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When is blockchain worth it? Value and risk drivers of corporate blockchain announcements

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Abstract

In the era of emerging technologies, many firms explore the role of blockchain technology and its impact on corporate market value. Past research has shown that companies benefit from executing blockchain projects, but little is known about specific value and risk drivers. Hence, we provide evidence for several conditions under which blockchain provides additional firm market value. Moreover, we test whether blockchain announcements lead to changes in the systematic risk of firms. Theoretically founded on the resource-based view, we utilize the event study methodology, supplemented by a multivariate regression and a firm's beta analysis. We find that stock markets react positively to corporate blockchain news if the announcement is related to a blockchain consortium or partnership, is declared by a tech company, or if the announcement is a follow-up announcement to initial blockchain news. Moreover, our findings show that blockchain announcements do not lead to significant changes in a firm's systematic risk.

Keywords Blockchain · Market value · Market risk · Event study

JEL classification G14

Introduction

Blockchain technology remains one of the most relevant emerging technologies among other applications such as artificial intelligence (AI), applications in virtual or augmented reality (VR/AR), or advances in cybersecurity architectures (Perri & Davis, 2022). Blockchain technology provides numerous opportunities for corporate businesses to create additional business value (Weking et al., 2020). By now, most practitioners are fully aware of this circumstance. For instance, Deloitte's 2021 Global Blockchain Survey unveils that 78% of 1280 executives from enterprises worldwide believe that there exists a compelling

business case for the use of blockchain and 80% are of the opinion that their firm will lose competitive advantages if the introduction of blockchain technology is neglected.¹ Potential use cases are manifold. Practice as well as research considers the field of supply chain management as especially compelling as blockchain can provide the opportunity to enhance traceability of products (Chod et al., 2020), unveil counterfeiting attempts (Pun et al., 2021), or act as a catalyst for enabling automation processes within the field of logistics (Babich & Hilary, 2020). Recently, companies also explore blockchain with the goal to enhance corporate sustainability processes (Rogalski & Schiereck, 2024) by enabling carbon emission tracking (Varriale et al., 2020) or certifying ethical resource harvesting (Kshetri, 2022). As blockchain technology originally developed from the field of cryptocurrencies with the goal to revolutionize financial transactions, many banks and financial institutions try to develop promising applications with this novel technology. Hereby, blockchain can enable a more efficient and secure way of processing financial transactions (Dong et al., 2023) and provides opportunities to reduce costs and execution times of financial settlement processes such as intraday repo transactions, as shown by Morgan Stanley.²

¹ <https://www2.deloitte.com/de/de/pages/innovation/contents/global-blockchain-survey.html>

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² https://advisor.morganstanley.com/scott.altemose/documents/field/s/scott-a--altemose/DeFi_Apr.pdf

Despite the variety of potential opportunities, substantial evidence of blockchain providing actual enhanced business value is still scarce and therefore requires additional effort to reduce the disparity between anticipated outcomes and results under real circumstances (Klößner et al., 2022). A prominent way of evaluating and quantifying the business value of new information technology (IT) introduced by firms is the measurement of its impact on market value or market risk (Schryen, 2013). Consequently, scholars set out to examine stock market reactions to blockchain announcements. Initial results show that in general, corporations announcing a blockchain project benefit in terms of enhanced stock market returns (e.g., Ali et al., 2023; Cahill et al., 2020; Cheng et al., 2019; Klößner et al., 2022). Nevertheless, existing studies neglect the role of specific value and risk drivers for corporate blockchain applications (Klößner et al., 2022) specifically focus on blockchain applications in the field of logistics and show that the involvement of IT service providers reduces the positive stock market reaction, whereas Liu et al. (2022) demonstrate that shareholders value strategic-level blockchain news more than announcements referring to operational improvements via blockchain. Besides that, evidence of other factors impacting the market reaction to blockchain announcements is scarce and requires further investigation. Hence, our study offers a novel approach in blockchain market value research by exclusively focusing on specific value and risk drivers.

Most blockchain announcements are either released in the form of a single firm declaring a proprietary blockchain project, or in a multi-company setting such as a blockchain-partnership or consortia announcement. As inter-organizational IT initiatives are associated with a higher degree of human and technological capabilities leading to a higher success rate of such projects (Ravichandran & Giura, 2019), we deem it relevant to consider this differentiation when analysing stock market returns to blockchain projects. Moreover, increased IT capabilities are mostly found in firms settled in the IT industry (Felipe et al., 2020). Therefore, industry classification is another factor that we expect to have a significant impact on market reactions to a blockchain announcement. Lastly, past research has not yet considered the circumstance that firms should experience an increase in blockchain capabilities, mainly in the form of knowledge and experience, when continuing to work on a blockchain project. This, in turn, should increase the probability of finishing a blockchain initiative with the goal of longer-term operational implementation. Thus, we expect firms who provide continuous blockchain announcements to significantly progress towards a successful completion of the respective project. On the other hand, initial announcements should be prone to a high probability of failing, as approximately 90% of corporate blockchain initiatives fail (Disparte, 2019).

Consequently, stock market participants should consider such announcements as riskier and attribute a lower probability to ultimately provide added business value.

Besides *market value*, academic research also considers *market risk* as a fundamental indicator for determining the value of information systems (IS). In general, past research has shown that the introduction of new IT leads to a decreasing risk of holding the firm's respective stock. This is attributable to the fact that past subjects under study such as business intelligence systems (Rubin & Rubin, 2013) or ERP Systems (Tian & Xu, 2015) facilitate internal as well as external information flow and benefit managerial decision making processes and therefore reduce the risk of sudden or non-rational decisions of major impact (Rubin & Rubin, 2013). The same argument could be used for the market effect of blockchain implementation, as this emerging technology also leads to more effective data- and information distribution processes (Weking et al., 2020). However, we argue that the novelty of blockchain, the high uncertainty of successful implementation, and the general lack of knowledge regarding this technology (Cheng et al., 2019) outweigh the possible risk-mitigating factors and hypothesize that blockchain announcements lead to increases in firm-specific market risk.

Research on stock market reactions regularly applies the event study method when intending to quantitatively determine the value of IT. This methodology is especially useful for the examination of short-term stock market reactions and serves as a reliable indicator of the business value of emerging technologies (Klößner et al., 2022). In this study, we execute an event study and measure additional market value via the calculation of abnormal returns (AR) which represent differences between actual returns of a security and the expected returns based on historical performances. Our study is based on an overall sample of 681 different blockchain announcements from 277 companies. In this context, we first perform three different subsampling event studies and supplement our findings with a multivariate regression to further examine the magnitude of the effects observed. In the second part, we perform a risk analysis by examining changes in market risk in the form of changes in a company's beta factor. We are interested in the general impact of blockchain announcements on market risk and posit that consortia related announcements as well as increased persistence in the form of continuing blockchain project news have a mitigating impact on the general risk-increasing effect. In summary, our study is guided by the following research question: *How do industry affiliation, blockchain project persistence, and the involvement of partners impact shareholder reactions to blockchain announcements?*

Our findings in both the univariate and multivariate analysis show that stock markets react more positively to blockchain news by firms who make an announcement with

relation to a partnership or blockchain consortium. Additionally, our second subsampling analysis indicates that firms from the tech industry exhibit higher returns than firms from non-tech industries. Nevertheless, the results of the multivariate regression analysis cannot confirm these findings. Results from the third subsampling analysis show significantly increased returns for subsequent organizational blockchain announcements in comparison to initial blockchain announcements. The multivariate regression analysis also confirms these findings. On the other hand, the risk analyses show insignificant results. We neither observe a general significant increase in market risk nor significant mediating effects.

Theoretically founded on the resource-based view (RBV), we make various contributions to the existing stream of research on the value of blockchain technology. We provide additional evidence for circumstances under which companies benefit from blockchain announcements and demonstrate that shareholders recognize individual blockchain resources and capabilities. We also show that investors appear to assign a lower probability of success to initial blockchain announcements than to subsequent blockchain announcements. Results of the risk analyses provide initial hints that shareholders do not consider blockchain projects to exert a significantly high impact on a firm's risk profile.

Moreover, our study encompasses relevant implications for practitioners across various domains by not only shedding light on the advantages of strategic decision-making in the blockchain landscape but also encouraging proactive approaches to seize opportunities that appear to present no current threats of increased market risk. As shareholders appear to prefer announcements of blockchain projects pursued in an interorganizational context, executives could be encouraged to explore blockchain venture in the form of collaborative projects with other firms or by participating in a blockchain consortium. Additionally, our finding of heightened positive market impacts of blockchain initiatives in the IT sector might instil confidence in decision makers of technology firms to explore different blockchain use cases and cultivate strategic partnerships. It could be imperative for IT enterprises to scrutinize how their distinct IT capabilities can be harnessed by the specific blockchain technology under consideration. Furthermore, our analysis demonstrates that managers should carefully evaluate potential blockchain projects and focusing on those that promise the highest strategic fit, and then allocating sufficient resources to ensure a successful project execution.

The remainder of this paper is structured as follows. First, we give an overview of related work on blockchain value and risk literature and the theoretical RBV background of our study. Next, we develop our hypotheses and provide an overview of the research methodology, dataset, and measures

applied. Subsequently, we present the results of the subsampling, multivariate regression, and market risk analyses. We then discuss our results, present their theoretical and practical implications, and finish by explaining limitations to the study as well as future research paths.

Related work

Blockchain market value

Several empirical studies have shown that the announcement of a blockchain initiative creates additional market value for companies.

Based on an international data sample of announcements between November 2016 and December 2018, Cahill et al. (2020) demonstrate that declaring a blockchain initiative leads to average abnormal returns of 5% on the announcement day. This effect is amplified for companies situated in the USA as well as for small- and medium-sized firms. Moreover, they show that the price performance of Bitcoin and abnormal returns are significantly correlated and speculative blockchain announcements create more positive market reactions than non-speculative news (Cahill et al., 2020). These findings are supported by Cheng et al. (2019) who provide evidence that shareholders react positively to blockchain announcements by speculative firms and that the reactions depend on the current price of Bitcoin.

Sharma and Paul (2021) examine blockchain- and cryptocurrency-related name changes of companies and their effect on the firms' market value. Compared to non-blockchain-related name changes, they exhibit higher abnormal returns, and the market reaction is stronger during times of heightened public attention on cryptocurrencies (Sharma & Paul, 2021).

