

Modern slavery remediation in healthcare supply chains through blockchain implementation: a socio-technical systems perspective

Vei Yie Tan, Kamrul Ahsan and Aswini Yadlapalli

Department of Supply Chain and Logistics Management, College of Business and Law, RMIT University, Melbourne, Australia

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Abstract

Purpose – Modern slavery remediation remains a supply chain concern for Australian healthcare organisations, which rely heavily on imported goods with limited upstream visibility. Although blockchain is recognised as a means of enhancing supply chain transparency, little is known about how it can be effectively implemented across organisational boundaries. Taking a socio-technical systems approach, this study investigates how blockchain can support the remediation of modern slavery in healthcare supply chains.

Design/methodology/approach – This study adopts an abductive approach based on semi-structured interviews with healthcare procurement managers and blockchain experts. The abductive approach enables iterative engagement between theoretical insights and empirical evidence to develop a context-sensitive understanding of blockchain implementation in healthcare supply chains.

Findings – Blockchain implementation for modern slavery remediation is shaped by the interaction between the social and technical subsystems within a broader macro-environmental context. Healthcare organisations are motivated to implement blockchain by external accountability pressures, modern slavery data governance needs, socially sustainable procurement objectives and proactive risk management. However, implementation is constrained by socio-technical misalignments, including uneven organisational readiness, supplier integration barriers and technology-related challenges. To address these misalignments, the study identifies key enabling mechanisms, including supplier support and capability development, strategic stakeholder collaboration and organisational learning.

Originality/value – This study provides an early empirical investigation of buyer-initiated blockchain implementation for modern slavery remediation in Australian healthcare supply chains. Moving beyond techno-optimistic and techno-pessimistic perspectives, it demonstrates that blockchain effectiveness is neither guaranteed by technical capabilities nor constrained solely by technological limitations but depends on achieving socio-technical alignment across supply chains.

Keywords Modern slavery remediation, Blockchain technology, Socio-technical system lens,

Healthcare procurement, Healthcare supply chains

Paper type Research article

1. Introduction

Social sustainability in supply chains concerns the protection of human rights and the promotion of fair labour practices, yet its realisation remains impeded by the persistence of modern slavery (Lotfi and Walker, 2025; Sodhi and Tang, 2018). Modern slavery, a scourge of the twenty-first century, is an umbrella term encompassing severe forms of exploitation, through forced labour, debt bondage, child labour and human trafficking (Crane, 2013; Strand *et al.*, 2026). No country is immune from modern slavery, including Australia. Globally, there is still an estimated 50 million people worldwide (GSI, 2024; Han *et al.*, 2024), which is nearly twice Australia's population, living in modern slavery. However, its true scale remains difficult



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to ascertain due to a lack of supply chain transparency (Safieddine *et al.*, 2026; Tan *et al.*, 2026). Healthcare supply chains are not exempt from this reality. Hospitals procure a range of products intended to protect and improve human wellbeing, including personal protective equipment and medical devices, through complex and invisible supplier networks (Sinclair *et al.*, 2022). As an island, Australia's reliant on imported goods further exacerbates this issue, with around one in five imports originates from supply chains exposed to forced labour in informal economy, labour-intensive and low-technology industries (Han *et al.*, 2024; PASA, 2026).

Jurisdictions worldwide have enacted legislation to address modern slavery in supply chains, including the California Transparency in Supply Chains Act 2010, the UK Modern Slavery Act 2015, the Australian Modern Slavery Act 2018 and Germany's Supply Chain Due Diligence Act 2023 (Islam and Van Staden, 2022; Rowland, 2026; Tan *et al.*, 2026). These measures impose disclosure and supply chain due diligence obligations, which also support the UN Sustainable Development Goal 8 on decent work and the 2030 Agenda principle of leaving no one behind (Safieddine *et al.*, 2026; UN, 2026). In Australia, the proposed 2026 reforms to the Modern Slavery Act further drives healthcare organisations to move beyond disclosure towards remediation, as a failure to do so can result in consequential reputational harm (Rowland, 2026; Sinclair *et al.*, 2022). However, remediating modern slavery in supply chains requires a multifaceted approach involving stakeholder collaboration, modern slavery information sharing and robust due diligence mechanisms (Lotfi and Walker, 2025; Tan *et al.*, 2026).

Rising modern slavery legislation has prompted buyer-driven blockchain implementation initiatives for improving transparency and social sustainability in supply chains (Chaudhuri *et al.*, 2023; Marques *et al.*, 2025). Blockchain is a shared network database that connects disconnected information sources across complex supply chains (Tuladhar *et al.*, 2024). That is, information would no longer reside in private database silos, but each supply chain stakeholder obtains access to a single source of truth, improving the visibility of information (Yu *et al.*, 2024). This potential has been demonstrated through initiatives such as Tony's Chocolonely's ethical sourcing practices (Yu *et al.*, 2024), the WWF Pacific tuna fishing project (Wilhelm *et al.*, 2025) and the MekongClub (2020) project to protect migrant workers.

Despite promising cross-sector initiatives, considerably less is known about how blockchain can be implemented to support modern slavery remediation in healthcare supply chains (Wang *et al.*, 2023). Australia's national blockchain roadmap prioritises food safety and has yet to include plans for detecting modern slavery (Talbot *et al.*, 2022). This represents an important gap because healthcare organisations' purchasing power provides leverage to influence supplier conduct and drive positive changes over remediating modern slavery (Lichtman *et al.*, 2023; Sinclair *et al.*, 2022). Against this backdrop, this study investigates how healthcare organisations can implement blockchain to support modern slavery remediation in supply chains. Because implementing blockchain extends beyond technological deployment to encompass organisation practices, inter-organisational relationships and regulatory influences, this study adopts a socio-technical systems (STS) lens. STS posits that any new technologies or systems should not be implemented in isolation, but on the joint optimisation and harmonisation of social and technical systems within a broader environment (Trist, 1981).

Existing research has examined several motivational drivers of blockchain implementation but largely overlooks the interplay among social, technical and environmental factors (Shan *et al.*, 2022). Social factors are the attributes and structures, while technical factors encompass devices, tools and mechanisms (Geels, 2019). Environmental factors concern entities outside the firm's boundary, including political and economic forces (Emery, 1993). Together, these factors shape technology implementation for addressing modern slavery (Fayezi *et al.*, 2025; Shin and Ibahrine, 2020). Understanding this rationale is necessary, as the healthcare sector is uniquely grounded in values of human welfare, yet they often procure products with unknown modern slavery risks. Hence, we ask:

RQ1. What motivates healthcare organisations to implement blockchain to remediate modern slavery risks?

Buyer organisations often navigate a balance between socio-technical issues at organisational and supply chain levels when implementing blockchain (Fayezi *et al.*, 2025; Shan *et al.*, 2022). On one hand, blockchain's transparency and data-sharing capabilities have generated optimism about modern slavery remediation, including the use of smart contracts to mitigate deceptive recruitment practices (Christ and Helliard, 2021) and the role of digital dexterity in shaping modern slavery-related capabilities (Yu *et al.*, 2024). However, the reality is complex, at the organisational level, scalability, interoperability and integration have been the focus of techno-skeptical studies (Marques *et al.*, 2025; Possatto *et al.*, 2026; Yadlapalli *et al.*, 2022). Yet, these explanations overlook the boundary-spanning challenges of addressing modern slavery embedded within supply chains with firms operating under conflicting regulatory environments and misaligned objectives (Lotfi and Walker, 2025). This leads to the following question:

RQ2. While balancing social and technical subsystems, what barriers do healthcare organisations perceive in implementing blockchain for modern slavery remediation?

Prior research on modern slavery governance has identified a range of organisational mechanisms to improve supply chain transparency, including supplier governance, supplier risk management, supplier development, supplier integration and information-sharing technologies (Pinnington and Meehan, 2023; Tan *et al.*, 2026). However, these conventional supply chain mechanisms do not explain how they evolve when blockchain is introduced. In particular, it remains unclear how buyer organisations can leverage blockchain while aligning the social, technical, organisational and environmental elements required for successful implementation (Amanollahnejad *et al.*, 2026; Shan *et al.*, 2022). From an STS perspective, blockchain implementation requires more than technological deployment alone; rather, its effectiveness depends on the mechanisms that enable joint optimisation across interdependent social and technical systems within their broader operating environment (Trist, 1981). Identifying and understanding these mechanisms is, therefore, essential to realise its potential for modern slavery remediation in healthcare supply chains. Accordingly, we ask:

RQ3. How do healthcare organisations ensure socio-technical alignment through blockchain implementation to support modern slavery remediation?

To address these overarching research questions, we adopt an abductive qualitative approach, generating empirically grounded insights from healthcare procurement managers and blockchain experts within the Australian context. Our contributions are threefold. First, we provide empirical insights into healthcare buyer-initiated blockchain implementation within a socially sensitive and under-researched sector by identifying a set of recurrent socio-technical motivators, challenges and mechanisms shaping their implementation for modern slavery remediation across supply chains. Second, we extend STS scholarship by empirically illustrating how social and technical subsystems interact and struggle to achieve optimal alignments in the context of blockchain-enabled modern slavery remediation. Third, our multi-actor perspective unravels valuable lessons for organisations striving to turn the tide against modern slavery. The paper is structured as follows. Section 2 reviews the literature on modern slavery, blockchain technology and the STS lens. Section 3 outlines the research methodology. Section 4 presents the analysis of findings, followed by a discussion in Section 5. Section 6 concludes with implications and directions for future research.

