

BLOCKCHAIN TECHNOLOGY AND CORPORATE GOVERNANCE: AN ANALYSIS OF BOARD STRUCTURE, SHAREHOLDER RIGHTS AND COMPENSATION POLICIES

Maher Abida*

Abstract *The blockchain technology (BT) offers a new means to trade and monitor the ownership of financial assets which is similar to the advent of double-entry bookkeeping centuries ago. This represents a significant development in financial record-keeping. Stock exchanges are investigating BT worldwide to enable businesses to list, to trade and to vote on shares. This adoption has the potential to benefit stockholders through reduced trading costs, faster ownership transfers, improved record accuracy and increased process transparency. This study examines the effect of BT on corporate governance. Using feasible generalised least squares analysis, our study analyses data from 297 European businesses included in the STOXX Europe 600 index between 2016 and 2021. The results show that the adoption of BT improves the quality of board decision-making and streamlines board activities. In addition, the study indicates that BT facilitates greater direct shareholder rights and encourages effective worldwide administration of director and board member compensation. The research contributes to the current body of literature by confirming the positive impact of implementing (BT) on enhancing corporate governance measures. This, in turn, assists managers in formulating appropriate strategies.*

Keywords: *Blockchain Technology, Corporate Governance, Board Structure and Function, Shareholders Rights, Compensation Policy, Vision and Strategy*

INTRODUCTION

Blockchain is a distributed technology that increases the visibility and transparency of stored transactions (Wang et al., 2019). It ensures a single version of the truth, which helps build trust in the stored information (Queiroz et al., 2019) and allows for the automatic execution of transactions (Lacity, 2018a).

Blockchain technology (BT) is widely used as technical support for enterprises to improve production processes and reduce costs (Pan et al., 2019). With the development of research, it offers a good opportunity for improving investment efficiency (Yermack, 2017). Nevertheless, there are many difficulties to the perfection of BT and its application. BT represents the backbone of a new digital supply chain (Figorilli et al., 2018), maintains a competitive advantage and generates improved performance (Lu et al., 2014).

In their study, Agarwal and Singh (2022) examined 270 Indian IT companies and discovered that firm size, firm age and the presence of independent directors have a positive impact on corporate performance. Similarly, Palaniappan

(2017) observed significant correlations between board characteristics and firms' performance indicators.

Blockchain is a distributed database built on the principle of cryptography. Participants in blockchains, such as companies that list their shares on a blockchain stock registry, have many reasons to care about the governance of a blockchain itself (Yermack, 2017).

BT offers firms the opportunity to directly control their assets through the democratisation of corporate governance methods. This enables precise and traceable asset exchanges across company networks while promoting transparency (Capgemini, 2013).

According to this study's findings which are consistent with the most comprehensive research available, corporate governance will undergo significant transformations and benefits under a blockchain framework, as supported by studies conducted by Tapscott and Tapscott (2016), Fink Bradley (2017) and Haque (2018).

The adoption of BT may bring a qualitative change in the effectiveness of the agency relationship and corporate governance as a whole. This will lead to the elimination of certain traditional corporate governance checks and balances

* Assistant Professor of Finance, University of Sfax, Tunisia. Email: maherabida@yahoo.fr

such as agent monitoring, audit requirements, disclosure regimes and executive compensation plans.

Yermack (2017) asserts that BT holds enormous potential for revolutionising company voting, record-keeping and sharing ownership by displacing outdated corporate processes, resulting in significant improvements in accuracy and transparency.

Lafarre and Van der (2017) suggest that this modernisation can foster a more contemporary interaction between shareholders and management, ultimately reducing agency costs and fostering increased trust. By eliminating the need for principals to implement supervision and monitoring which are associated with agency expenses, the deployment of blockchain infrastructure reduces the need for principals to oversee and to monitor.

The inherent agency issues in contemporary finance and corporate governance are fully addressed by the governance guarantees embedded in code. According to Fearnley and Soohoo (2018), BT presents fresh possibilities for facilitating the agency connection between business players and fostering openness and trust.

BT studies have primarily focused on its ability to provide reliable and accurate information to supply chain participants. Sislian et al. (2022) also examined the connection between business performance and blockchain integration. They discovered that the integration of BT might improve company performance, based on data from 10 European enterprises across diverse industries. BT is considered a tool to equip businesses for an uncertain future.

Kumar et al. (2022) investigated BT's contribution to improving financial performance. The study's sample of 50 people was chosen based on how frequently they used BT. The authors demonstrated how BT can always improve data availability and transparency in all financial activities.

