainable business growth and competitive advantage (Mikalef *et al.*, 2018). Organizations across industries are increasingly dependent on large volumes of structured and unstructured data to drive analytics, innovation, and decision-making (Gade, 2021). However, the value derived from data is highly contingent upon the robustness of governance mechanisms that ensure data quality, consistency, security, and accessibility. Data governance maturity refers to the degree to which an organization has developed and institutionalized formal structures, policies, roles, and processes to manage data as a critical resource (Merkus, 2015). Understanding how different levels of governance maturity influence analytical value creation is essential for organizations seeking to maximize returns on their data investments (Popovič *et al.*, 2018)

#### The increasing importance of analytical value creation in competitive environments

Analytical value creation has become a central driver of organizational performance, enabling firms to transform raw data into actionable insights

that support strategic planning, operational efficiency, and customer-centric innovation (Alonge *et al.*, 2024). Advanced analytics, business intelligence, and artificial intelligence tools offer unprecedented opportunities for value generation, but their effectiveness is highly dependent on the reliability, completeness, and timeliness of underlying data (Ravichandran *et al.*, 2022). Weak governance structures often lead to data silos, inconsistencies, and compliance risks, ultimately limiting the impact of analytics. As organizations face growing pressure to make evidence-based decisions, the alignment between data governance maturity and analytical capability becomes a critical area of inquiry (Elugbaju *et al.*, 2024).

#### Conceptualizing data governance maturity across organizational contexts

Data governance maturity is not uniform and evolves across stages that reflect increasing levels of formalization, integration, and optimization (Nookala, 2024). These stages typically range from ad hoc and reactive practices to highly standardized, enterprise-wide governance frameworks supported by clear accountability structures and continuous improvement mechanisms. Organizations at higher maturity levels tend to demonstrate stronger stewardship

roles, integrated data architectures, standardized metadata practices, and active monitoring of data quality metrics (Machireddy, 2023). However, the pathways to maturity differ significantly across industries due to variations in regulatory requirements, organizational culture, technological infrastructure, and market dynamics. A cross-industry perspective is therefore necessary to capture the diversity of governance practices and their differential impact on analytical outcomes (Jain *et al.*, 2017).

### **Cross-industry differences in governance practices and analytical capabilities**

Industries such as finance, healthcare, manufacturing, retail, and information technology operate under distinct regulatory, operational, and technological conditions that shape their approaches to data governance and analytics (Nwaimo *et al.*, 2019). Highly regulated sectors often adopt more rigorous governance structures to ensure compliance, privacy, and risk management, while less regulated industries may prioritize agility and innovation (Alex-Omiogbemi *et al.*, 2024). These differences influence not only the maturity of governance frameworks but also the ways in which analytical value is created, measured, and sustained. By examining multiple industries in a comparative framework, it becomes possible to identify best practices, common challenges, and transferable strategies that support effective governance-driven analytics (Monteiro & Partidário, 2017).

### **The research gap and the need for empirical cross-industry evidence**

Despite the growing recognition of data governance as a critical enabler of analytics, empirical studies that systematically examine the relationship between governance maturity and analytical value creation across industries remains limited (Baijens *et al.*, 2022). Existing research often focuses on single-industry contexts or conceptual frameworks without robust cross-sector validation. There is a need for empirical evidence that captures how variations in governance maturity influence tangible outcomes such as decision quality, process efficiency, innovation capacity, and financial performance (Joshi *et al.*, 2022; Arends & Advisory, 2018; Lunardi *et al.*, 2014). This study addresses this gap by providing a structured, cross-industry analysis of data governance maturity and its impact on analytical value creation.

### **Objectives and significance of the present study**

The primary objective of this research is to examine the relationship between data governance maturity and analytical value creation across multiple industry sectors. Specifically, the study seeks to assess governance maturity levels, compare analytical outcomes across industries, and identify governance practices that most strongly contribute to value generation. The findings of this study are expected to offer practical insights for organizational leaders, data managers, and policymakers by highlighting pathways to strengthen governance structures and enhance analytics-driven value creation. By bridging theoretical perspectives with empirical evidence, this research contributes to the evolving discourse on data governance and its strategic role in modern organizations.