2. Literature review and theoretical background

2.1 Modern slavery in supply chains and remediation

The prominence of social sustainability in the literature has brought particular attention to modern slavery as a complex, hidden and deeply embedded social problem (Benstead *et al.*, 2021; Bodendorf *et al.*, 2023; Han *et al.*, 2024). As supply chains extend upstream, modern

slavery victims become increasingly obscured, which limits focal organisations' ability to remediate labour risks (Gold *et al.*, 2015; Tan *et al.*, 2026). More fundamentally, existing remediation practices are narrowly focused on detection and compliance (such as worker surveys, grievance channels, factory audits and site visits) in upstream supply chains (Kach *et al.*, 2025; Stevenson and Cole, 2018). For instance, the use of physical "smart cards" in Bangladesh was introduced to store migrant workers' personal and biometric information for modern slavery monitoring. However, the physical nature of these cards allowed employers to confiscate them, undermining their intended purpose of remediating worker vulnerability in supply chains (Bhuyan, 2018). While such remediation failures are often attributed to corruption and weak labour regulatory environments, these explanations alone are insufficient. These remediation approaches remain episodic as their effectiveness is constrained by reliance on periodic audits and static reporting (LeBaron, 2021; Lotfi and Walker, 2025). Even in well-regulated contexts, modern slavery remediation is constrained by the absence of continuous monitoring tools, limited trust in information-sharing, uneven organisational commitment and misaligned incentives across supply chains (Marques *et al.*, 2025; Tan *et al.*, 2026).

2.2 Blockchain technology's role in modern slavery remediation

A growing body of research suggests that technological advances, such as blockchain technology, may offer a mechanism for addressing modern slavery by enabling transparent and traceable supply chains (Christ and Helliard, 2021; Heldt and Pikuleva, 2025; Saberi *et al.*, 2019). Originally introduced in the Nakamoto White Paper, blockchain is a distributed ledger technology that enables transactions to be recorded in a secure and immutable manner without relying on intermediaries (Nakamoto, 2008). Since its first application in Bitcoin in 2009, blockchain has evolved into permissionless (public) and permissioned (private and hybrid) forms (Christ and Helliard, 2021). Permissionless blockchain remains primarily associated with cryptographic assets for unfiltered operational transparency, whereas permissioned blockchains are used by businesses to capture sensitive information, such as product history and worker data that satisfies the techno-sceptics' concerns regarding privacy (Yu *et al.*, 2024).

The emergence of permissioned and permissionless blockchain architectures has strengthened techno-optimistic claims regarding blockchain's capacity as a "trust machine" to improve transparency across global supply chains theorised (Christ and Helliard, 2021; Rogerson and Parry, 2020; Wang *et al.*, 2023). In this view, blockchain supports capabilities, such as provenance tracking, real-time data capture and more agile risk management through improved traceability of transactions and production processes (Helliard *et al.*, 2020; Wang *et al.*, 2023). For example, Rogerson and Parry (2020) show, through case studies in fishing, agriculture, infant formula and wine supply chains, that blockchain is primarily used to enhance product provenance and supply chain visibility. Similarly, Helliard *et al.* (2020) examine the My-Story blockchain in the wine industry, which records grape origin and production processes. These applications suggest that blockchain can foster system-based trust, where confidence is derived from the transparency and immutability of the technological infrastructure rather than from individual actors. Although these studies demonstrate blockchain's capacity to improve transparency, they largely focus on product authenticity and quality assurance rather than social sustainability conditions. The only study in this space, Wang *et al.* (2023), develops a conceptual blockchain framework for multi-tier personal protective equipment (PPE) supply chains that is designed to monitor compliance with environmental and social sustainability standards.

However, techno-sceptical perspectives contend that these blockchain technological capabilities alone are insufficient to overcome the broader organisational and supplier-related complexities (Marques *et al.*, 2025; Possatto *et al.*, 2026). Heldt and Pikuleva (2025) show that budget concerns, insufficient competitive pressure account for wariness, even where managers recognise the need for blockchain technologies but remain uncertain about their implications

for work practices. [Kouhizadeh et al. \(2021\)](#) recognised lack of management commitment and support, limited knowledge and expertise, weak cooperation, coordination and information disclosure between supply chain members as key impediments. Studies further point to cost and technological complexity as persistent constraints ([Hald and Kinra, 2019](#); [Wong et al., 2020a](#)). Importantly, these challenges reflect deeper issues of supplier engagement and support ([Gold et al., 2015](#)). Buyer-initiated blockchain implementation depends on active participation across multiple tiers; however, suppliers, particularly in upstream contexts, may lack the digital capabilities, incentives or willingness to engage ([Possatto et al., 2026](#)).

While discussions have become polarised between optimistic narratives that portray blockchain as a transformative “holy grail” and techno-sceptical perspectives that highlight implementation challenges, several empirical studies primarily examine the mechanisms for blockchain implementation ([Chaudhuri et al., 2024](#)). They commonly emphasise organisational readiness, technological affinity, trust and social influence as factors shaping managerial willingness to engage with blockchain ([Queiroz et al., 2021](#); [Wong et al., 2020b](#)). For example, [Queiroz et al. \(2021\)](#) show that trust and social influence play a critical role in encouraging blockchain participation among supply chain partners in Brazil. Related work further suggests that capacity-building efforts, such as training and knowledge development, function as mechanisms for supporting implementation. What remains absent from this debate is a nuanced account of how motivations, misalignments and enabling mechanisms that recognise the complexity of modern slavery risks interact with each other for blockchain implementation. Without examining these aspects holistically, the implementation of blockchain to address modern slavery may not be meaningfully translated ([Chaudhuri et al., 2024](#)).

2.3 STS lens and conceptual framework

Existing theoretical perspectives, such as the technology–organisation–environment (TOE) ([Aminah et al., 2026](#); [Yadlapalli et al., 2022](#)) and the technology acceptance model (TAM), have provided valuable insights into factors influencing blockchain implementation in supply chains ([Morgan et al., 2023](#)). The TOE explains how organisational and environmental contexts influence adoption decisions ([Aminah et al., 2026](#)), while TAM focuses on individuals’ perceptions of technology acceptance ([Morgan et al., 2023](#)). However, addressing the wicked problem of modern slavery through blockchain necessitates a more holistic approach ([Fayezi et al., 2025](#)). Implementing blockchain to remediate modern slavery is not merely a matter of technical capability or organisational readiness in isolation but rather involves the intricate interplay of various socio-technical factors spanning the entire supply chain ecosystem ([Shin and Ibrahine, 2020](#)). It requires careful consideration of trust in information sharing, cross-organisational collaboration and system synchronisation among diverse stakeholders ([Christ and Helliard, 2021](#); [Yu et al., 2024](#)), which go beyond the adoption-centric theories.

The STS perspective offers a comprehensive lens in this landscape. STS theory recognises that successful deployment of new technologies, like blockchain, depends on aligning technical and social systems, with broader environmental factors ([Fayezi et al., 2025](#); [Kach et al., 2025](#)). The STS lens unpacks how technologies can be integrated into the workplace without failing due to the neglect of critical social and cultural elements ([Trist, 1981](#)). Essentially, STS helps identify “critical fragility” points, where an overly narrow focus on process efficiency can make the system vulnerable to failure, such as operational errors, fatigue and workplace issues ([Moran et al., 2025](#)). Leveraging this perspective can yield valuable insights into the mechanisms enabling socio-technical alignment for blockchain to realise its full potential in modern slavery remediation.

At the core of STS is the premise that desired outcomes are achieved through the careful balancing and optimisation of social and technical subsystems, while accounting for broader environmental conditions ([Trist, 1981](#)). Importantly, STS theory challenges the

techno-optimistic view that sees technological innovation as the primary driver of change. Instead, it emphasises the need to achieve equilibrium among these social, technical and environmental elements rather than relying solely on technological solutions (Cummings, 1978; Pasmore *et al.*, 1982). The social subsystem encompasses people, organisational structures, capabilities, relationships, values and patterns of interaction that shape how work is performed (Emery, 1993; Trist and Bamforth, 1951). The technical subsystem comprises technologies, tools, infrastructure, processes and procedures that support organisational activities (Emery, 1993; Pasmore *et al.*, 1982). The environmental subsystem refers to the external conditions in which buyer organisation operates, including regulatory requirements, industry conditions and market forces (Cummings, 1978; Pasmore *et al.*, 1982; Trist, 1981).

Within STS, Trist (1981) further conceptualises three interrelated levels of analysis: the primary work systems, the organisation system and the macro-social system, also known as macro-environment. Applied to blockchain-enabled modern slavery remediation in healthcare sector, the primary work system comprises operational activities, such as supplier data entry, certification uploads, audit verification and risk flagging. The organisational system includes buyer-led blockchain governance, supplier onboarding and modern slavery compliance processes. The macro-social system captures the broader institutional environment, including modern slavery legislation, international labour standards and institutional trust in blockchain. Using STS logic, a supply chain should be controlled as a system of systems taking account of the interdependencies between its technical and social components of inter and intra-organisational elements (Fayezi *et al.*, 2025; Shan *et al.*, 2022). This multi-level STS lens suggests that blockchain effectiveness in remediating modern slavery depends on achieving socio-technical alignment not only within the buyer organisation but also across the supply chains and in response to environmental conditions.