Significant positive abnormal returns are also confirmed by Klöckner et al. (2022). The analysis of announcements between 2015 and 2019 also shows that news about blockchain projects related to the tracing of physical objects or sharing of explicit data exhibit less positive abnormal returns. Moreover, a company's innovativeness does not lead to a more positive market reaction. Industry factors and macrofactors such as research and development (R&D) intensity and a country's data restriction level significantly impact market reactions to blockchain announcements (Klöckner et al., 2022).

Zhang et al. (2022) as well as Liu et al. (2022) present evidence of positive stock market reactions to blockchain announcements in the Asian market. Hereby, technical innovation- and strategic-level announcements lead to higher abnormal returns than non-technical innovation- and operational-level blockchain news (Liu et al., 2022). Furthermore,

announcements by Chinese IT firms as well as the existence of a chief information officer have a positive mediating impact on abnormal returns (Zhang et al., 2022).

The resource-based view and blockchain

Past research has regularly relied on the resource-based view (RBV) for the explanation of business value through IT (Konchitchki & O'Leary, 2011) or emerging technologies such as big data analytics (Teo et al., 2016). RBV declares that business value is derived through resources and capabilities that have (1) value, (2) are uncommon, (3) incompa- rable, and (4) are hardly replaceable (Chatterjee et al., 2002; Teo et al., 2016). Moreover, business value through IT can not only be achieved through resources but also through firm specific capabilities (Hulland & Wade, 2004).

The general business value (1) of blockchain has been discussed widely in existent literature. As such, blockchain technology can ensure greater efficiency in business processes (Schlecht et al., 2020). Moreover, it enables the mitigation of information asymmetries in supply-chains through its decentralized character (Bauer et al., 2022). Thereby, it can also lead to cost- and time reductions when dealing with intermediaries (Weking et al., 2020). As entries in an existing blockchain are usually immutable, an increase of trust in the data and in interorganizational ecosystems as a whole can be expected (Weking et al., 2020). Furthermore, multiple examples have shown that blockchain can enhance data integrity and transparency and simultaneously provides opportunities to decrease transaction costs in multi-organizational settings (Cho et al., 2021). Consequently, blockchain can also be effective in combating counterfeiting and shielding businesses from fraud and corruption activities (Sarker et al., 2021). On the other hand, these potential value drivers are highly context dependent. Liu et al. (2022) show that shareholders of Chinese firms attribute more value to strategic-level announcements, such as declaring a general stance or partnership, than to operational-level blockchain news. Moreover, announcements that specifically focus on time-and cost saving issues lead to more positive stock market reactions than blockchain news pursuing other objectives (Ali et al., 2023). Blockchain applications can also vary between different companies and even industries. Whereas the banking sector usually leverages the technology for enhancing financial transaction processes (Rogalski & Schiereck, 2024), industrial firms as well as retailers often apply blockchain for improving traceability of data related to either product transportation or production processes (Gaur & Gaiha, 2020). Additionally, enterprises harness blockchain for marketing purposes. Especially in times of heightened attention on cryptocurrencies, such as in the hype cycles of 2017–2018 and 2021–2022, companies regularly used blockchain as a buzzword (Cheng et al.,

2019) with announcements such as blockchain-related firm name changes (Sharma et al., 2020). Hereby, one popular example is the rebranding of beverage production firm “Long Island Iced Tea Corp.” to “Long Blockchain Corp.”.³ Another example of marketing related blockchain announcements could be the creation and distribution of non-fungible tokens (NFTs) which usually does not have a direct impact on enhancing operational performance (Chohan & Paschen, 2023). This should underscore the necessity of a consequent differentiation of both varying blockchain applications as well as potential value drivers.

Secondly, companies possess individual capabilities and use cases to utilize blockchain technology. As firms often lack internal capabilities to successfully incorporate blockchains (Klößner et al., 2022), they either hire external service and IT providers, or firms join a blockchain consortium to individually extract the most value out of a possible blockchain use case. This shows the rarity of current organizational blockchain capabilities (2). Thirdly, literature has demonstrated that in order for IT to effectively provide value and be adopted successfully, it must align with the highly individualized tasks within a company (Liang et al., 2021). In comparison to standardized IT systems such as enterprise resource planning systems (ERP), blockchain systems are rarely standardized and need to be tailored specifically to a company's needs and existing infrastructure. Therefore, firms need to be able to specifically determine and develop the blockchain capabilities and resources necessary to ensure a successful implementation. These customized requirements make individual organizational blockchain capabilities inimitable (3). Lastly, there currently exists no other technology possessing the specific set of characteristics, including decentralization and immutability, of a blockchain. Thus, if organizations identify use cases that require the specific characteristics of blockchain technology, there is currently no single other IT system available to replace a blockchain system (4).

Systematic risk

Recent studies in the IS field also started to incorporate the concept of market risk when analysing the value of IT. Thereby, various quantitative measures of risk have been utilized. Hunter et al. (2003) as well as Kobelsky et al. (2008) find a significant positive relation between the amount of a firm's IT investments and market risk, conceptualized as the volatility of future earnings. Ren and Dewan (2015) examine the volatility of the return on assets and show that it

³ <https://www.globenewswire.com/news-release/2017/12/21/1268978/0/en/Long-Island-Iced-Tea-Corp-to-Rebrand-as-Long-Blockchain-Corp.html>

increases with more investments in IT. Moreover, increases in yield spreads as well as decreasing bond ratings have been observed by Kim et al. (2017) in cases of risky IT investments. Other studies also specifically consider the impact of digital technology implementations on equity risk. Agarwal et al. (2005) show that ecommerce initiatives by organizations lead to a significant increase in stock return volatility. Additionally, investments in ERP systems have mitigating effects on earnings- and stock return volatility during post-implementation stages (Parra et al., 2015; Tian & Xu, 2015). Lastly, implementing a business intelligence system also has a decreasing effect on a company's stock return volatility (Rubin & Rubin, 2013). Other studies have considered the effect of security breaches and data thefts on the systematic market risk of firms. Cardenas et al. (2012) as well as Hinz et al. (2015) show that such events lead to an increase in systematic market risk, measured as the firm's beta. Furthermore, initiating an IT-standard setting process together with other peer companies leads to a significant reduction in systematic market risk (Aggarwal and Walden, 2011).

Hypothesis development

As a blockchain in essence represents an immutable decentralized ledger, its value inherently lies in applications where several partners or participants of a network benefit from its design features (Klöckner et al., 2022). In the financial sector, blockchain technology is often explored in the context of increasing trust, consensus, and security in institutional financial transactions (Liang et al., 2021). Hereby, smart contracts represent one common form of financial blockchain applications where transactions are executed based on a predefined set of conditions (Yuan et al., 2018). Advantages of industrial blockchain implementations also become more apparent in an inter-organizational context (Babich & Hilary, 2020). For instance, blockchain can establish trust between supply-chain partners and simultaneously decrease costs associated with intermediaries. On the other hand, use cases of blockchain technology in non-interorganizational settings are usually not associated with characteristics that enhance business value. One prominent example is the release of non-fungible tokens (NFTs) which are usually published with marketing intentions (Hofstetter et al., 2022).

On a broader scale, stock market participants value companies forming alliances when pursuing IT innovation (Han et al., 2012). As such, organizational partnerships or consortia offer a wider range of complementary resources and also benefit from shared costs in comparison to projects executed by a single company (Klöckner et al., 2022; Ravichandran & Giura, 2019). Thus, an increasing number of firms engaging in blockchain prototyping decide to do so in the form of a consortium (Zavolokina et al., 2020).

This form of blockchain development could signal higher confidence in the initiative to investors, as more than one company presumably believes in the additional value of the project (Klöckner et al., 2022). Moreover, the presence of a variety of prestigious and well-known brands might lead to increased public attention and trust in commitment to the initiative. Applying the RBV lens, pursuing a blockchain project together with a partner firm or a consortium also offers a wider range of individual organizational, human, and technological capabilities necessary for the success of a blockchain initiative. From the organizational perspective, engaging in a consortium offers increased efficiencies and reduced costs through sharing the workload and decreasing overhead costs (Zavolokina et al., 2020). Having more human capital involved also increases the chances of having all forms of blockchain knowledge available which is deemed necessary for its successful completion. Finally, it usually means having more technological resources available. Therefore, we hypothesize:

H1: Consortia announcements or partnership announcements related to blockchain projects exhibit higher stock market returns than announcements about single company blockchain initiatives.

RBV literature on the value of IS shows that IT resources are essential for the effective extraction of business value for the firm (Melville et al., 2004). Moreover, RBV research also emphasizes the importance of the ability to implement new IT in a way such that it supports the firms' individual core competencies. This highly depends on the company's IS capabilities (Ravichandran & Lertwongsatien, 2005). As organizations from the IT industry are expected to have more IT capabilities enabled through the high degree of IT knowledge and organizational agility in the IT industry (Felipe et al., 2020), IT companies could be better equipped to ultimately benefit from innovative technologies in the form of an increase in business and market value (Dos Santos et al., 1993). In the case of blockchain, companies need to deal with the experimentation and possible implementation of a decentralized and inter-organizational technology which requires a high degree of IT affinity (Klöckner et al., 2022). Moreover, tech companies might also possess more technological resources and knowledge in the form of human capital to deal with the goal of establishing a blockchain system. Additionally, big data topics in combination with data privacy concerns are emerging and become especially important for the tech industry (Zhang et al., 2017). As blockchain technology is in part inherently designated for data protection issues, IT companies could benefit more than other industries from the implementation of blockchain systems which in turn could generate more business and market value (Zhang et al., 2022). Lastly, literature on the

market value of other emerging technologies such as big data and artificial intelligence shows that market returns depend on the industry classification of the companies observed, with IT and manufacturing companies usually benefiting more than organizations from other industries (Lui et al., 2022; Tony et al., 2016). We also expect this to apply for the announcement of blockchain initiatives and hence posit:

H2: Companies from the tech and IT industry exhibit higher stock market returns related to blockchain announcements than firms from non-tech and non-IT industries.