Information asymmetries, censorship and agents' opportunistic conduct, as well as violations of fiduciary obligations, liability laws, fraud and third-party interference, can all be eliminated with the use of BT. By implementing blockchain, all contractual terms become open and transparent, and anyone, not just the accounting team, has access to a company's entire financial situation.

A custom-built blockchain may be used to develop and manage smart agency contracts, giving principals and agents the ability to record lists of obligations or promises, establish marketplaces and carry out a variety of other yet-to-be-disclosed tasks.

BT has the potential to revolutionise the way principals and agents interact as well as to provide new opportunities for creating more efficient and transparent business practices.

The essay's remaining sections are structured as follows: A development of hypotheses and prior literature are presented in Section 1. The research design is described in Section 2. However, the results are presented in Section 3. In Section 4, there are discussions and the conclusion is in Section 5.

PREVIOUS LITERATURE AND HYPOTHESES DEVELOPMENT

Relation between Blockchain Technology and Board Structure

Transactional assurances are offered by the blockchain's immutability and its cryptographic security protocols which also foster confidence between agents and owners in the legitimacy of their contractual connection. These assurances ensure that no participant can get beyond the regulations built into the BT.

The blockchain ensures that contracts between the principal and the agent are only carried out if and when all contract requirements have been completed and certified by the system's bulk of nodes and miners. The principal does not thus need to implement oversight and monitoring which would normally result in agency fees in the blockchain infrastructure. The underlying agency issues in contemporary corporate governance and finance are fully addressed by blockchain because of the governance assurances built into the technology.

BT improves supply chain management's effectiveness, dependability and transparency (Devi, 2014; Wamba et al., 2018a; 2018b). According to Liu et al. (2013), to digitise their operations, companies invest heavily in infrastructure between businesses and their supply chains and they enhance board structure decisions in order to have gain and to maintain competitive edge.

H1: Blockchain technology implementation can improve the quality of decisions of board structures.

Blockchain Technology and Board Function

By reducing obstacles to confidence in agency collaborations that demand agent oversight, BT's usage of cryptographic hashes improves blockchain security even further and lowers agency expenses. Cryptographic hashes are intricate algorithms that create a distinct hash value by using the specifications of every transaction. According to Schuetz and Venkatesh (2019), by digitising present procedures, fixing current issues and providing users with new chances,

blockchain-based solutions provide a variety of goods that are suited for customers in three ways.

Smart contracts are computerised protocols for executing contract terms. They consist of code fragments that can be automatically executed by miners. These contracts were initially proposed by Szabo in 1997. They enable the coordination of agency relationships without any transaction or agency costs, ensuring comprehensive and error-free execution. BT facilitates this coordination.

Without the need for traditional principal control systems, middlemen or counterparty risk, agency relationship governance takes place on the blockchain. In contrast to the previous financial systems, BT eliminates the need for multiple layers of control and verification. Lawrence et al. (2016) concluded that the BT facilitated the control mechanisms commonly associated with corporate governance, for example the meetings with management agents and shareholders based on stock market performance.

H2: Blockchain technology adoption facilitates the role of the board function.

Blockchain Technology's Effects on Shareholders Rights

BT provides a mechanism for contract validation and enforcement, data delivery and equips governance and investor relations professionals with the tools they need to do their jobs successfully and to inform investors. Using BT for share registration, according to Yermack (2017), may increase transparency and give early notice of changes.

Through honesty and openness for all parties, BT builds a foundation for trust. The blockchain promotes transparency while sharply lowering transaction costs because it is public and unchangeable (at least the public blockchain). Furthermore, BT offers statutory assurances that fully resolve the agency. In contrast to the current finance infrastructure, which is riddled with agency problems (such as executive remuneration, credit rating, etc.), the BT enables a different solution to corporate governance problems because of these guarantees.

We completely agree that using BT can help with the exercise of voting rights. The corporation would be more aware of its holdings and has real-time access to this data (Yermack, 2017). Wright and DeFilippi (2015) concluded that the increased voting efficiency, openness and accuracy provided by BT may encourage shareholders to demand votes on a wider range of issues and more frequently.

H3: The use of blockchain technology would permit more direct shareholder rights.