To frame our research, we conceptualise an STS-based framework on blockchain implementation for modern slavery remediation (Figure 1). The framework identifies external influences, including stakeholder pressure and perceived technological benefits, as key drivers motivating buyer organisations to implement blockchain to improve supply chain visibility and enable real-time modern slavery tracking. However, achieving socio-technical optimisation is subject to boundary conditions (Emery, 1993; Geels, 2019). Grounded in STS, supply chain organisations operate as interconnected systems that are dependent on external environments. As such, the effectiveness of blockchain implementation extends beyond organisational boundaries, which requires behavioural adaptation and participation among multi-tiered supply chain actors with conflicting capabilities, interests and objectives.

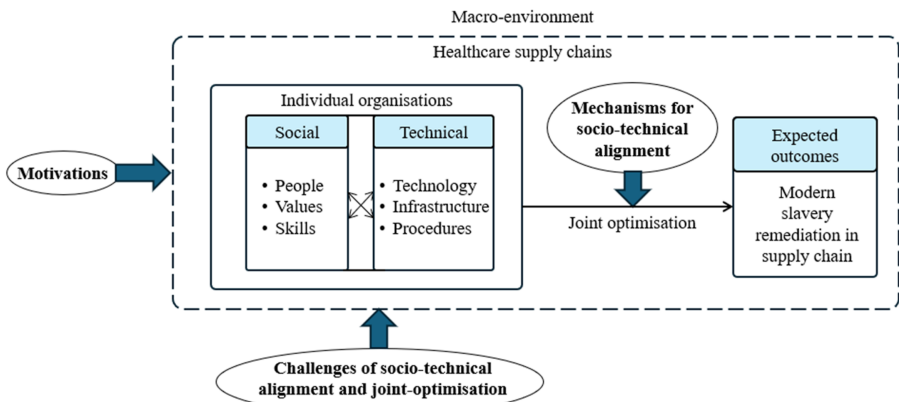


Figure 1. STS alignment for blockchain implementation in modern slavery. Source: Authors' work

Crucially, the development of socio-technical mechanisms can be critical for sustained socio-technical alignment in implementation (Geels, 2019). These mechanisms are especially vital in complex healthcare supply chains, where strengthening modern slavery remediation requires the deliberate optimisation of both the social and technical subsystems within broader context.

3. Methodology

3.1 Research context

The healthcare sector in Australia presents a uniquely challenge and underexplored context in modern slavery and blockchain implementation literature. Similar to consumer-facing sectors such as fashion, agriculture, fisheries and wine (Heldt and Pikuleva, 2025; Marques *et al.*, 2025), the Australian healthcare supply chains rely on geographically dispersed, multi-tier sourcing networks, limiting visibility into upstream labour practices (Hughes *et al.*, 2023). The sector is subject to rigorous oversight governing safety, quality and ethical compliance, including modern slavery reporting requirements (Lichtman *et al.*, 2023; Rowland, 2026). While these mandates ostensibly incentivise disclosure, prior research suggests they often result in compliance-driven transparency rather than substantive engagement with modern slavery risks (LeBaron, 2021; Stevenson, 2022). Furthermore, the critical nature of healthcare products in Australia, from life-saving personal protective equipment to medical devices, means that supply continuity takes precedence over modern slavery due diligence, as illustrated by the COVID-19 pandemic's impact on the country's procurement practices (Cole and Shirgholami, 2022). Third, the Australian healthcare sector's highly complex and globally dispersed supply chains, which rely heavily on imports, obscure labour conditions in upstream tiers, particularly in high-risk modern slavery regions (Sinclair *et al.*, 2022; Tan *et al.*, 2026). Finally, healthcare organisations face heightened public accountability due to their societal role, intensifying reputational risks associated with unethical sourcing (Benstead *et al.*, 2021).

3.2 Research design

This study adopts an abductive research design which integrates both deductive and inductive reasoning (Braun and Clarke, 2006) (see Figure 2). The first step employs a deductive approach to establish theoretical understanding and develops *a priori* framework from existing literature (Ketokivi and Choi, 2014). The *a priori* framework was built to guide the data coding process of interviews (see Figure 1). A deductive approach is crucial because prior research has already established relevant constructs for interpretation (Braun and Clarke, 2006). The second phase adopts an inductive orientation, informed by semi-structured interviews with healthcare (HC) and blockchain (BC) professionals. This phase aims to address the lack of empirical research on modern slavery in healthcare supply chains and seeks to match or validate the initial framework through empirical analysis of interviews. Accordingly, the research design unfolds across three phases: data collection, organisation and interpretation (see Figure 2).

3.2.1 Preparation and data collection. Developing interview protocol: The study employed purposive sampling to recruit participants with relevant professional expertise in healthcare procurement and blockchain implementation. Purposive sampling is appropriate for qualitative research that seeks information-rich participants who possess specialised knowledge and experience relevant to the research phenomenon (Yin, 2018). Eligible participants from two stakeholder groups, healthcare procurement managers and blockchain professionals, were drawn from organisations formally registered with an active Australian Business Number (ABN) to provide complementary perspectives on the motivations, misalignments and implementation mechanisms of blockchain for modern slavery remediation. The interview protocol comprised eight open-ended shared and participant-specific questions developed from prior literature on blockchain and modern slavery (Marques *et al.*, 2025; Possatto *et al.*, 2026) (see Appendix Table A1).

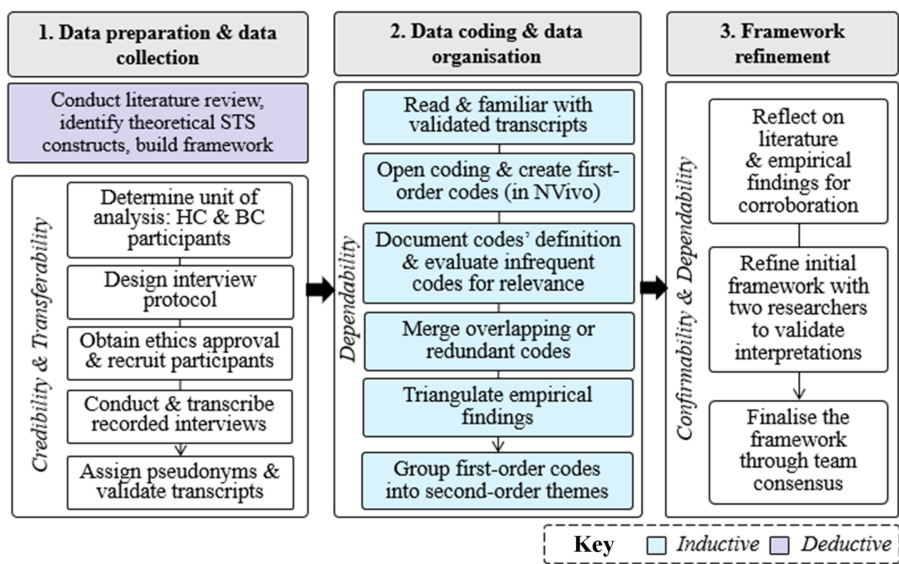


Figure 2. Research design process. Source: Authors' work

Data collection: Data collection process was guided by the case study protocol (Yin, 2018). All interviews were conducted by the lead author between July and October 2025. Interviews ranged from 32 to 102 min, with an average duration of 58 min. Data collection followed an iterative process in which interviewing and coding were conducted concurrently. Initially, six interviews were conducted (three from each stakeholder group), followed by preliminary coding to assess the emergence of themes. At this stage, thematic saturation had not been reached. Subsequently, four further interviews were conducted (two from each stakeholder group), after which analysis indicated that thematic saturation was beginning to emerge, with fewer novel insights identified. A final round of four interviews (two from each stakeholder group) was undertaken to confirm saturation. Across the three rounds, a total of 14 participants were interviewed, comprising seven participants from healthcare organisations and seven from blockchain technology providers in Australia (Table 1). Two participants from each group were subsequently interviewed a second time, resulting in four follow-up interviews to clarify the preliminary interpretations. At this stage, no new themes emerged, indicating that theoretical saturation had been achieved (Thompson, 2022). This iterative approach is consistent with qualitative research best practice, where sampling continues until theoretical saturation is reached (Thompson, 2022).

Healthcare organisations ranged from regional providers to large health systems with workforces exceeding 30,000 employees, providing variation in organisational size and procurement practices (Table 1). In contrast, blockchain providers were comparatively younger organisations with small-to medium-sized teams, reflecting the emerging nature of blockchain implementation in Australia. Healthcare participants had between three and seven years of managerial experience in sustainable supply chain procurement. Blockchain participants possessed a minimum of five years' professional experience in blockchain technologies, with at least two years of experience implementing blockchain solutions in supply chain procurement. The difference in the experience criterion reflects the relatively early stage of blockchain implementation in Australian healthcare supply chains. Although qualitative studies do not seek statistical generalisability, 14 participants can provide diverse perspectives while reducing the likelihood of overlooking minority viewpoints (Morse et al., 2006). Comparable sample

Table 1. Background of healthcare and blockchain organisations and respondent's profile