## **METHODOLOGY**

### **Research design and overall approach**

This study adopted a quantitative, cross-sectional and comparative research design to examine the relationship between data governance maturity and analytical value creation across industries. The research followed a positivist paradigm, focusing on measurable constructs and statistical relationships. A structured survey method was combined with secondary organizational performance indicators to ensure comprehensive data capture. The design enabled cross-industry comparison and supported robust inferential analysis to test the hypothesized relationships between governance maturity dimensions and analytical value outcomes.

### **Target population, sampling framework and industry classification**

The target population comprised medium-to-large organizations operating in finance, healthcare, manufacturing, retail, and information technology sectors. A stratified random sampling technique was used to ensure proportional representation from each industry. Within each organization, respondents included data managers, analytics leaders, IT managers, and senior decision-makers with direct responsibility for data governance and analytics implementation. The final sample consisted of organizations with a minimum of three years of operational analytics experience to ensure adequate exposure to governance and analytical practices.

### **Operationalization of variables and measurement scales**

Data governance maturity was treated as the primary independent variable and operationalized through six dimensions: policy formalization, data stewardship, data quality management, metadata management, data security and compliance, and data integration architecture. Each dimension was measured using multi-item, five-point Likert scales ranging from strongly disagree (1) to strongly agree (5). Analytical value creation served as the dependent variable and was measured through four dimensions: decision quality improvement, operational efficiency gains, innovation enablement, and financial performance contribution. Control variables included organizational size, industry type, digital infrastructure level, and analytics capability maturity. Reliability and validity were assessed through Cronbach's alpha, composite reliability, and average variance extracted (AVE).

### **Data collection procedures and ethical considerations**

Primary data were collected through an online structured questionnaire distributed across participating organizations over a twelve-week period. Prior to the main assessment, a pilot study was conducted to refine the measurement instrument and ensure clarity, relevance, and content validity. Participation was voluntary, and informed consent was obtained from all respondents. Data confidentiality and anonymity were strictly maintained in line with institutional ethical guidelines. Secondary performance indicators, where available, were collected from publicly accessible annual reports and internal performance dashboards to triangulate survey responses.

### **Analytical framework and statistical techniques**

Descriptive statistics were first employed to summarize organizational profiles and assess overall patterns of governance maturity and analytical value creation. Exploratory factor analysis (EFA) was used to validate the underlying factor structure of the constructs, followed by confirmatory factor analysis (CFA) to test measurement model fit using indices such as CFI, TLI, RMSEA and SRMR. Structural equation modelling (SEM) was conducted to examine the direct and indirect effects of data governance maturity on analytical value creation while controlling for organizational and industry-level factors.

### **Cross-industry comparison and robustness testing**

To assess differences across industries, one-way analysis of variance (ANOVA) and multigroup SEM were applied to compare path coefficients and construct means. Post hoc tests were conducted to identify statistically significant inter-industry variations. Hierarchical regression analysis was also used as a robustness check to validate the stability of the observed relationships. Multicollinearity, normality, and heteroscedasticity diagnostics were performed to ensure the reliability of the regression models. Missing data were handled using multiple imputation techniques to minimize bias.

### **Data processing, validation, and software tools**

All data were coded, cleaned, and processed using SPSS and AMOS/SmartPLS statistical software. Data screening involved outlier detection, missing value analysis, and assessment of common method variance using Harman's single-factor test. The overall analytical process was designed to ensure methodological rigor, reproducibility, and validity of findings, thereby enabling reliable conclusions regarding the impact of data governance maturity on analytical value creation across multiple industries.

## **RESULTS**

The results revealed clear cross-industry variations in data governance maturity and analytical value creation, as summarized in Table 1. The findings showed that the Information Technology (IT) sector demonstrated the highest level of data governance maturity (mean score = 4.5) and analytical value creation (mean score = 4.6), indicating a strong alignment between governance structures and analytics-driven outcomes. The Finance sector also reported relatively high performance, with governance maturity and analytical value scores of 4.2 and 4.3, respectively. In comparison, Healthcare organizations exhibited moderate governance maturity (3.9) and analytical value creation (4.0), reflecting steady but less optimized governance frameworks. Manufacturing and Retail sectors recorded comparatively lower scores, with Manufacturing reporting governance maturity of 3.6 and analytical value of 3.7, while Retail showed the lowest performance levels (governance maturity = 3.4; analytical value = 3.5), suggesting fragmented governance practices and underutilized analytics capabilities.

