When people matter: A socio-technical vision of a blockchain proof of concept

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Abstract

This work presents a case study on an Italian public sector organization developing a blockchain proof of concept (PoC). While blockchain and other emerging technologies are often analyzed from a contingency perspective, where organizations are expected to adapt their work organization to the technology functionality to unlock its full potential, this study takes a different approach. It explores a participatory approach that adopts a socio-technical perspective, emphasizing how technological development is shaped by organizational dynamics and needs. By doing so, the study challenges the traditional contingency view and highlights the importance of considering multiple organizational aspects when developing a blockchain PoC. Specifically, we address the following research question: What are the key socio-technical mechanisms for developing a blockchain PoC? Drawing on a series of interviews with the two individuals responsible for the PoC, the Chief Information Officer and the Information System Architect, the study identifies six socio-technical mechanisms that shape the design and implementation of the blockchain initiative.

Keywords

Blockchain, organizational science, socio-technical theory, case study

1. Introduction

Organizations operate successfully when the coordination of their work practices is efficient [1]. Efficient coordination occurs through the structured and timely alignment of actions among human resources across individuals, teams, and departments [2]. Without adequate coordination mechanisms, organizations experience fragmentation, delays, and resource misallocation. Digital technologies play a pivotal role in supporting coordination due to their ability to provide information that can be exploited by organizational members to carry out work practices [3]. Digital technologies, such as information systems (ISs), have already increased coordination efficiency by providing real-time data on back-end operations [4]. Blockchain is an emerging technology that promises to support work practices and their coordination within and across organizational boundaries [5]. It reduces information asymmetries by providing a single, shared, and immutable database across all participants in an organizational or inter-organizational setting. Transactions, once validated through consensus mechanisms, are recorded in a tamper-proof ledger accessible to all authorized nodes and cannot be changed without permission [6]. Furthermore, the blockchain enables automation of work practices on stored data through smart contracts, i.e., self-executing code that automatically enforces

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the terms of an agreement when predefined conditions are met [7]. The choice of using Blockchain, considering other analogue systems (append-only databases, other distributed ledgers approaches, etc.) relies on its principle of general public widespread availability (ease of access), possibility of offering readability of provided data also to third parties (such as investment funds, data rooms, lenders and so forth), and to interconnect ERC-20 standardized smart contracts (e.g. it is certified that a service provider receives an amount of money, therefore the authorization of money lending to this subject will be automated). Originally developed to enable decentralized trust in cryptocurrency networks [9], blockchain is increasingly seen as an emerging technology applicable in various contexts such as supply chain management, healthcare, finance, and public administration [5, 8]. These functionalities make blockchain a compelling tool for coordination, both within the organization and with external parties, to improve work practices. However, the presence of these technical features does not guarantee successful implementation or the realization of the promised improvements [10]. Indeed, some studies follow a contingency approach to technology adoption: the organization should adapt to the technology, and the outcomes mainly depend on how the technology is used [11]. Some studies on blockchain adoption question the adequacy of this perspective, showing that blockchain adoption requires profound changes in how people work, how decisions are made, and how systems interoperate [12]. Therefore, implementing blockchain is not merely a technical upgrade; it often involves rethinking how organizational members conduct work practices supported by this technological solution [13]. However, literature lacks empirical studies that explore how blockchain can be adopted effectively, especially within an organizational environment. The combination of socio-technical theory and the participatory approach can be used to analyze this issue. Socio-technical theory is a valid lens for analyzing how digital technology is designed to accommodate organizational changes [14]. The theory claims that an organization is seen as a combination of a technical system, comprising digital tools and social aspects, such as the skills of organizational members and its structure [15]. The joint optimization of both systems enables a better understanding of how a digital technology can be adopted while taking organizational needs into account [16]. On the other hand, the participatory approach helps to understand how a facilitator can achieve joint optimization [17]. Therefore, this study aims to explore the socio-technical mechanisms during a blockchain proof-of-concept (PoC). A PoC is a small-scale experimental implementation of digital technology used to evaluate the technical feasibility and functional performance of a proposed blockchain solution. By analyzing the blockchain PoC and the related organizational changes, it is possible to understand socio-technical mechanisms and how technology can be adopted while considering organizational aspects and needs. Therefore, this study raises the following research question: *What are the socio-technical mechanisms for developing a blockchain PoC?*

To answer this question, we conducted a single case study of an Italian public sector organization developing a blockchain PoC and an organizational change plan, applying socio-technical theory anchored to the participatory approach. We contribute to the literature by offering an empirically grounded blockchain PoC case study that identifies six socio-technical mechanisms to account for organizational aspects.