Sector	Organisation	Number of employees	Geographic coverage	Interviewee		Experience	Interview duration
	Entity type			Code	Role		
Healthcare	Public (has modern slavery reports)	11,000	New South Wales	HC-P1	Category Manager	4-year experience in procurement	48 min
Healthcare	Public (has modern slavery reports)	9,743	Victoria	HC-P2	Procurement Manager	4-year experience in procurement	67 min
Healthcare	Private (has modern slavery reports)	10,000	National	HC-P3	Supply Chain Director	5-year experience in procurement	75 min
Healthcare	Public (has modern slavery reports)	550	Regional	HC-P4	Procurement Manager	4-year experience in procurement	32 min
Healthcare	Private (has modern slavery reports)	30,000	International	HC-P5	Procurement Director	7-year experience in procurement	102 min
Healthcare	Public (has modern slavery reports)	4,605	Queensland	HC-P6	Supply Chain Specialist	3-year experience in procurement	40 min
Healthcare	Private (has modern slavery reports)	16,771	Victoria	HC-P7	Senior Proc. Officer	3-year experience in procurement	52 min
Blockchain	Private	49	Victoria	BC-P8	Founder Blockchain Developer	6-year blockchain experience with 4-year experience in blockchain in procurement	63 min
Blockchain	Private	55	New South Wales	BC-P9	Blockchain Engineer	5-year blockchain experience with 3-year experience in blockchain in procurement	45 min
Blockchain	Private	42	New South Wales	BC-P10	Co-founder and Blockchain Developer	6-year blockchain experience with 3-year experience in blockchain in procurement	94 min
Blockchain	Private	27	Victoria	BC-P11	Founder and Blockchain Developer	5-year blockchain experience with 2-year experience in blockchain in procurement	58 min
Blockchain	Private	25	New South Wales	BC-P12	Blockchain Developer	5-year blockchain experience with 2-year experience in blockchain in procurement	50 min
Blockchain	Private	34	Victoria	BC-P13	Blockchain Developer	5-year blockchain experience with 2-year experience in blockchain in procurement	32 min
Blockchain	Private	48	New South Wales	BC-P14	Founder and Blockchain Developer	6-year blockchain experience with 3-year experience in blockchain in procurement	48 min

Source(s): Authors' work

sizes have been used in exploratory qualitative research on emerging technologies in supply chains, including 13 practitioner interviews by [Patil et al. \(2023\)](#) on additive manufacturing across several industries and countries and 15 expert interviews by [Vu et al. \(2023\)](#) on blockchain implementation in food supply chains.

3.2.2 Data coding and organisation. All interview recordings were transcribed verbatim and reviewed by participants by follow-up emails to ensure data familiarity, minimise information-selection bias and contextual sensitivity. Pseudonyms were assigned to participants and organisations to protect confidentiality. The first author led the coding process, initially analysing the interview data, termed “Coder 1 led coding” using NVivo 12. This started with the analysis of a subset of transcripts that were independently coded by the second and third authors to validate the first author’s interpretation of the dataset. The team then reviewed the refined coding structure, resolving discrepancies by consensus ([Given, 2015](#)). The first author subsequently analysed the full dataset using NVivo 12, confirming existing themes and inductively identifying new drivers, misalignments and mechanisms. Initial codes were iteratively compared, merged and grouped to reduce redundancy and capture shared meanings. As patterns emerged, second-order themes were developed and interpreted through a deductive lens informed by STS. The coding process yielded 36 sub-categories, which were consolidated into 12 higher-order thematic categories. As described in [Section 3.2.1](#), data saturation was reached, with no new substantive themes emerging from the final interviews. [Appendix Table A2](#) illustrates the aggregation of themes with representative coding examples. We have recorded for each second-order themes, the number of cases supporting it. For instance, we found that each second-order theme was supported by responses from 8 to 12 participants, indicating that data saturation was achieved ([Given, 2015](#)).

To enhance analytical rigor, cross-stakeholder data triangulation was undertaken by revisiting fourteen participants ([Farmer et al., 2006](#)), comprising two healthcare procurement managers and two blockchain professionals. Their feedback was used to challenge, validate and refine the preliminary coding structure. For example, data processing inefficiencies were initially categorised under information integrity. However, follow-up discussions indicated that these inefficiencies primarily arose from system compatibility misalignment issues rather than concerns regarding data quality. Consequently, the code was reclassified under technology misalignment. This iterative validation process strengthened the credibility and analytical robustness of the coding framework ([Denzin, 2017](#)). Interview findings were also triangulated with publicly available organisational documents, including healthcare organisations’ modern slavery reports. For blockchain providers, documentary evidence was comparatively limited because blockchain applications for modern slavery remediation remain at an early stage of implementation in Australia. However, for healthcare organisations, modern slavery documentary reports evidence largely corroborated participants’ accounts of the key motivations, misalignment challenges and mechanisms associated with modern slavery data governance, particularly regarding supplier due diligence.

3.2.3 Framework refinement. At this stage, identified themes were mapped against the initial framework and corresponding research questions. This alignment facilitated the classification of findings into three categories: drivers, challenges and mechanisms of blockchain implementation for modern slavery remediation from an STS perspective. The themes were subsequently refined and validated through iterative team discussions, during which theme boundaries and STS dimensions were critically reviewed. The final themes thus reflect a theoretically grounded yet empirically refined model, capturing the interplay between social and technical elements in fostering and constraining blockchain-enabled modern slavery remediation.

3.3 Study’s trustworthiness

Given the sensitivity of modern slavery, ethical considerations were prioritised throughout the interview process. Verbal informed consent was obtained from all participants before each

interview, and participants were assured of the confidentiality and anonymity of their responses. Participants were also invited to review their transcripts. In one instance, notes were taken as one participant declined to be recorded.

To enhance the trustworthiness of the findings, multiple forms of validation were employed, including repeated examination of raw data narratives, participant consultation, triangulation with secondary data of modern slavery reports from healthcare organisations and iterative discussion and reflection within the team (Lincoln and Guba, 1982). First, interview findings were triangulated against publicly available modern slavery statements published by participating healthcare organisations to corroborate the evidence, as described in Section 3.2.2. Data source triangulation was conducted across two participant groups: healthcare procurement managers and blockchain experts involved in supply chain procurement, to strengthen the robustness of the findings (Mello and Flint, 2009; Noble and Heale, 2019). Following the triangulation protocol proposed by Farmer *et al.* (2006), we applied a feedback mechanism that involved repeated examination of the interview data, participant consultation and iterative discussion among the research team to enhance the credibility and trustworthiness of the analysis (Lincoln and Guba, 1982). Following the analysis, a summary of the key findings was shared with selected stakeholders for review and comment, providing an additional layer of cross-stakeholder data triangulation (Farmer *et al.*, 2006; Mello and Flint, 2009).

Investigator triangulation was used to enhance the credibility, dependability and reliability of the coding process. Three researchers independently analysed the data using the same coding framework. The first author conducted the initial coding and thematic clustering, which were independently reviewed and verified by the second and third authors. The coding framework was collaboratively refined through regular discussions, iterative comparison of codes and constructs and reference to the relevant literature (Hemmler *et al.*, 2022). Any coding disagreements were resolved through consensus following detailed deliberation and re-examination of the data. This process resulted in an inter-rater agreement of 90%, with agreement achieved on 163 of the 180 coded segments. We ensured “trustworthiness” of our analysis through multiple readings of the narratives and raw data, participant consultation, triangulation with secondary data of modern slavery reports from healthcare organisations and iterative discussion and reflection within the team (Lincoln and Guba, 1982).

4. Analysis of findings

The analysis adopts the STS perspective to identify drivers, challenges and enabling mechanisms across the social and technical subsystems, highlighting how interactions shape blockchain implementation for modern slavery remediation across organisational and supply chain contexts within the broader macro-environment.

4.1 Social subsystem elements of blockchain implementation

The social landscape presents a formidable challenge, as organisations grapple with deep-seated misunderstandings about blockchain technology. At the organisational level, *organisational readiness* is identified as a challenge. Participants reported low blockchain literacy and widespread misconceptions about the technology’s value proposition in addressing modern slavery. As HC-P4 explained, “When mentioning blockchain, I immediately think of Bitcoin or some sort of speculative trading, so I don’t see how it relates to modern slavery or hospitals at all”, highlighting a lack of conceptual alignment between blockchain and healthcare applications. Concerns about unclear blockchain value proposition were also identified as a barrier, with HC-P6 noted, “If it gives us some clear savings by implementing the blockchain then I would think that would be beneficial for us to do that sooner”. While blockchain experts emphasised “the cost of running an efficient blockchain will require additional costs of extra infrastructure and hardware” (BC-P10).

Additionally, the change management burden emerged as an obstacle. As BC-P13 noted, “if the users are already familiar and comfortable with current system, they may be resistant to use”.

On the other hand, *fostering organisational learning* emerges as a mechanism that is believed to help facilitate socio-technical alignment during blockchain implementation. Participants emphasised that successful implementation requires organisations to develop the knowledge, capabilities and organisational culture necessary to integrate blockchain into existing procurement and governance practices. *Leadership buy-in* was viewed as important for fostering a culture that supports continuous learning, as HC-P3 explained, “Hospitals are usually quite risk-averse, so creating a culture where people can pilot something like blockchain, learn from it, and not be punished if it isn’t perfect first time is really important”. Strengthening organisational capabilities through internal employee training in blockchain technology is vital, as BC-P10 puts it, “The training of employees to use blockchain and having the appropriate tooling and being able to train the employees that perform the audits”.

4.2 Technical subsystem elements of blockchain implementation

Participants highlighted several technical features of blockchain, particularly *modern slavery data governance* as a motivational driver for enabling information sharing on modern slavery risks within supply chains. The ability of permissioned data-sharing was emphasised: “Blockchain lets us open up the right information to the right partners, without handing over all our commercial details to everyone in the chain” (BC-P10). Enhanced modern slavery data reliability is seen as critical. As BC-P3 stated: “Having them time-stamped and locked into a ledger would give [firms] more confidence that nothing has been altered later”. Furthermore, participants highlighted the value of real-time modern slavery data monitoring for ongoing supplier management and due diligence, as HC-P2 posited, “We expect that blockchain helps monitor our procurement process and capture ongoing modern slavery information”.