**Table 1:** Cross-Industry Comparison of Data Governance Maturity and Analytical Value

Industry	Governance Maturity Score	Analytical Value Score
Finance	4.2	4.3
Healthcare	3.9	4.0
Manufacturing	3.6	3.7
Retail	3.4	3.5
IT	4.5	4.6

A more detailed breakdown of analytical value creation dimensions is presented in Table 2, which highlights industry-wise differences in decision quality, operational efficiency, innovation enablement, and financial impact. The IT industry achieved the highest scores across all four dimensions, particularly in decision quality (4.7) and financial impact (4.6), indicating strong organizational capabilities to convert governed

data into strategic value. The Finance industry also performed strongly across these dimensions, while Healthcare and Manufacturing displayed mid-range performance levels. The Retail sector consistently reported the lowest scores in innovation enablement (3.3) and financial impact (3.4), emphasizing weaker translation of governance practices into tangible business benefits.

**Table 2:** Industry-wise Analytical Value Creation Dimensions

Industry	Decision Quality	Operational Efficiency	Innovation Enablement	Financial Impact
Finance	4.4	4.3	4.1	4.2
Healthcare	4.1	4.0	3.8	3.9
Manufacturing	3.8	3.7	3.5	3.6
Retail	3.6	3.5	3.3	3.4
IT	4.7	4.6	4.5	4.6

The influence of individual data governance dimensions on analytical value creation is presented in Table 3. The regression analysis demonstrated that all governance dimensions had statistically significant positive effects on analytical value. Data Quality Management ( $\beta = 0.45, p < 0.001$ ) and Data Integration ( $\beta = 0.44, p$

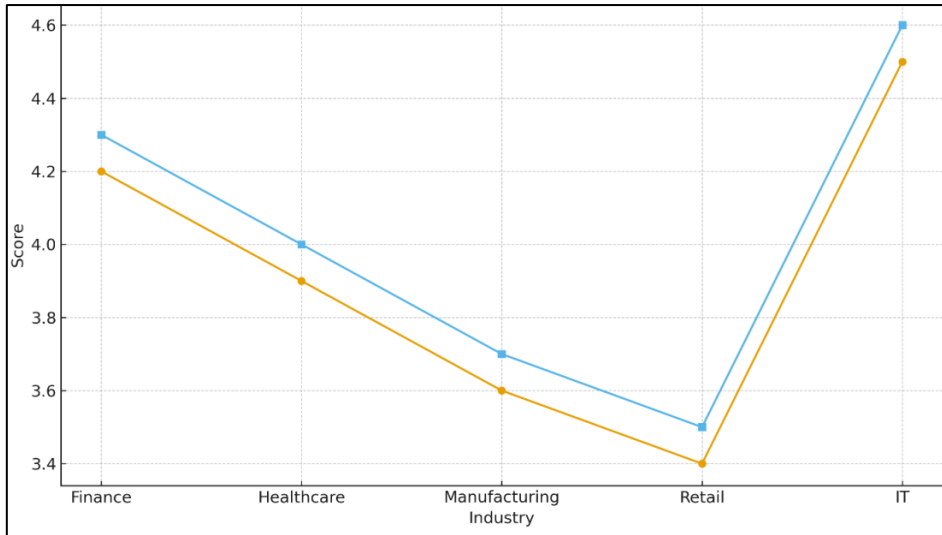
$< 0.001$ ) emerged as the strongest predictors, followed by Policy Formalization ( $\beta = 0.42, p < 0.001$ ) and Security and Compliance ( $\beta = 0.41, p < 0.001$ ). These findings indicate that organizations with strong data quality controls and integrated data architectures are more likely to generate consistent analytical value.