The outcome of investments in emerging technologies is considered uncertain as it is not guaranteed that the implementation will lead to more effective or efficient business processes (Bhattacharjee, 1998). It is estimated that over 90% of corporate blockchain projects will fail due to unclear use cases and the immaturity of the technology (Disparte, 2019). Thus, a company declaring for the first time that it will explore the opportunities of blockchain technology should, on average, be expected to not succeed with its implementation ambitions. Consequently, if a firm continues to publish information about an ongoing project, its success rate could be considered significantly higher, as companies usually do not publish news about failed or unfinished projects. The significant impact of increasing experience is also observable when examining reactions to corporate mergers and acquisitions (M&As) where firms with prior M&A experience benefit from higher abnormal returns than companies without prior M&As (Haleblian & Finkelstein, 1999). Companies that continue publishing statements regarding the same topic or project could signal confidence in the possible future value of the blockchain use case mentioned. From the investor's perspective, each subsequent announcement might also signal a higher degree of commitment to the blockchain project. The more a blockchain initiative progresses, the more resources should have been spent, making it harder for managers and decision makers to abandon a project. Moreover, the more time passes and the longer a firm is involved in a blockchain technology initiative, the more knowledge and experience the organizations involved should gain. From the RBV perspective, this enhances the firms' capabilities necessary for a successful blockchain implementation. Therefore, investors might infer a higher chance of success for blockchain projects with subsequent updates for shareholders. Thus, we hypothesize:

H3: The first announcement regarding a blockchain project exhibits lower stock market returns than subsequent blockchain announcements for the same blockchain project.

Past research has shown that IT investments have a significant effect on either the idiosyncratic or systematic risk of a company. Capital market theory states that idiosyncratic risk is the individual risk of a company which can be reduced through diversification (Sharpe, 1964) and has mainly been measured through stock return volatility (Aggarwal and Walden, 2011; Dewan & Ren, 2011). On the other hand, systematic risk cannot be diversified and is considered as the type of risk for which an investor requires additional compensation. Besides debt relevant aspects, this also affects the respective company in the form of higher equity costs (Sharpe, 1964). Investments in emerging technologies are inherently risky as the successful implementation into operational business processes is generally doubtful and in many cases do not meet the managements' expectations (Hunter et al., 2003). If significant parts of a firm's investments flow into the financing of an unsuccessful IT project, the firm ultimately did not allocate its capital in the most efficient way. This could lead to lower-than-expected profitability, and as such, investors might require more compensation to justify this type of increased risk. From the perspective of debt, this has already been shown by Kim et al. (2017) who demonstrate that risky IT investments lead to increases in corporate bond yield spreads. Additionally, the existence of information asymmetries between shareholders and the company making a blockchain announcement could also lead to higher systematic market risk. Investors might not be aware of the informational intent of a firm's blockchain announcement. For instance, in the past, many firms took advantage of existing blockchain hype periods by making blockchain announcements such as corporate name changes (Sharma & Paul, 2021) or general statements on blockchain exploration, leaving shareholders with the impression that the company was seriously considering the new technology, when in reality only superficial changes and little efforts were made. Therefore, investors might classify the long-term operational value of the blockchain system to be implemented as uncertain. Moreover, some investors might not possess enough knowledge about blockchain technology to realistically assess its potential benefits. As the concept of blockchain is a relatively new phenomenon and many investors confuse the value of cryptocurrencies with the value of corporate blockchain use cases (Cahill et al., 2020; Cheng et al., 2019), shareholders might not be able to differentiate between the volatile cryptocurrency markets and industrial blockchain value. Therefore, we propose:

H4: Corporate blockchain announcements lead to an increase in systematic risk.

The uncertain outcome of investments in emerging technologies such as blockchain makes them inherently risky. As such, the resources required as well as the final results

of projects in early stages are deemed as especially uncertain (Disparte, 2019). On the other hand, cases in which blockchain projects are advancing might signal an increasing amount of capital invested as well as the commitment of decision makers to the initiative. Moreover, the additional value and in some instances also additional use cases that have not been envisioned at the beginning of the project might be clearer in later stages of a project. After gaining sufficient blockchain capabilities by being involved for a significantly long time with implementing a blockchain prototype, companies should be confident enough to estimate its expected additional business value. Therefore, early-stage projects proclaimed through an initial public announcement should be considered as riskier by investors than blockchain projects in their final stages. Consequently, we hypothesize:

H5: First blockchain announcements lead to a higher increase in systematic risk than subsequent blockchain announcements.

Companies that singlehandedly explore the opportunities of new technologies depend on internal capabilities such as human resources and knowledge available as well as a functioning and mature technological infrastructure. On the other hand, if organizations conduct a new project together with partners, they benefit in the form of a shared pool of knowledge as well as a broader basis of technological equipment, human capital, and supplementary expertise (Zavolokina et al., 2020). This enables the respective firm to have resources available which otherwise could not be created or enabled internally. Beyond the distribution of existing knowledge, inter-organizational collaboration also promotes ways of developing new knowledge (Hardy et al., 2003). This is especially important for tasks and technologies of heightened complexity (Juell-Skielse et al., 2017). Research on inter-organizational collaboration has shown that the positive effects of organizational partnerships increase with more complex and novel tasks or technologies (Lundin, 2007). As blockchain systems represent a novel and complex technology, their exploration in inter-organizational settings should be especially beneficial. Additionally, use case explorations of blockchain by single companies might become more difficult and riskier as the inherent strengths of blockchain technology mostly manifest in multilateral data sharing or data transfer situations by providing properties such as decentralization and auditability of data (Klöckner et al., 2022; Risius & Spohrer, 2017). Therefore, we hypothesize:

H6: Single company blockchain announcements lead to a higher increase in systematic risk than consortia announcements.

Table 1 Coefficients of the FFM5 model

Factor	Estimate	<i>t</i> -value
(Intercept)	0.01	2.68***
rm_rf	1.036	2.06**
SMB	0.013	1.66*
HML	0.012	2.06**
RMW	0.011	−1.21
CMA	−0.012	−1.09
Adjusted R^2	5.18%	
<i>F</i> statistic (<i>p</i> -value)	7.01 (0.000)	

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Data and research methodology

Estimation method — Event study

We apply the event study methodology (Brown & Warner, 1980) in combination with a multivariate regression analysis to examine the stock market reaction of corporate blockchain announcements and the impact of mediating variables. For the event study, we rely on the Fama–French five-factor (FFM5) which is described as:

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{1i}(r_{m,t} - r_{f,t}) + \beta_{2i}SMB_t + \beta_{3i}HML_t + \beta_{4i}RMW_t + \beta_{5i}CMA_t + \epsilon_{it}$$

Hereby, $r_{i,t}$ is the return of stock i for period t , $r_{f,t}$ captures the risk-free rate, $r_{m,t}$ is the market return, and SMB_t represents the difference in returns of a diversified portfolio of small stocks and a portfolio of large stocks which is also called the size factor. HML_t is defined as the difference in returns of a portfolio of shares with a high book-to-market ratio and a portfolio of shares with a low book-to-market ratio, RMW_t captures the difference in returns of portfolios with high and low profitability, and CMA_t is the difference in returns between a portfolio of firms with low investments and a portfolio with high investments (Fama & French, 2015). Lastly, ϵ_{it} represents the error term. All relevant factor data are retrieved from the K.-French website (French, 2022). The regression results lead to the coefficients presented in Table 1.

Next, abnormal returns of stock i at time t are estimated as:

$$AR_{i,t} = r_{i,t} - r_{f,t} - [\hat{\alpha}_i + \hat{\beta}_i(r_{m,t} - r_{f,t}) + \hat{\beta}_iSMB_t + \hat{\beta}_iHML_t + \hat{\beta}_iRMW_t + \hat{\beta}_iCMA_t]$$

As in previous literature, we utilize an estimation window including 255 trading days, starting 300 days before and ending 45 days prior to the event (Chatterjee et al., 2001; Y. Zhang

Table 2 Exemplary announcements for different measures defined

Measure	Example
Consortia	“Accenture Collaborates with Mastercard, Amazon Web Services, Everledger, and Mercy Corps to Increase the Sustainability and Fairness of Global Supply Chains.”
Single firm	“AWS Announces General Availability of Amazon Managed Blockchain.”
Initial announcement	“Maersk and IBM Introduce TradeLens Blockchain Shipping Solution.”
Subsequent announcement	“TradeLens blockchain-enabled digital shipping platform continues expansion with addition of major ocean carriers Hapag-Lloyd and Ocean Network Express.”
IT firm	“SAP Boosts Blockchain Integration and Customer Flexibility, Launches New Industry Consortia within SAP Blockchain Consortium Program.”
Non-IT firm	“Merck Granted U.S. Patent for novel combination of Artificial Intelligence and Blockchain Technology.”

et al., 2022). Then, we sum the event specific ARs to receive cumulative ARs (CAR) during the event window t_1 and t_2 :

$$CAR_{i,t_1;t_2} = \sum_{t_1}^{t_2} AR_{i,t},$$

We also follow previous research and use event windows of 2 days $[-1; +1]$, 4 days $[-2; +2]$, and 2 weeks $[-5; +5]$ around the event. Lastly, we calculate cumulative average ARs:

$$CAAR_{i,t_1;t_2} = \frac{1}{n} \sum_1^n CAR_{i,t_1;t_2},$$

where n captures the number of events.

Statistical significance for the results of the event study is verified through two types of tests. First, we apply the Patell Z-test as well as the standardized cross-sectional tests as parametric tests. The Corrado rank test and generalized sign test represent our non-parametric tests to assure statistical significance of CAARs in cases where the sample is not normally distributed. We also perform Welch t -tests to determine whether the CAARs of the respective subsamples are significantly different from each other.

In the next step, we perform a multivariate regression analysis in the form of ordinary-least-squares (OLS) regressions to examine the impact of the measures defined in the subsampling analysis on the CARs of the overall data set. Moreover, it serves as a robustness check for the univariate analysis. The calculations were performed with the statistical software “R” with the application of the R-package “EventStudy.”

Measures

We test H1, H2, and H3 via subsampling analyses and via a multivariate regression and therefore rely on various measure definitions. We use those measures to split our dataset into two separate groups for each of the hypotheses tested.

We also apply these measures for the risk analysis of H5 and H6.

We define *consortia and partnership announcements* as all news that either mention the joining or involvement of a consortia or the involvement of two or more firms in a blockchain project. *Single announcements* are all blockchain news that only mention a single company.

Secondly, we applied four-digit SIC codes and defined all companies from the computer programming, data processing, and other computer-related services as *tech and IT companies*. Moreover, we also included all companies falling into the SIC category of industrial and commercial machinery and computer equipment in the category of *tech and IT companies*. All other firms were defined as *non-tech companies*.