However, the findings also reveal several *technology misalignment* challenges. Firstly, participants identified unverifiable modern slavery data as a major concern, as BC-P13 cautions, “Garbage in, garbage out, blockchain cannot fix bad data entry. A lot of what organisations get now are self-declarations that they can’t easily verify, and putting those onto a blockchain doesn’t magically make them true”. Secondly, participants identified data processing inefficiencies as a potential pitfall, as BC-P2 warned, “the existing processes in [supply chain] firms are quite manual; if we just bolt blockchain on top of that, we risk doubling the workload rather than streamlining the workflows”. Thirdly, issues of legacy system interoperability were viewed as a critical prerequisite for blockchain implementation. As BC-P11 explained, “If there isn’t a system to track attendance, calculate work hours and determine wages in a structured format, it would be impossible to implement blockchain”.

Interoperable technology integration emerged as an important mechanism for supporting blockchain implementation. Participants first emphasised the importance of seamless integration with existing platforms, explaining that blockchain should complement rather than replace established supplier portals. As HC-P7 explained, “We already have supplier e-procurement portals; ideally blockchain would sit on top of those platforms, not replace everything we’ve built over the last ten years”. Participants also highlighted the need for connecting supporting technologies for blockchain to address implementation challenges that blockchain cannot resolve independently. As BC-P12 put, “We need complementary tools [BC] to help tackle the unverifiable modern slavery information on the chain, there may be new ways, that is something to be investigated”.

4.3 Environmental subsystem elements of blockchain implementation

External accountability pressures are identified as a driver of implementing blockchain. The increasing public scrutiny of modern slavery practices in supply chains places pressure on

healthcare organisations to demonstrate stronger accountability. As one participant noted, “With all the attention on modern slavery now, if we had a system that could clearly show where our products come from, it would make it much easier to respond when NGOs or the media start asking questions” (HC-P8). Participants also highlighted the role of enforcement of modern slavery regulations: “The Australian Modern Slavery Act has certainly pushed us to look deeper into our supply chain and issues of modern slavery . . .” (HC-P7). Beyond regulatory compliance, healthcare organisations are increasingly attentive to public sector reputational risks associated with modern slavery in their supply chains, stating that “If modern slavery presents in the supply chains, it’s their reputation and image as a hospital on the line”.

Participants also highlighted a set of *institutional and regulatory constraints* of blockchain implementation to remediate modern slavery. One issue raised is blockchain regulatory uncertainty, which is ascertained by BC-P13: “There will need to be legislation updates knowing that how the privacy of information is being stored and used and access to information”. Another factor is weak labour protection of supplier’s host-country, “We may come from a country where we are under the pressure of reporting and are ready to use it. Developing countries are still on their way to embrace such technology, it is still at an early stage” (HC-P4).

4.4 Intertwined dimensions of blockchain implementation

The analysis reveals the dynamic interplay between social and technical sub-system motivations and challenges, highlighting the importance of developing socio-technical alignment mechanisms at the supply chain level.

Proactive modern slavery risk management emerged as a key socio-technical motivation of blockchain implementation. Participants first highlighted blockchain’s potential to improve monitoring of workers’ working conditions by enabling suppliers to securely record labour-related information, thereby providing healthcare organisations with greater visibility into upstream labour practices. As BC-P14 explained, “If suppliers were entering data on things like recruitment fees or dormitory conditions onto a shared ledger, firms would have a much better sense of what workers actually face further up the chain”. Participants also emphasised blockchain’s ability to strengthen supply chain risk detection and crisis response by providing earlier visibility of emerging risks, allowing organisations to intervene before issues escalate into major incidents. As BC-P8 noted, “Instead of waiting for an annual audit, blockchain system could surface warning signs earlier then it could help hospitals investigate the issues before it blows up into a crisis”. Finally, participants suggested that blockchain could support more informed alternative supplier selection by identifying suppliers operating in high-risk regions and facilitating procurement decisions based on verified modern slavery information. As HC-P7 explained, “If there is a system that can flag a particular area as high-risk, it would be easier to justify moving volume to an alternative supplier that is already verified on the system”.

Developing *socially sustainable procurement* was also perceived as an important driver of blockchain implementation. Participants recognised that healthcare organisations rely on strong relationships with suppliers to facilitate information sharing and responsible procurement practices. As HC-P1 explained, “We rely on building relationships with our suppliers here, who are our first point of contact”. Furthermore, participants suggested that blockchain could strengthen sustainable supplier selection and onboarding by requiring suppliers to join the blockchain network before entering the supply chain. Recording supplier information, certifications and activities from the outset was perceived as improving transparency, supporting due diligence and enabling closer monitoring of supplier performance. As BC-P12 noted, “You could require iers to be onboarded onto the blockchain first, with their information and activities recorded so firms can have transparency and monitor them more closely”.

At the supply chain level, *supplier integration barriers* were a challenge. Participants highlight limited modern slavery understanding: “For many of our suppliers, even the term “modern slavery” is still quite abstract, they don’t always recognise that things like recruitment fees or holding passports can fall into that category” (HC-P5). Lack of economic incentives and long-term commitment was also a concern, as one participant explained: “If a supplier admits there’s an issue in their factory, their worry is that we’ll terminate the contract, so they’re very cautious about putting anything sensitive into a system like blockchain” (HC-P5). Fear of sharing confidential data was another social barrier, as “suppliers may fear disclosing personal and labour-related information if they believe it could expose them contract termination or penalties” (HC-P5).

Participants consistently highlighted *stakeholder collaboration and partnerships* as essential mechanisms to facilitate alignment for blockchain implementation at a supply chain level. Participants emphasised that blockchain implementation requires strategic collaborative information-sharing: “You need hospitals, suppliers and NGOs all at the table, it can’t be siloed. To use blockchain, there would need to be collaboration on information sharing” (BC-P9). Participants also highlighted the importance of establishing partnerships with third-party technology providers that possess both blockchain capabilities and an understanding of modern slavery governance. As HC-P4 noted, “Partnering with technology providers and NGOs that understand modern slavery would be essential to design a system that actually works”. These collaborations provide access to specialised expertise and enable knowledge sharing across organisational boundaries. Finally, participants recognised that developing data sharing incentive strategy through providing tangible benefits for suppliers, such as preferred supplier status or pricing incentives, can encourage more consistent modern slavery remediation in blockchain-enabled governance. As BC-P14 explained, “If we told suppliers that better modern slavery data could translate into preferred status or a small price premium, they’d be much more willing to share information consistently” (BC-P14).

Supplier support and capability development emerged as another critical socio-technical mechanism for blockchain implementation. Participants emphasised that the successful implementation of blockchain depends not only on the availability of technical infrastructure but also on suppliers possessing the knowledge, capabilities and resources required to participate in blockchain-enabled information sharing. Without adequate supplier capability development, organisations are unlikely to achieve consistent data capture, information quality or sustained participation across the supply chain. Consequently, participants highlight the importance of supplier blockchain training support to suppliers. As HC-P3 explained, “Larger [buyer] firms, may need to take the lead in helping smaller suppliers onboard and integrate with the blockchain system”. Moreover, participants stressed that suppliers often lack the financial resources to invest in new technologies and compliance activities. They therefore emphasised supplier resources and cost support, highlighting the importance of buyer organisations sharing the costs of technology upgrades, data collection and compliance to reduce implementation barriers. As BC-P8 explained, “We can’t expect a factory to absorb all the costs of new systems and audits. If buyers share some of the upgrade and compliance costs, then blockchain becomes a joint investment rather than a burden” (BC-P8).

5. Discussion

Building on the preceding analysis, we develop the blockchain implementation for modern slavery remediation (BIMSR) framework (Figure 3), which presents an STS theory-based view of the motivations, misalignment challenges and mechanisms for blockchain implementation to remediate modern slavery in healthcare supply chains. The framework conceptualises blockchain implementation as a social and technical subsystems alignment process rather than simply implementing new technology. Healthcare organisations are increasingly compelled to implement blockchain technology to strengthen modern slavery data governance, enhance the social sustainability of procurement practices and enable more

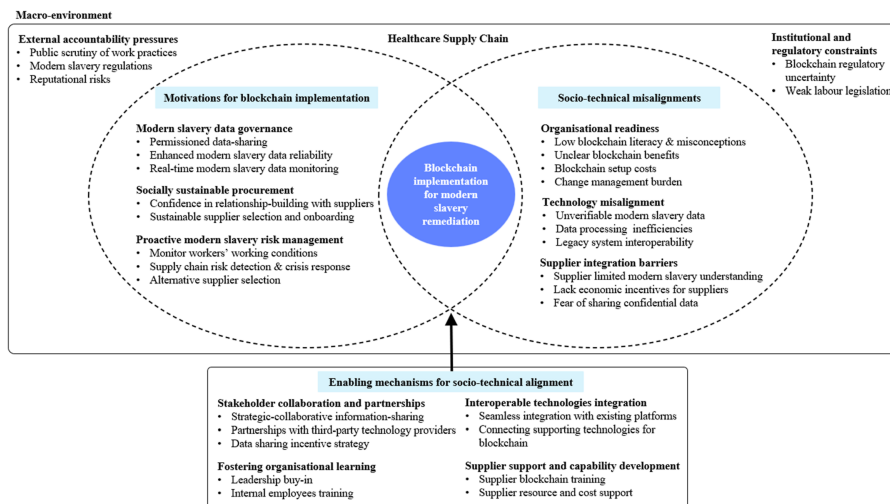


Figure 3. Blockchain implementation for modern slavery remediation (BIMSR) framework. Source: Authors' work

proactive risk management to support modern slavery remediation. However, implementing blockchain for modern-slavery remediation depends on overcoming socio-technical misalignment, including organisational readiness, technology misalignment and supplier integration barriers. To overcome these misalignments and facilitate joint-optimisation, strategic stakeholder collaboration, organisational learning, support for supplier capability development and interoperable technology integration are identified as key mechanisms in remediating modern slavery. These interactions are embedded within the macro-environment, which represents the institutional, regulatory and industry conditions shaping blockchain implementation.

