

Trustless is not trust free: How to build trust for organisations' adoption of blockchain technology

Ying Zhang^{1}, Mahdi M. Tavalaei¹, Glenn C. Parry²*

¹Department of Business Analytics and Operations, University of Surrey, Guildford, United Kingdom

²Department of Digital Economy Entrepreneurship and Innovation, University of Surrey, Guildford, United Kingdom

**yz02203@surrey.ac.uk*

Abstract

This study investigates the trust-building antecedents and mechanisms influencing organisations' decisions to adopt blockchain technology. Through a grounded theory approach, we conduct 20 semi-structured interviews with executives and managers from 19 enterprises in China. We identify six key trust antecedents: culture values, business value, institutional infrastructure, information externalities, signalling, and leadership engagement. Two primary trust-building mechanisms – compatibility and informativity – are established, drawing on agency theory, signalling theory, and the concept of compatibility from the diffusion of innovation theory. Our findings indicate that to build trust in the technology, it is crucial to ensure its use fits within the values, needs, and existing infrastructure of organisations and the broader social environment. Equally important is providing accurate, complete information to improve understanding and acceptance of the technology. For building trust in trading partners, aligning diverse interests through institutional infrastructure or leadership engagement is important for Chinese firms. Additionally, clear signalling of trustworthiness, such as reputation and relational signals, is vital for reducing information asymmetry and fostering initial trust. This study contributes to the literature by providing a synthesised trust-building framework and extending the scope of agency theory to enhance trust-building in both technology and organisational contexts.

Keywords: Blockchain Adoption; Grounded Theory; Trust Antecedents; Trust-building mechanisms; Agency Theory; Signalling Theory; Compatibility; Informativity

1 Introduction

Blockchain technology has been examined through a trust lens, serving as both a consequence and a driving factor in its adoption (Batwa & Norrman, 2021; Völter et al., 2023). Numerous studies have explored how blockchain influences trust dynamics across various domains, such as supply chains (Brookbanks & Parry, 2022), trade finance (Kowalski et al., 2021), strategic alliances (Chen et al., 2023), and video game loot boxes (Carvalho, 2021). The terms ‘trust machine’ or ‘trustless system’ (Sodhi et al., 2022) are often used to describe blockchain’s role in relationships. As empirical evidence of blockchain’s trust-building utility grows, it becomes apparent that blockchain does not eliminate the need for trust at its core. Instead, it partially shifts reliance from interpersonal trust (e.g., in a control authority) to trust in the technology itself (Völter et al., 2023) or its algorithms (Lustig & Nardi, 2015). Research suggests that blockchain adoption can enhance commitment and elevate trust levels at the start of a relationship rather than creating trust entirely between partners (Kopyto et al., 2020; Baharmand et al., 2021; Yavaprabhas et al., 2023). Consequently, trust as a critical success factor for blockchain adoption has been studied, for example, having trust in blockchain technology and in trading partners (e.g., Balci & Surucu-Balci, 2021; Batwa & Norrman, 2021; Sternberg et al., 2021; Wamba & Queiroz, 2022; Guan et al., 2023).

Despite the attention to trust in adoption decisions, understanding of trust-building factors and mechanisms in organisational blockchain adoption remains limited. While determinants of trust in technology adoption are well-studied (Prakash & Das, 2021), the trust requirements for blockchain adoption may differ. For example, artificial intelligence trust focuses on reliability, efficacy in making human-like decisions (Hasija & Esper, 2022), and morality perspectives such as perceived injustice (Sullivan et al., 2022). In contrast, blockchain technology’s design features, such as distributed ledger technology and peer-to-peer network, inherently facilitate trust-building among managers (Falcone et al., 2021). Additionally, blockchain adoption often involves multiple organisations forming a network, making trust considerations more complex than those for internally focused technologies (Hacker et al., 2023). Positive inter-organisational experiences are emphasised, while they may also reduce the necessity for adopting blockchain among organisations (Sternberg et al., 2021). A comprehensive set of trust-building factors in blockchain adoption contexts warrants further exploration.

Examining broad trust literature, a unified theoretical framework that connects disparate trust-building elements towards technology remains lacking. Studies often apply established technology theories such as technology acceptance model, unified theory of acceptance and use of technology, and diffusion of innovation theory to identify trust-building factors and evaluate their empirical impacts (Prakash & Das, 2021; Tung et al., 2008; Hernandez-Ortega, 2011; Fan et al., 2020). However, these theories are not tailored specifically on trust formation.

In inter-organisational contexts, economic and social-psychological frameworks such as transaction cost economics and social exchange theory primarily approach trust from calculative or relational perspectives, focusing respectively on pre-exchange calculations and trust developed through repeated interactions (Bai et al., 2024; Tan & Saraniemi, 2022). Although agency theory and signalling theory offer valuable insights, their direct contributions to trust-building may be underrepresented in the literature (Beccerra & Gupta, 1999). The elements such as incentive alignment, monitoring, and credible signals of trustworthiness are recognised as effective trust-building mechanisms (Narayanan & Raman, 2004; Schweitzer et al., 2018; Chawla, 2020; Shahid et al., 2022). Yet, a comprehensive framework that integrates these perspectives with technology adoption in inter-organisational settings remains undeveloped.

Filling the knowledge gap, our research aims to investigate the trust-building factors and synthesise a comprehensive overview of trust-building mechanisms in organisational decisions regarding blockchain adoption. Hence, we seek to answer the following questions:

RQ. *What are the trust antecedents for organisational blockchain adoption, and through what specific mechanisms do these antecedent foster trust?*

We use a grounded theory approach (Gioia et al., 2013) and conduct 20 semi-structured, in-depth interviews with purposefully sampled decision-makers from various organisations in China. As one of the world's largest economies, China represents a significant potential market for blockchain adoption and diffusion. Characterised by centralised trusted governance, China adopts a dual approach to blockchain: it officially prohibits cryptocurrency trading since 2019 while simultaneously promoting blockchain development across various sectors (CAICT, 2022; Xiao et al., 2024). This dual stance offers a unique context for blockchain research, complementing existing research primarily from western countries (e.g., Agi & Jha, 2022; Falcone et al., 2021) and India (e.g., Kamble et al., 2019; Yadav et al., 2021).

Through iterative coding of interview data, we identify six key antecedents of trust: culture values, business value, institutional infrastructure, information externalities, signalling, and leadership engagement. We also emphasise two specific mechanisms – *compatibility* and *informativity* – that foster trust. Culture values, business value, and institutional infrastructure promote trust through compatibility, while information externalities and signalling exemplify the informativity mechanism. Leadership engagement is crucial in demonstrating both trust-building pathways. We develop a compatibility-informativity matrix to illustrate these influences. These trust-building mechanisms are synthesised by integrating empirical findings with existing theories, including agency theory, signalling theory, and the concept of compatibility from the diffusion of innovation theory. Drawing inspiration from the notion of blockchain as an embedded software agent (Falcone et al., 2021) and the principal-agent

relationships within blockchain networks (Hacker et al., 2023), we extend the scope of agency theory from human interactions to human-technology interactions, enhancing trust through improved compatibility and accurate, complete information.

This study contributes to the literature in three ways. First, it enhances understanding of trust in organisations' decision to adopt blockchain technology. Previous research has identified trust as a key driver of blockchain adoption; our study extend this by systematically exploring all influential trust antecedents and the specific compatibility-informativity mechanisms that promote trust.

Second, we extend the scope of agency theory and integrate it with signalling theory and the concept of compatibility from the diffusion of innovation theory to develop a unified theoretical perspective of trust-building in both technological and organisational contexts. The compatibility mechanism reflects the alignment between the features and uses of an innovation and the values, needs, and infrastructure of an organisation and the broader social environment, along with the alignment of varying interests among organisations. It adapts the concept of incentive alignment from agency theory to accommodate human-technology relationships. The informativity mechanism involves bridging information gaps between trustors and trustees to build trust, incorporating the core idea of promoting complete information from agency theory and credible signals from signalling theory. This contributes a unified theoretical framework for trust-building to the broader trust literature.

Third, we highlight the potential of agency theory and signalling theory in providing effective trust-building mechanisms in organisational contexts. We advocate for further research integrating these theories with the trust literature, responding to the calls of Beccerra & Gupta (1999) and Lumineau et al. (2023). Many existing studies rely on transaction cost economics and social exchange theory to explain trust decisions in inter-organisational settings, prioritising calculative and relational trust. However, the straightforward trust-building capabilities of agency theory and signalling theory have been relatively underexplored. Our findings demonstrate the effectiveness of combining these theories as a comprehensive approach to fostering trust between organisations.

Following the introduction, Section 2 reviews pertinent literature. Section 3 describes the method. Section 4 explores key trust antecedents and how they influence trust through specific trust-building mechanisms to address the RQ. Section 5 provides a synthesised theoretical overview of trust-building. Section 6 concludes.

2 Literature review

The unit of analysis in trust literature is highly diverse, encompassing relationships between individuals (Malhotra & Murnighan, 2002), between organisations (Villena et al., 2019), between individuals and organisations (Ammeter et al., 2004), between individuals and technologies (Söllner et al., 2016), between organisations and technologies (Hasija & Esper, 2022), as a general characteristic of different societies (Delhey et al., 2011), and as a personal trait (Ito, 2022). It includes any dyadic relationship among individuals, groups of individuals, or with technologies. This literature review focuses on the theoretical perspectives of building trust between organisations and between organisational decision-makers and technologies in subsection 2.1. The two relationships are mostly relevant in blockchain adoption decisions. Subsection 2.2 examines the current research on trust-building for blockchain adoption.