THE RELATIONSHIP BETWEEN BLOCKCHAIN TECHNOLOGY AND COMPENSATION POLICY

If a blockchain registration system were implemented, managers would not be able to retroactively date compensation instruments. Over the past ten years, Heron and Lie (2007) demonstrated that managers made profits by backdating stock option awards and exercises. Blockchains are databases where data is time-stamped and cannot be changed once it is entered. As a result, share transfers cannot be retrospectively altered or backdated. This is a reform that managers would consider expensive but shareholders may perceive it as adding value.

The cooperation conditions and commitments are formed and kept on the blockchain, giving all engaged partners enforceability, auditability and privacy (Kim & Shin, 2019). While enabling multiple contractual procedures, this digital automation offers an effective cooperation process. BT is crucial for increasing investment, increasing credit availability and lowering default risk. Considering that the code is open to the public, shareholders now have a stronger means of controlling the overall compensation of directors and board members.

H4: By utilising blockchain technology, shareholders would be able to oversee the worldwide compensation of directors and board members more effectively.

Exploring the Relationship between Blockchain Technology and Managerial Vision and Strategy

The introduction of BT might result in dramatic changes to corporate governance. Activists and raiders may profit by purchasing shares at a discount and reselling them on a more active market, but their transactions would be more difficult to conceal.

By digitising their operating environments and infrastructures, businesses want to increase their financial performance (Chae et al., 2018). In a theoretical study, Baumgartner and Rauter (2017) analyse the components of strategic management. They contend that a study of the company's utility is necessary before embracing the commercial benefits of sustainable strategic planning. This gives managers a thorough understanding of the subjects important for incorporating sustainability into routine company operations, although this conclusion has not been experimentally supported.

In addition to establishing a trust mechanism, the deployment of the BT system increases organisational synergy effectiveness (Wamba et al., 2018, a b; Chen et al., 2018; Leng et al., 2018). The possible influence of BT on health profession education has been studied by Funk et al. (2018).

They contend that BT can enhance monitoring of information and the people who provide it, measure the effects of education across generations and establish the relative worth of educational initiatives. This result lends credence to the idea that BT can fundamentally alter the way that health professions education will be delivered in the future, as well as how patients, professionals, teachers and students will interact while seeking out reliable information.

H5: Blockchain technology adoption can improve the vision and strategy of managers.

RESEARCH DESIGN

Sample and Data

We began with a sample of 600 European companies listed in the STOXX Europe 600 index from 2016 to 2021. After excluding firms without BT and those with missing data (153 firms), our final sample consisted of 297 European companies using BT, resulting in 1782 firm-year observations (see Table 1). We extracted accounting and financial data from the DATASTREAM database for our empirical analysis.

Table 1: Sample Selection

Stoxx Europe 600	600	3600
Banks and financial institutions	(139)	(834)
Firms with missing data	(153)	(965)
Final sample	297	1782

Variable Selection and Description

Board Structure and Function, Shareholder Rights, Compensation Policy, Vision and Strategy

For our analysis, we used the scores obtained from Thomson Reuters-ASSET 4, as mentioned by Erragragui (2018), Jamali (2008) and Chatterji et al. (2009).

The corporate governance pillar measures a company's systems and processes that ensure its board members and executives act in the best interests of its long-term

shareholders. Board structure indicates that companies with either a policy on, or compliance with, the country's corporate governance codes for any one of the following elements: Size, Independence, Gender, Culture, Experience or Balanced Board, will be awarded a "Yes" for this indicator. Aggarwal (2022) conducted a study on the board structure of listed companies in the National Stock Exchange (NSE-200 Index). The study measured the board structure using variables such as board size, board independence, board meetings and audit committees.

For board function, ESG DataStream specifies that a company with either a policy for, or compliance with, the country's corporate governance codes on Audit Committee, Nomination Committee, Compensation Committee or Effective Board, will be awarded a "Yes" for this indicator.

Regarding shareholder rights, companies with either a policy on or compliance with, the country's corporate governance codes on ensuring equal treatment of minority shareholders, facilitating shareholder engagement or limiting the use of anti-takeover devices, will have a "Yes" for this indicator.

For the compensation policy, the score is obtained from the response to this question: "Does the company have a policy for performance-oriented compensation that attracts and retains senior executives and board members?"

For vision and strategy items, the company explains how it engages with its stakeholders. Data on how the reporting organisation is engaging with its stakeholders, how stakeholders are involved in its decision-making process and what procedures are in place for engagement are considered.