2. Theoretical Framework: Socio-technical theory & participatory approach to technology adoption

This study is underpinned by two conceptual lenses: socio-technical theory and the participatory approach to technology adoption [17–19]. Both frameworks underscore the critical importance of considering the perspectives and involvement of organizational members, especially employees, during technology adoption and PoC development of a digital technology [20].

Socio-technical theory constitutes a foundational paradigm in organizational studies and information systems research [18]. Historically, technology adoption within organizations has often followed a managerial contingency approach, wherein technology is regarded as the dominant force shaping organizational structures, processes, and roles [21]. This approach assumes that organizations must adapt to the intrinsic characteristics and functionalities of new technologies, frequently at the expense of their unique organizational attributes that sustain competitive

advantage [22]. However, such a techno-centric approach has been widely criticized, as it has frequently resulted in technology rejection and suboptimal productivity outcomes [18]. In contrast, socio-technical theory emerged as a response to these limitations, proposing a more balanced and human-centered perspective on technology adoption [16]. The theory conceptualizes organizations as comprising two interrelated systems: the technical system, encompassing tools (such as blockchain PoC) and tasks subject to automation, and the social system, comprising organizational members, structures, and processes [15, 16]. Both systems are deemed equally significant, and effective organizational transformation requires their mutual alignment [20, 23]. A central tenet of socio-technical theory is the principle of joint optimization, which advocates for the simultaneous and balanced development of both technical and social systems to enable successful technology integration [24]. In this context, digital technologies should be adopted with due consideration of organizational goals, practices, and the competencies of organizational members to engage with new digital technologies [23]. In this regard, the participatory approach to technology adoption operationalizes joint optimization by centering the experiences and inputs of organizational members in the decision-making process [17]. It introduces the role of the facilitator, an institutionalized actor tasked with representing the interests and concerns of stakeholders throughout the technology adoption [17]. Facilitators provide contextually informed recommendations on the implementation of digital technologies that reflect the lived realities of organizational members. The role is inherently complex, as facilitators must reconcile diverse viewpoints and address challenges related to technological change [17]. These actors may be internal stakeholders or external agents such as consultants or system integrators [2].

In conclusion, both socio-technical theory and the participatory approach emphasize the role of facilitators in implementing socio-technical mechanisms during the adoption of new technologies and the development of POCs. These mechanisms are essential to achieving the fit between technological solutions and the organizational context in which they are deployed [20]. Specifically, socio-technical mechanisms guide the adoption process to ensure that technological innovations are tailored to the needs of organizational members, thereby promoting both user acceptance and increased organizational productivity [16].

Such mechanisms address three key areas: (i) identifying and responding to the specific challenges experienced by organizational members through digital technology; (ii) engaging workers in practices that promote familiarity and acceptance of new technologies; and (iii) implementing human resource tasks that prepare staff to effectively integrate and utilize digital tools within their workflows [20].

3. Related literature: Blockchain, proof-of-concept and organizational change

Blockchain is an emerging technology, defined as a decentralized, distributed ledger, that securely records transactions across a network of computers. Such a network can be used to manage organizational data [25, 26]. A fundamental characteristic of blockchain is its immutability; once a transaction is recorded, it becomes practically infeasible to alter. Otherwise, it is possible to implement a distributed shared database when blockchain allows for deleting transactions after achieving consensus among the network participants [25, 26]. This feature fosters a high level of transparency, minimizing the reliance on centralized authorities [7, 25]. In addition, blockchain utilizes cryptographic techniques to protect data integrity and employs consensus algorithms, such as proof-of-work or proof-of-stake, to validate and synchronize data across a computer network [6]. Moreover, blockchain enables traceability, allowing the tracking of assets or transactions throughout the entirety of their lifecycle [26]. Blockchain systems can be structured as public, private, or hybrid, depending on organizational goals and operational requirements. A public blockchain is an open, decentralized network (e.g., Bitcoin, Ethereum), where anyone can read, write, or audit data, making it highly transparent and resistant to tampering, though it raises confidentiality concerns (e.g., Bitcoin, Ethereum) [27]. A private blockchain is governed by a single entity or consortium, restricting participation to authorized users, which enhances security and privacy for internal processes such as audits and financial reporting, but its centralized control may reduce external trust (e.g., J.P. Morgan's

Quorum) [28]. A hybrid blockchain combines the transparency of public systems with the control of private ones, allowing selective data sharing and participant access; it balances openness and confidentiality, supports regulatory compliance, and enables secure inter-organizational collaboration, making it suitable for industries that require both trust and data protection [29].