2.1 Theory of trust-building

Trust, with its long historical roots and broad relevance, has been defined in various ways throughout the literature. Rousseau et al. (1998) and Fulmer & Gelfand (2012) highlight two key dimensions in these definitions: *positive expectations of trustworthiness*, which pertain to perceptions, beliefs, or expectations about the trustee's intention, and *willingness to accept vulnerability*, typically indicating an inclination or a decision to take risk. One commonly used definition of trust is thereby 'the willingness of a party [trustor] to be vulnerable to the actions of another party [trustee] based on the expectation that the other party will perform a particular action important to the trustor (Mayer et al., 1995).

Regarding inter-organisational trust, the economic and socio-psychological perspectives, particularly transaction cost economics (TCE) and social exchange theory (SET), are widely utilised (Khalid & Ali, 2017; Bai et al., 2024). TCE views inter-organisational trust as a rational evaluation of expected behaviour in others, supporting the concept of *calculative trust* (Williamson, 1993; Susarla et al., 2020). Given that inter-organisational relationships often involve transaction costs and the risk of opportunistic behaviour, trust is built through evaluation mechanisms like information processing, risk evaluation, and uncertainty perception (Becerra et al., 2008). Organisations must evaluate the trustworthiness of each transaction, carefully balancing the benefits of collaboration against the risks of a partner failing to fulfil their obligations (Poppo et al., 2016).

In contrast, SET emphasises the quality of social interaction between organisations as the basis for *relational trust* (Blau, 1964; Tan & Saraniemi, 2022). According to SET, trust is reinforced through successful, repeated interactions that foster mutual recognition of institutionalised rules and normative behaviours (Lioukas & Reuer, 2015). Key trust-building factors in inter-organisational settings typically involves past experiences and reputation (backward-looking),

current communication, and anticipated length of the relationship (forward-looking) (Khalid & Ali, 2017). Overall, the calculative and relational approaches primarily emphasise different philosophies of trust decisions – calculating trust before exchanges versus developing trust during exchanges.

Despite the prominence of TCE and SET in trust literature, the potential of agency theory (AT) and signalling theory (ST) for providing more straightforward trust-building mechanisms has perhaps been overlooked. AT addresses principal-agent relationships, focusing on diverging interests and information asymmetry as primary sources of distrust and advocating monitoring and incentive alignments as solutions (Arrow, 1984; Caldwell & Karri, 2005; Chawla, 2020). Although initially centred on owner-agent (manager/employee) dynamics, subsequent studies have depicted the firm as a nexus of contracts among various stakeholders (Gefen et al., 2008; Till & Yount, 2019). Early work by Shapiro (1987) emphasised AT's utility in explaining the production of impersonal trust, which relied on the systems, structures, and institutions that govern interactions rather than direct interactions between parties. Efforts to integrate AT with trust literature highlight its utility in environments where distrust is prevalent, suggesting further exploration of AT in trust research (Beccerra & Gupta, 1999). While direct references to AT in trust studies are limited (e.g., Chawla, 2020), its strategies, including incentive alignment and monitoring, are acknowledged as effective trust-building mechanisms (e.g., Narayanan & Raman, 2004; Schweitzer et al., 2018).

Similarly, ST addresses information asymmetry in markets by exploring how one party conveys credible information about themselves or their products to another party, thereby building trust (Spence, 1978; Perks & Halliday, 2003; Connelly et al., 2011). Organisational research recognises the role of credible signals in conveying trustworthiness. For example, in buyer-supplier relationships, a supplier's precontractual investments specific to a buyer is a costly signal of trustworthiness, even without a long-term contact (Beer et al., 2018). Li et al. (2024) apply ST to conceptualise a model in which contract completeness, contract compliance, and transaction-specific investment act as trust-building signals in ERP vendor-vendee relationships. Shahid et al. (2022) observe that both formal (third-party certification) and informal (claims of social entrepreneurship) reputational signals can influence stakeholder trust in non-profit organisations. Lumineau et al. (2023) suggests further investigation of ST to understand which credible signals distant trustees can send, distinguishing them from untrustworthy counterparts in the age of the fourth industrial revolution.

The importance of trust in technology is widely acknowledged as a key driver of technology adoption among both individual and organisational decision-makers (Benbasat & Wang, 2005; Roberts et al., 2021; Capestro et al., 2024). However, compared to the rich theoretical perspectives on inter-organisational trust, the theoretical foundations for building trust in

technology, especially among organisational decision-makers, are less developed and unified. For instance, Hasija & Esper (2022) propose several strategies through inductive analysis to establish AI's trustworthiness among organisational leaders. These include aligning workforce skills with AI-enabled infrastructure needs, demonstrating AI's reliability and efficacy in making human-like decisions, and addressing ethical concerns and job loss fears associated with AI. Such work often emphasises empirically derived insights rather than theoretical expansions of trust-building mechanisms. Additionally, the positivist approach utilises technology theories, such as technology acceptance model (TAM), diffusion of innovation (DOI), and unified theory of acceptance and use of technology (UTAUT), to explore organisational trust formation towards technology. Key variables such as perceived ease of use, compatibility, and social influence are often combined and act as trust antecedents (Prakash & Das, 2021; Tung et al., 2008; Hernandez-Ortega, 2011; Fan et al., 2020). While these technology theories are effective in formulating trust-building factors from diverse perspectives, a unified theoretical framework of trust-building in technology remain lacking.

In addition to these classic theories specific to building inter-organisational or technology trust, the concepts of *initial trust* versus *long-term trust*, along with various modes of trust production, provide a broader perspective applicable to both domains. Traditionally, trust is seen as developing gradually, beginning at low levels and increasing incrementally over time (Rempel et al., 1985; McKnight et al., 1998). This *long-term trust* aligns with *knowledge-based trust* research, which underscores trust production through first-hand knowledge accumulation from experiences with a specific entity (Lewicki & Bunker, 1995; Holsapple et al., 2008; Robert et al., 2009), and *affective-based trust*, built on emotional bonds and relationships that develop through repeated and consistent interactions over a long period (Lioukas & Reuer, 2015). These share some common traits of *process-based* trust production tied to past transactions and exchanges (Zucker, 1986)

However, earlier empirical evidence has revealed instances of high *initial trust*, also known as '*swift trust*', promoting further exploration into its formation. McKnight et al. (1998) define initial trust as trust in an unfamiliar party without substantial first-hand information and outline four key modes of its production: (1) *Personality-based* (faith in humanity), stemming from a person's lifelong experiences with key referents, which tends to remain relatively stable over time (Rotter, 1971); (2) *Institution-based* (formal societal structures), indicating reliance on impersonal structures or institutional environment in specific situations (Zucker, 1986; Shapiro, 1987); (3) *Calculative-based* (calculation of benefits and costs), rooted in the economic principles of rationally derived costs and benefits (Williamson, 1993); (4) *Cognitive-based* (second-hand knowledge), linked to categorisation process and illusions of control process, including factors like reputation, stereotyping, and unit grouping (Brewer et al., 1981), similar to Zucker's (1986) *characteristic-based* trust.

Initial trust is particularly relevant in technology adoption, where potential users navigate perceptions of risk and uncertainty before embracing new technologies (Benbasat & Wang, 2005; Fan et al., 2020). It encapsulates the immediate trust placed in new technology, system, or digital platform, based on limited information and initial impressions (McKnight et al., 2002; McKnight et al., 2011). Although various modes of trust production – initial and long-term – are often analysed to understand trust formation towards technology, these primarily focus on individual decision-makers (e.g., Li et al., 2008; Wang & Benbasat, 2008; Cabiddu et al., 2022; Kyung & Kwon, 2022). However, research on organisational decision-makers typically draws on insights from studies of individual users, treating them as a collective (e.g., Prakash & Das, 2021; Hernandez-Ortega, 2011; Fan et al., 2020). Therefore, these modes of trust production could also offer valuable insights for enhancing organisational technology adoption. **Table 1** summarises the theoretical perspectives of building inter-organisational and technology trust.

Table 1 The theoretical perspectives of trust-building.

	Theories specific to ...		General sources	Identified gaps
Inter-organisational trust	Transaction cost economics (TCE)	Rationally calculating trust before exchanges (calculative trust): rational evaluation	Long-term trust: Knowledge-based, Affective-based, Process-based Initial trust: Personality-based, Institution-based, Calculative-based, cognitive-based, characteristic-based	1. Despite the prominence of TCE and SET in trust literature, the potential of AT and ST for providing more straightforward trust-building mechanisms has perhaps been overlooked.
	Social exchange theory (SET)	Developing trust during exchanges (relational trust): successful repeated interactions		2. While these technology theories are effective in formulating trust-building factors from diverse perspectives, a unified theoretical framework of
	Agency theory (AT)	Diverging interests and information asymmetry as primary sources of distrust: incentive alignment and monitoring		
	Signalling theory (ST)	Addressing information asymmetry: credible signals of trustworthiness		

Trust in technology	Technology acceptance model (TAM)	Providing a foundation for selecting and combining various variables as trust antecedents, such as perceived ease of use, compatibility, and social influence		trust-building in technology, especially among organisational decision-makers, remain lacking.
	Diffusion of innovation (DOI)			
	Unified theory of acceptance and use of technology (UTAUT)			3. A unified perspective on trust-building both between organisations and towards technology is still lacking.