Lastly, *first blockchain announcements* are all initial corporate blockchain news regarding a specific project. If there is at least one announcement belonging to a certain blockchain initiative, then all following announcements for the same project are defined as *subsequent blockchain announcements*. For instance, when there exist four consecutive announcements from a firm regarding one specific blockchain project, announcements two, three, and four are labelled as *subsequent blockchain announcements*.

Table 2 shows exemplary announcements for each type of measure defined. Additional exemplary announcements can be found in the appendix.

Estimation method — Risk modelling

Whereas systematic risk can also be approached from the cost of debt-perspective, our study focuses on the cost of equity component. It represents the firm’s costs — or the amount that equity holders demand — to compensate for the systematic risk and is generally calculated by an interest rate surcharge on the risk-free rate (Hinz et al., 2015). The mathematical foundation for calculating the cost of equity has

been described via the capital asset pricing model (CAPM) (Sharpe, 1964):

$$r_i = r_f + \beta_i(r_m - r_f)$$

In this model, r_f represents the risk-free rate, r_m is the market return, and β_i is the systematic risk of company i . The beta factor also shows how sensitive an individual stock reacts to movements in market returns. We assume that a change in the systematic risk of a company is shown by significant changes in its beta factor (Hinz et al., 2015). We also follow the approach of (Hinz et al., 2015) and calculate the individual beta factors via the following formula:

$$\beta_i = \frac{\text{cov}(r_i, r_m)}{\text{var}(r_m)}$$

It is the ratio of the covariance of individual stock returns r_i with the market return r_m and the variance of the market return r_m .

We calculate the beta factors on a 1-year rolling basis for each company of our data sample by holding the covariance as well as the variance component constant over a period of 200 trading days. In the next step, we calculate the mean as well as the median beta factor of the period 120 days prior and 120 days after the respective event. We also control for the bias through the blockchain announcement itself by excluding the period of 21 days around the announcement from the calculation of mean and median values (Hinz et al., 2015). This implies that we are only able to analyse the period between 1 January 2014 and 31 December 2020, as a total of 320 trading days is not examinable due to the 1-year beta-calculation window (200 trading days) and the 120-day window for mean-estimations. Thus, the final dataset for the risk analysis consists of a total of 424 events. For testing H5 and H6, we also calculate pre- and post-beta factors for each subsample. We then determine the pre-post deltas and calculate via a Welch t -test and a Wilcoxon Rank-Sum test (z -test) whether they are statistically significantly different from each other.

Data

We collected corporate blockchain announcements via the database Nexis Uni and Google search. Hereby, we followed previous literature and utilize a predefined set of companies (Borah & Tellis, 2014; Klöckner et al., 2022). Hereby, we selected the firms from the S&P500 as well as the STOXX Europe 600 Index as all their constituents are large sized companies. This indicates a high trading volume which is a necessary precondition for the methodology applied because lower trading volumes of firms would not support the efficient market assumption (Klöckner et al., 2022). We chose to focus on announcements between 1 January 2014 and 30 June 2022, as public attention on the topic of blockchain has not been significant prior to 2014 (Cahill

et al., 2020). As in prior IS market value research (Barua & Mani, 2018; Teo et al., 2016), we utilize Nexis Uni for searching news from the outlets *PR Newswire* and *Business Wire*. Beyond that, we also explored the investor-relations news websites of the companies included in our sample firm pool for blockchain announcements published directly by the firms. The queries used during the first search step on Nexis Uni were *blockchain* or *cryptocurrency* in combination with each company name of the S&P500 and STOXX Europe 600.

Our initial search concluded with 15,924 announcements. We excluded unrelated articles that were not related to a blockchain specific announcement of the firm. Among others, we focused on articles that included statements or updates of blockchain initiatives, collaboration intents, joining a blockchain collaboration, mergers and acquisitions (M&As) of blockchain firms, cryptocurrency payment and NFT offerings, or the publishing of blockchain-related patents. Moreover, we excluded forecast news, reports from analysts, or general market predictions (Klöckner et al., 2022) which made up the major part of our initial data sample. This exclusion step left us with a sample of 765 announcements. In the next step, we removed duplicates and excluded announcements that might introduce confounding factors, such as financial earnings disclosures, executive changes, or M&A announcements of non-blockchain firms that occurred within the three-day event window (Konchitchki & O’Leary, 2011). Lastly, we needed to eliminate four announcements where no sufficient data was available during the estimation or event window. This resulted in a final sample which included 681 announcements from 277 different organizations. Table 23 highlights examples of the announcement sample. During our search, we did not encounter any “negative” announcements that mentioned the rejection or failing of a specific blockchain project. If we observed varying announcement dates from different sources regarding the same blockchain announcement, we chose the earlier date (Wilcox et al., 2001), and announcements published on non-trading dates were moved to the next possible trading day (MacKinlay, 1997). In the last step, we collected daily stock price data as well as daily MSCI World index data from Refinitiv Workspace. We use the index data for the calculation of market returns $r_{m,t}$. Fama–French Factors as well as the risk-free rate are retrieved from the Dartmouth college database (French, 2022). Table 3 provides a summary of the sample, presenting information on announcement years, industry distribution, and country distribution.

Results

Event study

Table 4 shows the results for testing H1 where the dataset is split into consortium- and partnership announcements

Table 3 Sample summary

Country	Freq	Industry	Freq	Year	Freq
USA	338	Financials	221	2022	132
Germany	104	Technology	124	2021	127
France	59	Industrials	100	2020	83
UK	44	Consumer discretionary	80	2019	131
Netherlands	30	Consumer staples	46	2018	118
Spain	29	Healthcare	24	2017	65
Switzerland	19	Telecommunications	24	2016	21
Italy	13	Utilities	22	2015	3
Sweden	10	Basic materials	20	2014	1
Austria	9	Energy	14		
Belgium	5	Real estate	6		
Denmark	5				
Finland	5				
Ireland	3				
Norway	3				
Isle of Man	2				
Luxemburg	1				
Poland	1				
Portugal	1				

and single-firm announcements. Event study results for the consortium and partnership panel show overall positive significant results. The 3-day event window CAAR of 0.47% is significant for both parametric tests at the 5% level, and the 5-day event window CAAR of 0.78% shows significance at the 1% level for the Patell, standardized cross-sectional, and the generalized sign tests. The single-firm analysis exhibits no significant results with CAARs of 0.14% (3-day window), 0.21% (5-day window), and 0.00% (2-week window). Subsequent Welch *t*-tests show that the CAAR delta for the 5-day event window is statistically significant at the 5% level.

Table 5 shows Panel A2 with the event study results for the subsamples of tech firms and non-tech firms. For the three-day event window, we do not find significant returns even though the CAAR is positive at 0.22%. For the 5-day event window, results become significant for both parametric tests at the 5% level with a CAAR of 0.65%. The CAAR of 0.93% for the 2-week event window remains significant at the 10% level for all tests except the Corrado test. Panel B2, which shows results for our sample of non-tech firms, exhibits no statistical significance for the 3- and 5-day event windows. Nevertheless, we find statistical significance for the negative CAAR of −0.43% for the 2-week event window. The Patell test is significant at the 1% level, the standardized cross-sectional test at the 5% level, and the Corrado test at the 10% level. Only the generalized sign test shows no significance for either event window when analysing the non-tech firm data sample. The CAAR deltas of the 5- and 2-week event window are statistically significant at the 5% and 1% levels.

Table 6 presents the results of the analysis for H3. In Panel A3, CAARs for the first announcement dataset can be observed. None of the CAARs for the three event windows are statistically significant. On the other hand, CAARs for Panel B3, representing the subsample of subsequent blockchain announcements, are partially significant. Whereas results for the 3-day event window with a CAAR of 0.42% remain insignificant, the CAAR of 0.94% at the 5-day event window is significant for both parametric tests at the 5% level. Moreover, it shows significance for the generalized sign test at the 1% level. Statistical significance becomes weaker again for the 2-week event window (CAAR=0.08%) with only the generalized sign test being significant at the 10% level. Consequently, the CAAR delta of the 5-day (−2; +2) event window is statistically significant at the 5% level.

Table 4 Consortium- and single-firm subsampling results

Event window	CAAR	Patell (Z)	Adjusted StdCSect (Z)	Corrado (Z)	Generalized Sign (Z)	Observations
Panel A1: Consortium/partnership						
[−1; +1]	0.47%	2.57**	2.46**	0.53	1.60	314
[−2; +2]	0.78%	3.08***	2.89***	0.95	2.97***	314
[−5; +5]	0.43%	0.64	1.01	1.34	0.26	314
Panel B1: Single firm						
[−1; +1]	0.14%	1.13	1.01	1.34	0.26	367
[−2; +2]	0.21%	1.11	1.11	1.05	0.58	367
[−5; +5]	0.00%	−0.53	−0.45	−0.93	0.69	367
Event window	Delta CAAR	Welch <i>t</i> -test				
[−1; +1]	0.33%	1.51				
[−2; +2]	0.57%	2.19**				
[−5; +5]	0.43%	0.92				

p* < 10%; *p* < 5%; ****p* < 1%

Table 5 Tech- and non-tech firm subsampling results

Event window	CAAR	Patell (Z)	Adjusted StdCSect (Z)	Corrado (Z)	Generalized Sign (Z)	Observations
Panel A2: Tech firms						
[− 1; + 1]	0.22%	1.24	1.19	0.46	0.24	155
[− 2; + 2]	0.65%	2.11**	2.01**	1.48	1.36	155
[− 5; + 5]	0.93%	1.82*	1.96**	0.68	1.69*	155
Panel B2: Non-Tech Firms						
[− 1; + 1]	− 0.14%	− 1.18	− 0.93	− 1.1	− 1.04	526
[− 2; + 2]	− 0.09%	− 0.87	− 0.81	− 0.87	0.70	526
[− 5; + 5]	− 0.43%	− 2.60***	− 2.16**	− 1.78*	0.61	526
Event window	Delta CAAR	Welch <i>t</i> -test				
[− 1; + 1]	0.36%	1.28				
[− 2; + 2]	0.74%	2.04**				
[− 5; + 5]	1.36%	2.61***				

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Table 6 First and subsequent announcement subsampling results