Blockchain Technology

We collected relevant information from BT, listed in the STOXX Europe 600 during the 2016-2021 periods. BT is a 0-1 categorical variable that has been implemented in all samples, as reported by Xiongfeng-Pan et al. (2019).

Control Variable

Consistent with previous research, we included several control variables in our regression models. To measure R&D intensity, we used R&D expenditure divided by total assets. We also included leverage (LEV), which was measured as short-term and long-term debt divided by total assets. Additionally, we included controls for the level of a firm's indebtedness (Assets), sales revenue scale (Sales) and employee size (Staff). To account for country, industry and year fixed effects, we added dummy variables (COUNTRY, IND and YEAR) to our models.

Regression Models

The complex business environment makes the traditional centralised supply chain management model unsustainable (Devi, 2014, Wamba et al., 2018a; 2018b, Ukko et al., 2019; Ezzi et al., 2022a). Therefore, we examined the basic motivations of firms to implement BT-related business from the perspectives of research and development intensity, firm asset size, staff size and sales scale (Pan et al., 2019). In order to analyse the above problems; we first grouped the firm samples and constructed a logistic regression model. The dependent variable here is – whether to implement the BT, that is, “yes” or “no”, which is a categorical variable. Secondly, the explanatory variables mainly include the research and development intensity, total asset size, sales revenue scale and employee size. Moreover, due to the uneven annual distribution of the BT firm sample, the Year dummy variable was used as a control variable to control the influence of other external factors. The model was built as follows:

$$BT_{it} = \beta_1 R\&D_{it} + \beta_2 ASSETS_{it} + \beta_3 SALES_{it} + \beta_4 STAFF_{it} + YEAR + \epsilon_{it} \tag{1}$$

In Model 1, BT_{it} is a 0–1 categorical variable, which represents the implementation of BT of firm i in t year. $R\&D_{it}$ = R&D expenditure divided by total assets. $Assets_{it}$ represents the firm’s total asset size, $Sales_{it}$ represents firm’s sales revenue scale, $Staff_{it}$ represents firm’s employee size. In the test of the model, because the values of BT_{it} are equal to 0 (left-censored) or 1 (right-censored), the Tobit regression method was used in the empirical analysis process. It was proposed by Tobin (1958) and describes the association between non-negative dependent variables (latent variables) and independent variables when the data are censored or truncated (Pan et al., 2019).

Second, our base feasible generalised least squares (FGLS) regression model used to examine the association between extent of BT and financial distress is estimated as follows:

$$BS_{it} = \beta_1 BT_{it} + \beta_2 ASSET_{it} + \beta_3 LEV_{it} + \beta_4 R\&D_{it} + \beta_5 CASH_{it} + \beta_6 ROA_{it} + \beta_7 Sales_{it} + \beta_8 Staff_{it} + \beta_9 IND + \beta_{10-17} YEAR + \beta_{18-33} COUNTRY + \epsilon_{it} \tag{2}$$

$$BF_{it} = \beta_1 BT_{it} + \beta_2 ASSET_{it} + \beta_3 LEV_{it} + \beta_4 R\&D_{it} + \beta_5 CASH_{it} + \beta_6 ROA_{it} + \beta_7 Sales_{it} + \beta_8 Staff_{it} + \beta_9 IND + \beta_{10-17} YEAR + \beta_{18-33} COUNTRY + \epsilon_{it} \tag{3}$$

$$SR_{it} = \beta_1 BT_{it} + \beta_2 ASSET_{it} + \beta_3 LEV_{it} + \beta_4 R\&D_{it} + \beta_5 CASH_{it} + \beta_6 ROA_{it} + \beta_7 Sales_{it} + \beta_8 Staff_{it} + \beta_9 IND + \beta_{10-17} YEAR + \beta_{18-33} COUNTRY + \epsilon_{it} \tag{4}$$

$$CP_{it} = \beta_1 BT_{it} + \beta_2 ASSET_{it} + \beta_3 LEV_{it} + \beta_4 R\&D_{it} + \beta_5 CASH_{it} + \beta_6 ROA_{it} + \beta_7 Sales_{it} + \beta_8 Staff_{it} + \beta_9 IND + \beta_{10-17} YEAR + \beta_{18-33} COUNTRY + \epsilon_{it} \tag{5}$$

$$V\&S_{it} = \beta_1 BT_{it} + \beta_2 ASSET_{it} + \beta_3 LEV_{it} + \beta_4 R\&D_{it} + \beta_5 CASH_{it} + \beta_6 ROA_{it} + \beta_7 Sales_{it} + \beta_8 Staff_{it} + \beta_9 IND + \beta_{10-17} YEAR + \beta_{18-33} COUNTRY + \epsilon_{it} \tag{6}$$