2.2 Research on trust-building for blockchain adoption

Trust in blockchain technology is a central theme in the literature, with various terms highlighting its importance: algorithm trust (Lustig & Nardi, 2015), trusting math (Nofer et al., 2017), blockchain trust (Wamba & Queiroz, 2022), trust in the technological code of blockchain (Ostern, 2018), lack of trust towards blockchain (Balci & Surucu-Balci, 2021), and trustworthiness of blockchain (Falcone et al., 2021). However, few studies focus on the core formation of trust in blockchain technology, particularly from an organisational perspective. One notable study by Falcone et al. (2021) examines how distributed ledger technology and peer-to-peer network influences perceived trustworthiness of blockchain, affecting managers' willingness to adopt it. Their insights, based on design theory, are valuable but may lack comprehensiveness in trust-building factors and a unified theoretical framework for trust-building mechanisms.

Recent developments have heightened the focus on inter-organisational trust for blockchain adoption, supported by increasing empirical evidence. Studies now affirm that a certain level of inter-organisational trust is crucial for collective adoption and effective collaboration in blockchain-based systems (Kopyto et al., 2020; Baharmand et al., 2021; Balci & Surucu-Balci, 2021; Batwa & Norrman, 2021; Sternberg et al., 2021; Brookbanks & Parry, 2022; Wamba & Queiroz, 2022; Guan et al., 2023; Yavaprabhas et al., 2023). Despite this, the specific factors and mechanisms that build trust between organisations in the context of blockchain adoption remain underexplored. Bai et al. (2021) contribute by identifying criteria for organisations to evaluate and select reliable blockchain service vendors and platforms within a supply chain environment, emphasising trustworthiness and expertise. However, they do not explicitly classify these criteria as trust-building factors. Furthermore, Sternberg et al. (2021) highlight

the significance of long-term trust between inter-organisational actors, noting that existing long-term trust could diminish the perceived need for blockchain adoption. This may indicate a gap in the literature that requires a more in-depth analysis of initial trust formation between organisations in blockchain contexts.

Overall, trust is universally recognised as a critical factor in blockchain adoption, encompassing both trust in the technology itself and in trading partners. However, research specifically focused on developing trust for blockchain adoption from an organisational perspective remains limited (**Table 2**). There is a notable gap in the detailed exploration of trust-building factors and theoretical frameworks that provide a cohesive view of trust-building mechanisms.

Table 2 Summary of research on trust as a key driver in blockchain adoption

	Importance as a key driver of adoption	Specific trust-building factors and mechanisms
Trust in blockchain technology (early emphasis)	Algorithm trust (Lustig & Nardi, 2015), trusting math (Nofer et al., 2017), blockchain trust (Wamba & Queiroz, 2022), trust in the technological code of blockchain (Ostern, 2018), lack of trust towards blockchain (Balci & Surucu-Balci, 2021), and trustworthiness of blockchain (Falcone et al., 2021). Trust in blockchain technology (Gan & Lau, 2024)	Distributed ledger technology and peer-to-peer network, based on design theory (Falcone et al., 2021)
Inter-organisational trust (recent emphasis)	Certain level of inter-organisational trust necessary for adoption: Kopyto et al., 2020; Baharmand et al., 2021; Balci & Surucu-Balci, 2021; Batwa & Norrman, 2021; Sternberg et al., 2021; Brookbanks & Parry, 2022; Wamba & Queiroz, 2022; Guan et al., 2023; Yavaprabhas et al., 2023	Criteria for organisations to evaluate and select reliable blockchain service vendors and platforms, emphasising trustworthiness and expertise; however, they do not explicitly classify these criteria as trust-building factors (Bai et al., 2021) Long-term trust (Sternberg et al., 2021)

3 Method

As there is a limited understanding of trust formation in organisations' decisions to adopt blockchain technology, we conduct an inductive, qualitative study utilising grounded theory approach (Gioia et al., 2013; Glaser & Strauss, 2017). This method is widely employed in organisational qualitative research for formulating constructs, frameworks, and theories (Martin & Turner, 1986). Through iterative processes of collecting and analysing empirical

data alongside relevant literature (Gioia et al., 2013), we seek to identify key trust antecedents and the specific mechanisms through which they cultivate trust.

3.1 Research setting

Our research setting is situated in China, providing a compelling context for our study based on three primary considerations. First, China has one of the largest populations globally and a deep-rooted emphasis on scientific and technological development. This creates a vast potential market for blockchain technology adoption and diffusion. Second, the Chinese government has adopted a dual approach to blockchain. While officially prohibiting cryptocurrency trading since 2019 to align with broader financial and social policies, it has simultaneously promoted blockchain development in various sectors like the digital yuan (CBDC), non-fungible token (NFT), cross-border finance, carbon emission traceability, digital evidence, supply chain, and public service (CAICT, 2022; Xiao et al., 2024). The interplay between stringent regulations and active promotion of blockchain technology may introduce complexities that impact trust in blockchain and adoption decisions. Third, China's cultural values and institutional infrastructure, characterised by collectivism and centralised governance, provide a unique perspective on trust-building mechanisms for decentralised technology. The research setting complements predominantly studied organisational blockchain adoption in western countries (e.g., Agi & Jha, 2022; Falcone et al., 2021) and India (e.g., Kamble et al., 2019; Yadav et al., 2021). Understanding how to build trust for organisational blockchain adoption in China is crucial for developing effective strategies practically and laying the foundation for future research to compare trust-building mechanisms across different cultural and institutional contexts.

3.2 Data collection

Given the current lack of knowledge about blockchain technology, we investigate this topic in a selected and information-rich setting, as recommended in qualitative research (Patton, 2014; Tan & Saraniemi, 2022). Accordingly, our informants are top- and middle-level managers selected from Chinese firms that: 1) have either adopted, are considering adoption, or have considered and rejected blockchain technology in their business operations (non-cryptocurrency initiatives)¹; and 2) possess knowledge and experience with blockchain

¹ In China, blockchain segments are categorised into the *chain circle* and *coin circle*. The chain circle focuses on the practical applications of blockchain technology in various industries, such as supply chain management, data storage, identity verification, financial services, excluding cryptocurrency trading or speculation, which are associated with the coin circle. Our research specifically targets blockchain adoption in the chain circle, and due to regulatory constraints, no firms registered in China are engaged in the coin circle such as DeFi, GameFi, and SoFi.

technology. These criteria ensure that key informants offer a useful and profound understanding of blockchain technology and the decision-making processes surrounding it.

Due to the inherent difficulty in accessing targeted elite practitioners, we initially identify informants through personal contacts within our universities and alumni networks (Wiersema & Mors, 2023). We employ the snowball sampling technique for recruitment, where initial informants suggest other managers from their professional networks (Biernacki & Waldorf, 1981). This enables us to expand our reach to a broader network of executives and managers. While we cannot completely eliminate bias in our sampling, the diversity in terms of geography (i.e., diverse provinces/cities in China), sectors (including manufacturing such as automobile, shipbuilding, fridge, and new energy, and services such as banking, tourism, IT, real estate, and logistics), as well as interviewee experiences and backgrounds (e.g., finance, management, consulting, Internet, and technology), indicates our ability to mitigate bias and capture a broad spectrum of perspectives (Wiersema & Mors, 2023). A description of our informants is presented in Appendix A. The number of informants was not pre-determined; we adhere to the principle of saturation, halting data collection when no new information emerges (Gummesson, 2005).

Between July and November 2023, we conducted 20 semi-structured online interviews (ranging from 50 minutes to 2 hours; total 23.32 hours) with managers from 19 different enterprises in China. Semi-structure interviews offer flexibility and consistency, making them suitable for gaining a deeper understanding of poorly understood phenomena (Berg & Lune, 2016; Kowalski et al., 2021). We ensured complete anonymity for the informants to foster open discussions. The interviews are conducted in Chinese, as it is the informants' native language. For each interview, we provided an interview guide with open-ended questions as shown in Appendix B. To avoid biasing our informants in the interviews, we adhered to Charmaz (2006)'s suggestions, listening and observing with sensitivity to surface unanticipated statements and stories. We began with broad questions and then probed further with follow-up questions based on informant responses. For example, if an informant expressed scepticism or shared an experience, we asked 'why' questions to obtain more details. Additionally, as we gained insights from our interviews, we adjusted and added questions to our standard interview protocol to capture more detail on specific issues (Gioia et al., 2013; Wiersema & Mors, 2023).

3.3 Data analysis

The interviews were recorded, transcribed, and translated into English. To enhance the reliability of our interview data coding, we implemented three general rules. First, a coding panel was established, led by the first author and comprising two co-authors. The panel leader manages the method design and conducts the coding process. One member cross-verifies each step, resolving interpretational differences through discussion or regular meetings with the

other member. Second, data analysis proceeds concurrently with data collection to ensure that further interviews can be conducted if saturation, signifying no new variation in higher-order themes, is not achieved (Charmaz, 2006; Wiersema & Mors, 2023). Third, Gioia et al.'s (2013) procedures for analysing interview data are followed to ensure qualitative rigour, with NVivo R1 facilitating the coding process. This involves four iterative steps: creating first-order concepts, identifying second-order themes, aggregating dimensions, and developing a holistic understanding of the specific mechanisms through which these aggregated dimensions of trust antecedents build trust in blockchain adoption decisions.