Event window	CAAR	Patell (Z)	Adjusted StdCSect (Z)	Corrado (Z)	Generalized Sign (Z)	Observations
Panel A3: First announcement						
[− 1; + 1]	− 0.07%	− 0.68	− 0.50	− 0.82	− 0.49	597
[− 2; + 2]	0.02%	− 0.10	− 0.10	− 0.26	0.25	597
[− 5; + 5]	− 0.15%	− 1.59	− 1.30	− 1.12	0.66	597
Panel B3: Subsequent announcement						
[− 1; + 1]	0.42%	1.37	1.35	0.91	1.00	84
[− 2; + 2]	0.94%	1.96**	2.10**	1.40	2.78***	84
[− 5; + 5]	0.08%	− 0.19	− 0.23	0.47	1.89*	84
Event window	Delta CAAR	Welch <i>t</i> -Test				
[− 1; + 1]	0.49%	− 1.47				
[− 2; + 2]	0.92%	− 2.21**				
[− 5; + 5]	0.23%	− 0.40				

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Multivariate regression analysis

We performed a multivariate regression analysis to subsequently examine the magnitude of the effects observed in the univariate event study. The following models describes the multivariate regression which we executed in the form of OLS regressions:

$$CAR_i = \alpha_i + \beta_1 \text{Consortium}_i + \beta_2 \text{FirstAnnouncement}_i + \beta_3 \text{TechFirm}_i + \beta_4 \text{ROE}_i + \beta_5 \text{FreeFloat}_i +$$

$$\beta_6 \frac{\text{Cash}}{\text{Assets}_i} + \beta_7 \frac{\text{Debt}}{\text{Equity}_i} + \beta_8 \text{EBIT}_i + \beta_9 \text{NetIncome}_i + \beta_{10} \text{Firm}_i + \beta_{11} \text{Time}_i + \epsilon_i$$

We performed our analysis based on the 5-day (− 2; + 2) event window CARs, as the most significant results from

the subsampling analysis can be found in this event window. Consortium, FirstAnnouncement, and TechFirm are dummy variables equalling one if (1) the respective announcement mentions the involvement of other firms in the blockchain project, (2) is an initial announcement of a specific blockchain initiative, or (3) is an announcement by a tech-firm, and else equal zero. As it is necessary to control for firm specific financial and operating performance, we relied on various control variables already applied in previous research. Previous research recommends to focus on valuation, profitability, and leverage metrics; thus, we included the indicators return on equity (ROE), free float, cash to assets, debt to equity, earnings before interest and taxes (EBIT), and net income (Bassen et al., 2019). These indicators were retrieved from the Refinitiv Workspace database. As some values were unavailable for the time of the announcement, our sample for the multivariate regression was reduced to 670 announcements. For robustness

Table 7 Impact of consortium-, initial-, and tech-firm blockchain announcements on abnormal returns

Parameter	Model 1	Model 2	Model 3	Model 4
	Estimate	Estimate	Estimate	Estimate
Consortium	-	0.007 (1.75*)	0.008 (2.04**)	0.008 (1.95*)
First announcement	-0.014 (-2.74***)	-	-0.015 (-2.98***)	-0.015 (-2.87***)
Tech firm	0.007 (1.36)	0.008 (1.46)	-	0.007 (1.21)
ROE	0.006 (1.16)	0.007 (1.30)	0.006 (1.05)	0.006 (1.13)
Free float	0.009 (0.15)	0.018 (0.31)	0.002 (0.03)	0.008 (0.14)
Cash to assets	0.092 (1.06)	0.093 (1.07)	0.089 (1.03)	0.088 (1.02)
Debt to equity	-0.002 (-1.59)	-0.001 (-1.46)	-0.001 (-1.40)	-0.001 (-1.42)
EBIT	0.043 (0.69)	0.034 (0.53)	0.042 (0.67)	0.044 (0.71)
Net income	-0.086 (-1.08)	-0.074 (-0.92)	-0.064 (-0.81)	-0.074 (-0.93)
Intercept	0.060 (0.99)	0.031 (0.52)	0.054 (0.89)	0.050 (0.83)
Firm-fixed	Yes	Yes	Yes	Yes
Time-fixed	Yes	Yes	Yes	Yes
Adjusted R^2	73.12%	72.80%	73.28%	73.32%
F statistic (p-value)	7.126 (0.000)	7.029 (0.000)	7.179 (0.000)	7.169 (0.000)

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

reasons, we calculated four different models with different variations of the dummy variables *tech-firm*, *first announcement*, and *consortium or partnership announcement*. We also included firm-fixed as well as time-fixed effects.

Table 7 shows the results of the multivariate regression analysis. All four models demonstrate statistically significant results for the positive impact of consortium-related announcements on CARs. Thus, the results for testing H1 are confirmed. On the other hand, results for the dummy variable *tech-firm* remain insignificant across all four models. Hence, the results of the univariate analysis for H2 cannot be confirmed. Lastly, we observe a significant negative impact of initial blockchain announcements on the respective CARs across all models. Therefore, we can confirm the univariate findings for testing H3.

Risk analysis

Table 8 presents the results of the systematic risk analysis. For each announcement, we calculated mean beta factors for the 120-day period prior to the announcement and 120 days after the announcement which leads to individual pre- and post-beta factors. Then, we calculated the mean as well as the median value of these factors. The mean post-beta factor is 1.017 and thus slightly higher than the pre-beta factor of 1.013. Nevertheless, a two-sample and two-sided *t*-test indicates that they are not significantly different from each other. The median post-beta factor of 1.025 is also higher than the median pre-beta factor of 1.005. A Wilcoxon signed rank test (*z*-test) shows that this result is also not statistically significant. Therefore, H4 is not supported.

Table 9 presents the results of testing H5. For initial announcements, the post-average beta (1.027) is slightly higher than the pre-average beta (1.021), but this difference is statistically insignificant. This also applies to the analysis of the pre-median beta value of 1.004 and post-median beta value of 1.025. Results for the analysis of following blockchain announcements show that the post-average beta (0.948) is smaller than the pre-average beta (0.961). On the other hand, the post-median beta of 1.021 is higher than the pre-median beta of 1.006. Both deltas are statistically insignificant. Therefore, the difference between the mean/median delta of the initial announcement sample and the mean/median delta of the following announcement sample is also not significantly different from zero. Thus, we cannot confirm H5.

In Table 10, results for testing H6 are shown. For the subsample with consortium or partnership-related blockchain announcements, we observe an insignificantly higher post-average beta (1.013) than the pre-average beta (1.007). The post-median beta value of 1.025 for this dataset is also higher than the pre-median beta value of 1.004, but the delta is also statistically insignificant. Results for single-company

Table 8 Changes in systematic risk through blockchain announcements

	Pre	Post	Delta	<i>t</i> -value/ <i>z</i> -value	Observations
Total sample Mean	1.013	1.017	0.004	-0.23	424
Total sample Median	1.005	1.025	0.020	-0.72	424

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Table 9 Differences in systematic risk changes between initial and subsequent announcements

	Pre	Post	Delta	<i>t</i> -value/ <i>z</i> -value	Observations
First announcements mean	1.021	1.027	0.007	−0.24	371
First announcements median	1.004	1.025	0.021	−0.97	371
Following announcements mean	0.961	0.948	−0.013	0.19	53
Following announcements median	1.006	1.021	0.015	−0.70	53
	Delta first	Delta following	<i>t</i> -value / <i>z</i> -value		
Mean	0.007	−0.013	0.85		
Median	0.021	0.015	1.14		

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Table 10 Differences in systematic risk changes between single firm- and consortium-related announcements

	Pre	Post	Delta	<i>t</i> -value/ <i>z</i> -value	Observations
Consortium announcements mean	1.007	1.013	0.005	−0.16	243
Consortium announcements median	1.004	1.025	0.021	−0.63	243
Single announcements mean	1.021	1.024	0.003	−0.06	181
Single announcements median	1.005	1.020	0.015	−0.17	181
%	Delta consortium	Delta single	<i>t</i> -value/ <i>z</i> -value		
Mean	0.005	0.003	0.17		
Median	0.021	0.015	0.24		

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

announcements show a post-average beta of 1.024 and a pre-average beta of 1.021. The delta of 0.003 is not significantly different from zero. The median beta delta is 0.015 and non-significant with a pre-median beta of 1.005 and a post-median beta of 1.020. Consequently, the last part of Table 10 shows that both mean and median deltas of the consortium-announcement subsample and the solo-announcement subsample are not significantly different from each other. Therefore, H6 is not supported.

For robustness reasons, we performed additional calculations by considering varying estimation windows for the mean-beta calculations. We specifically focus on smaller estimation windows (100 days and 20 days), as the time-range of 240 days could lead to the dissipation of significant results. Tables 17 to 22 in the appendix show the outcomes of the supplementary calculations. As Table 17 and Table 18 indicate, we neither observe a statistically significant different risk factor for the 100-day nor for the 20-day estimation window. The same applies to differences in market risk changes between initial and subsequent announcements, as presented in Table 19 and Table 20 where the difference in betas is not significant for both alternative estimation windows. Finally, Table 21 and Table 22 show that also the robustness checks conducted to examine potential differences in changes to systematic risk between announcements related to single firms and those related to consortia do not yield significant differences. This should indicate that

our results are not impacted by the choice of the estimation window.

Post hoc analyses

Our study considers blockchain announcements from firms made between January 2014 and June 2022. While we deem it important to analyse a large enough time frame to include a significant number of blockchain news, this design choice neglects the potential impact of different market conditions. Attention on blockchain technology is highly correlated with the state of the cryptocurrency market (Cahill et al., 2020). This could have a potential significant impact on the market reactions measured (Cheng et al., 2019). Consequently, we deem it important to also consider the aspect of timing of the announcements in our analysis. Therefore, we follow the approach of Cheng et al. (2019) by measuring the current stage of public blockchain attention via the *Google Search Index*. This Google trend analysis using the terms *blockchain* and *cryptocurrency* indicates a significant surge in interest, as depicted in Fig. 1, notably during two distinct periods: between October 2017 and March 2018, and again between October 2020 and January 2022.

In order to be able to analyse the impact of blockchain announcement timings, we consider all announcements made during a time where the Google Search Index depicts a value of over 50 as news made during a *hot market*. In the

Fig. 1 Google Search Index for “blockchain” and “cryptocurrencies.”