5.1 Drivers motivating blockchain implementation for modern slavery remediation

The impetus for implementing blockchain in remediating modern slavery in healthcare supply chain is influenced by macro-environmental pressures. Healthcare organisations in Australia are experiencing growing external accountability pressures, such as the Modern Slavery Act 2018, growing public scrutiny and heightened public scrutiny over their procurement practices. As one of the country's largest publicly funded sectors, healthcare faces high stakeholder expectations to demonstrate ethical stewardship of public resources (PASA, 2026). Failing to do so could have serious reputational and legal consequences, especially with the proposed 2026 reforms that will introduce criminal penalties for organisations that fail to remediate modern slavery (Rowland, 2026). Healthcare organisations occupy a unique ethical position because their core mission is to save lives and improve human wellbeing. This mission is fundamentally compromised if the medical devices and personal protective equipment used to care for patients are produced through exploitative labour practices. This ethical paradox creates a particularly strong motivation for healthcare organisations to implement blockchain as a means of strengthening modern slavery remediation across their supply chains.

These external environmental pressures subsequently motivate healthcare organisations to implement blockchain within the supply chain for modern slavery data governance, socially sustainable procurement and proactive modern slavery risk management. Rather than viewing blockchain merely as a technology, healthcare organisations are attracted by blockchain's

distinct ability for modern slavery data governance. Permissioned data sharing is identified as an attractive feature of blockchain that healthcare supply chains need because it enables authorised supply chain actors to securely access modern slavery information while protecting commercially sensitive data (Wang *et al.*, 2023). Blockchain may therefore help reconcile the competing requirements of supply chain transparency and inter-organisational trust that conventional databases often struggle to accommodate (Heldt and Pikuleva, 2025). Participants also emphasised the value of real-time modern slavery data monitoring, where healthcare organisations oversee supply chain risks, suppliers submit modern slavery information, auditors and NGOs verify the submitted evidence and blockchain preserves a trusted record of these interactions. These technical capabilities of blockchain increase stakeholders' confidence in the integrity of information, which fosters greater driver for healthcare organisations to facilitate blockchain implementation for modern slavery remediation.

Proactive modern slavery risk management is highlighted as another motivating factor, particularly because healthcare organisations' desire to move beyond reactive periodic audits. Participants highlighted blockchain's potential to support the continuous monitoring of workers' conditions, provided that suppliers consent to sharing data, which enables healthcare organisations to identify earlier warning signs of modern slavery risks. Participants also recognised blockchain's value in supporting alternative supplier selection, allowing procurement volumes to be redirected towards socially sustainable suppliers. These developments highlight that implementing blockchain is motivated by its potential to provide a visible and immutable record of remediation progress that can be accessed by authorised supply chain partners before they escalate into reputational crises. Such visibility enables healthcare organisations to distinguish between suppliers demonstrating meaningful remediation and those failing to address labour issues over time and make informed procurement decisions regarding continued engagement.

Supporting socially sustainable procurement also emerged as a key driver for blockchain implementation, reflecting healthcare organisations' desire to strengthen sustainable supplier selection and onboarding practices, while developing confidence in supplier relationships. Participants consistently recognised that selecting and onboarding suppliers with ethical labour practices is critical. However, they also emphasised that remediating modern slavery depends on establishing trusted relationships with suppliers. The motivation has been reinforced by recent use of forced labour allegations involving Australian healthcare PPE supplier Ansell that affected workers were excluded from remediation (Lichtman *et al.*, 2023). In response, Ansell had deliberately chosen to continuously engage with suppliers to encourage remediation rather than immediately terminating the relationship (Lichtman *et al.*, 2023). While existing studies identify blockchain enables supplier collaboration (Chaudhuri *et al.*, 2023; Heldt and Pikuleva, 2025), our findings suggest that healthcare organisations are motivated to implement blockchain because it reconfigures predominantly transactional one-off procurement towards a continuous, boundary-spanning supplier governance that connects supplier selection and relationship-building, in which modern slavery risk monitoring activities can be recorded. Rather than functioning as a transactional technical database, blockchain facilitates relational governance beyond organisational boundaries by enabling healthcare organisations to work with suppliers on a shared infrastructure. Consequently, blockchain is attractive because it enables relational buyer-supplier relationships to be jointly redesigned in support of socially sustainable procurement.

Ultimately, the motivational factors for blockchain implementation in healthcare supply chain are primarily rooted in the interaction between the social and technical subsystems within a broader macro-environment rather than in the technology itself. Heightened public scrutiny and potential serious allegations arising from the Australian Modern Slavery Act push healthcare organisations to seek for implementing tools capable of strengthening modern

slavery remediation (Lichtman *et al.*, 2023; Rowland, 2026). Blockchain becomes attractive not because of its inherent technical capabilities, but because it enables healthcare organisations to achieve perceived benefits and relational governance outcomes that emerge from socio-technical interactions in supply chains, such as modern slavery data governance and enforcing socially sustainable procurement practices. Hence, blockchain technical capabilities only serve as an enabler for strengthening accountability, collaboration and shared responsibility among supply chain partners rather than as the principal source of implementation motivation.

5.2 Socio-technical misalignment constraining blockchain implementation for modern slavery remediation

Blockchain implementation for modern slavery remediation is contingent upon a set of socio-technical boundary conditions across organisational, supply chain and macro-environmental levels. These boundary conditions encompass organisational readiness, supplier integration, technological interoperability and institutional and regulatory constraints. Socio-technical misalignments emerge when these interdependent boundary conditions are not simultaneously satisfied, constraining the effective implementation of blockchain.

Organisational readiness emerged as a social-technical challenge because the technical demands of blockchain were accompanied by unclear value propositions, limited blockchain literacy and widespread misconceptions about the technology. Blockchain is sometimes associated with Bitcoin cryptocurrency or speculative trading activities by healthcare procurement managers, reflecting limited blockchain literacy in understanding its relevance to modern slavery remediation. This disconnection extended beyond limited technological literacy; it reflected a misalignment between the technical purpose of blockchain and the social meanings attached to it within healthcare organisations. Consequently, healthcare organisations found it difficult to articulate a convincing value proposition, with implementation becoming contingent upon demonstrable operational or financial benefits that justified additional investment in infrastructure upgrades. These uncertainties intensified change management burdens, as employees familiar with existing systems questioned the need to replace established routines with a technology whose organisational purpose remained unclear. Organisational readiness therefore reflects an internal ability to establish a shared understanding of how blockchain contributes to existing work systems responsible for modern slavery remediation. Without this shared interpretation, healthcare organisations will struggle to align the technical subsystem with the social subsystem. That is, where blockchain's technical capabilities remain disconnected from organisational practices they are intended to support, resulting in a socio-technical imbalance. Consequently, organisational readiness is not simply about preparing people to use new technology, it is about creating a shared understanding of why blockchain is necessary for achieving modern slavery remediation objectives and how it complements existing organisational practices.

Healthcare organisations further encountered perceived supplier integration barriers when implementing blockchain for modern slavery remediation. Healthcare organisations indicated that suppliers had a limited understanding of modern slavery. This limited understanding constrained the social subsystem by reducing suppliers' willingness to engage with blockchain-enabled labour transparency initiatives, despite healthcare organisations' technical capability to implement them. The absence of economic incentives and long-term relational commitments weakened suppliers' motivation to participate in buyer-led blockchain initiatives, creating a socio-technical imbalance in which the benefits of enhanced transparency and compliance assurance accrued primarily to healthcare organisations, while suppliers bear the costs of technology implementation. Compounding these challenges, healthcare organisations also struggled to encourage suppliers to disclose modern slavery information because it could result in contract

termination. Consequently, blockchain implementation success also depends on the willingness of supply chain actors outside healthcare organisation's boundary to participate and share modern slavery information.

Moreover, technology misalignment represents a technical constraint to blockchain implementation because blockchain depends on existing healthcare organisational work systems. Participants highlighted that healthcare organisations and their suppliers often lacked interoperable labour management systems recording attendance, working hours and wages, resulting in inconsistent data inputs and processing across upstream suppliers. This means that blockchain implementation also heavily depends on the existence of sufficiently structured work systems capable of generating reliable labour information (Liu *et al.*, 2023; Wang *et al.*, 2023). Participants further recognised that implementing blockchain within predominantly manual environments could increase administrative workload, as healthcare organisations would first need to digitise existing procurement processes before blockchain could add value. That is, healthcare organisations should evaluate whether suppliers possess the digital infrastructure and governance capabilities required to systematically capture labour records. Otherwise, blockchain merely secures incomplete or inaccurate information, reinforcing the "garbage in, garbage out" persists even when information is stored securely. Rather than assuming blockchain can compensate for these deficiencies, the critical blockchain implementation question is whether healthcare organisations' existing operations and their suppliers are capable of sharing forced labour information that blockchain is intended to govern.

