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BLOCKCHAIN TECHNOLOGY INTEGRATION AND ORGANIZATIONAL PERFORMANCE: THE INTERVENING INFLUENCE OF CORPORATE GOVERNANCE AND BUSINESS DATA ANALYTICS

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Abstract

This study examines the relationship between blockchain technology integration and organizational performance, emphasizing the mediating roles of corporate governance and business data analytics capabilities. Drawing upon the Resource-Based View (RBV), the research explores how blockchain adoption enhances organizational efficiency, transparency, and competitiveness through improved governance mechanisms and data-driven decision-making. A quantitative, cross-sectional design was employed, utilizing data collected from 457 managers and executives across manufacturing firms in Pakistan. Structural Equation Modeling (SEM) using SmartPLS was applied to test the proposed hypotheses. The results reveal that blockchain technology integration has a significant positive impact on organizational performance, confirming its strategic potential to streamline processes and enhance operational outcomes. Furthermore, both corporate governance and business data analytics capabilities significantly mediate this

Volume. 4 Issue No. 4 (2025)
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relationship, demonstrating that blockchain's value realization depends on robust governance structures and the ability to extract actionable insights from data. These findings extend the RBV by illustrating how technological capabilities interact with organizational mechanisms to generate sustained competitive advantage. The study contributes to the growing discourse on digital transformation and strategic management by offering empirical evidence from an emerging economy context.

Keywords: Blockchain Technology Integration, Organizational Performance, Corporate Governance and Business Data Analytics

Introduction

Over the last few years, the intersection of new digital technologies and new models of corporate governance has been a point of concern in the scholarly and managerial practices. On the one hand, businesses are being challenged by the need to be more transparent, make better decisions, and achieve better performance in unstable situations. Technology, conversely, has brought in new possibilities of more effective capture, analysis and utilization of business and organizational data. In this dynamic environment, where distributed ledger systems are integrated into organizational workflows, and analytics based on high volumes of business data is being applied, it is possible to re-analyze the relationship between governance, analytics and performance. Board and senior executives are under increased scrutiny to bring internal controls, strategic oversight and data-driven management to bear sustainable results and competitive advantage. This change has far-reaching impacts on how companies handle risk, adjust to the regulatory environment and mobilize resources to create value and operational viability.

The current body of empirical literature indicates that digital technologies, including blockchain, will be capable of improving organizational transparency and accountability, which will reinforce the governance mechanisms (Ogedengbe and Adelowotan, 2025). The study of Chinese listed companies concluded that the performance outcomes of firms

Volume. 4 Issue No. 4 (2025)
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Print ISSN: 3006-2039

adopting blockchain systems were better. Nevertheless, the literature also indicates a major pitfall, that is, digital technologies do not necessarily lead to performance gains, unless they are accompanied by the complementary capabilities, resources, and governance practices (Hussinki, 2025). In the context of business data analytics, researchers have found that there is positive relationship between analytics potentials and the performance of firms but observe that the value derived is dependent on the way analytics are integrated into processes of the organizations. The results are all pointing in the same direction that technology, governance and analytics are components of a complex system and not separate performance determinants.

Over this positive horizon, there are increasing regulatory pressures on firms worldwide, stakeholder pressure and competitive interference. The data integrity, auditability and information asymmetry are also the topic of unremitting concerns: digital technologies have the potential to address the problem, and at the same time, they provoke the problem of governance risk, implementation cost, and regulatory uncertainty (Ogedengbe & Adelowotan, 2025). Nationally, emerging economies like Pakistan are also facing poorer institutional frameworks, higher information non-transparency and poor analytics infrastructures conditions which make process of technology-to-performance translation more difficult. Besides, with companies tilted towards analytics and blockchain, there are sustainability demands on top of the regimes of sustainability like the European Green Deal and the United Nations Sustainable Development Goals (SDGs). The interaction between technology adoption, governance adaptation and analytics-driven operations hence is of practical importance at the firm, sector and country level.