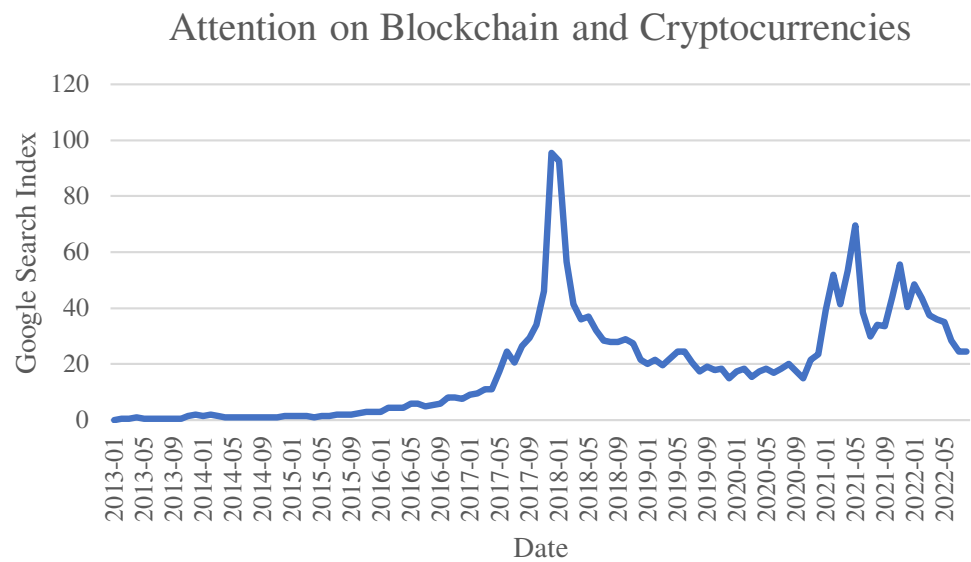


Table 11 Multivariate regression results with inclusion of “Hot Market” variable

Parameter	Model 1	Model 2	Model 3	Model 4
	Estimate	Estimate	Estimate	Estimate
Consortium	-	0.007 (1.66*)	0.008 (1.95*)	0.008 (1.86*)
First announcement	-0.014 (-2.71***)	-	-0.015 (-2.95***)	-0.015 (-2.84***)
Tech firm	0.007 (1.27)	0.008 (1.38)	-	0.006 (1.14)
Hot market	0.010 (1.75*)	0.010 (1.70*)	0.010 (1.71*)	0.010 (1.66*)
ROE	0.006 (1.14)	0.007 (1.29)	0.005 (1.04)	0.006 (1.12)
Free float	0.018 (0.31)	0.027 (0.46)	0.002 (0.03)	0.017 (0.30)
Cash to assets	0.089 (1.03)	0.091 (1.05)	0.087 (1.01)	0.086 (1.00)
Debt to equity	-0.002 (-1.60)	-0.001 (-1.47)	-0.001 (-1.41)	-0.001 (-1.43)
EBIT	0.043 (0.69)	0.034 (0.54)	0.042 (0.67)	0.044 (0.71)
Net income	-0.089 (-1.12)	-0.077 (-0.96)	-0.068 (-0.86)	-0.077 (-0.97)
Intercept	0.019 (0.32)	-0.002 (-0.03)	0.017 (0.28)	0.014 (0.23)
Firm-fixed	Yes	Yes	Yes	Yes
Time-fixed	Yes	Yes	Yes	Yes
Adjusted R^2	73.27%	72.94%	73.42%	73.44%
F statistic (p-value)	7.152 (0.000)	7.051 (0.000)	7.202 (0.000)	7.188 (0.000)

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

next step, we include *hot market* as an additional dummy variable in the multivariate regression analysis. Table 11 shows the respective results of the regression performed. The variable *hot market* is positive and significant across all four model variations. This indicates that stock market reactions to our subsamples of blockchain announcements analysed are higher in times of increased public blockchain attention.

Next, we perform an additional regression analysis with an alternative “Hot Market” variable by following the approach of Beinke et al. (2021) who apply the market

capitalization of the Top 30 cryptocurrencies (CCI30)⁴ as a measure for the degree of attention on the topics of blockchain. Hereby, we first determine the market capitalization means of the 3 days surrounding the respective events and compare those to the total CCI30 median market capitalization of the time period 1 January 2015 to 30 June 2022. Consequently, *Hot Market_alternative* equals 1 if the 3-day-mean is higher than the median, and 0 otherwise (Beinke et al., 2021). Table 12 presents the results of this regression analysis. We observe no statistical significance for the

⁴ <https://cci30.com/>

Table 12 Multivariate regression results with inclusion of an alternative “Hot Market” variable

Parameter	Model 1 Estimate	Model 2 Estimate	Model 3 Estimate	Model 4 Estimate
Consortium	-	0.007 (1.75*)	0.008 (2.04*)	0.008 (1.95*)
First announcement	-0.014 (-2.74***)	-	-0.015 (-2.99***)	-0.015 (-2.87***)
Tech firm	0.007 (1.36)	0.008 (1.45)	-	0.007 (1.21)
Hot Market_alternative	-0.001 (-0.14)	0.000 (0.01)	-0.001 (-0.17)	-0.001 (-0.17)
ROE	0.006 (1.15)	0.007 (1.30)	0.006 (1.05)	0.006 (1.13)
Free float	0.008 (0.14)	0.018 (0.31)	0.001 (0.02)	0.008 (0.14)
Cash to assets	0.092 (1.06)	0.093 (1.07)	0.090 (1.03)	0.089 (1.02)
Debt to equity	-0.002 (-1.60)	-0.001 (-1.46)	-0.001 (-1.41)	-0.001 (-1.43)
EBIT	0.043 (0.69)	0.034 (0.53)	0.041 (0.66)	0.044 (0.70)
Net income	-0.086 (-1.07)	-0.074 (-0.92)	-0.063 (-0.80)	-0.074 (-0.92)
Intercept	0.034 (0.56)	0.011 (0.18)	0.031 (0.52)	0.028 (0.46)
Firm-fixed	Yes	Yes	Yes	Yes
Time-fixed	Yes	Yes	Yes	Yes
Adjusted R^2	73.05%	72.73%	73.21%	73.25%
F statistic (p-value)	7.08 (0.000)	6.99 (0.000)	7.14 (0.000)	7.13 (0.000)

* $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

Hot Market_alternative variable in none of the four model specifications. The statistical significances of the remaining variables remain robust to the inclusion of this variable.

Moreover, our initial analyses do not consider specific blockchain project characteristics. The range of blockchain announcements that companies make varies widely and reaches from publishing NFTs⁵ to introducing operational blockchain systems.⁶ Overall, we recognize 29 different types of blockchain announcements that firms make. This makes it necessary to also control for the impact of distinct types of blockchain projects in our regression analysis. We consider this aspect in two ways. First, we introduce the type of blockchain project as an additional categorical fixed-effect variable in the multivariate regression analysis. Such fixed effects capture the unique characteristics of each group or entity, allowing the analysis to account for differences between them. It enables the analysis to isolate the different explanatory measures, in our case the dummy variables for *tech-firm*, *first announcement*, and *consortium or partnership announcement*, while accounting for the inherent differences between the diverse types of blockchain announcements. The blockchain project categorization is the result of a coding process of two researchers where the first person executed the categorization which was then independently

reviewed by the second researcher. Different categorization opinions were then discussed until a consensus was found. Table 13 depicts the results of the multivariate regressions including the project-fixed effects, and Table 14 highlights the total 29 categories. The results show that the significance levels of the variables tested are robust to the inclusion of project-fixed effects.

Second, we assume that blockchain projects that have the goal to support or enhance firm-specific operational processes could induce different market reactions than purely marketing-related blockchain announcements or vague statements about the technology (Cheng et al., 2019). Hence, we categorized all types of blockchain projects announced into either supporting individual core-processes or competencies or news that are weak or unrelated to the actual business processes of a firm. For instance, we categorize offering NFTs or only declaring a general interest in blockchain as *non-business-related*, whereas a blockchain system for reducing counterfeiting or enhancing financial transactions could be *business-related*. For the categorization, two independent coders conducted a comprehensive evaluation of each announcement. This coding process resulted in an agreement rate exceeding 84%. In instances of disagreement, the coders deliberated on the announcement until reaching a consensus. Table 14 provides an overview of the different types of blockchain announcements made with the categorization into either *business-related* or *non-business-related*.

Next, we include this measure as an additional variable dummy variable in the multivariate regressions. Table 15 shows the results of this examination. The coefficient is statistically insignificant across all models. Consequently, our

⁵ <https://www.coca-colacompany.com/news/coca-cola-nft-auction-fetches-more-than-575000#>

⁶ <https://newsroom.ibm.com/2017-03-05-Maersk-and-IBM-Unveil-First-Industry-Wide-Cross-Border-Supply-Chain-Solution-on-Blockchain>

Table 13 Multivariate regression results with inclusion of project-fixed effects

Parameter	Model 1 Estimate	Model 2 Estimate	Model 3 Estimate	Model 4 Estimate
Consortium	-	0.010 (2.14***)	0.011 (2.38**)	0.011 (2.31**)
First announcement	-0.012 (-2.28**)	-	-0.014 (-2.56**)	-0.013 (-2.45**)
Tech firm	0.006 (1.11)	0.007 (1.20)	-	0.005 (0.95)
Hot market	0.010 (1.70*)	0.010 (1.66*)	0.010 (1.62)	0.010 (1.58)
ROE	0.006 (1.14)	0.006 (1.17)	0.005 (0.97)	0.006 (1.03)
Free float	0.005 (0.08)	0.013 (0.22)	-0.003 (0.06)	0.003 (0.05)
Cash to assets	0.141 (1.55)	0.132 (1.45)	0.131 (1.45)	0.128 (1.42)
Debt to equity	-0.002 (-1.83*)	-0.002 (-1.75*)	-0.002 (-1.65)	-0.002 (-1.67*)
EBIT	0.029 (0.44)	0.022 (0.33)	0.025 (0.39)	0.029 (0.43)
Net income	-0.078 (-1.12)	-0.068 (-0.81)	-0.056 (-0.68)	-0.066 (-0.79)
Intercept	0.036 (0.52)	-0.022 (-0.03)	0.039 (0.28)	0.037 (0.54)
Project-fixed	Yes	Yes	Yes	Yes
Firm-fixed	Yes	Yes	Yes	Yes
Time-fixed	Yes	Yes	Yes	Yes
Adjusted R^2	73.06%	73.01%	73.41%	73.40%
F statistic (p -value)	6.52 (0.000)	6.50 (0.000)	6.61 (0.000)	6.60 (0.000)

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Table 14 Types of blockchain announcements, categorized into "business-" and "non-business related"

Business-related	Non-business-related
Collaboration for blockchain project	Blockchain accelerator program
Cryptocurrency coverage	Award for blockchain project
Cryptocurrency-related financial product	Blockchain university chair sponsoring
Offering of a new blockchain service	Strategic/unspecific blockchain initiative
Blockchain patents	Interest in blockchain
Providing resources for blockchain infrastructure	Strategic investment/M&A
Usage of blockchain for enhancing operational efficiency	Joining a blockchain collaboration
Usage of blockchain against fraud	New staff for crypto/blockchain units
Usage of blockchain for certification	NFTs
Usage of blockchain for data management	Enabling payments with cryptocurrencies
Usage of blockchain for decentralized identities	General statement on blockchain
Usage of blockchain for financial transactions	Starting a strategic partnership
Usage of blockchain for insurance services	Usage of BC for voting
Usage of blockchain for traceability	Initial coin offerings (ICOs)
Building proprietary BC infrastructure	

original results are not altered when also considering the business-relatedness of the project.