In the first step, we coded the interview data into first-order concepts and addressed overlaps and redundancies among these concepts, a process akin to the notion of open coding (Strauss & Corbin, 1998). Throughout the process, we adhere to 'informant terms', ensuring that the development of first-order concepts reflected the perspectives and experiences of the informants (Gioia et al., 2013). For example, statements expressing perceptions of blockchain's utility were coded into first-order concepts such as 'blockchain for empowering trustworthy collaboration between (cross-border) businesses', 'blockchain for enhancing brand influence and impression', 'blockchain for facilitating automatic community governance through smart contracts', 'significant features of blockchain such as proof of origin, data ownership, and security', and 'linking blockchain deployment with enhanced profitability directly is often challenging, given high costs for experimentation and setup'.

The second step involves systematically analysing, comparing, and organising first-order concepts into more abstract, conceptual themes, akin to axial coding (Strauss & Corbin, 1998). While exploring similarities and differences among the concepts, we not only delved into the interview data but also examined relevant literature to ascertain if these concepts and their categorised themes are novel or established theoretically (Nag & Gioia, 2012). This approach helps us establish connections with existing literature and explore novel themes within our context (Gioia et al., 2013). For instance, the aforementioned first-order concepts on blockchain's utility were categorised under the theme of 'perceived usefulness', a well-established construct in technology adoption literature. This includes both positive and negative aspects derived from our interview data. Other first-order concepts, such as 'the case for blockchain use is not convincing when other solutions could suffice' and 'the blockchain demand from key customers may heighten the perceived necessity for adopting blockchain', converged under the theme of 'perceived necessity', an emerging concept in our research context.

Once a workable set of themes and concepts is in hand, in the third step, we explored the potential to distil emergent second-order themes further into aggregate dimensions (Gioia et al., 2013). We navigated between qualitative data and literature to 'make connections between

concepts' (Corbin & Strauss, 2008: 70) and better comprehended emergent patterns. For example, the second-order themes such as 'perceived usefulness' and 'perceived necessity' were aggregated into the dimension of 'business value'. Through iterative engagement with the data and existing literature, we developed two specific trust-building mechanisms. These mechanisms coherently and consistently explain how the identified diverse trust antecedents cultivate trust in adoption decisions. The data structure illustrating our progression from raw data to themes, aggregated dimensions, and the two holistic trust-building mechanisms is provided in **Figure 1**.

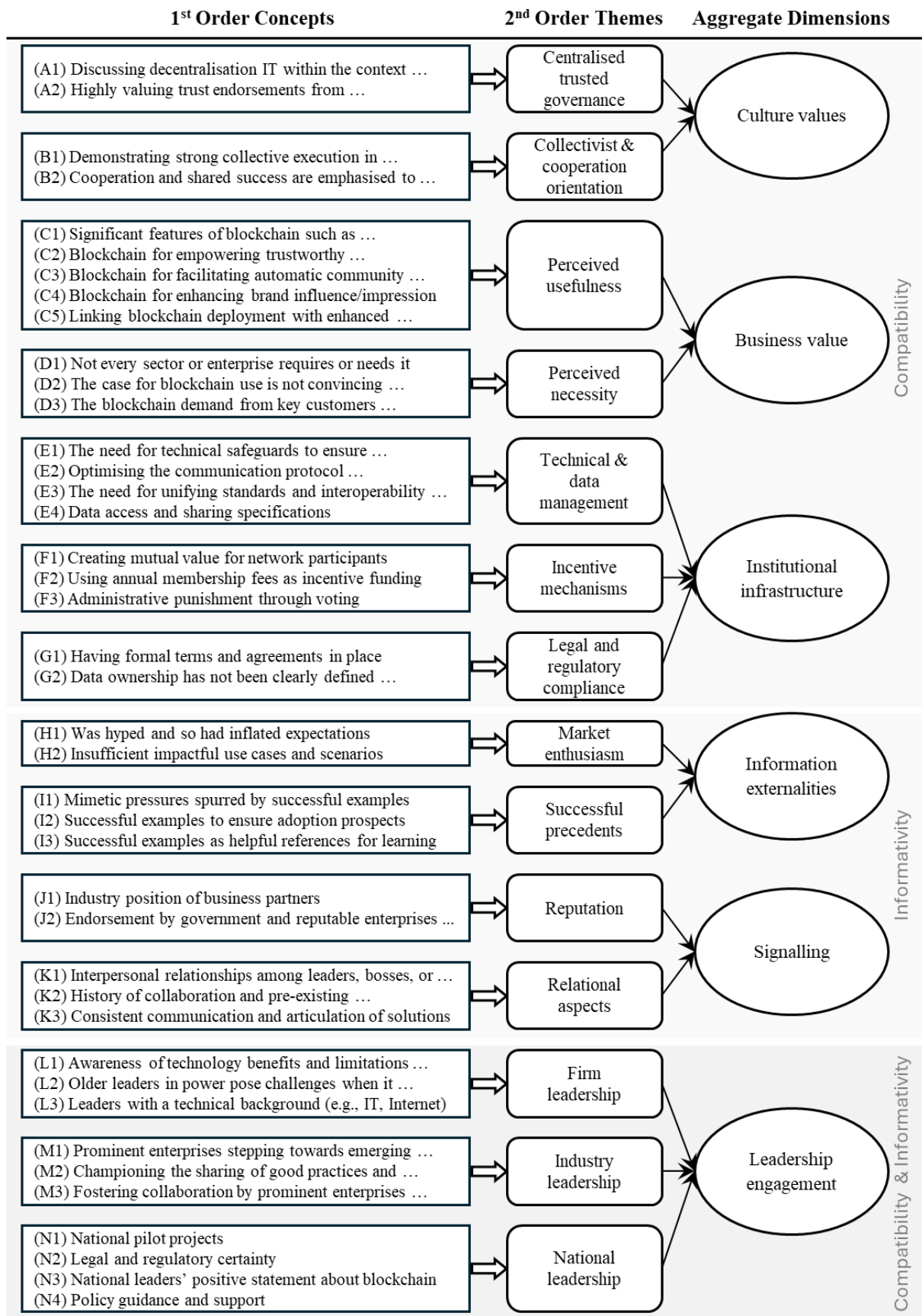


Figure 1 Data structure: The identification of trust-building antecedents and mechanisms.

Notes: (A1) of China can be difficult as the country operates highly centralised architectures; (A2) the reciprocal government and reputable enterprises when assessing new technologies or trading partners; (B1) implementing leadership decisions; (B2) leverage the large domestic market for more opportunities; (C1) proof of origin, data ownership, and security; (C2) collaboration between (cross-border) businesses; (C3) governance through smart contracts; (C5) profitability directly is often challenging; (D2) when other solutions could suffice; (D3) may heighten the perceived necessity for adopting blockchain; (E1) the security, integrity, and functionality; (E2) of blockchain and addressing system complexity; (E3) among various partners and blockchain systems; (G2) in legal and regulatory aspects; (J2) such as partnerships, customer base, licenses, certification, and awards; (K1) managers (boundary spanners); (K2) inter-organisational business relationships; (L1) at the top leadership level is needed; (L2) comes to embracing novel technologies, as they are often more sceptical of technology; (M1) technologies serve as guiding lights in cultivating awareness of this technology in the market; (M2) establishing standards, led by prominent enterprises and industry associations; (M3) and industry associations, both among enterprises and between enterprises and governments, to harness network effects.

4 Trust-building antecedents and mechanisms

We identify six key trust antecedents – *culture values*, *business value*, *institutional infrastructure*, *information externalities*, *signalling*, and *leadership engagement*, and emphasise two specific mechanisms – *compatibility* and *informativity* – that foster trust in blockchain adoption decisions, addressing the RQ. Compatibility reflects the alignment between the features and uses of an innovation and the values and needs of an organisation and the broader social environment, along with the varying interests among organisations. Informativity involves having sufficient information to build trust. Specifically, culture values, business value, and institutional infrastructure promote trust through compatibility, whereas information externalities and signalling embody the informativity mechanism. Leadership engagement plays a crucial role in demonstrating both pathways for trust-building in blockchain adoption.

In this section, we present each trust antecedent and illustrate its influences on trust via compatibility and informativity mechanisms. Then, in next section 5, we discuss the theoretical underpinnings of our trust-building mechanisms and introduce a compatibility-informativity matrix (**Figure 2**) that integrates all these antecedents. This framework aims to link our empirical findings with the broader trust literature and offer an overarching theoretical perspective on these trust-building strategies.

4.1 Culture values

Our interviews show that the compatibility of an innovation with the cultural values of potential adopting organisations and the broader social environment significantly influences trust in the technology itself. In our context, centralised trusted governance and a collectivist, cooperative orientation are main themes that facilitate or impede trust for blockchain adoption.

Centralised governance can potentially conflict with the decentralised philosophy of blockchain technology. The term ‘decentralisation’ itself carries sensitivity, as it may imply ‘*diminishing certain aspects of government and organisational management*’ (Informant Q) or ‘*the decentralisation of power*’ (Informant L). Informant R emphasised the caution regarding its usage in businesses, stating ‘*Especially for domestic enterprises involved in government business or large state-owned enterprises, they generally avoid talking about decentralisation; people don’t like to hear that term*’. Additionally, ‘*Purely decentralised applications, like DAOs, are not expected to see significant growth in China*’, as noted by Informant M. Organisations with less hierarchical management structures are more likely to adopt blockchain for corporate or community governance due to more compatible values, although this is not typical in our context, as indicated by Informant I and S.