A further salient feature of blockchain is the implementation of smart contracts, which are self-executing programs stored on the blockchain that automatically enforce the terms of agreements once specified conditions are met [7]. Therefore, this new technology has the potential to automate processes, streamline intra- and inter-organizational workflows, and change how organizational members and partners interact [6, 7]. Illustrative examples include Walmart's initiative to trace pork products in China and Maersk's blockchain-based solution for global shipping documentation [26].

When organizations decide to adopt a blockchain, they commence with the development of a PoC [25, 26]. A PoC constitutes a small-scale experimental implementation designed to evaluate the technical feasibility, functional performance, and business value of a proposed blockchain solution [30]. PoCs simulate realistic operational environments under controlled conditions, ensuring that insights gathered are actionable. By adopting a PoC, organizations can test adoption patterns of technology and understand potential technical and organizational challenges [30]. Therefore, analyzing the PoC is possible to analyze the knowledge infusion of the digital technology, namely, whether the digitalized work practices are valid for the organization and whether the organization benefits from it [3].

Although a PoC may not yet be the final implementation of blockchain technology, it acts as a catalyst for organizational change [31]. In accordance with socio-technical systems theory, senior management should devise a context-specific change management plan to ensure that employees comprehend and effectively engage with the blockchain PoC. Given that blockchain's core features are not amenable to a universal, one-size-fits-all application, any deployment must be tailored to accommodate the unique requirements of organizational work practices. Therefore, the implementation of a PoC should be accompanied by a comprehensive organizational change plan to support successful adoption and integration [8].

4. Research Design

This study employs a single case study methodology [32], which is particularly appropriate for investigating emerging technologies in contexts where limited empirical evidence exists. It is a valid methodology to analyze digital transformation adoption, such as a PoC development and the associated organizational transformations [33, 34]. The case study approach facilitates a comprehensive and contextually grounded examination of complex phenomena, enabling the systematic collection and analysis of qualitative data [35]. Moreover, it ensures methodological rigor while accommodating the exploratory nature required to uncover intricate dynamics and processes inherent to digital technology adoption [32].

This study is based on THETA, an Italian public sector organization. It represents a valid case for the following reasons: (i) it initiated a PoC for blockchain technology; (ii) the facilitator is the Chief Information Officer; (iii) organizational aspects were considered during the development of the PoC; and (iv) the organization provided both primary and secondary data, which is fundamental for qualitative research [36]. For the data collection, we primarily relied on primary data in the form of semi-structured interviews with two key informants [37]: the Chief Information Officer (CIO) and the Information Systems Architect (ISA). Although the sample size is small, it includes the entire organizational team responsible for developing the blockchain PoC and the related organizational change plan. We conducted three interviews with the CIO and the ISA in April 2025, totaling approximately three hours. After each interview, we transcribed detailed memos. In addition to the interviews, the key informants provided secondary data, including documents on employee engagement planning and human resource practices related to the blockchain PoC. Regarding data analysis, our approach was primarily deductive [38]. The analysis was guided by the socio-technical framework and informed by principles of the participatory approach [16, 17]. Accordingly, we

examined the socio-technical mechanisms employed by the facilitators in the design of the blockchain POC, as well as the worker engagement practices implemented to address organizational challenges associated with the new technology. The analysis was conducted collaboratively by the research team and subsequently presented to the CIO and the ISA, who validated the findings and provided further nuance to the identified socio-technical mechanisms [32]. The following chapter presents the results of this analysis, which consists of six socio-technical mechanisms applied in the development of the blockchain PoC.