Lastly, our initial analysis considering industry-specific effects only differentiates between IT-and non-IT firms. Nevertheless, also firms from other industries such as the financial sector might benefit significantly from introducing blockchain systems to their business processes. Especially banks can utilize blockchain for enhancing and automating various financial transaction processes (White, 2017), but also industrial firms explore the technology with regard to use cases such as improving traceability processes (Hastig

& Sodhi, 2020) or enabling environmental-, social-, and governance-related processes like enabling carbon emission tracking (Sabeti et al., 2019). Consequently, this raises the question of potential *industry-specific* market reactions. Therefore, we performed an additional set of event studies where we clustered the announcements made according to the Global Industry Classification Standard (GICS). Table 16 presents the results of the industry-specific analyses. The outcomes reveal that corporations especially from the financial-, healthcare-, and technology-sector benefit in terms of significant positive stock market reactions.

Table 15 Multivariate regression results with inclusion of variable “business-related.”

Parameter	Model 1 Estimate	Model 2 Estimate	Model 3 Estimate	Model 4 Estimate
Consortium	-	0.007 (1.65*)	0.008 (1.95*)	0.008 (1.86*)
First announcement	-0.014 (-2.70***)	-	-0.015 (-2.94***)	-0.015 (-2.83***)
Tech firm	0.007 (1.27)	0.008 (1.38)	-	0.006 (1.14)
Hot market	0.010 (1.75*)	0.010 (1.70*)	0.010 (1.71*)	0.010 (1.66*)
Business-related	0.001 (0.09)	0.001 (0.21)	0.000 (0.01)	0.000 (0.02)
ROE	0.006 (1.13)	0.007 (1.26)	0.005 (1.04)	0.006 (1.11)
Free float	0.019 (0.31)	0.028 (0.47)	0.011 (0.19)	0.018 (0.30)
Cash to assets	0.089 (1.03)	0.091 (1.04)	0.087 (1.01)	0.086 (1.00)
Debt to equity	-0.002 (-1.60)	-0.001 (-1.48)	-0.001 (-1.41)	-0.001 (-1.43)
EBIT	0.044 (0.70)	0.035 (0.55)	0.042 (0.67)	0.044 (0.71)
Net income	-0.089 (-1.12)	-0.078 (-0.97)	-0.068 (-0.85)	-0.077 (-0.97)
Intercept	0.019 (0.31)	-0.003 (-0.05)	0.017 (0.27)	0.014 (0.22)
Firm-fixed	Yes	Yes	Yes	Yes
Time-fixed	Yes	Yes	Yes	Yes
Adjusted R^2	73.19%	72.87%	73.35%	73.37%
F statistic (p -value)	7.11 (0.000)	7.01 (0.000)	7.16 (0.000)	7.14 (0.000)

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

Discussion

We utilized an international dataset of blockchain announcements to analyse the impact of various mediating factors on stock market value and the impact of blockchain news on market risk. Hereby, we initially performed three different subsampling analyses. Event study results of the first analysis indicate that shareholders value blockchain announcements referring to a consortium or partner-firm more than single-firm blockchain statements. The multivariate regression analysis also confirms this finding. The results suggest that investors could have more confidence in the value added through blockchain if firms combine resources as well as IT capabilities with other companies when approaching blockchain use cases. Shareholders appear to be able to recognize that a blockchain system provides more benefit in an inter-organizational setting than projects managed by one company alone. Secondly, we are partially able to show that the stock market differs in its reactions to blockchain news by tech- and non-tech companies. Some investors could be aware that tech-heavy organizations should possess a greater range of resources and capabilities to be able to successfully finish a blockchain initiative. Even though the results of the multivariate analysis cannot confidently be declared as significant, the subsampling analysis indicates that the stock market in part also recognizes that blockchain technology is especially designed for issues heavily present in the tech industry, first and foremost data protection and data privacy issues (Zhang et al., 2022). Thirdly, we find partially significant confirmation in the event study as well as fully significant confirmation in the regression analysis for

the hypothesis that initial blockchain announcements exhibit lower abnormal stock market returns than subsequent blockchain news. This validates the assumption that shareholders perceive the first news regarding a new blockchain project as especially risky. Moreover, it confirms the observation made in practice that most of the blockchain projects by companies fail (Disparte, 2019), as our data sample possesses far less subsequent announcements than initial announcements. Subsequent announcements show significant positive abnormal returns. This shows that investors might value the effort as well as the increasing capabilities and resources committed to the continuation and further development of a blockchain project.

Further analyses of industry-specific impacts reveal that beyond tech-firms, companies from the financial- and the healthcare-sector benefit significantly from blockchain announcements. In terms of potential use cases, the financial sector stands out as one of the most prominent and most researched area for potential blockchain applications. Therefore, various blockchain business cases such as enhancing payment and lending processes have been shown to enhance the business and market value of blockchain technology (Rogalski & Schiereck, 2024). Additionally, research on healthcare-related blockchain initiatives indicates that the amount of use cases unveiled is increasing rapidly and that practitioners in this field consider this new technology to be helpful for reducing operational costs and enhancing the coordination of patient information between different parties (Attaran, 2020). Our results indicate that shareholders appear to share this opinion and might see more potentials to be unveiled in the future. On the other hand, our findings

Table 16 Event study results with industry differentiation

Event window	CAAR	Patell (Z)	Adjusted StdCSect (Z)	Corrado (Z)	Generalized Sign (Z)	Observations
Panel 1: Basic materials						
[− 1; + 1]	− 0.09%	− 0.00	− 0.08	0.06	1.24	20
[− 2; + 2]	− 0.07%	− 0.21	− 0.24	0.03	0.27	20
[− 5; + 5]	− 0.28%	− 0.74	− 0.61	0.26	− 0.70	20
Panel 2: Consumer discretionary						
[− 1; + 1]	0.02%	0.39	0.44	− 0.76	0.24	80
[− 2; + 2]	− 0.05%	0.19	0.34	− 0.62	0.70	80
[− 5; + 5]	− 0.14%	0.65	0.59	− 0.84	0.24	80
Panel 3: Consumer staples						
[− 1; + 1]	− 0.12%	− 0.74	− 0.64	− 0.70	− 0.40	46
[− 2; + 2]	0.16	− 0.12	0.04	− 0.50	0.80	46
[− 5; + 5]	− 0.18%	− 0.40	− 0.33	− 1.11	0.20	46
Panel 4: Energy						
[− 1; + 1]	2.19%	1.63	1.96**	0.71	1.24	14
[− 2; + 2]	2.64%	1.86*	2.93***	1.01	1.87*	14
[− 5; + 5]	1.23%	0.18	0.13	− 0.14	− 0.03	14
Panel 5: Financials						
[− 1; + 1]	0.49%	2.19**	2.80**	1.06	2.57**	221
[− 2; + 2]	0.52%	1.94*	2.27**	0.50	2.14**	221
[− 5; + 5]	0.25%	0.83	0.74	1.91*	1.28	221
Panel 6: Healthcare						
[− 1; + 1]	1.12%	2.98***	2.04**	1.20	0.27	24
[− 2; + 2]	2.30%	3.71***	2.03**	2.24**	1.58	24
[− 5; + 5]	2.04%	1.24	1.09	1.20	1.58	24
Panel 7: Industrials						
[− 1; + 1]	0.36%	0.76	0.68	− 0.19	0.31	100
[− 2; + 2]	0.33%	0.52	0.34	− 0.32	− 0.11	100
[− 5; + 5]	− 0.25%	− 0.44	− 0.62	− 0.80	− 0.75	100
Panel 8: Real estate						
[− 1; + 1]	− 1.86%	− 1.77*	− 1.12	− 2.14**	− 1.63	6
[− 2; + 2]	− 3.10%	− 2.39**	− 2.92***	− 3.23***	− 1.63	6
[− 5; + 5]	− 5.56%	− 2.97***	− 2.29**	− 4.48***	− 2.45**	6
Panel 9: Technology						
[− 1; + 1]	0.60%	1.67*	2.37**	1.79*	0.95	124
[− 2; + 2]	1.05%	2.73***	3.22***	2.29**	2.20**	124
[− 5; + 5]	1.21%	2.11**	2.63***	1.34	2.62***	124
Panel 10: Telecommunications						
[− 1; + 1]	− 0.29%	− 1.21	− 1.25	− 1.51	− 1.44	24
[− 2; + 2]	0.43%	− 0.64	− 0.56	− 1.16	0.22	24
[− 5; + 5]	1.56%	− 0.11	− 0.03	1.71*	0.64	24
Panel 11: Utilities						
[− 1; + 1]	− 2.13%	− 4.33***	− 3.13***	− 3.20***	− 1.91**	22
[− 2; + 2]	− 4.27%	− 6.12***	− 4.86***	− 4.71***	− 3.22***	22
[− 5; + 5]	− 7.46%	− 7.43***	− 4.60***	− 5.70***	− 3.22***	22

* $p < 10\%$; ** $p < 5\%$; *** $p < 1\%$

on stock market reactions to blockchain news from firms of the real estate and utilities sector suggest a potential negative impact of blockchain announcements on stock market

value. Nonetheless, these results should be considered with caution due to the relatively small sample sizes (real estate $n = 6$; utilities $n = 22$). Our regression analysis including the

business relatedness does not reveal any significant impact of this factor. Hence, market participants might respond indifferently to the specific blockchain project characteristic. This could potentially be attributed to a deeper lack of knowledge regarding the specific differences and nuances of certain blockchain initiatives. Consequently, corporate blockchain activities might be valued on a more general level. As many projects still fail (Disparte, 2019), it might be difficult for outside investors to evaluate the chances of successful implementation and the ultimate realized value a certain initiative might eventually deliver, making differentiations between different blockchain project characteristics more challenging.