Although the literature of individual relationships among digital technologies, governance, and analytics continues to grow, not many studies have considered individually and combined together the interactions of blockchain integration, governance mechanisms, and business data analytics to determine their impact on organizational performance especially in non-

Volume. 4 Issue No. 4 (2025)
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advanced economies. Indicatively, although the studies of Chinese firms demonstrate the performance impact of blockchain, they rarely disaggregate the mediating or the moderating role of governance or analytics capability in manufacturing firms operating in the emerging markets. Simultaneously, in the literature of business analytics, the necessity of supporting resources is highlighted, but little is associated with the analytics ability and the governance schemes, applied to blockchain-based data flows (Hussinki, 2025). To this end, an absence of empirical research that charts the route between technology uptake (blockchain) and analytics capability and performance outcomes still exists. In addition, context-specific regulatory, cultural and resource limitations can lead to unique dynamics in the environment of manufacturing companies in emerging economies including Pakistan. In brief, the issue is that the mechanisms relating to technology integration, governance, analytics and performance are to a small extent researched, and it restricts our possibilities to assist in prescribing practical frameworks to managers or policymakers who want to utilize these abilities.

It is important to address this gap due to a number of reasons. Academically, it contributes to the development of theory, as it not only integrates technology adoption and governance and analytics in a system but also does not separate threads. In practice, those companies that can implement blockchain, analytics and high-quality governance effectively, will be able to enhance the effectiveness of operations, responsiveness to decisions and competitive advantage that will be essential in the post-pandemic, digital-intensive world. In addition, these interactions can be used by policymakers in the emerging markets to shape regulatory structure and policy to enhance governance, digital infrastructure and data-capability developing. Since the SDGs emphasize sustainable business operations and responsible innovation, the connection between governance and analytics through embracing technology is in line with the sustainability and quality of institutions at large.

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

It is not only applicable in performance improvement, but also institutional upgrading and inclusive development.

This research therefore provides novel value of exploring the interplay between blockchain implementation, business data analytics capacity and corporate governance systems in determining the performance of an organization in the manufacturing sector of Pakistan. Its implementation of an integrated model instead of individual pairwise relationships offer a detailed description of governance as a mediator and mediator in this ecosystem. This method produces not only scholarly insights that move beyond the scholarly research but also practical implications to practitioners and policymakers. The study is based on the agency theory and the resource-based view as it seeks to provide insights on how governance systems can reduce the agency costs and how analytics and blockchain are strategic capabilities that generate performance (Ogedengbe and Adelowotan, 2025). In these terms, the research will make a contribution to the theory by defining the connection between the adoption of blockchain and analytics capabilities and performance results through the lens of governance (as a control and alignment mechanism). In the practical sense, the results can be used to guide technology implementation, governance restructuring and analytics investment in new-market production companies.

Theoretical Foundation

The conceptual development of this study is in the Agency Theory. The Agency Theory was developed by the works of Jensen and Meckling (1976), who also built on economics and organizational research to explain the association between principals (shareholders or owners) and agents (managers). This theory posits that because of information asymmetry and goal differences, agents charged with the authority of decision-making might not always utilize decision-making authority in the best interest of principals. In order to reduce these conflicts, we need good governance systems like transparent reporting, incentive alignment and monitoring systems in order to make sure that the

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

agents will act in a manner that will maximize the organizational value. This theoretical prism has over time come to be central to studying, in both corporations and institutions, the organization of governance, accountability and performance.

In modern research, the Agency Theory has been diversified to go beyond the economic foundation to include wider organizational and technological aspects. Recent research highlights the importance of agency costs reduction through digital transformation and advanced analytics in the way transparency, traceability, and accountability is increased (Hussinki, 2025). It is blockchain, which has been structured as an algorithmic governance mechanism to reduce information asymmetry through the establishment of records that are immutable and auditable (Ogedengbe and Adelowotan, 2025). Equally, business data analytics allows decision-makers to have real-time insights, which minimize opportunistic behavior and enhance monitoring effectiveness (Al-Htaybat and von Alberti-Alhtaybat, 2023). This is a refinement of the theory indicating its flexibility to the new corporate environment whereby digital infrastructures are playing an increasingly significant role by mediating principal-agent relations.

The Agency Theory provides a very interesting way to comprehend the dynamics of interaction between the governance mechanisms and the technological tools in the context of emerging economies in order to improve organizational performance. Agency problems are usually aggravated by weak institutional environments, reporting practices, and lack of regulatory oversight. Blockchain and analytics as well as their integration with strong governance can be used as corrective measures to build on trust and accountability. Recent reports have shown that organizations using these technologies would enjoy enhanced managerial control and transparency in decision making, which translates into enhanced performance results (Liu et al., 2024). These dynamics highlight the relevance of the Agency Theory in

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

examining how companies can apply governance and digital tools to coordinate managerial behaviors with corporate goals.