5. Case study

THETA is an Italian public sector organization with approximately 100 employees. When a consumer or business pays a bill for gas, energy, or environmental services, THETA is responsible for collecting the payment and subsequently transferring it to the appropriate service providers. The organization has a tall hierarchical structure with two further divisions. The headquarters includes the COO's direct unit, as well as departments for human resources, finance, and legal affairs. Additionally, there are three staff units focused on audit and quality, research, and IS. The two divisions, energy and environment, oversee operational activities that collect payment data on energy and environmental services, aiming to support the relationship between governmental bodies and service providers. Despite its highly hierarchical structure, THETA employs a range of integrated ISs — most of which are customized to meet internal needs— that interconnect the information flows among the various divisions and headquarters. These systems enable the energy and environmental divisions to input and store transactional activities related to the payment status for providers. These systems also support an authorization system that serves to deliver such payments. The authorization system requires digitally signed accessory documents for paying providers not included in the IS. While work practices for managing consumer data are highly regulated and standardized, the technical processes involving interactions (digital signatures, data transparency) between THETA and energy or environmental service providers are less formalized and offer room for improvement. Based on this context, the following key socio-technical mechanisms underpin how the CIO successfully initiates the innovation process aimed at the development of a blockchain PoC.

Addressing unstandardized work practices. After the onboarding of the CIO, the IS unit engages in several meetings to assess the effectiveness of the ISs. Although these systems successfully support the internal collection, use, and analysis of transactional payment data of providers, the ISA recognizes that the process runs smoothly but with a lack of complete process transparency. This impediment arises from the authorization system embedded in the current IS, which requires accessory documents to be digitally signed outside the system without a standardized procedure. As a result, the IS unit acknowledges the need to find an emerging technology that may standardize and authenticate the process while integrating with the existing IS. Drawing on the CIO's prior knowledge, blockchain is seen as a promising solution due to its consensus mechanism that supports employees to automatically track and securely store highly personalized transactional operations, potentially aiding in the authentication of various organizational members involved in the delivery of the payment process.

"I studied on my own blockchain features, and it fits with the needs of our company. The idea is to create a blockchain that helps those practices where we don't have control and where human error is possible." (CIO)

Building trust with a blockchain PoC. Although blockchain is considered a suitable digital technology, its adoption depends on the existence of clearly defined work practices. To address this, the CIO and ISA begin analyzing the unstandardized procedures at the basis of the lack of transparency by mapping the internal units involved in these phases. The IT unit technically supports the entire process. The finance unit is responsible for digitally signing and authorizing payment.

Meanwhile, the energy and environment divisions handle the reporting of the payment and submission of accessory documents that inform the finance unit's decisions. The key distinction between these operative divisions lies in the fact that the environmental division is less complex to manage compared to the energy unit. The unit should provide less documentation, making its authorization process less complex and subject to greater scrutiny. Therefore, to develop the blockchain project, the CIO chooses to follow an incremental management approach: he includes only the necessary organizational unit to test an embryonic blockchain within the organization. As a result, the CIO chooses to focus on one operative division at a time, starting with the environmental division. Once the blockchain solution is successfully implemented in the environmental division, he plans to apply the same tested approach to the energy division, aiming to reduce technical challenges and minimize resistance to change from employees.

"We start from one division, the energy one, because it has more processes on which the blockchain is employed. We learnt employees' responses to blockchain and the various doubts. Then, we move to the environmental division, which has information on how to better use the technology." (CIO)

Following this analysis, the CIO develops a series of scenarios illustrating how blockchain could support the existing authorization system in a smoother way, also offering an optional second path for the same process. He presents this proposal to the management committee, along with top and middle managers from the finance and environmental units. Rather than emphasizing the operational efficiencies of blockchain, the CIO advocates for the technology by highlighting its potential to foster interdepartmental trust through a consensus mechanism that requires human interaction for their authentication. This method also offers the eventuality to switch to a smart contract after blockchain PoC use. The finance and environmenal units recognize the benefits of the proposal. Consequently, based on this recommendation, the CIO and IS unit designed a project for the development of a blockchain PoC, which they presented to the management. The proposed PoC was designed to work in a public blockchain based on a distributed shared database. The blockchain PoC is not the final implemented version of the technology; thus, it offers flexibility in case of organizational issues. This perspective was presented to the executive committee, which agreed to fund the initiative, encouraged by the strong alignment and collaboration among the units involved, as well as the potential to resolve technical challenges.

