

# Editorial: the dark side of blockchains: threats, risks, ethics and biases in blockchain adoption

## Introduction

Blockchain technology (BCT) is a decentralized, distributed and immutable system designed for secure and transparent record-keeping that allows organizations to use secure business processes globally across all sectors (Denter *et al.*, 2022). The BCT is a new technology linked with transparency and its ability to work as an immutable distributed ledger among involved parties. The critical characteristics of BCT include decentralization, immutability, transparency, security and smart contracts. BCT is the most exposed business function that deals with many internal and external organizational stakeholders (Reddy *et al.*, 2021). BCT has been embraced by several industries, including financial services (Khatwani *et al.*, 2023), health care (Shah *et al.*, 2023), marketing (Treiblmaier and Petrozhitskaya, 2023), supply chain management (Tokkozhina *et al.*, 2023) and others.

As BCT operates on decentralized networks, it eliminates the need for central authority and reduces the single point of failure, enhancing security and promoting trust among participants. The immutability ensures data integrity, making blockchain a secure and tamper-resistant system. The transparency offered fosters trust and accountability as users can independently verify and validate the information on the blockchain. The security features offered make the BCT highly resistant to fraud, hacking and unauthorized access. Due to the reduction of intermediaries, transactions are sped up, and cost savings occur. The data redundancy enhances data integrity and resilience against data and corruption, thereby minimizing the risk of errors. The features offered by BCT enable new business models and innovations, especially in industries where trust, transparency and security are critical. Blockchain poses ethical concerns over data ownership and control. Ethical considerations, such as unintended consequences, could occur; thus, the ethical use of technology should be considered for responsible use. While BCT offers businesses a plethora of exciting opportunities, it also poses significant challenges and potential drawbacks, often referred to as the “dark sides” of blockchain, including privacy, security and provenance tracking (Rana *et al.*, 2022; Sangal *et al.*, 2022).

Integration of blockchains with emerging technologies like AI and IoT is poised to reshape the landscape of the next generation of organizational applications, as highlighted by Kumar *et al.* (2022). BCT brings numerous advantages, including explainability, privacy and trust, and its synergy with AI can enhance scalability, security and personalization. BCT plays a pivotal role in facilitating the execution, verification and recording of transactions, leading to improved organizational processes and enhanced information management. One of the distinctive features of BCT is its versatility as a programmable platform, enabling the management of real-time, non-tamper contracts with an audit trail. The append-only, immutable ledger maintained by BCT contains verified and validated transactions, establishing a foundational element of trust for businesses, as noted by Mattila (2016). This trust forms the basis for secure and transparent business interactions.



On the flip side, there are certain challenges in implementing BCT, such as energy consumption (e.g. Bitcoin usage), scalability issues (e.g. slower transactions as BCT network increases), complexity leading to poor adoption, irreversibility of transactions, legal and regulatory uncertainty, vulnerabilities while using smart contracts and data privacy concerns. Smart contracts are irreversible and automated. There is no room to reverse a transaction as the code of law is fixed. Hackers often leverage cryptocurrencies for illicit activities, using them as a novel means for ransomware attacks and bribery, as noted by Katarzyna (2019). Cryptocurrencies offer anonymity to criminal groups, making it easy to engage in illegal activities (e.g. money laundering and drug trafficking) without being traced easily (Kabra and Gori, 2023). Cryptocurrencies give peddlers drug distribution without affecting the supply chain (Morelato *et al.*, 2018). In the supply chain, ethical questions regarding material sourcing, fair trade practices and labor conditions in BCT can be raised.

Due to the lack of intermediaries while using cryptocurrencies in the crypto markets (e.g. brokers and street sellers), vendors find it easy to operate due to profit maximization. Cryptocurrencies are susceptible to hacking and cyber-attacks due to their digital nature, which may be targeted easily during cryptocurrency exchanges or stealing money from wallets, leading to financial losses. Various scams and fraudulent activities (e.g. pump and dump schemes) and fake initial coin offerings can occur in the cryptocurrency market harming unsuspecting investors (Corbet, 2021). Cybercriminals demand cryptocurrency payments made towards releasing encrypted data or preventing the system from further damage or loss (Reddy and Minnaar, 2018). In the crypto market, traders with significant holdings can influence the market rates compared with traditional markets (Bianchi, 2020). Regulating and enforcing laws is challenging with cryptocurrencies due to its centralized and global nature. Peddlers can operate here in an environment freely. Money laundering through BCT involves criminals blending their illegal funds with lawful transactions on decentralized exchanges (Singh and Mishra, 2022). Organizations must establish sufficient anti-money laundering protocols, enabling criminals to exploit the exchange for laundering proceeds from drug trafficking, ransomware attacks and various unlawful activities.

Blockchains, the underlying technology for cryptocurrencies, are susceptible to transaction malleability attacks, wherein attackers alter the transaction ID before its confirmation, leading to the transfer of modified cryptocurrencies to the hacker's account. The complete assurance of user transaction anonymity is challenging, allowing hackers to divert digital coins to their addresses, as Conoscenti *et al.* (2016) highlighted. Investors may be prone to investing in cryptocurrencies, which fluctuate, causing losses to investors due to their highly volatile nature (Dadmal and Jain, 2023).