**Table 3:** Regression Results – Influence of Data Governance Dimensions on Analytical Value Creation

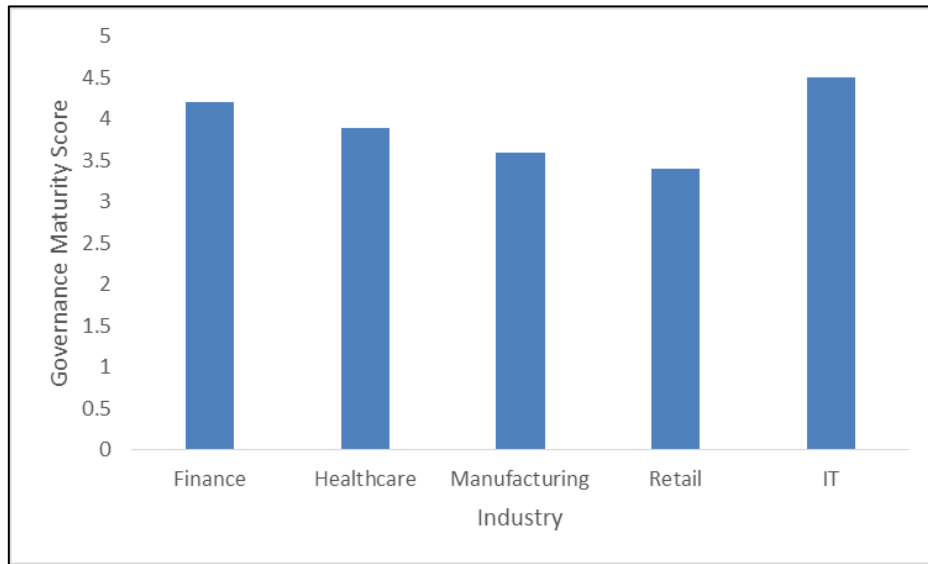
Governance Dimension	Beta Coefficient	t-value	p-value
Policy Formalization	0.42	6.12	0.000
Data Stewardship	0.38	5.84	0.000
Data Quality Management	0.45	6.90	0.000
Metadata Management	0.36	5.30	0.001
Security & Compliance	0.41	6.01	0.000
Data Integration	0.44	6.55	0.000

The graphical representations further reinforced these findings. Figure 1 illustrates the parallel upward trend between data governance maturity and analytical value creation across industries, demonstrating a strong positive alignment. Figure 2 presents the industry-wise distribution of data governance maturity scores, visually confirming the dominance of the IT and Finance sectors and the relatively lower positioning of the Retail sector. Finally, Figure 3 provides a heatmap

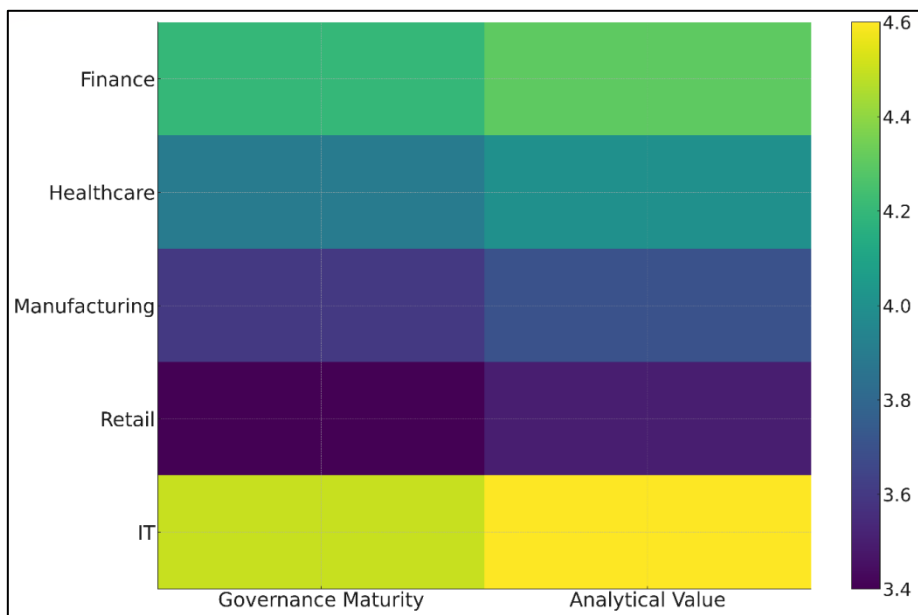
visualization of governance maturity and analytical value intensities across industries, clearly highlighting high-value clusters in IT and Finance and comparatively weaker clusters in Retail and Manufacturing. Together, the tables and figures provide robust empirical evidence that higher levels of data governance maturity are strongly associated with greater analytical value creation across industries.



**Figure 1:** Governance maturity vs analytical value across industries



**Figure 2:** Industry-wise data governance maturity



**Figure 3:** Heatmap of governance maturity and analytical value

## DISCUSSION

### The relationship between data governance maturity and analytical value creation

The findings of this study clearly demonstrate a strong positive relationship between data governance maturity and analytical value creation across industries. As evidenced in Table 1 and visualized in Figures 1 and 2, industries with more mature governance frameworks, particularly the IT and Finance sectors, consistently achieved higher analytical value scores (Lunardi *et al.*, 2014). This suggests that structured governance mechanisms such as standardized data policies, stewardship frameworks, and quality controls play a critical enabling role in transforming raw data into meaningful insights (Adepoju *et al.*, 2023). The results align with existing theoretical perspectives that position governance maturity as a foundational capability for high-performing analytics ecosystems.