"We built trust among departments for the blockchain. Then, we got financed when there was the hype of the blockchain and when we had several funds to innovate the digital infrastructure. For these reasons, the committee did not hesitate too much about the blockchain." (CIO)

Maintaining unaltered operative work practices. The blockchain PoC is centered on the ability to support the existing ISs rather than replace them. The organization currently relies on customized ISs tailored to its specific operational needs. These ISs offer the right level of data granularity for recording and managing transactional operations and have been widely accepted by employees, who consider them easy to use and essential for day-to-day activities. Given this context, the CIO decides to develop a blockchain PoC that complements the current ISs. The rationale behind this decision is to avoid triggering resistance to change or causing any disruption to operational continuity. In other words, the blockchain simplifies and standardizes the authorization process, which remains external to Theta's ISs and cannot therefore be effectively handled by the existing ISs. Within this blockchain system, employees are guided to enter the accessory information required for the authorization process, which is indexed to ensure traceability, while the finance unit can proceed with the approval of payments. The entire procedure holds legal validity, as the blockchain automatically saves a tamper-proof log of every step in the process.

"No resistance from workers is key in this implementation. We don't touch the interface of the ISs. All remains unaltered; we simply extend the systems with the blockchain for some features." (CIO)

Raising awareness on blockchain organizational benefits. The launch of the blockchain PoC is accompanied by a series of communication activities for the entire organization. The CIO aims to raise awareness and build knowledge about this emerging technology. In collaboration with the IS team, a communication plan consists of a series of emails that focus on three key themes: the fundamentals of blockchain, real-world use cases, and its specific application within THETA. This information is delivered in a simplified, user-friendly format that helps employees become familiar with the concept of blockchain and understand the potential benefits it brings to the organization.

"We are developing some emails to create interest and offer practical information with the blockchain." (ISA)

Personalized training for blockchain. The blockchain PoC, even in its embryonic stage, provides a workable system and interface. Its initial experimentation is accompanied by a series of collective training sessions, personalized according to the role of each organizational department in relation to the technology. The environmental division receives training on utilizing the blockchain-based authorization system and its native interface, where they input specific data on payments and claims, along with the necessary accessory documents. The finance unit trains on how the blockchain authorizes payments and how to retrieve additional information. They are also educated on how the blockchain automatically saves work practices and the importance of the autosaved log that traces the entire process, given the relevant amounts involved in financial transactions. Finally, the IS unit is educated on the various functionalities of the blockchain interface.

"In the file, you can see the scheduling of our courses. Blockchain foundations are for all, and then we have specific courses for finance and IS units." (CIO)

Innovation round tables for blockchain PoC. During the testing phase of the blockchain PoC, beyond the traditional training, a series of round tables is organized. In these round tables, the CIO invites various organizational members. A first set of meetings involves middle managers and employees from the environmental division who are already engaged in the innovation project. In these meetings, participants provide recommendations about the PoC, identifying potential procedural issues. In a second set of meetings, the CIO discusses with environmental division employees how they envision the blockchain being used for different purposes within the organization. In this way, the industrialization of the POC may include further adjustments or inspire new traceable projects.

"Now we have set up the idea of the blockchain, now we want employees to help us to better refine the blockchain. We show how this technology helps us. Let's see if we can come up with some ideas for its improvement." (CIO)

6. Discussion

The results show six socio-technical mechanisms for developing a blockchain PoC. These mechanisms may help understand how to develop a technological solution that considers organizational aspects together with the main technological characteristics. While some studies focus on how blockchain can be used in inter-organizational relationships [5, 8], our study extends this literature by providing an intra-organizational use of blockchain that supports coordination and work practices among various departments and divisions. The existing literature argues that blockchain characteristics cannot be applied using a purely contingency-based approach because they need to be tailored to the organizational context [8, 26]. Therefore, an organization aiming to adopt blockchain should analyze its specific needs and address them through the technology [16]. Our results align with this literature, showing that, in our case, blockchain is not used to replace existing ISs but rather to support certain work practices. Specifically, blockchain PoC is used to standardize work practices related to the authorization system that requires authentic digital signatures on payments. Hence, this socio-technical mechanism emphasizes consensus mechanisms based on human interactions rather than automated smart contracts when applying blockchain with organizational considerations [7].