“where i = firms 1–297; t = financial years 2016–2021; BS = board structure, BF: board function; SR: Shareholders rights; CP: compensation policy; V&S: vision and strategy; BT_{it} is a 0–1 categorical variable; LEV = short-term and long-term debt divided by total assets; R&D = R&D expenditure divided by total assets; CASH = cash holdings by the firm defined as cash and marketable securities scaled by total assets; ROA= return on assets; Assets represents firm’s total asset size, Sales represents firm’s sales revenue scale, Staff represents firm’s employee size. YEAR, IND and COUNTRY represent year, industry and country fixed effects, respectively; ϵ is an error term.”

RESULTS

Summary Statistics

Table 2 lists the descriptive data; BT shows a mean (median) of 0.518 (0.358) whereas our corporate governance scores show a mean (median) of 79.786 (79.840).

The VIF values and Pearson’s correlation coefficient are between 1 and 4, which is below the advised maximum threshold of 10 (Gujarati, 2011), and none of the correlation coefficients is more than 0.6. According to the standards Pallant (2001) and Coakes et al. (2010), the independent variables in the regression model do not demonstrate deleterious multicollinearity. For multicollinearity, the tolerance values must be more than 0.10 and the VIF values must be lower than 10.

Table 2: Descriptive Statistics

Variable	Mean	Min	Median	Max	Std. Dev.
CG	79.786	72.775	79.840	83.406	1.587
BS	14.786	7.772	14.840	13.406	1.587
BF	7.786	0.772	7.840	11.406	1.587
SHR	11.786	4.772	11.840	15.406	1.587
CP	9.786	2.772	9.840	13.406	1.587
V&S	4.786	-2.227	9.840	8.406	1.587

Variable	Mean	Min	Median	Max	Std. Dev.
BT	0.517	0.000	0.358	1.000	0.499
LEV	23.905	0.000	22.770	100.63	15.082
CASH	0.089	0.000	0.063	0.955	0.0945
ROA	8.255	-46.19	6.300	806.000	22.159
RD	5.815	-0.550	1.730	658.210	24.330
Sales	1.644	1.000	5018900	3.622	3.246
Assets	16.141	9.108	16.123	20.415	80.647
Staff	1.641	1000	9.841	13.406	1.587

Test of the Blockchain Technology Determinant

Based on Model 1, we examined the determinants of BT implementation, as shown in Table 3. The regression coefficient of R&D is 0.005, and it passes the significant test at the 5% level. This result suggests that the firm’s R&D expenditure relative to total assets has a significant positive impact on the implementation of BT. Additionally, we found that the positive impact is also reflected in the firm’s employee size, total asset size and sales revenue scale (Pan et al., 2019).

To test the robustness of the results, we employed the FGLS method to verify the findings. As shown in the right

column of Table 3, the values and symbols of the regression coefficients do not significantly change. This result suggests that the conclusions obtained in this section are robust.

BTit is a 0–1 categorical variable, it is implemented in all samples, research and development (R&D) intensity, firm asset size, staff size and sales scale and year effects. R&Dit = R&D expenditure divided by total assets. Assets represent the firm’s total asset size, Sales represents firm’s sales revenue scale; Staff represents firm’s employee size. Industry sector (IND) dummy variables, defined by the two-digit Global Industry Classification Standard (GICS) codes and the Year dummy variable. All the estimates are carried out using the Tobit-model and FGLS method.

Table 3: Test Results of the Determinant for Implementing BT

Variable	Tobit-Model			FGLS		
	Coef	Std-Err	T-Value	Coef	Std-Err	T-Value
R&D	0.0050**	0.0025	2.01	0.0041**	0.0013	1.98
Sales	6.58*	1.77	3.71	5.39*	1.36	2.75
Assets	0.0193	0.0470	0.41	0.0202	0.0521	0.321
Staff	-.1203**	0.0500	-2.4	-.1365**	0.0600	-2.78
Constant	-1.9924*	.5981	-3.33	-2.3654*	.5321	-3.59
Year	Yes			Yes		
IND	Yes			Yes		
Country	Yes			Yes		
N			1485			1485
R-squared			0.5264			0.5487

Statistical significance at the 1%, 5% and 10% levels is indicated by *, ** and ***, respectively.