The Agency Theory offers the intellectual basis of the study explaining the mediation role of governance structures in the correlation between technological integration and performance. It provides a logical structure on how companies can utilize the integrity, transparency, and accountability of data to minimize information asymmetry and attain high results. With organizations becoming more digital in their infrastructures, the Agency Theory is becoming more and more relevant in explaining how governance reforms and technological innovations support each other to create improvement in the performance of organizations in both theory and practice.

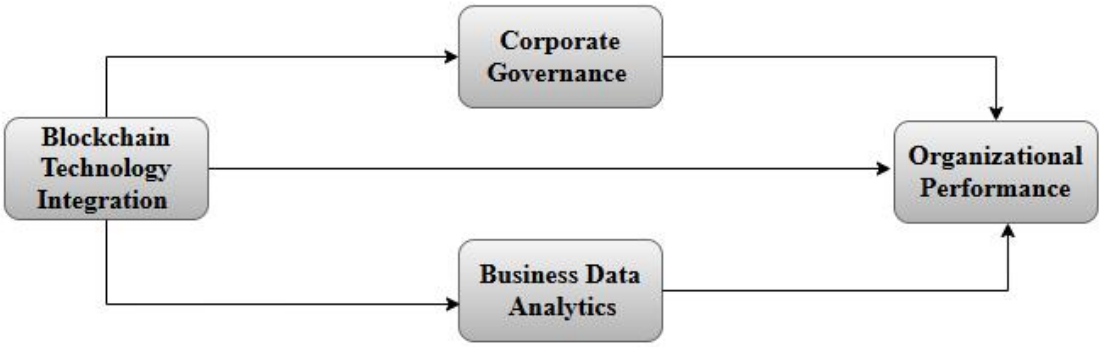

Figure 1: Research Model

Hypotheses

The digitization of organizational systems has significantly influenced the way companies organize their government, resource management and competitive advantage pursuits. One of the most revolutionary changes has been the emergence of blockchain technology, which has no longer been linked to cryptocurrencies but rather an instrument of enhancing transparency, accountability, and efficiency of operations. The concept of blockchain is becoming viewed by modern-day management as the facilitator of trust and the means to curb the information asymmetry between stakeholders (Ogedengbe & Adelowotan, 2025). Blockchain can limit opportunities to engage in opportunistic actions and manipulation which are a major problem

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

of agency relationship between principals and agents by writing down transactions on an immutable and decentralized ledger. According to scholars, such technological infrastructures are used as tools of digital governance, ensuring the integrity of the data and enhancing internal control (Liu et al., 2024). Agency theory In the agency theory, blockchain may be used to act as a self-enforcing mechanism to reduce agency costs with automated compliance and verifiable transactions as well as real-time audit trails. This innovation transparency may, furthermore, enhance the decision-making process and resource distribution and promote the greater degrees of organizational performance (Al-Htaybat and von Alberti-Alhtaybat, 2023). Nevertheless, as previous researchers claim that blockchain adoption is positively correlated with firm performance, some of them warn that the advantages, however, cannot be unanimously positive; they require readiness in the context, managerial capability, and integration of blockchain into the current governance system (Yoon et al., 2023).

The existing empirical data on the effect of blockchain in the various industries depicts the potential of the technology along with its complexity. Research in manufacturing and supply chain settings reveals that blockchain can be used to improve performance by increasing traceability, minimizing the cost of transactions, and reinforcing inter-organizational trust (Lin et al., 2024). In a similar manner, studies in the financial services indicate that the application of blockchain can help to improve operational efficiency through reliable, transparent, and unclevageable data flows (Iqbal et al., 2023). These results are in line with the agency theory view that governance and disclosure mechanisms play a significant role in alleviating agency issues and enhancing performance results. However, there are still gaps in the understanding of the work of these mechanisms in the emerging economies, where weak institutional structures and infrastructural limitations can influence the performance-enhancing ability of blockchain (Zhu et al., 2025). Although there is a significant focus on the use of blockchains in technologically

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

developed contexts in the existing literature, the information regarding the adoption of this technology in the settings characterized by less regulatory regulation and increased ease of governance is less well known. This paper deploys this theory to suggest that blockchain technology through the establishment of verifiable documents and accountability would replace or strengthen the existing moral order, especially in that setting. When well incorporated, it increases managerial control, harmonizes the interests of the stakeholders, and increases the credibility of the performance results. It is assumed that

H1: Blockchain technology integration has a positive and significant effect on organizational performance.