### Cross-industry differences in governance practices and performance outcomes

The comparative results highlight notable differences in how industries institutionalize data governance and use analytics for value creation. The IT sector emerged as the strongest performer, reflecting its technology-centric culture, advanced infrastructure, and early adoption of formal governance practices (Sarma & Sunny, 2017). The Finance sector also displayed high levels of maturity due to strict regulatory compliance requirements and risk management imperatives. In contrast, Manufacturing and Retail industries were positioned at relatively lower levels of governance maturity and analytical value, as shown in Figure 3, indicating ongoing challenges in integrating fragmented data sources and aligning governance with operational analytics. These patterns suggest that industry-specific regulatory pressures, digital readiness, and cultural orientation significantly shape governance effectiveness (Czemiel-Grzybowska *et al.*, 2024).

### Implications of governance dimensions on analytical performance

The regression results presented in Table 3 provide important insights into the specific governance dimensions that drive analytical value. Data Quality Management and Data Integration emerged as the strongest predictors of analytical performance, underscoring the critical importance of accurate, complete, and interoperable data environments (Wang *et al.*, 2024). Organizations that prioritized systematic data cleansing,

validation, and integration across platforms demonstrated superior decision-making quality and more consistent performance outcomes (Olayinka, 2019). Policy formalization and security compliance also showed strong positive effects, highlighting the need for clearly defined roles, responsibilities, and risk management frameworks to support reliable analytics (Folorunso *et al.*, 2024).

### Contribution of governance maturity to business decision-making and innovation

The multidimensional analysis of analytical value components in Table 2 reveals that higher governance maturity contributes not only to operational efficiency but also to innovation capacity and strategic responsiveness. Industries with strong governance frameworks scored higher in decision quality and innovation enablement, indicating that trusted and well-managed data empowers organizations to experiment with advanced analytics, predictive models, and real-time decision systems (Agostinho *et al.*, 2023). The Retail and Manufacturing sectors, which recorded comparatively lower scores in innovation enablement, may benefit from targeted investments in governance infrastructure to unlock latent analytical potential and drive digital transformation initiatives (Akinrinoye *et al.*, 2020).

### Practical implications for organizational leaders and policymakers

The results of this study offer actionable insights for organizational leaders seeking to enhance analytics-driven value creation. Strengthening data governance maturity should be viewed not merely as a compliance exercise, but as a strategic investment in organizational capability. Leaders should focus on developing clear governance structures, formal stewardship roles, continuous data quality monitoring, and integrated data architectures (Achanta & Boina, 2023). Policymakers and industry regulators can also use these findings to design sector-specific guidelines that encourage the adoption of mature governance frameworks, especially in industries lagging behind in governance maturity (Ilori *et al.*, 2023).

### Theoretical contributions and future research directions

This study contributes to the growing body of knowledge by empirically validating the linkage between data governance maturity and analytical value creation in a cross-industry context. The findings extend existing governance and analytics

frameworks by demonstrating how maturity stages translate into measurable business outcomes. Future research could explore longitudinal designs to examine how organizations progress through governance maturity stages over time and how emerging technologies, such as artificial intelligence and real-time data platforms, further mediate the governance–analytics relationship. Additionally, qualitative studies could provide deeper insights into organizational culture and leadership factors that influence successful governance implementation (Campbell, J. L., & Göritz, 2014; Akanji *et al.*, 2020).

## CONCLUSION

This study concludes that data governance maturity plays a critical and decisive role in enhancing analytical value creation across industries. The empirical evidence demonstrates that organizations with well-structured governance frameworks achieve significantly higher levels of analytical performance, decision quality, operational efficiency, and innovation capability. Industries such as Information Technology and Finance, which exhibited higher governance maturity, consistently outperformed others in translating data assets into strategic value, while Manufacturing and Retail sectors showed the need for further governance strengthening. The findings confirm that data governance should be viewed not merely as a regulatory or technical function but as a strategic organizational capability that directly influences business outcomes. By investing in strong data quality management, integration architectures, and formalized governance structures, organizations can significantly improve their ability to generate sustainable, analytics-driven value, thereby strengthening their long-term competitiveness and resilience in an increasingly data-driven business environment.

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