The Impact of Blockchain Technology Implementation on Corporate Governance Items

The regression findings of the correlation between BT and corporate governance metrics from 2016 to 2021 are shown in Table 4. The findings show that for all metrics of corporate governance issues, the coefficient of BT is positive and

statistically significant, implying that the adoption of BT has improved the quality of board decisions, enhanced the role of board functions and facilitated the management of global remuneration for directors and board members (p < 0.01). These results are consistent with our five assumptions and imply that BT can increase company value and corporate governance, as suggested by other researchers (Pundir, 2019).

Table 4: BT and Corporate Governance Items (BS = Board Structure, BF: Board Function; SR: Shareholders Rights; CP: Compensation Policy; V&S: Vision and Strategy)

	BD Model 2	BF Model 3	SR Model 4	CP Model 5	V&S Model 6
BT	0.257** (10.33)	0.981** (9.56)	0.187** (11.38)	0.125 (2.158)	0.874 (3.264)
LEV	0.0001*** (5.28)	0.0002*** (2.82)	0.0018 (0.37)	0.0054* (3.189)	0.0021* (2.825)
Assets	99.287 (0.25)	0.0871*** (12.35)	182.274 (47.54)	10.249 (10.98)	15.325 (17.35)
CASH	48.598** (5.57)	3.738*** (46.57)	5.509 (3.54)	5.258*** (8.28)	8.002 (5.23)
ROA	0.0012*** (7.28)	0.0037** (3.54)	0.0028** (4.38)	0.0024** (5.26)	0.0012** (5.38)
R&D	-0.248*** (-4.28)	-0.0002 (-7.59)	-0.0012 (-5.82)	-0.0045 (-5.29)	-0.2584 (-8.49)
Sales	-8.285*** (-8.93)	-5.2648*** (-45.23)	-7.4682*** (-8.53)	-8.1954*** (-48.23)	-8.1954*** (-8.84)
Staff	-0.486 (-48.83)	0.0258 (4.38)	-0.0495 (-2.84)	0.1285 (8.56)	-0.0258 (-8.28)
Constant	-8.1398*** (-8.46)	-8.5401*** (-6.34)	-3.486*** (-84.13)	-5.1547*** (-7.325)	-8.125*** (-45.06)
YEAR FE	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES
COUNTRY	YES	YES	YES	YES	YES
Observations	1485	1485	1485	1485	1485
Chi2(1)	52.68	49.87	59.47	49.87	59.47
Prob>Chi2	.0000	.0000	.0000	.0000	.0000

Statistical significance at the 1%, 5% and 10% levels is indicated by *, ** and ***, respectively.

Furthermore, our results suggest that the implementation of BT can help alleviate the problem of governance, and since it is linked to better investment decisions (Sislian & Jaegler, 2022), it can also facilitate access to external capital. These findings align with the conclusions drawn by Khalil et al. (2022) and Kumar et al. (2022), who propose that firms adopting BT experience improved financial performance and lower financial risk.

The influence on the investors' trading techniques and the insiders' motivations may still be significant even if the transaction ledger was only accessible to the blockchain sponsor and the government as it is detailed below. In the end, a variety of blockchains with different levels of investor anonymity may compete in the market to draw corporate listings, with businesses placing themselves on various platforms that appeal to various shareholder clienteles based on their preferences for ownership transparency.

The estimated models show that the coefficient and t-statistics of the variables, as well as the quality of the board's structure

and function, are significant at the 5% level, as shown in the Table 4.

The estimates presented in Table 4 align with the findings reported by Ezzi et al. (2022). According to the authors, businesses using BT may have easier access to finance thanks to lower agency costs brought on by successful stakeholder involvement. The underlying issue of organisational self-interest is raised by agency theory. The firm's owners may have personal objectives that are inconsistent with the managers' objective to maximise shareholder value. There may be a conflict of interest since the shareholders authorise management to handle the company's assets.

This finding is also consistent with the research conducted by Singh et al. (2019) and Powell et al. (2023), who observe that BT enhances the transparency of the information environment. BT makes a substantial contribution to reevaluating the management of inter-organisational business processes by enabling execution without the need for a central party as a single point of trust, as emphasised by

Mendling et al. (2018). Furthermore, as demonstrated in research by Chen et al. (2018), Wamba et al. (2018a, 2018b), and Kumar et al. (2022), firms may easily adjust internal business rules, build efficient operational procedures and manage complicated data and information.