However, this does not mean that blockchain cannot find a way to be trusted or aligned within centralised governance contexts. Informant R suggests that a more acceptable term like *‘distributed technology’* is preferred and utilised. Features of blockchain such as *‘security, traceability, and automated execution’* (Informant R), consistent with the existing values and needs of decision-makers, are perceived as more trustworthy. In China, a prominently utilised and promoted area of blockchain is digital evidence preservation, serving as a *‘more guaranteed means of storage’* (Informant P) or helping to *‘confirm data ownership and authenticity’* (Informant M).

We also observe the potential for blockchain to gain swift trust and widespread adoption due to centralised but trusted governance, and a collectivist, cooperative orientation. Businesses often have high levels of trust in reciprocal government and reputable third-parties, relying on external endorsements to assess the trustworthiness of new technologies or partners. Informant M emphasised, *‘The most critical factor in China is that having the endorsement of government credibility or support from significant companies plays a vital role in building trust and driving technology development at this stage’*. There is strong collective execution in implementing leadership decisions at both organisational and national levels. As Informant A noted, *‘In China, when leaders speak, regardless of whether others understand blockchain or not, everyone starts learning (...) China’s situation has this advantage that when leaders make decisions, everyone follows’*. Furthermore, cooperation and shared success are valued with a strong *‘we’* consciousness, aligning well with the philosophy and requirements of blockchain consortiums implementation. Informant B illustrated, *‘The domestic market is large, and competition between companies hasn’t reached a life-and-death level. Instead, we all need to work together to create more market opportunities’*. Informant N added, *‘I believe there’s still a need for data resource sharing between companies and industries. It’s all about mutual success (...) That is the business mode that we value in China’*.

Therefore, despite the inherent conflict between blockchain’s decentralised nature and China’s centralised governance, there is a potential for swift trust in blockchain technology. This trust can be fostered through endorsements from the government, institutions, and leadership within the centralised trusted system. Moreover, the strong execution and cooperative orientation of collectivist culture can enhance the commercialisation and implementation of blockchain innovations.

4.2 Business value

Our interviews reveal that the alignment of blockchain benefits with the business needs of potential adopting organisations significantly influences trust in the technology. Perceived usefulness and necessity are key themes in its business value. Positive perceptions center around *‘data ownership’* (Informant M), *‘automatic community governance’* (Informant I), and

‘brand influence and impression’ (Informant D). Blockchain’s utility is particularly acknowledged in cross-border businesses, where reliance on a single government authority for trust is not feasible. As emphasised by A Chief Executive Officer of an IT firm:

Regardless of whether it’s data or carbon emissions, especially within China, a powerful government might make it feasible. However, once we step outside the country, participating in initiatives like the Belt and Road, it will inevitably require blockchain technology to solve trust and consensus between countries (Informant M).

Despite these technical advantages, managers are sceptical about its business value in achieving profitability given high costs for experimentation and setup. Negative cost perceptions are evident through statements like *‘high costs for experimentation and setup’* (Informant B), *‘the cost of building and operating a decentralised system increases with more participants’* (Informant E), and *‘the costs of starting from scratch and building a collaborative system are high’* (Informant J). Informant M highlighted, *‘Linking the technology and profitability directly is often challenging’*.

The necessity of blockchain is questionable in non-data-centric sectors (beyond finance and supply chain management), particularly when alternative solutions could suffice and key customers show no demand for it. An industry analyst of an IT firm suggested that China’s robust trust mechanisms mitigate the urgent need for blockchain solutions compared to regions with significant cross-border trust issues:

I also think that there might not be such an urgent need in China, as the overall trust mechanisms here are quite good. Unlike abroad, where there might be trust issues when goods move from one country to another, it’s not a big problem in China. With China’s vast land area, it’s not like Europe or Africa, where goods have to cross multiple countries. Additionally, if you commit a crime, you can’t escape within the country, and the cost and consequences of deception are significant (Informant E).

Overall, while blockchain’s technical advantages are recognised in China, it must overcome cost challenges and demonstrate its necessity for business utilisation to gain widespread trust and implementation.

4.3 Institutional infrastructure

Our interviews show that institutional infrastructure is essential for the orderly and efficient functioning of a blockchain system, fostering trust in the system and among participating organisations. Concerns primarily revolve around human factors, ensuring a trustworthy system, and addressing governance issues, particularly in the context of adopting blockchain consortiums. As noted by Informant R, *‘Addressing the human factor from a governance or*

institutional perspective is crucial, with responsibilities extending to all relevant parties, such as technology providers and participants'. Three core aspects of institutional infrastructure emerge: technical and data management, incentive mechanisms, and legal and regulatory compliance.

First, technical safeguards are essential to ensure the security, integrity, and functionality of blockchain systems, cultivating trust for adoption. Informant A highlighted, *'All these (blockchain) advantages are predicated on the assumption that the algorithm works successfully'*. Efforts such as *'optimising the communication protocol of blockchain'* (Informant G) and *'unifying standards and interoperability'* (Informant A) are proposed to enhance technical infrastructure. Data access and sharing specifications should also be embedded in the technological structures, as data is a significant asset for organisations using blockchain. Not all data should or can be shared or made public, such as *'specific contract details'* (Informant R), *'R&D, production, and internal data'* (Informant Q), and *'identity and transaction details'* (Informant A). Restricting data access to relevant parties is advocated, supported by Informant A's statement that *'Transaction records should only be accessible to the transacting parties, not outsiders'* and Informant G's recommendation to *'restrict data usage to authorised participants to prevent misuse'*. Additionally, Informant K suggested, *'Sensitive data should be desensitised or disclose as little as possible on the public network'*.

Second, incentive mechanisms are proposed to align the interests of participating organisations. Currently, incentive mechanisms in blockchain consortiums are lacking. Informant R noted, *'In consortium blockchains where nodes often record based on functional needs rather than incentives. Determining how to incentivise, who will do the incentivising, and who will fund the incentives is difficult at the moment (they cannot issue cryptocurrency)'*. To implement rewards, blockchain consortiums must create mutual value for network participants and sponsors, as highlighted by Informant A, *'If the chain merely wants to gather others' information, others won't be willing'*. Sustainable value creation within the ecosystem supports the feasibility of implementing *'collection of membership fees annually'* (Informant R) as the funding source for incentives. Additionally, a punishment mechanism should be in place for organisations violating governance rules. A procurement manager of a logistic firm stated:

Punishment tends to be more administrative. For smaller errors, the punishment might involve suspending the company's qualification to participate in recording or halting its benefits in the consortium chain for several months. For more severe cases, a vote by all members might result in expulsion from the consortium chain (Informant T).

Third, legal and regulatory compliance is crucial for a trustworthy blockchain system. Clear policies on advisory board, incentive mechanisms, and data ownership and usage, both within blockchain systems and legal frameworks, are necessary to mitigate risks, ensure proper

conduct, and enhance trust. Informant R emphasised the importance of establishing formal terms and agreements: *‘When joining the chain, there should be certain terms and agreements in place, such as fines for errors’*. The informant also noted the lack of regulations regarding data ownership in blockchain systems: *‘In theory, data that can be written to the nodes should belong to all nodes. However, it seems that this hasn’t been clearly defined yet in terms of legal and regulatory aspects. This could be a source of distrust’*.

In summary, fostering trust for blockchain adoption among organisations requires an institutional infrastructure that effectively manages their needs and harmonises their diverse interests. Such infrastructure also promotes more compatible system use across these organisations.

4.4 Information externalities

Our interviews find that information externalities significantly influence trust in the technology by providing information to enhance understanding. Information externality refers to the spillover effects of information impacting organisations not directly engaged in specific blockchain initiatives. Key themes like market enthusiasm and successful precedents illustrate the role of information externalities in trust-building of our context.

Currently, organisations perceive a decline in market enthusiasm for blockchain, often due to inflated expectations and doubts about its potential. For example, Informant B observed that interest in blockchain *‘isn’t as fervent as before’*. Informant E expressed disappointment, stating, *‘The actual benefits that blockchain can bring are not as dazzling as one might imagine’*. Prominent use cases and scenarios beyond digital currencies remain limited. Informant C described blockchain explorations in real estate as *‘adding the icing on the cake’*. Informant H highlighted the contrast with other Industry 4.0 technologies like artificial intelligence, remarking *‘Technologies like AI and ChatGPT have a more direct impact on everyone. The influence of blockchain isn’t very obvious yet, and many people don’t feel its effects in business or real life’*.

Successful precedents are expected to provide valuable information and foster trust in the technology amid hype and disillusionment. Informant B explained, *‘I’ve been researching blockchain online, but my understanding remains rooted in interpretations from 2018 to 2020, primarily concerning virtual currencies. More information on its organisational utilisation is needed’*. Three mechanisms are emphasised for successful precedents in building trust. First, they serve as valuable references for comprehension and learning. An account manager of an international bank described a common process for decision-makers approaching a technology:

This is essentially a process of moving from observations to understanding the essence. From a practical perspective, managers usually prefer to understand the technology's characteristics from observed use cases rather than starting with the underlying logic of this technology (Informant K).

Second, successful examples alleviate adoption fears and foster positive expectations. Informant J observed, *'When people see that blockchain technology has been successful in one domain, they are more likely to believe that it can produce similar positive results in other areas'*. Positive feedback on engaging in digital collectibles builds trust in similar endeavours: *'Since (...) the current market response has been positive without any negative effects on enterprises or scenic areas, our company's leadership believes this endeavour is viable and has placed trust in our push forward'* (Informant C).