Institutional and regulatory constraints are embedded within the external environment that constrains blockchain implementation decisions. Regulatory uncertainty surrounding blockchain discourages organisations from investing in new technologies, as they remain uncertain about future privacy requirements and data access responsibilities. These challenges are compounded by differences in labour legislation across sourcing countries, where suppliers often operate under substantially weaker regulatory environments than healthcare organisations. Prior social sustainable supply chain research similarly recognise institutional differences as barriers to implementing transparency initiatives (Lotfi and Walker, 2025; Tan *et al.*, 2026). Consequently, blockchain implementation cannot, by itself, reconcile these institutional differences because socio-technical misalignment arises when implementation spans across organisational boundaries, requiring coordination among supply chain partners operating under different institutional expectations for modern slavery accountability.

5.3 Mechanisms for effective blockchain implementation in modern slavery remediation

The effectiveness of blockchain implementation for modern slavery remediation in healthcare supply chains is contingent upon mechanisms that can address the identified socio-technical misalignments. These mechanisms include supplier support and capability development, integration of interoperable technologies, stakeholder collaboration and partnerships and organisational learning.

Supplier support for capacity and capability development emerged as a critical social-technical mechanism for blockchain implementation in modern slavery remediation. Healthcare organisations highlighted the importance of training their suppliers and supporting their technological and organisational capacity and capability development, where smaller suppliers lacked the infrastructure, expertise and organisational resources required to participate in blockchain. While STS traditionally emphasises the joint optimisation of social and technical subsystems within organisations, the findings suggest that blockchain implementation in healthcare supply chains requires socio-technical subsystem optimisation across the supply chain. By supporting or sharing resources for implementation, healthcare organisations help establish a more compatible operational environment in which blockchain can function effectively.

Beyond developing supplier capabilities, blockchain implementation also requires interoperable technological infrastructures that enable the integration and coordination of blockchain systems across supply chains to strengthen transparency, traceability and modern slavery remediation. Participants emphasised that blockchain should complement, rather than replace, existing supplier information sharing platforms that organisations have developed over years. This finding reinforces previous research highlighting the importance of legacy system compatibility for blockchain implementation (Kouhizadeh *et al.*, 2021; Yadlapalli *et al.*, 2022). Meanwhile, participants highlighted the need to connect complementary emerging technologies, such as AI-enabled anomaly detection, to compensate for blockchain's inability to independently verify supplier-reported information. Interoperability therefore represents more than technical compatibility; it enables the joint optimisation of interconnected STS. At the organisational level, integrating blockchain with existing procurement systems reduces implementation disruption and preserves established work practices. At the supply chain level, interoperability enables healthcare organisations and suppliers to coordinate information-sharing through connected digital infrastructures. Collectively, for healthcare supply chain, blockchain implementation is more likely to be effective when it interoperates alongside existing digital infrastructures.

Stakeholder collaboration and partnerships represent another socio-technical mechanism for blockchain-enabled modern slavery remediation. Participants consistently emphasised that effective blockchain implementation requires strategic collaboration among hospitals, suppliers to disclose modern slavery information, NGOs contribute contextual expertise and technology providers to support the implementation of blockchain. Such collaboration facilitates socio-technical alignment by enabling stakeholders to jointly establish data governance arrangements, accountability structures and implementation practices that support blockchain implementation. This perspective aligns with prior blockchain literature emphasising the role of embedded incentives in enabling supply chain coordination (Kouhizadeh *et al.*, 2021; Saberi *et al.*, 2019). This extends the notion of joint optimisation beyond individual organisations to the supply chain as the primary STS. Rather than optimising isolated organisational work systems, blockchain implementation requires complementary capabilities to be coordinated across interdependent actors with different responsibilities and resources. This study also finds that suppliers' willingness to provide accurate and complete modern slavery information is influenced by incentive mechanisms, such as price premiums and priority consideration for future contracts. Embedding these incentive structures within blockchain strengthens inter-organisational coordination by encouraging sustained information sharing for remediating modern slavery.

In addition, fostering organisational learning is another social-technical mechanism because blockchain implementation in modern slavery remediation requires healthcare organisations to redesign established work practices rather than simply introduce new technology. Participants highlighted the importance of leadership buy-in in fostering organisational cultures that support experimentation and the gradual integration of blockchain within healthcare organisations that are traditionally risk-averse. Leadership commitment therefore functions not only as a source of organisational support but also as a mechanism for legitimising changes to established procurement, compliance and auditing practices (Chaudhuri *et al.*, 2024). Likewise, employee training was viewed as essential for enabling sustainable procurement to perform new tasks within blockchain. These findings reinforce that joint optimisation of social and technical systems is an ongoing process rather than a static implementation outcome. The introduction of blockchain requires the social subsystem (leadership, employee capabilities and organisational culture) to evolve alongside the technical subsystem (Davis *et al.*, 2014; Emery, 1993), ensuring that new technologies are embedded within redesigned work practices rather than simply layered onto existing routines. In this sense, it enables

6. Conclusions, implications and limitations

Ultimately, the implementation of blockchain for modern slavery remediation in healthcare supply chains is neither the solution imagined by techno-optimists nor the dead end portrayed by techno-pessimists. The question is not whether blockchain can remediate modern slavery, but what enables its implementation potential to be translated into meaningful modern slavery remediation. The possibilities for blockchain-enabled modern slavery remediation are realised only when healthcare organisations collectively align the social and technical systems across organisational, supply chain and macro-environmental levels. Progress towards modern slavery remediation depends not on these initial motivations alone, mechanisms including fostering organisational learning, support for supplier capability and development and strategic stakeholder collaboration are critical as macro-environment institutional expectations evolve.

6.1 Theoretical implications

The study extends social sustainable supply chain research by applying an STS perspective to theorise blockchain implementation in the underexplored healthcare supply chain context. It demonstrates that meaningful modern slavery remediation requires socio-technical alignment rather than technological implementation alone. While prior blockchain studies have largely focused on sectors such as agriculture, fisheries, food and apparel (Rogerson and Parry, 2020; Tuladhar *et al.*, 2024), healthcare represents a distinctive governance context. Healthcare organisations must balance their responsibility for human well-being with the management of globally dispersed supply chains exposed to modern slavery risks. Our findings illustrate how blockchain is perceived by healthcare organisations not merely as a traceability technology, but as a governance infrastructure for modern slavery remediation, enabling continuous information sharing, supplier engagement and coordinated remediation across organisational boundaries. This shifts the discussion beyond blockchain as a traceability technology towards its role in supporting socially sustainable governance in complex healthcare supply chains.

Second, this study advances STS theory by developing the BIMSR framework, which conceptualises blockchain implementation in healthcare supply chains as a process of achieving socio-technical alignment across organisational, supply chain and macro-environment levels. The framework moves beyond viewing implementation factors as isolated motivational drivers or misalignments by explaining how they interact to shape blockchain-enabled modern slavery remediation. Specifically, the findings reveal that motivations such as external accountability pressures, modern slavery data governance, social sustainable procurement and proactive risk management encourage healthcare organisations to explore blockchain implementation. However, the value of blockchain capabilities depends on the alignment of social and technical elements, including organisational learning, interoperable technology infrastructure, supplier engagement and supportive institutional conditions.

By identifying how socio-technical misalignments emerge and are addressed across multiple levels, this study extends STS from explaining technology implementation within individual organisations to understanding cross-organisational alignment in complex supply chain governance contexts in healthcare sector. This contribution advances existing blockchain research (Heldt and Pikuleva, 2025; Liu *et al.*, 2023; Tuladhar *et al.*, 2024), which has predominantly examined implementation challenges as separate technical issues (e.g. interoperability, scalability and privacy) or social issues (e.g. organisational resistance

and supplier participation), by demonstrating how these dimensions are interconnected in blockchain-enabled modern slavery remediation.

6.2 Practical implications

The empirical findings provide timely practical insights for healthcare procurement managers and blockchain technology providers seeking to strengthen modern slavery remediation through blockchain implementation. As regulatory expectations and accountability for modern slavery continue to increase in Australia (Lichtman *et al.*, 2023), healthcare organisations need to move beyond technology implementation alone. While blockchain can enhance end-to-end supply chain traceability, its value depends on alignment between social and technical systems. Accordingly, healthcare procurement managers can benefit from adopting an integrated socio-technical approach that aligns organisational, supply chain and broader institutional factors to support effective modern slavery remediation.

Our findings highlight that organisation motivation alone is insufficient for successful blockchain implementation in healthcare procurement. Effective implementation requires socio-technical alignment within healthcare organisations and across supply chain partners. While external accountability pressures, public scrutiny and reputational risks, may motivate organisations to explore blockchain technologies or emerging technologies, these motivations alone do not guarantee successful implementation. There are socio-technical misalignments across supply chains and macro-environment levels. Healthcare procurement managers should therefore assess implementation readiness beyond their organisational boundaries by evaluating supplier participation, organisational capabilities, technology maturity and institutional conditions before embarking on blockchain implementation. Such an approach enables organisations to identify socio-technical misalignments and develop appropriate implementation strategies.

For regulatory bodies, the findings highlight the need for policies that encourage information sharing on modern slavery across supply chains to enable remediation. Because healthcare supply chains operate across jurisdictions with different labour laws, data governance requirements and accountability expectations, blockchain implementation depends on a supportive institutional environment. As Lumineau *et al.* (2021) suggest, identifying appropriate collaborators and establishing effective governance structures are critical for successful blockchain implementation. Regulators can therefore promote inclusive participation, particularly among smaller lower-tier suppliers and foster strategic collaboration with external collaborators in blockchain to strengthen incentives, interoperability and capacity-building initiatives that support digital literacy and implementation readiness.