Robustness Test

To check the robustness of our main results, we verify the relationship between BT and corporate governance items, we re-estimate regressions (2)-(6) using the timing adoption dummy variables.

BTit is a 0–1 categorical variable; it has been implemented in all samples. We include several control variables in

our regression models, research and development (R&D) intensity, LEV, industry sector, firm asset size, staff size and sales scale and year effects. R&Dit = R&D expenditure divided by total assets. ROA is return on assets. CASH is cash holdings by the firm defined as cash and marketable securities scaled by total assets. LEV measured as short-term and long-term debt divided by total assets, controls for the level of a firm's indebtedness Assets represents firm's total asset size, Sales represents firm's sales revenue scale, Staff represents firm's employee size. Industry sector (IND) dummy variables, defined by the two-digit GICS codes and the Year dummy variable, timing of adoption (T&A) dummy variables All the estimates have been carried out using the FGLS method.

Table 5: BT Timing of Adoption and Corporate Governance Items

	Model 2	Model 3	Model 4	Model 5	Model 6
BT	0.284** (7.25)	0.056** (7.84)	0.0021** (7.54)	0.0013** (0.21)	0.0045** (3.21)
LEV	-0.0021*** (-6.25)	-0.0045*** (-5.34)	0.0052 (4.08)	-0.0021*** (-8.24)	0.0047 (4.25)
Assets	19.162 (0.0012)	0.00154* (5.28)	10.4512 (4.33)	0.0016* (6.81)	10.147 (7.28)
CASH	7.158** (5.26)	7.085*** (7.28)	4.197 (5.33)	4.025*** (4.084)	7.184 (4.238)
ROA	0.0013*** (8.28)	0.0014** (8.27)	0.0017** (7.09)	0.2145** (7.27)	0.0011** (4.23)
R&D	-0.00184*** (-5.48)	-0.0015 (-4.08)	-0.0045 (-9.17)	-0.0412 (-5.26)	-0.0335 (-7.025)
Sales	-4.2468*** (-0.23)	-4.1974*** (-7.08)	-3.4712*** (-7.46)	-3.1547*** (-4.26)	-5.3245*** (-4.025)
Staff	-0.1745 (-9.32)	0.1874 (0.27)	-0.00021 (-2.49)	0.1457 (0.25)	-0.02141 (-4.02)
T&A	0.1475* (4.2451)	0.00125** (5.1745)	2.01254*** (7.0124)	0.00215** (5.1145)	2.214*** (7.0147)
Constant	-7.1020*** (-7.28)	-4.3164*** (-4.24)	-7.0124*** (-5.01)	-5.2164*** (-6.48)	-6.0124*** (-2.28)
YEAR FE	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES
COUNTRY	YES	YES	YES	YES	YES
Observations	1485	1485	1485	1485	1485
Chi2(1)	44.23	25.46	54.84	25.46	54.84
Prob>Chi2	.0000	.0000	.0000	.0000	.0000

Statistical significance at the 1%, 5% and 10% levels is indicated by *, ** and ***, respectively.

DISCUSSION

BT is frequently employed as a technical assistance for businesses to enhance the production processes, to save costs and to provide profitable results (Li et al., 2018). With the

advancement of research, there is a strong chance to increase the effectiveness of the board decisions, to facilitate the role of the board, to provide more direct shareholder rights and to facilitate the use of BT for effective global pay management of directors and board members. Corporate voting may

become more accurate and strategies such as “empty voting” that seek to separate voting rights from other aspects of share ownership may become more difficult to implement secretly.

Each member of a BT has a copy of the register, which is continuously revised with the most recent data. Farnoush et al. (2022) investigated the impact of BT on business financial stability using a descriptive method. They concluded that any new information can be seen by all participants and that any ill-intentioned attempts to undermine the objectivity of the information are quickly identified and tracked. This lessens hazards and improves the process’s fairness and effectiveness.

The use of BT attempts to increase the accuracy of information, and his clarity encourages managers to create excellent results. Using the aforementioned justification, this analysis suggests the following. Since participants in some blockchains are unable to “rewrite history” by changing their entries retroactively, manipulations like the backdating of stock compensation could become much more difficult, if not impossible, and managerial ownership could become much more transparent with real-time market detection of insider buying and selling.