Third, mimetic pressures from successful precedents encourage emulation among industry peers to maintain competitiveness, especially in uncertain situations. Informant C noted, *'The trendiness and novelty of the subject, with many companies pursuing it – we can't afford to lag behind'*. Informant B added, *'The decisions made by industry participants might have a greater impact on us. It's not about whether I trust them or not, but rather that I trust their decision-making choices'*.

Overall, the success or failure of blockchain initiatives by one organisation offers valuable insights for others considering the technology. Establishing successful precedents will require time but is crucial for building widespread trust by promoting accurate and complete information.

4.5 Signalling

Our interviews indicate that signalling is crucial for building inter-organisational trust, necessary for blockchain adoption. Unlike information externalities, signalling is often intentional, involving the act of conveying information about oneself or ones' intentions through actions or symbols. Effective signals are those that cannot be easily mimicked by those lacking the desired qualities or intentions. In our context, reputation and relational signals are effective, reflecting, to some extent, the cultural values of centralised trusted governance and a collectivist, cooperative orientation.

On one hand, reputation serves as a highly valued signal of an organisation's quality. Larger enterprises, especially those in leading industry positions, are typically viewed as more dependable. Informant J noted, *'People generally feel that larger companies are more reliable, both in terms of the implementation of the technology itself and in resolving disputes when issues arise'*. Official recognition and support from the government and reputable enterprises,

such as partnerships, customer base, awards, and qualifications (e.g., license and certifications), effectively build inter-organisational trust for cooperation. For instance, a Chief product officer of an IT firm shared how collaboration with CAICT eased initial resistance from potential adopters:

Before we collaborated with the CAICT, when we were negotiating with some financial institutions, they were often hesitant to use our system. They didn't want to use our technology and, to some extent, didn't trust our system because we are a company, and promoting this kind of cooperation was quite challenging (...) However, after our collaboration with CAICT, when we engaged with enterprises, their initial resistance or difficulties had significantly eased (Informant M).

On the other hand, relational signals are an effective way to convey good intentions based on communication and relationships. Pre-existing interorganisational business relationships, such as '*a history of collaboration*' (Informant B), or interpersonal connections among leaders, bosses, or managers, for example, '*within the same social circle*' (Informant M), help cultivate stable trust relationships. Highlighting the advantages of relying on familiar technology providers, Informant K stated, '*We usually select from technology providers with whom we have a history of cooperation. Previous collaborators are more familiar with our compliance requirements, our cooperation, our system's entry interfaces, and the regulatory framework of the banking industry*'. Moreover, consistent communication and clear articulation of solutions are essential for establishing trustworthiness with clients. Informant I remarked, '*Many might not understand this; therefore, clear explanations of technological principles and proposals by providers definitely increase trust and confidence.*'

To summarise, by effectively using signals, organisations can reduce information asymmetry, demonstrate their credibility, and build trust with others. This, in turn, facilitates smoother and more efficient transactions and relationships.

4.6 Leadership engagement

Our interviews underscore the pivotal role of leadership engagement in building trust for blockchain adoption through both compatibility and informativity mechanisms. Leadership support or rejection of the technology reflects its perceived compatibility with organisational needs, influencing its further integration and trust within organisations and industries. As leaders engage with blockchain, they disseminate or generate information about it, influencing trust. For inter-organisational trust, leadership can align diverging interests and deliver signals of trustworthiness. Specifically, leadership exerts significant influence across multiple levels – firm, industry, and national.

Internal leadership (i.e., firm leadership) emphasise the importance of top leaders' technological awareness in fostering organisational trust towards innovation and change. Informant B explained, *'From the company's perspective, trust sources are quite simple. The boss needs to acknowledge and be aware of the technology'*. However, alignment challenges persist among top leadership in China, primarily due to scepticism from older executives and their lack of technical backgrounds.

Currently, social resources (funds) in China are mainly concentrated in the hands of those born in the 1960s and 1970s. Our boss has billions in assets, and it's already challenging for us younger generations to understand blockchain, let alone for them (Informant B).

From an operational standpoint, the leadership and decision-making levels of most Chinese enterprises are older and tend to be sceptical of novel concepts (Informant F).

You need to explain how blockchain can solve their problems, which isn't easy in the process we call market nurturing/education. Decision-makers are typically a large, non-technical group (...) In simple terms, they lack technological understanding (Informant M).

External leadership at the industry and national levels is crucial for building broader trust. According to Informant B, *'If the industry association shows interest, establishes standards, provides relevant guidance, or simply makes a statement, everyone's trust in blockchain technology will also increase'*. The informant also emphasised the role of the government and leading enterprises in driving technological exploration, expressing, *'I believe the development of emerging technologies in China's system requires the government, or rather, state-owned or leading enterprises, to take the lead. They need to bear the responsibility and obligation to lead in these initiatives. It's not feasible to expect a single company, especially a small one, in an industry to undertake this'*. Moreover, in establishing consortium blockchains, leading enterprises often act as a *'hub or central entity'*, with *'most organisations establishing connections and trust with this leading enterprise'* (Informant E). The leading party's role is emphasised in ensuring compatibility when forming consortium blockchains.

National leadership fosters trust for blockchain adoption through positive statements from national leaders, policies, national pilot projects, and definitive legal and regulatory frameworks, creating an environment conducive to blockchain adoption. This reflects an overarching tone set by upper-level leadership, serving as credible information. Informant J mentioned, *'Whether blockchain technology can serve as data storage is also a decision that needs to be made by upper-level leaders (national/government). If even the upper-level decision-makers have not resolved trust issues with blockchain technology, it's even more*

challenging for those below'. Organisations are more motivated to cooperate and adopt the technology under the guidance and safety net provided by national leadership.

Overall, leadership engagement has a pervasive impact on trust-building by promoting compatibility and generating information about the technology within and among organisations.

5 The synthesised overview: A compatibility-informativity matrix for trust-building

Initially, integrating the six diverse trust antecedents into a unified theoretical framework was challenging. We considered linking these antecedents to various trust production modes, such as personality-based, institution-based, calculative-based, cognitive-based, and knowledge-based. However, this approach resulted in a fragmented perspective with limited information on specific trust-building strategies. Social exchange theory, which orientates towards long-term trust developed through repeated interactions, fails to explain many trust-building factors in our context, especially those requiring initial trust before adoption. Transaction cost economics interprets trust-building through rational evaluation but may be too broad to elucidate the specific mechanisms underlying these trust-building factors, as rational evaluation is ubiquitous. While classic technology theories like the technology acceptance model provide specific trust-building factors for empirical models, they are not designed to explain the underlying trust-building mechanisms.

After iterative analysis and drawing on existing theoretical perspectives, we synthesised insights from agency theory, signalling theory, and the concept of compatibility from diffusion of innovation theory to develop a comprehensive trust-building framework. Agency Theory highlights the challenges in principal-agent relationships, such as divergent interests and information asymmetry, which are central to distrust (Caldwell & Karri, 2005; Chawla, 2020). In blockchain adoption, organisations are seen as contract networks involving various stakeholders like vendors, suppliers, and clients. Harmonising diverging interests within these networks necessitates impersonal governance structures, and reducing information gaps between trustees and trustors enhances trust. Rather than the traditional monitoring emphasised in agency theory, credible signals of trustworthiness – such as reputation and relational signals – mitigate information asymmetry and foster initial trust. This aligns with signalling theory, although it does not account for all trust antecedents.

Extending agency theory, we apply its principles to fostering trust in technology. IS research often views autonomous technologies as 'quasi-agents', treating artificial intelligence as a system-based artificial agent (Sullivan et al., 2022) and blockchain as an embedded software agent that substitutes traditional interfirm intermediaries (Falcone et al., 2020). This provides a foundation for broadening the scope of principal-agent relationships from human interactions to include human-technology interactions. Similar to aligning interests in inter-organisational

settings, the features and benefits of the technology need to align with the values, needs, and existing infrastructure of organisations and the broader social environment to be trusted. This principle mirrors the concept of compatibility in the diffusion of innovation theory, which defines compatibility as the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters (Rogers 1983, 1995). Note that compatibility extends beyond technology adoption and is also applicable in inter-organisational settings (Rajaguru & Matanda, 2011; Lu et al., 2016). Similar to how accurate and complete information fosters trust between organisations, direct or indirect interactions with the technology enhance understanding and build trust. Given that blockchain technology has not been widely adopted, indirect interactions such as use cases are critical in creating information externality and building trust in the market.

By integrating these concepts, we propose a holistic framework for trust-building in both technology and organisations: compatibility and informativity. The former broadens the scope beyond mere incentive alignment, and the latter stresses the importance of providing adequate information to establish trust. Error! Reference source not found. presents the framework, illustrating how compatibility and informativity serve as pathways for the six identified trust antecedents to influence trust in the technology and trading partners. Inspired by the management tools like the BCG Matrix and SWOT Analysis, this matrix format facilitates systematic analysis and decision-making of trust-building.

		Forms of trust	
		Organisation – Technology	Organisation – Organisation
Mechanisms of trust-building	Compatibility	Culture values Business value Institutional infrastructure Leadership engagement	Institutional infrastructure Leadership engagement
	Informativity	Information externalities Leadership engagement	Signalling Leadership engagement

Figure 2 A compatibility-informativity matrix for trust-building.