In the present digitalized age, organizations are being pressured to implement successful governance systems that can deal with technological interference and at the same time be transparent, accountable, and sustainable in performance. The introduction of blockchain technology is a rare chance to improve the strength of governance by increasing trust and decreasing agency-based inefficiencies in the process of managing organizations. The decentralization and immutability of blockchain will enable companies to document and verify the transactions in a clear and transparent environment, therefore, alleviating information asymmetry between managers and stakeholders (Ogedengbe and Adelowotan, 2025). This transparency reduces the opportunistic behaviour, as seen through agency theory, and makes it easier to monitor the decision making of the managers, as it reflects on the organizational goals. Nonetheless, the advantages of blockchain are hardly achieved independently. To ensure the transformation of the technological transparency into the real performance results, the technology must have supportive governance practices, including board oversight, compliance, performance monitoring frameworks (Liu et al., 2024). The lack of these governance alignments can result in blockchain uptake contributing to the improvement of data integrity but without a better quality of decision-making

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

and strategy implementation (Yoon et al., 2023). Accordingly, the governance is a crucial mediation framework that funnels the technological potential of blockchain into quantifiable organizational performance procurement.

Empirical evidence is growing to conclude that the quality of governance measures the extent to which blockchain integration is beneficial to the performance of firms. A study indicates that companies with a better governance system have more advantages in digital transformation projects, such as increased efficiency in their operations and trust among stakeholders (Iqbal et al., 2023). Equally, the results in new markets show that the transparency through blockchain will be most beneficial in cases where governance systems internalize accountability and compliance among managers (Zhu et al., 2025). In this context, corporate governance is a mediating process that helps in ensuring technology is translated into the results of the technology by converting informational advantages in blockchain into control, risk management, and strategic decisions (Al-Htaybat and von Alberti-Alhtaybat, 2023). According to agency theory, governance is a way of ensuring that the adoption of technology lowers the agency costs and administrates alignment in the organization. The lack of such mediation can constrain the influence of blockchain, especially in the situations with weak institutions or low regulatory governance. The interaction between blockchain inclusion, regulation, and performance should be empirically investigated. In successful governance, transparency and data reliability of blockchain can make managers more accountable, and this phenomenon will result in greater efficiency and performance within the organization. It is therefore hypothesized that:

H2: Corporate governance mediates the relationship between blockchain technology integration and organizational performance.

In the modern data-driven economy, organizations are increasingly relying on the power of analytics to make strategic decisions, streamline operations, and remain in operation. This trend has been enhanced by the incorporation of the

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

blockchain technology, which has resulted in the creation of volumes of secure, verifiable and real-time transaction data that can be utilized with the help of sophisticated business data analytics (BDA). Blockchain is an underlying infrastructure amplifying the data accuracy, traceability, and the integrity key factors that amplify the analytical foundation of organizations (Ogedengbe and Adelowotan, 2025). According to an agency theory view, such a combination of unchangeable data and analytical processing lessens information asymmetry between principals and agents and therefore enhances more transparent and efficient decision-making. Recent research has also highlighted that the actual worth of blockchain lies in the fact that companies should have the analytical capacity to analyze and leverage its data outputs to their strategic benefit (Al-Htaybat and von Alberti-Alhtaybat, 2023). Blockchain will not achieve transparency, and without data analytics, then organizations might not translate that transparency into actionable intelligence and better performance outcomes. Therefore, the business data analytics have a mediating effect between converting the raw and distributed data in blockchain to viable information that leads to productivity, innovation, and competitiveness (Hussinki, 2025).

The significance of business analytics as a medium of bridge between technological integration and organizational success is supported further by empirical evidence. It has been shown that companies that integrate blockchain usage with sophisticated analytics systems are more likely to be affected by better performance mainly because of improved accuracy of decisions, predictive thinking, and optimization of processes (Iqbal et al., 2023). To illustrate, analytics based on the blockchain data allow making more accurate predictions, tracking data in real-time, and preventing risks, which positively affect the efficiency of operations in the manufacturing and supply chain industries (Lin et al., 2024). Additionally, analytics capabilities allow the organizations to find the points of performance bottlenecks, measure the adherence to governance policy, as well as to balance strategic

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

decisions and long-term goals (Liu et al., 2024). The synergistic application of blockchain and analytics can be a way to transcend the limitations in institutional inefficiencies and data fragmentation that impede decision-making in emerging markets, and that can be used to deliver quantifiable performance benefits (Zhu et al., 2025). On the background of the agency theory, the business data analytics will be a mediator that converts blockchain-facilitated data transparency into lower agency costs and better organizational fit. It can be postulated that:

H3: Business data analytics mediates the relationship between blockchain technology integration and organizational performance.