While blockchain provides transparency and privacy, it also raises several ethical concerns by exposing sensitive business information in some cases; thus, ensuring a balance between the two is essential to avoid violating privacy rights or exposing confidential data (Sedlmeir *et al.*, 2022). Blockchains pose questions regarding the fair distribution of power and influence in the network, ensuring the control is not restricted to a few entities (Cao *et al.*, 2019). Blockchain provides financial inclusion to vulnerable customers, which raises questions about aggravating further inequalities.

Examining blockchains through two lenses provides a comprehensive perspective. First, the Information Communication Technology lens captures the recording of platform asset ownership. Second, the "institutional technology" lens decentralizes governance structures, fostering effective coordination among organizations, as articulated by Aste *et al.* (2017). This dual perspective underscores the multifaceted nature of blockchains, encompassing both technical and governance aspects in their application across various domains.

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This special issue aims to provide a forum for scholars studying BCT to debate new problems about the disadvantages of BCT. This special issue aims to provide new insights into the challenges in adopting, using and managing BCT and to comprehend its risks and potentially negative effects on people, organizations and societies by combining technical, behavioral and managerial perspectives.

### Contributions to the special issue

We received a variety of theoretical, methodological and interdisciplinary viewpoints. We performed a rigorous peer-review process, selected three papers and published them in this special edition. The authors addressed a wide range of research problems related to many facets of the dark side of BCT.

The first article in this editorial by Sheshadri Chatterjee, Demetris Vrontis and Ajith Kumar investigates the positive impact of integrating BCT on organizational sustainability, exploring the roles of morality, ethics and governance. The study leverages diverse literature and theories to construct a robust theoretical model, subsequently validating it through the partial least squares structural equation modeling approach. Rigorous statistical analyses affirm the model's effectiveness, showcasing its high explanatory power. The study's findings underscore that adopting BCT can enhance organizations' sustainability performance. Notably, the research emphasizes that transparency in the underlying algorithms of BCT is crucial for imbuing applications with moral and ethical considerations, thereby further augmenting organizational sustainability.

Moreover, the study establishes that effective governance of BCT plays a pivotal role in supporting organizations to elevate their sustainability performance. This research highlights the significance of organizational management in overseeing BCT and its consequential impact on sustainability. The insights generated offer practical guidance to practitioners and policymakers concerning BCT and its governance models. Additionally, the study furnishes valuable recommendations for leaders and managers on successfully navigating the adoption of BCT.

The second article by Arunkumar O.N., Divya D. and Jikku Susan Kurian seeks to explore the negative aspects of adopting BCT in small and mid-size enterprises, focusing on unraveling the complex relationships among variables. Using a focused group approach to identify barriers, the authors use total interpretive structural modeling and matrice d'impacts croisés multiplication appliquée á un classment for analyzing intricate relationships among these identified barriers. The study reveals that BCT implementation reduces maintenance costs by automating manual efforts, leveraging its superior capability to quantify the internal system status (observability characteristic). This observability characteristic contributes to high compatibility with the system, reducing implementation costs and facilitating project management. The findings recommend thoroughly analyzing maintenance costs and BCT compatibility before implementation. This enables small and mid-size enterprises to choose a suitable BCT based on their IT usage sophistication and project management capabilities. The model provides a foundation for further investigation using structural equation modeling. The study's theoretical and managerial contributions are multifaceted, catering to industrialists and researchers seeking insights into barriers and recovery methods.

The third article by Shreya Sangal, Gaurav Duggal and Achint Nigam meticulously examines and amalgamates insights into the involvement of BCT in a spectrum of illicit activities, encompassing but not limited to fraud, money laundering, ransomware attacks, firearms, drug tracking, cyberattacks, identity theft and scams. The authors systematically reviewed studies on illegal activities using blockchain spanning the period from 2015 to 2023. Subsequently, a thorough thematic review of the literature was conducted to unveil the

methodologies used in executing these illicit activities using BCT. During this study, the authors discerned pertinent themes that shed light on the primary illegal activities facilitated by BCT, delineating potential preventive measures and identifying prospects for future developments in this domain. In conclusion, the authors present valuable suggestions for guiding future research endeavors, using a framework encompassing theory, context and methodology. This research has systematically synthesized the intricacies of illegal activities involving BCT through a thematic approach. Therefore, this study lays the groundwork for subsequent academic and technical research in this crucial area.

### **Contribution and direction for future research**

The articles in this special issue have covered essential and critical issues related to the dark side of blockchains. Important questions that emerge from the articles submitted in the special issue are: What are the negative social implications of the use of BCT? What are the inter-organizational relationships of using BCT technology, governance and regulations in the context of government information systems?

We anticipate that our special issue will provide significant theoretical and practical contributions to academic literature in the field of information systems, particularly within the domains of BCT. Each article showcased in this special issue offers compelling evidence emphasizing the significance of research dedicated to exploring the challenges and potential risks associated with the darker aspects of BCT. The combined results strongly suggest the substantial impact of BCT on the future of information systems and underscore the precautions organizations need to consider when implementing this technology.

We wish to express our sincere gratitude for the dedicated efforts and valuable contributions made by all the authors involved in this project. Our special thanks go to Dr Jenifer Sunrise Winter, the Editor-in-Chief of the Journal of Information, Communication and Ethics in Society, for her support in initiating the special issue topic and offering insightful guidance throughout various stages of the project. Additionally, our heartfelt appreciation extends to the members of the special issue review board and the anonymous reviewers. The time and effort they invested in reviewing the manuscripts have played a crucial role in elevating the overall quality of the articles published in this special issue.

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