6 Conclusion

Despite growing focus on trust as a crucial factor in blockchain adoption for organisations, our understanding of how to effectively build trust remains limited. The broad trust literature does not offer a unified theoretical framework that explains trust-building in both technological and

organisational contexts. To bridge this gap, we adopt a qualitative approach, conducting interviews with executives and managers who have extensive blockchain experience in China. From these interviews, we identify six trust-building factors – culture values, business value, institutional infrastructure, information externalities, signalling, and leadership engagement – and two specific trust-building mechanisms: compatibility and informativity. These mechanisms are synthesised using agency theory, signalling theory, and the concept of compatibility in diffusion of innovation theory. We then use a matrix format to illustrate how compatibility and informativity serve as pathways for the six identified trust antecedents to influence trust in the technology and trading partners.

We offer guidance to organisational decision-makers on managing blockchain adoption by providing trust-building strategies for both technology and trading partners (Error! Reference source not found.). The core principles are enhancing compatibility and informativity. To build trust in the technology, it is essential to ensure its use fits within the values, needs, and existing infrastructure of organisations and the broader social environment. Specifically, culture values, business needs, institutional infrastructure, and leadership support are prominent compatibility-relevant trust-building factors. Providing accurate, complete information to improve understanding and acceptance of the technology is equally crucial. For building trust in trading partners necessary for blockchain adoption, effective strategies include aligning diverse interests through institutional infrastructure and leadership engagement, as well as diminishing information asymmetry through clear signalling of trustworthiness and leadership guidance. Notably, leadership engagement is particularly important, as it fosters trust through both compatibility and informativity mechanisms.

Two potential avenues for future research emerge. First, further exploration into trust formation in blockchain adoption decisions across different contexts, or through cross-context comparisons, would enhance the generalisability of our findings. Second, future research could test the synthesised theoretical framework through surveys and econometric analyses to assess its broader validity and utility.

Appendix A

Table A Informants description.

Informant	Position	Years	Area of expertise	City	Sector	Adoption phase	Duration
A	Former director	33	Bank management	Beijing	Banking	Adopting blockchain in digital finance	70 (min)
B	Procurement manager	10	Procurement management	Shanghai	Real estate	Not yet adopted	105
C	Product manager	8	Product management	Chengdu	Tourism	Adopting blockchain in digital collectibles/NFT	90
D	Market manager	16	Marketing	Chengdu	Tourism	Adopting blockchain in digital collectibles/NFT	60
E	Industry analyst	15	Industry research	Fuzhou	IT	Having considered blockchain in internal OA system, but rejected	60
F	Technology director	22	Technology department	Hangzhou	Manufacturing: Automobile	Not yet adopted	60
G	Technology strategy manager	11	Technology strategy	Beijing	Manufacturing: Shipbuilding	Deciding to adopt blockchain in IoT	50
H	Financial advisor	27	Finance and accounting	Beijing	Accounting	Not yet adopted	60
I	Technology director	22	Data security	Fuzhou	IT	Not yet adopted	60
J	Product manager	8	Game developing	Shenzhen	Internet-related	Adopting blockchain in Metaverse	50
K	Account manager	8	Corporate client management	Xiamen	Banking	Not yet adopted	75
L	Finance manager	11	Financial analysis and financing	Hangzhou	Real estate	Not yet adopted	60
M	Chief product officer	25	Finance and government projects	Beijing	IT	Adopting blockchain in digital construction	74
N	Head of engineering	12	Manufacturing process supervision	Wuhan	Manufacturing: new energy	Not yet adopted	56
O	Senior Associate	7	Audit and tax	Shanghai	Accounting	Not yet adopted	56
P	Senior Engineer	21	IT and software development	Beijing	Research institute	Setting industry criteria for blockchain	62
Q	Product manager	12	Product research and management	Shenzhen	Manufacturing: new energy	Not yet adopted	65
R	CEO	8	Internet and information technology	Shenzhen	IT	Adopting blockchain in user operation of E-commerce	110
S	President Assistant	5	Administration and collaboration	Qingdao	Manufacturing: fridge	Adopting blockchain in community governance and IoT	121
T	Procurement manager	10	Procurement management	Shanghai	Logistics	Adopting blockchain in supply chains	55

Appendix B

Interview Guide

I. Introduction

- Thank you to interviewee for participating in our study
- Purpose of the Study: With growing interest in blockchain technology among organisations, we aim to explore the influence of trust on adoption decisions and the factors that affect trust.
- Confidentiality: We assure interviewee that we operate under strict confidentiality. The identities of the enterprises and managers will remain anonymous and non-identifiable in the study.
- Recording Permission – If appropriate, audio recording will be used for the interview.

II. General background information

- Interviewee's role, years of experience, and areas of expertise within the organisation
- Background information about the organisation and its phases of blockchain adoption

III. Interview questions

- Why has blockchain technology been considered, adopted, or rejected in your organisation?
- How does trust play a role in the decision-making process?
- Will the factors influencing blockchain adoption also impact the overall trust required in decision-making within your organisation? Why or why not?
- How do these factors influence trust in blockchain adoption decisions?

References

- Agi, M. A., & Jha, A. K. (2022). Blockchain technology in the supply chain: An integrated theoretical perspective of organizational adoption. *International journal of production economics*, 247, 108458.
- Ammeter, A. P., Douglas, C., Ferris, G. R., & Goka, H. (2004). A social relationship conceptualization of trust and accountability in organizations. *Human Resource Management Review*, 14(1), 47-65.
- Arrow, K. J. (1984). The economics of agency.
- Bai, C., Zhu, Q., & Sarkis, J. (2021). Joint blockchain service vendor-platform selection using social network relationships: A multi-provider multi-user decision perspective. *International journal of production economics*, 238, 108165.
- Bai, J., Su, J., Xin, Z., & Wang, C. (2024). Calculative trust, relational trust, and organizational performance: A meta-analytic structural equation modeling approach. *Journal of Business Research*, 172, 114435.
- Balci, G., & Surucu-Balci, E. (2021). Blockchain adoption in the maritime supply chain: Examining barriers and salient stakeholders in containerized international trade. *Transportation Research Part E: Logistics and Transportation Review*, 156, 102539.
- Batwa, A., & Norrman, A. (2021). Blockchain technology and trust in supply chain management: A literature review and research agenda. *Operations and Supply Chain Management: An International Journal*, 14(2), 203-220.
- Becerra, M., Lunnan, R., & Huemer, L. (2008). Trustworthiness, risk, and the transfer of tacit and explicit knowledge between alliance partners. *Journal of Management Studies*, 45(4), 691-713.
- Benbasat, I., & Wang, W. (2005). Trust in and adoption of online recommendation agents. *Journal of the association for information systems*, 6(3), 4.
- Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological methods & research*, 10(2), 141-163.
- Blau, P. (1967). *Exchange and power in social life*: Routledge.
- Brewer, M. B. (1981). Ethnocentrism and its role in interpersonal trust. *Scientific inquiry and the social sciences*, 214, 231.
- Brewer, M. B., Dull, V., & Lui, L. (1981). Perceptions of the elderly: Stereotypes as prototypes. *Journal of personality and social psychology*, 41(4), 656.
- Brookbanks, M., & Parry, G. (2022). The impact of a blockchain platform on trust in established relationships: a case study of wine supply chains. *Supply Chain Management: An International Journal*, 27(7), 128-146.
- Cabiddu, F., Moi, L., Patriotta, G., & Allen, D. G. (2022). Why do users trust algorithms? A review and conceptualization of initial trust and trust over time. *European Management Journal*, 40(5), 685-706.
- Caldwell, C., & Karri, R. (2005). Organizational governance and ethical systems: A covenantal approach to building trust. *Journal of business ethics*, 58, 249-259.
- Capestro, M., Rizzo, C., Klietnik, T., Peluso, A. M., & Pino, G. (2024). Enabling digital technologies adoption in industrial districts: The key role of trust and knowledge sharing. *Technological Forecasting and Social Change*, 198, 123003.
- Carvalho, A. (2021). Bringing transparency and trustworthiness to loot boxes with blockchain and smart contracts. *Decision support systems*, 144, 113508.

China Academy of Information and Communications Technology (CAICT). (2022). *White Paper on Blockchain* (2022). Retrieved from http://www.caict.ac.cn/english/research/whitepapers/202303/t20230316_416842.html

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*: sage.

Chawla, C. (2020). Trust in blockchains: Algorithmic and organizational. *Journal of Business Venturing Insights*, 14, e00203.

Chen, R. R., Chen, K., & Ou, C. X. (2023). Facilitating interorganizational trust in strategic alliances by leveraging blockchain-based systems: Case studies of two eastern banks. *International Journal of Information Management*, 68, 102521.

Chen, Y., Ping, L., & Liang, F. H. (2023). Industry reputation crisis and firm certification: A co-evolution perspective. *Journal of business ethics*, 186(4), 761-780.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of management*, 37(1), 39-67.

Delhey, J., Newton, K., & Welzel, C. (2011). How general is trust in “most people”? Solving the radius of trust problem. *American sociological review*, 76(5), 786-807.

Falcone, E. C., Steelman, Z. R., & Aloysius, J. A. (2021). Understanding managers’ reactions to blockchain technologies in the supply chain: The reliable and unbiased software agent. *Journal of Business Logistics*, 42(1), 25-45.

Fan, W., Liu, J., Zhu, S., & Pardalos, P. M. (2020). Investigating the impacting factors for the healthcare professionals to adopt artificial intelligence-based medical diagnosis support system (AIMDSS). *Annals of Operations Research*, 294(1), 567-592.

Gan, Q., & Lau, R. Y. K. (2024). Trust in a ‘trust-free’ system: Blockchain acceptance in the banking and finance sector. *Technological Forecasting and Social Change*, 199, 123050.