Methodology

The research design type that was used in this study was quantitative and cross-sectional in order to analyse the interactions between blockchain technology integration, corporate governance, business data analytics, and organizational performance. The quantitative method was suitable since it enables the methodical gathering and statistical examination of numerical evidence and enables objective testing of the proposed relationships (Creswell and Creswell, 2023). To measure existing relationships between variables and determine mediating processes within organizations, a cross-sectional design was chosen to collect data at a specific time, which is most appropriate in this regard (Hair et al., 2022). This design fits the purpose of this study, which is to explain the effect that technological and governance factors have on the level of firm performance concurrently and not causally with time. In addition, it has been pointed out by recent literature that cross-sectional and survey-based research design is still a prevalent and effective method of conducting research in management and information systems investigating the phenomenon of digital transformation and governance (Podsakoff et al., 2023). The adopted design guarantees methodological rigor, reproducibility, and compliance with the modern empirical standards.

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

The target population was senior managers, directors and chief executives of medium and large-scale manufacturing companies in Pakistan. The reason behind the selection of this sector is that it is one of the critical parts of the national economy and is already being technologically modernized with the introduction of digital applications like blockchain and analytics. The manufacturing companies in the textile, chemicals and machinery segments are also transitioning to blockchain-powered data systems to improve on supply chain transparency, regulatory compliance, and performance management (Zhu et al., 2025). The firm was the unit of analysis, and the respondents were firm perspectives of governance, analytic capability, and performance outcomes at the organizational level. Stratified random sampling was employed to guarantee sufficient coverage of various sub-sectors in manufacturing that reduces bias in sampling and increases the scope of generalization. The number of responses needed was based on the fact that the minimum number of responses required before the structural equation modeling (SEM) is considered sufficient is ten responses per estimated parameter (Kline, 2023) and further supported by the Items Response Theory which provided sufficient statistical power. Using this criterion, 400 was considered to be a sufficient sample but 624 questionnaires were sent and 457 valid answers were received and reliability and representativeness ensured.

The analysis of the data was done with the help of a mixture of SPSS (version 26) and SmartPLS (version 4). Descriptive statistics, frequency analysis and initial screening of areas of missing values and outliers were done using SPSS. The confirmatory factor analysis (CFA), measurement model testing, and structural equation modeling (SEM) were conducted using SmartPLS that allowed testing path coefficients, mediating relationships, and predictive relevance. It is reasonable to use SmartPLS because it can handle complex models that include multiple mediators and non-normal data distribution is supported (Hair et al., 2022). Validated scales that were modified in the previous studies measured all constructs. Six items derived

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

through Lin et al. (2024) were used to measure blockchain technology integration; five items derived through Liu et al. (2024) were used to measure corporate governance; business data analytics capability had six items derived through Al-Htaybat and von Alberti-Alhtaybat (2023); and organizational performance was measured using six items derived through Iqbal et al. (2023). Each of the items was graded on a 7-point Likert scale with the options of 1 (strongly disagree) to 7 (strongly agree), which is the standard of quantitative research. Content validity was assured through the application of validated tools, multi-item measurement technique promoted construct reliability and internal consistency.

Data Analysis

Table 1: ***Factor Loadings for Measurement Items***

Construct	Item Code	Measurement Item (Adapted Source)	Factor Loading
Blockchain Technology Integration (Lin et al., 2024)	BTI1	Our organization has adopted blockchain for recording and verifying transactions.	0.84
	BTI2	Blockchain enhances transparency and traceability across our business operations.	0.87
	BTI3	We integrate blockchain applications with existing information systems.	0.82
	BTI4	Blockchain improves the accuracy and security of our data management.	0.88
	BTI5	Our business processes	0.85