6.3 Limitations and future research

This study has some limitations that also provide opportunities for future research. Firstly, the findings are grounded in an under-researched Australian healthcare sector, where regulatory expectations, procurement practices and labour risk profiles shape blockchain implementation. Future comparative studies across sectors and countries could refine the framework by examining how different regulatory environments, governance structures and supply chain characteristics influence socio-technical alignment. Furthermore, the BIMSR framework explains interactions among implementation motivations, socio-technical misalignments and enabling mechanisms rather than prescribing blockchain system architectures. Future research could build on this by translating these socio-technical insights into blockchain system architecture in supporting modern slavery remediation.

Secondly, the study adopts a buyer-centric perspective by drawing on healthcare procurement managers and blockchain experts. Consequently, supplier-related challenges



reflect the perceptions and experiences of healthcare procurement managers and blockchain experts who actively engage with supplier governance and procurement processes. Although these stakeholders play a central role in initiating blockchain implementation, effective implementation also depends on collaboration among a broader network of actors, including upstream suppliers, workers and NGOs. Future research could therefore incorporate these stakeholder perspectives through multi-stakeholder and longitudinal studies. Such work could develop a more holistic understanding of how governance arrangements evolve, particularly the role of NGOs as trusted intermediaries in supporting remediation. Relatedly, the study involved 14 participants. This sample size was considered adequate for this exploratory qualitative study, given the sensitivity of modern slavery and the nascent stage of blockchain implementation in Australian healthcare procurement. Participants were purposively selected based on their relevant expertise, although this approach may introduce potential selection bias. Selection was guided by the researchers’ judgement of participants’ knowledge and experience rather than statistical representativeness. While the context-specific sample may limit transferability of the findings, established qualitative research protocols and multiple trustworthiness measures were employed to strengthen the credibility of the findings. Finally, it is our hope that this study stimulates further interdisciplinary research that advances both the conceptual understanding and practical implementation of blockchain for modern slavery remediation in supply chains.

Appendix

Table A1. Respondent profile and semi-structured questionnaire

	Healthcare participants (HC-P)	Blockchain participants (BC-P)
Respondent role	• What is your current position and title? • Can you please explain your current role and responsibilities?	
Managerial experience	• How long have you been working in the current position? • How long have you been in this line dealing with suppliers/vendors?	
Organisation type	Can you please briefly describe your firm?	
Interview questions	• What procurement challenges have you faced in the healthcare sector? • As your firm is reporting in response to the Australian Modern Slavery Act, what major challenges has your firm faced in identifying slavery risks? • How do you, in general, evaluate and monitor your suppliers? • What are the considerations that would influence your decision to adopt blockchain? • What do you think about the impacts/effects of implementing blockchain in areas of modern slavery risks? • Are there any challenges you foresee/encounter in the implementation of technology in healthcare? • As there are advancements in technology like AI, robotics in supply chains, can you share your brief understanding of blockchain? • What is necessary among stakeholders to successfully implement blockchain in supply chains?	• What sort of information should be integrated in the context of tracing modern slavery risks? • What are the technical components that should be considered for a blockchain system architecture? • What considerations should be made regarding scalability and data storage?

Source(s): Authors’ work

Table A2. Data structure and representative quotations

2nd order theme	1st order code	Frequency	Quotations
External accountability pressures	Public scrutiny of work practices	9	“With all the attention on modern slavery now, if we had a system that could clearly show where our products come from, it would make it much easier to respond when NGOs or the media start asking questions” (HC-P8)
	Modern slavery regulations	11	“The Australian Modern Slavery Act has certainly pushed us to look deeper into our supply chain and issues of modern slavery but it hasn’t been easy . . .” (HC-P7)
	Reputational risks	10	“If modern slavery presents in the supply chains, it’s their reputation and image as a hospital on the line” (BC-P2)
Modern slavery data governance	Permissioned data-sharing	10	“Blockchain lets us open up the right information to the right partners, without handing over all our commercial details to everyone in the chain” (BC-P10)
	Enhanced modern slavery data reliability	8	“Now, those questionnaires responses sit in folders. Having them time-stamped and locked into a ledger would give our clients more confidence that nothing has been altered” (BC-P3)
	Real-time modern slavery data monitoring	7	“We expect blockchain helps us automate our procurement processes and monitor modern slavery information, rather than us looking at documented audits every time” (HC-P2)
Socially sustainable procurement	Confidence in relationship-building with suppliers	9	“We rely on building relationships with our suppliers here, who are our first point of contact . . . It’s like a chain of trust, but trust can get shaky the further you go up the chain” (HC-P1)
	Sustainable supplier selection and onboarding	12	“In essence, you could require suppliers to be onboarded onto the blockchain first, with their information and activities recorded so firms can have transparency and monitor them more closely” (BC-P12)
Proactive modern slavery risk management	Monitor workers’ working conditions	11	“If suppliers were entering data on things like recruitment fees or dormitory conditions onto a shared ledger, firms would have a much better sense of what workers actually face further up the chain” (BC-P14)
	SC risk detection and crisis response	9	“Instead of waiting for an annual audit, blockchain system could surface warning signs earlier then it could help hospitals investigate the issues before it blows up into a crisis” (BC-P8)
	Alternative supplier selection	8	“If there is a system that can flag a particular area as high-risk, it would be easier to justify moving volume to an alternative supplier that is already verified on the system” (HC-P7)

(continued)

Table A2. Continued

2nd order theme	1st order code	Frequency	Quotations
Organisational readiness	Low blockchain literacy and misconceptions	13	“When mentioning blockchain, I immediately think of Bitcoin or some sort of speculative trading, so I don’t really see how it relates to modern slavery or hospitals at all” (HC-P4)
	Blockchain setup costs	11	“The cost of running an efficient blockchain will require additional costs of extra infrastructure and hardware” (BC-P10)
	Unclear blockchain value proposition	12	“If it gives us clear savings by implementing the blockchain then I would think that would be beneficial for us to do that sooner”. (HC-P6)
	Change management burden	10	“If the users are already familiar and comfortable with current system, they may be resistant to use” (BC-P13)
Technology misalignment	Unverifiable modern slavery data	10	“Garbage in, garbage out. A lot of our clients get now are self-declarations that they can’t verify, and putting those onto a blockchain doesn’t magically make them true” (BC-P13)
	Data processing inefficiencies	8	“The existing processes in most hospitals are quite manual; if we just bolt blockchain, we risk doubling the workload rather than streamlining the workflows” (BC-P2)
	Legacy system interoperability	10	“If there isn’t a system to track attendance, calculate work hours, and determine wages in a structured format, it would be impossible to implement blockchain” (BC-P11)
Institutional and regulatory constraints	Blockchain regulatory uncertainty	11	“There will need to be legislation updates knowing that how the privacy of information is being stored and used and access to information” (BC-P13)
	Weak labour legislation	10	“We come from a country where we are under the pressure of reporting. Our sourcing countries often have different labour legislation and may still be in the early stage” (HC-P4)
Supplier integration barriers	Supplier limited modern slavery understanding	12	“For our suppliers, even the term ‘modern slavery’ is still quite abstract, they don’t always recognise that things like recruitment fees or holding passports can fall into that category” (HC-P5)
	Lack of economic incentives for suppliers	9	“If supplier admits there’s an issue in their factory, their worry is the termination of contract, so they’re cautious about putting anything sensitive into a system like blockchain” (HC-P5)
	Fear of sharing confidential data	11	“Suppliers may fear disclosing personal and labour-related information if they believe it could expose them contract termination or penalties” (HC-P7)

(continued)

Table A2. Continued

2nd order theme	1st order code	Frequency	Quotations
Supplier support and capability development	Supplier blockchain training	11	"Larger firms, might need to take the lead in helping smaller suppliers onboard and integrate with the blockchain system" (HC-P3)
	Supplier resource and cost support	8	"We can't expect a supplier to absorb all the costs of new system resource. If buyers share some resource costs, then it becomes a joint capability rather than a burden" (BC-P8)
Interoperable technologies integration	Seamless integration with existing platforms	9	"We already have supplier portals and e-procurement tools; ideally blockchain would sit on top of those platforms, not replace everything we've built over the last ten years" (HC-P7)
	Connecting supporting technologies for blockchain	10	"We need complementary tools [BC] to help tackle the unverifiable modern slavery information on the chain, there may be new ways, that is something to be investigated" (BC-P12)
Stakeholder collaboration and partnerships	Strategic- collaborative information-sharing	10	"You need hospitals, suppliers and NGOs all at the table, it can't be siloed. To use blockchain, there would need to be collaboration on information sharing" (BC-P9)
	Partnerships with third-party technology providers	11	"Partnering with technology providers that understand modern slavery would be essential to design a system that actually works" (HC-P4)
	Data sharing incentive strategy	9	"If we let suppliers know complete data could translate into preferred status or a small price premium, they'd be much more willing to share information consistently" (BC-P14)
Fostering organisational learning	Leadership buy-in	12	"Hospitals in nature are usually risk-averse as we have our own systems in place, so having a culture where leadership is open to integrating tools like blockchain is important" (HC-P3)
	Internal employees training	10	"The training of employees to use blockchain and having the appropriate tooling and being able to train the employees that perform the audits" (BC-P10)

Source(s): Authors' work

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Corresponding author

Kamrul Ahsan can be contacted at: Kamrul.ahsan@rmit.edu.au