Gefen, D., Wyss, S., & Lichtenstein, Y. (2008). Business familiarity as risk mitigation in software development outsourcing contracts. *MIS quarterly*, 531-551.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational research methods*, 16(1), 15-31.

Glaser, B., & Strauss, A. (2017). *Discovery of grounded theory: Strategies for qualitative research*: Routledge.

Guan, W., Ding, W., Zhang, B., Verny, J., & Hao, R. (2023). Do supply chain related factors enhance the prediction accuracy of blockchain adoption? A machine learning approach. *Technological Forecasting and Social Change*, 192, 122552.

Hacker, J., Miscione, G., Felder, T., & Schwabe, G. (2023). Commit or not? How blockchain consortia form and develop. *California Management Review*, 65(3), 110-131.

Hasija, A., & Esper, T. L. (2022). In artificial intelligence (AI) we trust: A qualitative investigation of AI technology acceptance. *Journal of Business Logistics*, 43(3), 388-412.

Hernandez-Ortega, B. (2011). The role of post-use trust in the acceptance of a technology: Drivers and consequences. *Technovation*, 31(10-11), 523-538.

Holsapple, C. W., & Wu, J. (2008). Building effective online game websites with knowledge-based trust. *Information Systems Frontiers*, 10, 47-60.

Ito, T. (2022). Effects of general trust as a personality trait on willingness to communicate in a second language. *Personality and Individual Differences*, 185, 111286.

- Kamble, S., Gunasekaran, A., & Arha, H. (2019). Understanding the Blockchain technology adoption in supply chains-Indian context. *International Journal of Production Research*, 57(7), 2009-2033.
- Khalid, S., & Ali, T. (2017). An integrated perspective of social exchange theory and transaction cost approach on the antecedents of trust in international joint ventures. *International Business Review*, 26(3), 491-501.
- Kopyto, M., Lechler, S., von der Gracht, H. A., & Hartmann, E. (2020). Potentials of blockchain technology in supply chain management: Long-term judgments of an international expert panel. *Technological Forecasting and Social Change*, 161, 120330.
- Kowalski, M., Lee, Z. W., & Chan, T. K. (2021). Blockchain technology and trust relationships in trade finance. *Technological Forecasting and Social Change*, 166, 120641.
- Kyung, N., & Kwon, H. E. (2022). Rationally trust, but emotionally? The roles of cognitive and affective trust in laypeople's acceptance of AI for preventive care operations. *Production and Operations Management*.
- Li, X., Hess, T. J., & Valacich, J. S. (2008). Why do we trust new technology? A study of initial trust formation with organizational information systems. *The Journal of Strategic Information Systems*, 17(1), 39-71.
- Lioukas, C. S., & Reuer, J. J. (2015). Isolating trust outcomes from exchange relationships: Social exchange and learning benefits of prior ties in alliances. *Academy of Management journal*, 58(6), 1826-1847.
- Lu, V. N., Plewa, C., & Ho, J. (2016). Managing governmental business relationships: The impact of organisational culture difference and compatibility. *Australasian Marketing Journal*, 24(1), 93-100.
- Lumineau, F., Schilke, O., & Wang, W. (2023). Organizational trust in the age of the fourth industrial revolution: Shifts in the form, production, and targets of trust. *Journal of Management Inquiry*, 32(1), 21-34.
- Lustig, C., & Nardi, B. (2015). *Algorithmic authority: The case of Bitcoin*. Paper presented at the 2015 48th Hawaii International Conference on System Sciences.
- Malhotra, D., & Murnighan, J. K. (2002). The effects of contracts on interpersonal trust. *Administrative science quarterly*, 47(3), 534-559.
- Martin, P. Y., & Turner, B. A. (1986). Grounded theory and organizational research. *The journal of applied behavioral science*, 22(2), 141-157.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management review*, 20(3), 709-734.
- McKnight, D. H., Carter, M., Thatcher, J. B., & Clay, P. F. (2011). Trust in a specific technology: An investigation of its components and measures. *ACM Transactions on management information systems (TMIS)*, 2(2), 1-25.
- McKnight, D. H., Cummings, L. L., & Chervany, N. L. (1998). Initial trust formation in new organizational relationships. *Academy of Management review*, 23(3), 473-490.
- Nag, R., & Gioia, D. A. (2012). From common to uncommon knowledge: Foundations of firm-specific use of knowledge as a resource. *Academy of Management journal*, 55(2), 421-457.
- Narayanan, V., & Raman, A. (2004). Aligning incentives in supply chains. *Harvard business review*, 82(11), 94-103.
- Nofer, M., Gomber, P., Hinz, O., & Schiereck, D. (2017). Blockchain. *Business & Information Systems Engineering*, 59, 183-187.
- Ostern, N. (2018). Do you trust a trust-free transaction? Toward a trust framework model for blockchain technology.

- Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*: Sage publications.
- Perks, H., & Halliday, S. V. (2003). Sources, signs and signalling for fast trust creation in organisational relationships. *European Management Journal*, 21(3), 338-350.
- Poppo, L., Zhou, K. Z., & Li, J. J. (2016). When can you trust “trust”? Calculative trust, relational trust, and supplier performance. *Strategic management journal*, 37(4), 724-741.
- Prakash, A. V., & Das, S. (2021). Medical practitioner's adoption of intelligent clinical diagnostic decision support systems: A mixed-methods study. *Information & Management*, 58(7), 103524.
- Rajaguru, R., & Matanda, M. J. (2011). Role of inter-organisational compatibility and IOIS integration in large firms and SMEs retailing chains. *Asia Pacific Journal of Marketing and Logistics*, 23(2), 177-199.
- Rempel, J. K., Holmes, J. G., & Zanna, M. P. (1985). Trust in close relationships. *Journal of personality and social psychology*, 49(1), 95.
- Robert, L. P., Denis, A. R., & Hung, Y.-T. C. (2009). Individual swift trust and knowledge-based trust in face-to-face and virtual team members. *Journal of Management Information Systems*, 26(2), 241-279.
- Roberts, R., Flin, R., Millar, D., & Corradi, L. (2021). Psychological factors influencing technology adoption: A case study from the oil and gas industry. *Technovation*, 102, 102219.
- Rotter, J. B. (1971). Generalized expectancies for interpersonal trust. *American psychologist*, 26(5), 443.
- Schweitzer, M. E., Ho, T.-H., & Zhang, X. (2018). How monitoring influences trust: A tale of two faces. *Management Science*, 64(1), 253-270.
- Shapiro, S. P. (1987). The social control of impersonal trust. *American journal of Sociology*, 93(3), 623-658.
- Sodhi, M. S., Seyedghorban, Z., Tahernejad, H., & Samson, D. (2022). Why emerging supply chain technologies initially disappoint: Blockchain, IoT, and AI. *Production and Operations Management*, 31(6), 2517-2537.
- Spence, M. (1978). Job market signaling. In *Uncertainty in economics* (pp. 281-306): Elsevier.
- Sternberg, H. S., Hofmann, E., & Roeck, D. (2021). The struggle is real: insights from a supply chain blockchain case. *Journal of Business Logistics*, 42(1), 71-87.
- Sullivan, Y., de Bourmont, M., & Dunaway, M. (2022). Appraisals of harms and injustice trigger an eerie feeling that decreases trust in artificial intelligence systems. *Annals of Operations Research*, 308, 525-548.
- Susarla, A., Holzhacker, M., & Krishnan, R. (2020). Calculative trust and interfirm contracts. *Management Science*, 66(11), 5465-5484.
- Till, R. E., & Yount, M. B. (2019). Governance and incentives: is it really all about the money? *Journal of business ethics*, 159, 605-618.
- Tung, F.-C., Chang, S.-C., & Chou, C.-M. (2008). An extension of trust and TAM model with IDT in the adoption of the electronic logistics information system in HIS in the medical industry. *International journal of medical informatics*, 77(5), 324-335.
- Villena, V. H., Choi, T. Y., & Revilla, E. (2019). Revisiting interorganizational trust: is more always better or could more be worse? *Journal of management*, 45(2), 752-785.
- Völter, F., Urbach, N., & Padget, J. (2023). Trusting the trust machine: Evaluating trust signals of blockchain applications. *International Journal of Information Management*, 68, 102429.

- Wamba, S. F., & Queiroz, M. M. (2022). Industry 4.0 and the supply chain digitalisation: a blockchain diffusion perspective. *Production Planning & Control*, 33(2-3), 193-210.
- Wang, W., & Benbasat, I. (2008). Attributions of trust in decision support technologies: A study of recommendation agents for e-commerce. *Journal of Management Information Systems*, 24(4), 249-273.
- Wiersema, M. F., & Mors, M. L. (2023). Women directors and board dynamics: qualitative insights from the boardroom. *Journal of management*, 01492063231173421.
- Williamson, O. E. (1993). Calculativeness, trust, and economic organization. *The journal of law and economics*, 36(1, Part 2), 453-486.
- Xiao, L., Xu, X., & Xue, W. (2024). Blockchain mania without bitcoins: Evidence from the Chinese stock market. *Research in International Business and Finance*, 67, 102141.
- Yavaprabhas, K., Pournader, M., & Seuring, S. (2023). Blockchain as the “trust-building machine” for supply chain management. *Annals of Operations Research*, 327(1), 49-88.
- Zucker, L. G. (1986). Production of trust: Institutional sources of economic structure, 1840–1920. *Research in organizational behavior*.