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

		are increasingly supported by blockchain-enabled platforms.	
	BTI6	Blockchain adoption has streamlined operational and financial reporting processes.	0.83
	CG1	The board of directors effectively oversees organizational strategy and performance.	0.86
	CG2	Corporate decisions are guided by clear ethical and accountability standards.	0.84
Corporate Governance (Liu et al., 2024)	CG3	Management practices ensure transparency and compliance with regulatory frameworks.	0.88
	CG4	Stakeholder engagement is prioritized in governance processes.	0.81
	CG5	Governance structures support the integration of innovative technologies.	0.85
Business Data Analytics Capability (Al-Htaybat & von Alberti-	BDAC1	Our firm uses analytics to improve decision-making and operational efficiency.	0.89
	BDAC2	Data-driven insights are	0.87

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Alhtaybat, 2023)		regularly incorporated into strategic planning.	
	BDAC3	We possess advanced tools and expertise for analyzing business data.	0.86
	BDAC4	Data analytics is used to predict trends and customer behavior.	0.84
	BDAC5	Managers rely on analytics for evaluating organizational performance.	0.85
	BDAC6	Data analytics contributes to continuous process improvement.	0.88
Organizational Performance (Iqbal et al., 2023)	OP1	Our organization has achieved sustained financial growth over recent years.	0.83
	OP2	Operational efficiency has improved as a result of technology integration.	0.86
	OP3	Customer satisfaction levels have increased consistently.	0.84
	OP4	We effectively respond to market changes and competitive pressures.	0.87
	OP5	Our firm's productivity	0.88

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

		and innovation have improved significantly.	
	OP6	Our organization performs better than key competitors.	0.85

The loading of all the factors was much above the recommended level of 0.70, which indicates satisfactory reliability of indicators in all the constructs (Hair et al., 2022). The findings show that all items are significantly useful to their corresponding latent construct, which validates the internal consistency of the measurement model. The items with high loadings were those that measure blockchain technology integration, corporate governance, business data analytics capability, and organization performance, which are indicative of conceptual clarity and empirical strength. The results are in line with previous standards of the methods that underline the importance of having high loading values to achieve construct validity and accuracy in measurements (Henseler et al., 2015). As a result, the measurement model has high convergent validity, which implies that the indicators used are effective to measure their theoretical constructs and can be used later in the structural model analysis (Hair et al., 2022).

Table 2: ***Reliability and Convergent Validity Statistics***

Construct	**Cronbach's Alpha**	**Composite Reliability (CR)**	**Average Variance Extracted (AVE)**
Blockchain Technology Integration	0.904	0.928	0.679
Corporate Governance	0.878	0.913	0.678

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Business Data Analytics Capability	0.911	0.934	0.702
Organizational Performance	0.895	0.923	0.666

The reliability and validity tests had established that all constructs were within the psychometric standards of measuring quality. All the factor loadings are more than 0.70, which means that all items are good contributors to their latent constructs and prove good indicator reliability (Hair et al., 2022). Internal consistency was also high in the results, as indicated by the values of Cronbach alpha and composite reliability (CR) of above 0.70, with average variance extracted (AVE) values exceeding 0.50 in support of convergent validity (Fornell and Larcker, 1981; Hair et al., 2022).

Table 3: ***HTMT Discriminant Validity***

Constructs	**BTI**	**CG**	**BDAC**	**OP**
Blockchain Technology Integration (BTI)		0.721	0.746	0.784
Corporate Governance (CG)			0.693	0.732
Business Data Analytics Capability (BDAC)				0.764
Organizational Performance (OP)				

The establishment of discriminant validity used the HTMT criterion, according to which all the construct correlations were less than 0.85, proving that every variable measured a different conceptual domain (Henseler et al., 2015). This makes sure that blockchain technology implementation, corporate governance, business data analytics capability and organizational performance were empirically differentiated in the model.

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Table 4: ***Coefficient of Determination***

Endogenous Construct	Predictor Variables	R^2	Q^2	f^2 (Effect Size)
Corporate Governance (CG)	Blockchain Technology Integration	0.512	0.371	0.289 (medium)
Business Data Analytics Capability (BDAC)	Blockchain Technology Integration	0.548	0.386	0.317 (medium)
Organizational Performance (OP)	Blockchain Technology Integration, Corporate Governance, Business Data Analytics Capability	0.681	0.447	0.192 (small-to-medium)

The evaluation of the structural model showed that the predictors had great explanatory power with a R2 value exceeding 0.50 in all the endogenous variables and therefore, the predictors would have explained a considerable percentage of the variance. The results of the Q2 were positive, which confirmed the relevance of prediction, and the values of effect size (f2) indicated that blockchain technology integration has moderate impact on the corporate governance and the capability of business data analytics and a smaller but significant impact on the organizational performance (Cohen, 1988; Hair et al., 2022).