The development of BT and its use, however, still faces several challenges. First, this paper evaluates how BT has affected many aspects of corporate governance. We suggest that BT rebuilds the incentive system to increase the performance and to lower the risk of bankruptcy, in addition to establishing a trust framework and reducing the cost of online transactions within an organisation. Secondly, we suggest that BT can provide supply chain management technology support. Our research indicates that the adoption of BT significantly affects the standard of board decisions, permits more direct shareholder rights and makes it possible to manage directors’ and board members’ worldwide pay more effectively.

We gathered 297 BT firms in European nations and conducted a quantitative analysis of the effect of the use of BT on financial hardship in order to support the theoretical conclusion outlined above.

The outcome supports earlier findings that blockchain can help boards perform their duties more effectively by easing the management of directors’ and board members’ compensation globally. The explanation for these findings was based on earlier research that highlighted BT’s characteristics and features (Li et al., 2018; Mendling et al., 2018; Farnoush et al., 2022; Khawaja et al., 2022; Kumar et al., 2022; Sislian et al., 2022).

The findings are in line with the majority of prior research on BT, which found that companies get advantages from blockchain systems in various ways (Fink Bradley, 2017;

Haque, 2018; Singh et al., 2019; Murray et al., 2021; Ronaghi, 2022). Our empirical findings align with those of Ezzi et al. (2022b), who argue that blockchain enables agency-related governance without the need for intermediaries, counterparty risk, or traditional principal control mechanisms. Their study shows that agency charges have a comparable effect on the association between blockchain and corporate performance.

Additionally, our research supports Ronaghi’s assertion from 2022 that BT lowers a firm’s risk by controlling agency costs. Our results validate that BT adoption enhanced the standard of board structure decisions, facilitated the role of the board and facilitated the more effective management of the overall remuneration of directors and board members. These findings further their work.

Due to less information asymmetry, European businesses using blockchain have greater access to funding. This finding supports earlier research that focuses on BT’s salient characteristics and features (Mendling et al., 2018; Khawaja et al., 2022; Farnoush et al., 2022; Sislian et al., 2022). Based on the findings, BT requires careful consideration of the interests of multiple stakeholders, including society, suppliers, consumers and businesses. Companies must ensure that the market is well informed about the quality of their business or project. In doing so, they can benefit from reduced capital costs as capital providers gain confidence and trust in the organisation’s operations, facilitated by BT.

CONCLUSION

By digitising their operating environments and infrastructures, businesses hope to improve their financial performance (Chae et al., 2018). Baumgartner and Rauter (2017) indicated that the company’s utility must be examined in order to recognize its commercial value. Due to the complete disclosure of information to all participants, the transparency of the blockchain ensures that the information provided by agents and principals is fully verifiable, thereby eliminating any potential ex-ante or ex-post opportunistic behaviour on the part of the agent. The advantages might raise a company’s moral standing, which can increase its trustworthiness, the calibre of its earnings and its transparency.

This paper provides a comprehensive theoretical framework to investigate how corporate governance and BT interact. To investigate this link, we included earlier contributions and put out a fresh standard model.

This research adds to the corpus of information concerning the adoption of BT. According to earlier research, BT improves organisational performance (Ezzi et al., 2022a, 2022b; Ukko et al., 2019). We provide a contribution to research looking at the effects of BT deployment, a subject

that hasn't been thoroughly discussed in the literature. Our research indicates that BT can lessen the possibility of bankruptcy.

Our study demonstrates how BT deployment in European businesses improves corporate governance. However, knowing how BT may assist managers in developing effective plans has the most impact.

THEORETICAL CONTRIBUTION

This research has examined the connection between BT and the effectiveness of choices made regarding board composition, board function, shareholder rights and overall compensation for directors and board members' relationship.

Since most research on the subject ignores the function of BT in lowering financial risk, the current study adds to the body of information on the adoption of BT. In particular, we look at how blockchain affects corporate governance within firms.

MANAGERIAL CONTRIBUTION

The results of this study offer promising information for senior management to keep putting money into blockchain, from a managerial standpoint. Additionally, this study provides real data on the causes and effects of BT, allowing managers to understand the benefits of using BT more clearly. They will recognize how BT can improve the quality of decisions related to board structure, facilitate board functions, enhance shareholder rights and manage the global remuneration of directors and board members more efficiently.

In reality, BT can help customers to manage tactical, operational and strategic operations. In order to direct digital strategy and to generate financial returns for the business by raising the calibre of board structure choices, managers must be competent and have a positive attitude to facilitate board functions, to enhance shareholder rights and to manage the global remuneration of directors and board members more efficiently.

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