The results of all event studies performed indicate no statistically significant results for the 3-day event window which could be deemed as the most relevant event window as it depicts the immediate timeframe surrounding the respective blockchain announcement. Nonetheless, the publishing of certain corporate news can either occur various days later or reach investors several days prior to the public announcement, thereby diminishing the stock market reaction on the actual day of the official announcement by the firm (Schweikl et al., 2022). Furthermore, especially in longer time windows, additional information frequently arises, necessitating processing by market participants and thereby overshadowing the effects induced by the initial event. Therefore, the results not pertaining to the most recent event window should also be considered as relevant.

By utilizing the same dataset of blockchain announcements, we also analyse the effect of this type of corporate news on the systematic risk of companies. By calculating mean and median rolling betas, we first examine the overall data sample and find an insignificant increase for both mean and median rolling betas when comparing the time periods of 120 days before and 120 days after the blockchain announcements. Therefore, the fourth hypothesis is not confirmed. Overall, shareholders do not appear to presume additional market risk when a firm announces a blockchain initiative. Market participants might assume that companies will not risk a significant portion of their resources for exploring a relatively unknown emerging technology. Thus, the impact on the company's systematic risk should also remain irrelevant. Moreover, the dataset indicates that many firms only take initial steps of blockchain exploration and seldom signal a higher degree of commitment to longer-term integration into operational processes. Therefore, the possible impact of a blockchain system could be smaller than other IT implementations such as business intelligence systems which have been shown to have a significant impact on equity risk (Rubin & Rubin, 2013). The analysis of the mean beta deltas of the subsample of initial blockchain announcements and the respective values of the following blockchain announcements subsample shows that those are also not significantly

different from each other. Consequently, we must reject H5. One possible explanation could be that even though a following announcement might signal a higher chance of successfully finishing the blockchain project, investors might recognize that the diversification of investments and research projects by most firms should reduce the overall impact of such announcements on the company's market risk. This could also explain the insignificant results for all hypotheses related to the examination of systematic risk. In this case, the overall impact of blockchain announcements on systematic risk, irrespective of their subsample affiliation, should be non-significant. This is confirmed by the results of our market risk analysis. Existing research on IT-related market risk impact also reinforces this argument. Only fundamentally impactful technologies such as ERP systems (Parra et al., 2015), business intelligence systems (Rubin & Rubin, 2013), or heavily impactful IT-related events such as data breaches (Hinz et al., 2015) were found to have a significant impact on systematic risk. Thus, the impact of currently marginally relevant technologies is only reflected in short-term abnormal returns but not in the longer-term systematic risk analysis.

Theoretical implications

Our study provides several implications for research on blockchain business and market value. First, we apply the perspective of RBV to empirically demonstrate how companies benefit in terms of additional market value when focusing on announcements which include at least one other company or a consortium. According to RBV, blockchain capabilities should show a certain degree of rarity among firms which try to find valuable use cases. Indeed, blockchain capabilities appear to be rare, and hence, RBV suggests that they are more valuable in cases where several firms are part of a blockchain project. Firms can combine and complement unique capabilities which are necessary to identify the proper value proposition of the respective blockchain use case. One prominent example are cases where organizations hire IT consulting firms for identifying and implementing blockchain technology. Investors appear to recognize and value the additional technological blockchain know-how of external consultants and could believe that such projects possess a higher chance of succeeding (Klößner et al., 2022). This also applies to the RBV perspective which first and foremost posits the importance of additional (business) value. Consequently, by combining capabilities and using a shared pool of resources, the probability of value creation could be increased. Additionally, being part of a strong blockchain consortium could act as a signal of confidence for the stock market, with a whole group of companies believing in the value of the blockchain project addressed. Secondly, we utilize RBV by showing that new IT, here

in the form of blockchain technology, delivers the most value if individual core competencies are supported. In the RBV context, this shows that the alignment with firm specific requirements and capacities is an issue of particular importance when an organisation aims to realize blockchain potentials. As members of the IT industry possess more IT capabilities and competencies than non-IT firms (Felipe et al., 2020), they also seem to benefit more when approaching a blockchain project. Moreover, stock market participants empirically confirm the RBV-view that blockchain capabilities are hardly imitable and support specific issues such as data privacy and data protection (Zhang et al., 2022) which are more omnipresent in the IT industry. Thirdly, our study suggests that the capability-perspective supported through RBV could serve as an explanation for the observed additional value of subsequent blockchain announcements. Investors might appreciate companies adhering to a blockchain initiative and voluntarily deciding to keep their investors updated on its progress. Blockchain capabilities should increase over time, and according to RBV could lead to a higher probability of a successful and, more importantly, valuable implementation. Furthermore, applying RBV on blockchain value creation also implies that the technology in question should be hardly replaceable (Teo et al., 2016). By showing endurance in unveiling blockchain potentials over time, firms might increase their chances of revealing certain issues that might only be solvable through a specific type of blockchain application, whereas more generic corporate matters could be simplified by already standardised and more established technological applications, such as ERP systems or centralized data management systems.

Whereas Liu et al. (2022) utilize RBV to demonstrate how resource- and capability-related mediating factors impact stock market reactions to blockchain news, our analysis provides a more nuanced perspective on the various RBV factors and their interaction and interplay in creating blockchain value. We also extend the general considerations of Treiblmaier (2018) who provides a theoretical framework for applying RBV to blockchain related supply chain management research. By suggesting concrete ways how blockchain resources and capabilities lead to additional business value, thereby potentially resulting in competitive advantages (Treiblmaier, 2018), and how this can be measured in terms of additional market value, we offer an additional layer of insight into the incorporation of blockchain in RBV considerations.

Our findings on the impact of blockchain announcements on market risk show that shareholders appear to recognize this type of corporate news in the holistic context of the wide range of investments and ventures that large public companies usually carry out. Investors might even consider the exploration of emerging technologies such as blockchain

as mandatory to not fall behind the curve. Another possible reason for the non-significant effect on market risk could include the longer-term view of the risk analysis in comparison to the short-term event study executed. Shareholders might be more concerned about potential short-term gains and less focused on its impact on longer-term systematic risk. As we followed previous research and chose a calculation-window of 120 days before and after the event, there is also a significant possibility of other events that could have opposing effects on risk changes induced by corporate blockchain news.

Practical implications

This study also possesses various implications for practitioners. By providing deeper insights into specific drivers of blockchain market value, we extend general recommendations to explore blockchain technology. First, we show that blockchain partnership announcements lead to higher positive abnormal stock market returns than announcements only involving a single company. Collaborating with other firms could enhance development as well as deployment processes by leveraging the potential broader range of skill sets as well as technologies available. Moreover, our findings should encourage decision makers within firms to utilize blockchain partnerships to strategically position themselves within the evolving blockchain landscape. By participating in consortia, practitioners might be able to differentiate themselves from competitors by capturing a larger share of the value created in interorganizational blockchain ecosystems. Furthermore, we provide partial empirical evidence of higher positive market effects of blockchain projects in the IT industry. Managers of IT firms should take advantage of the possibility of integrating blockchain technology into IT solutions to increase customer benefits by offering greater transparency, security, and efficiency in digital transactions and data management. We encourage decision makers to prioritize the exploration of how their current IT infrastructure, software development expertise, data analytics capabilities, and domain knowledge can be integrated or improved with the adoption of blockchain technology. Through strategic alignment of their IT capabilities with blockchain initiatives, tech firms might be able to pioneer inventive solutions, streamline operational workflows, and establish competitive edges that propel market achievements and profitability. Moreover, we demonstrate that sticking to a blockchain project and signalling endurance to investors is rewarded by the stock market. Committing to certain blockchain initiatives and prioritizing sustainable investments into the technology might foster investor confidence in the company's strategic vision regarding blockchain which in return could attract additional investors. Executives should prioritize blockchain projects that align with the organization's

strategic objectives, core competencies, and market opportunities while ensuring adequate resources are allocated for successful project execution and ongoing support. As blockchain is a rapidly and continuously developing technology, practitioners should remain engaged in the respective blockchain project and leverage new features, functionalities, and efficiencies introduced through continuous updates of the technology. Lastly, our results should also encourage managers and executives to pursue blockchain initiatives with no realistic threads of increased market risk in sight.

Limitations and future research

Our empirical study has several limitations. First, we chose stock market performance as our measure for financial performance and do not focus on other measures of firm performance. Future studies might be able to shed light on the impact of blockchain technology on operational performance in the form qualitative analyses such as case studies (Klößner et al., 2022). Secondly, the event study only focuses on short-term market reactions from blockchain announcements. It is not guaranteed that positive short-term returns also lead to long-term future financial performance improvements of firms (Teo et al., 2016). Thus, additional empirical studies could focus on the examination of blockchain's long-term effects on financial firm performance, for instance by applying measures such as Tobin's Q (Chung et al., 2020) or buy-and-hold abnormal returns (BHAR) (Klößner et al., 2022). By focusing on systematic market risk, we also neglected the possible impact of blockchain announcements on the idiosyncratic risk of companies. As such, future research could explore how corporate blockchain news affect company-specific risk measures such as earnings volatility. Moreover, our data sample neglects announcements from companies located in emerging markets. Future research could explore if success factors of announcements from firms in these markets differ from the relevant factors in European and US markets. Additionally, it might be interesting to see whether the specific type of blockchain technology in use (e.g., Hyperledger Fabric, Corda or Ethereum) has an impact on the factors analysed. Nonetheless, this might lead to a significantly reduced sample of announcements as not all blockchain news reveal the underlying technology in use. Lastly, our analysis is only centred around large and publicly listed firms. The results of our study might look different for smaller organizations. Analyses of blockchain's impact on firm performance of private companies could also enrich the enhancing stream of research on the value of blockchain technology.

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