Table 5: ***Results***

H	Relationship	Path Coefficient	t-value	p-value	Decision
H1	Blockchain Technology Integration → Organizational Performance	0.412	8.276	0.000	Supported

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

H2	Blockchain Technology Integration → Corporate Governance → Organizational Performance	0.287	6.354	0.000	Supported
H3	Blockchain Technology Integration → Business Data Analytics Capability → Organizational Performance	0.263	5.982	0.000	Supported

Hypothesis testing results confirmed that blockchain technology integration significantly influenced organizational performance, both directly and indirectly. The mediation effects of corporate governance and business data analytics capability were statistically significant, indicating their partial mediating roles. These results align with prior empirical findings emphasizing the role of governance and analytics as mechanisms that strengthen the performance impact of emerging technologies (Al-Htaybat & von Alberti-Alhtaybat, 2023; Liu et al., 2024).

Discussion

The results of the present research contain the empirical evidence of relationships between the integration of blockchain technology and corporate governance, the capacity of the business data analytics and the organizational performance as the hypothesized. The initial hypothesis, which suggested that blockchain technology integration has a positive relationship with the organizational performance, was validated. The result supports the idea that digital transformation using blockchain improves the efficiency of operations, transparency of data, and accuracy of decisions, which are essential to performance improvement (Lin et al., 2024). The outcome is consistent with the theoretical assumptions of the Resource-Based View (RBV) according to

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

which technological capabilities serve as strategic assets that generate a competitive advantage when well utilized (Barney, 1991; Teece, 2022). The ability of blockchain to achieve immutable records, decentralized data governance, decreases information asymmetry and transaction costs creating trust and accountability in the business operations. Nearly identical results by Nasiri et al. (2023) and Hassan and Bashir (2024) revealed that blockchain-supported structures result in greater operational responsiveness, superior supply chain traceability, and elevated stakeholder confidence all of which translate into greater organizational performance results.

Contextually speaking, this finding is of specific interest to organizations that are in the volatile and competitive markets, in which trust and efficiency are performance drivers. Financial fraud, regulatory uncertainty, and ineffective systems of data management are problems that are alleviated in emerging economies through blockchain implementation (Iqbal et al., 2023). The fact that the results of this study align with the previous literature indicates that the transformative power of blockchain should not be viewed as the ability to embrace technological adoption but as the ability to establish the technology as a part of the internal processes. It means that those organizations that consider blockchain as a strategic enabler instead of a technical addition will have higher chances to achieve tangible performance benefits. Moreover, the findings support the position that blockchain helps in the dynamic capabilities of a firm by increasing the capacity to respond to environmental changes by the increase of its data usage and alignment of its governance (Teece, 2022).

The second hypothesis was also proven to be true as it analyzed the mediating effect of corporate governance between blockchain technology integration and organizational performance. This finding supports the argument that the governance processes can be used to convert blockchain adoption into organizational value by enhancing accountability, ethical decision making and transparency of stakeholders (Liu et al., 2024). This

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

finding is consistent with the agency theory and the institutional views, which consider that successful governance minimizes the information asymmetry among management and stakeholders so that blockchain-powered processes are employed in an ethical and strategic manner (Jensen and Meckling, 1976; North, 2023). The empirical results are consistent with those of Kim and Kim (2023), who discovered that the integration of technology can improve the performance only under the condition that the strong governance structure moderates or mediates its effectiveness. Blockchain helps in board supervision and audit trail visibility, which makes managerial actions more transparent and decreases the possibility of the opportunistic actions, increasing organizational integrity and trust.

The intermediary role of the corporate governance also indicates a larger organizational maturity effect, in which blockchain integration makes governance systems shift the compliance-driven systems to those systems oriented at creating value (Liu et al., 2024). In the case of companies in a developing economy where governance systems are not so formalized, blockchain presents an avenue to homogenize the reporting and improve the effectiveness of the board oversight. It is especially significant because this connection between governance and technology was shown to mean that the adoption of blockchain is not necessarily the way of improving performance, but it must have strong institutional and governance-based support to make a difference. The current research is, therefore, part of a growing body of knowledge that considers corporate governance as a channel through which technological innovation can be converted into the performance advantages that are sustainable (Ali et al., 2023).