Since blockchain does not replace the existing ISs, the CIO, acting as the facilitator, takes two actions to engage the broader organization. First, the CIO involves middle and top management by framing blockchain not merely as a technological advancement, but as a means to enhance organizational processes and support the work practices of different units. The literature suggests that internal facilitators may face resistance if perceived as using technology to consolidate power within the organization [2, 17]. However, our findings indicate that the CIO addresses this concern by building consensus around blockchain as a trust-enabling technology across departments and by adopting an incremental approach to implementation, initially involving only the enviromental division, along with the Information Systems and Finance units.

The second action taken by the CIO is to involve employees from the Environmental division who are directly engaged in transactional activities. Research suggests that employees are more likely to accept technological innovation when they perceive it as useful and feel confident in their ability to use it [20]. In this context, our results indicate that the implementation of the blockchain PoC will be supported by targeted communication efforts aimed at illustrating its benefits through real-life examples and core principles. Additionally, customized training programs will be introduced to ensure employees are well-prepared. Unlike traditional collective training sessions typically used for digital technologies [3], this study highlights a personalized approach: the enviromental and IT divisions will receive training on the blockchain interface and its application, while the finance unit will be trained specifically on authorizing payments. A final reflection concerns the last socio-technical mechanism: innovation roundtables for the blockchain PoC. The literature notes that organizations benefit from digital technologies through knowledge infusion [3], where designers standardize practices to improve processes. In this case, however, the designers, namely the IT unit, decide to involve employees after the blockchain PoC, allowing them to suggest improvements that may be incorporated into the final version of the blockchain. Therefore, the PoC enables the organization to begin exploring initial knowledge infusion, followed by additional knowledge acquisition from employees that can further enhance the final blockchain implementation.

6.1. Implications for researchers and limitations

This study highlights several avenues for future research. Firstly, as it is based on a single case study of a public sector organization, the generalizability of the findings is inherently limited. Therefore, we do not claim any statistical generalization. Future studies could address this limitation by employing more robust methodologies, such as multiple case studies or quantitative research designs. For example, including private small and medium-sized enterprises may help explore whether socio-technical mechanisms differ based on firm size and scope. Secondly, the study focuses on blockchain PoC rather than a full implementation. Moreover, it is grounded in two interviews with those managing the PoC of the blockchain, but without considering further perspectives on the PoC blockchain, especially from the finance unit. As such, it does not capture a broad view of this technology and the practical enactment of human-technology interactions over time [39]. A longitudinal case study could offer deeper insights into the evolving organizational implications of blockchain, such as concerns over employee surveillance and perceived threats to privacy. Moreover, our study is limited to the expected benefits that require further validation with the full implementation of blockchain.

Lastly, future research could examine blockchain adoption in organizations facing significant financial constraints. Unlike the public sector context studied here, where sufficient liquidity supports technological investment, constrained environments may require managers to build dominant coalitions to legitimize and sustain innovation. Exploring the formation and dynamics of such coalitions could reveal whether and how CIOs maintain leadership over blockchain initiatives under conditions of limited resources or internal political conflict.

6.2. Implications for managers

Managers can use this work as a roadmap for the development of a human-centered blockchain POC. Firstly, managers should focus on resolving work practices issues that hinder operational efficiency. Introducing a blockchain incrementally allows organizations to standardize key processes, such as

document authorization, without disrupting existing systems. This approach reduces resistance to change and supports gradual adoption. Clear communication and role-specific training are essential to build user competence and trust. Engaging employees through feedback sessions and collaborative design ensures the technology aligns with real organizational needs.

7. Conclusion

Researchers and practitioners are increasingly interested in investigating the organizational implications of blockchain technology. While blockchain has been extensively studied in the context of fintech, its adoption within traditional organizational environments,particularly as a complement to existing IS, remains underexplored. Furthermore, much of the current literature adopts a contingency approach that overlooks critical organizational and human factors. This study seeks to advance the scientific understanding of blockchain by conducting a single case study within an Italian public sector organization, where the CIO developed a blockchain PoC. Drawing on socio-technical theory and the participatory approach, the study examines how the CIO aligned the blockchain POC with organizational needs. The findings identify six socio-technical mechanisms that may serve as a practical roadmap for managers aiming to design human-centric blockchain initiatives.

Declaration on Generative AI

The author(s) have not employed any Generative AI tools.

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