The third hypothesis that assumed the existence of a mediating role played by business data analytics capability in the relationship between blockchain technology integration and the performance of organizations was also confirmed. The outcome indicates that the advantages of using blockchain in terms of performance are magnified in the presence of enhanced

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

data analytics. Blockchain yields enormous volumes of safe, organized data, and organizations that have analytical applications and knowledge can transform this information into actionable information that can be used to make strategic decisions (Al-Htaybat and von Alberti-Alhtaybat, 2023). The discovery can be related to the theory of the dynamic capability, which points to the fact that companies not only need to purchase technology but also build the analytical capabilities to reorganize and utilize information resources efficiently (Teece, 2022). Similar studies by Wang et al. (2023) and Sharma et al. (2024) also noted that data analytics capabilities lead to a more agile and predictive intelligence of firms, which improves the performance results of investments in digital technologies.

The mediation effect suggests that blockchain technology is the source of the data infrastructure, and analytics is the source of competitive intelligence that is created out of this data. Through this interaction, firms can detect the elements of inefficiency; anticipate the trends in the market, besides streamlining the decision-making process. The combination of blockchain and analytics is also effective in promoting the more accurate prediction of forthcoming events and the distribution of resources, which allows organizations to reach operational and strategic performance goals (Nasiri et al., 2023). The outcome also agrees with the RBV framework which considers analytics capability as a value-adding asset that complements the value generated by technology adoption. The merger of blockchain integrity and analytics intelligence can be utilized to form a powerful lever in enhancing organizational resilience and performance sustainability in long-term (Al-Htaybat and von Alberti-Alhtaybat, 2023) in emerging markets where data-driven decision-making is yet to be mature, and therefore mobility stays a crucial requirement of contemporary organizations.

Future Research Directions

Despite the fact that the current study provides insight into the effectiveness of blockchain technology integration in improving the performance of

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

organizations in terms of corporate governance and business data analytics capability, there are a number of potential avenues that can be explored in the future. One, longitudinal designs should be adopted in the future so that one can follow the changes in the effect of blockchain adoption over time as the organization learning and institutional maturity rise. The cross-sectional studies are useful in determining the relationship in a structure but cannot constitute the explanation of the temporal changes in governance adaptation or analytics-based transformation. The expansion of the analysis to a series of timeframes would answer the question of whether the notable effect of blockchain on firm performance has a learning curve or a declining return on the growth of the system (Teece et al., 2023).

Second, the subsequent research may be a multi-level study, where the firm-level governance practices would be correlated with the industry or ecosystem-level blockchain networks. The present paper is dedicated to the organizational perspectives, but the distributed character of blockchain implies that its usefulness might be influenced by the collaboration between firms, harmonization of regulations, and norms of data sharing (Culot et al., 2024). The analysis of these relations would assist in discovering the functioning of governance and analytics capabilities as a common resource instead of a firm-specific capability. Besides, it would be possible to test moderated mediation models with institutional quality or digital infrastructure or cybersecurity preparedness to learn about contextual contingencies influencing the magnitude of mediation effects.

Third, though the research relies on self-reported measures, future studies would supplement the rigor of the research through incorporation of objective performance metrics like the return on assets, ratios, or blockchain transactions data. Integrating both perceptual and secondary data would help reduce common method bias (Podsakoff et al., 2023) and increase the causal inference. Researchers could also conduct comparative studies on industries with different levels of digitalization like finance, manufacturing and logistics

Volume. 4 Issue No. 4 (2025)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

to find out the extent to which the benefits of governance by blockchain are specific to industry or can be used across settings.

The theoretical horizon of the Dynamic Capability Theory may be extended by other views that are more complementary to each other, like the Institutional Theory or the Socio-Technical Systems view, and provide a deeper insight into how organizations aim to align the technical, social, and strategic subsystems during blockchain integration (North, 2023). This integrative prism may explain how the role of governance and analytics abilities is jointly developed in the context of larger technological systems (in particular, in the agendas of sustainability and digital transformation). Future research could also look at the ethical and environmental aspects of blockchain concerns that are becoming more pertinent to the Sustainable Development Goals (SDGs) to make sure that efficiencies and benefits are obtained without compromising innovation responsibility and sustainability.

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Volume. 4 Issue No. 4 (2025)
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Volume. 4 Issue No. 4 (2025)
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