Assessing retailer readiness to use blockchain technology to improve supply chain performance

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Abstract

Purpose – This paper aims to assess the readiness of retail workers to use blockchain technology (BCT) to improve supply chain performance. The assessment was made via a quantitative approach taken using a theoretical framework based on Keller's motivation model and self-determination theory in the BCT context.
Design/methodology/approach – The authors collected data from 567 retail workers from an emerging country through a structured survey questionnaire. The authors tested the hypotheses of the proposed model using Warp PLS 7.0 and controlled firm age, industry type and technological intensity.
Findings – Our findings may help firms in making the process of digital transformation inclusive. The authors found that supplier-based attention and motivation through BCT lead to supply chain performance, and that supplier-based satisfaction and trust achieved through BCT positively impact supply chain performance. Further, supplier-based relevance on raw material selection with the higher trust and motivation levels achieved through BCT was found to have a positive impact on supply chain performance.
Research limitations/implications – IT supply chain applications are referred to as "lean" rather than "rich" because they still rely mainly on written and numerical means to present data. When the environment is less ambiguous, then less rich media can be used to facilitate communication. IT supply chain applications allow suppliers to spend time building relationships with other suppliers instead of focusing on administrative tasks, thus enhancing such relationships.
Originality/value – This study can be considered the first to assess retailer readiness to use BCT to improve supply chain performance through the theoretical lens of Keller's motivation model and self-determination theory.

Keywords Supply chain performance, Retailers, Blockchain technology, Gamification, Self-determination theory

Paper type Research paper

1. Introduction

The blockchain is an evolution of database technologies, such as distributed ledgers and peer-to-peer networks. A distributed ledger technology contains a list of append-only, timestamped transactions encrypted and backed by consensus mechanisms. In peer-to-peer networks, immutable records are permanently stored over a decentralized network of equal peers (Hwang *et al.*, 2018). Several decades have passed since blockchain technologies were first developed (e.g. Bamakan *et al.*, 2021; Jang and Han, 2022; Bai *et al.*, 2020). As conventional work methods may prove ineffective during disruptive events like pandemics, businesses need to adapt and transform their business practices (Bai *et al.*, 2020; Sangal *et al.*, 2022).

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Most firms have worked toward digital transformation (DT) in a phased manner (Bumblauskas *et al.*, 2020; Büttgen *et al.*, 2021; Sangal *et al.*, 2022). The fourth industrial revolution (known as Industry 4.0) has made firms transition seamlessly to digital technologies. As a result, firms have been able to use connected technologies in the interphase between the virtual and the real (Philbeck and Davis, 2018; Xu *et al.*, 2018). Most extant studies have discussed how new-age technologies have helped firms gain a competitive advantage, improve firm performance, enhance supply chain coordination, etc. (Di Vaio and Varriale, 2020; Frizzo-Barker *et al.*, 2020). In this regard, blockchain technology (BCT) enables teams to establish trust (Di Vaio and Varriale, 2020; Frizzo-Barker *et al.*, 2020). Despite the progress made in regard to understanding specific aspects of DT, we still lack a detailed understanding of it and its effects in several contexts. According to previous studies, digital technologies can trigger strategic changes, disrupt the way organizations create and transfer value, and manage the changes required for social and organizational structure.

Despite the advancements made in DT research, most of it is still conducted with firm-level data (Di Vaio and Varriale, 2020; Frizzo-Barker *et al.*, 2020). While it is vital to implement and adopt DT at the firm level, it is equally important to study its percolation across the entire supply chain network and its actors, with retailers being among the most crucial ones in a supply chain network structure. Recent studies have reported that supply chain firms struggle to include retailers in the DT process, which negatively affects their efficiency (Brookbanks and Parry, 2022; Di Vaio and Varriale, 2020), including chain firm inclusivity in the DT process. Thus, based on the foundational aspects of Keller's motivation model (which is further grounded in expectancy-value theory), we aimed to investigate retailer readiness to adapt to BCT and improve supply chain performance (Hooks, 2022). The key antecedents that explain retailer trust in technology would be satisfaction, attention, confidence and relevance (Walczuch and Lundgren, 2004). Trust would then act as an antecedent indicator to the use of BCT, which would further help improve supply chain performance (Blomqvist and Cook, 2018; Brookbanks and Parry, 2022).

We therefore assessed the readiness of retail workers to use BCT to improve supply chain performance by proposing a conceptual model using the theoretical constructs of Keller's motivation model (Blomqvist and Cook, 2018; Brookbanks and Parry, 2022). Blockchain drive plays a crucial role in the retail sector by facilitating the use of digital money (Creydt and Fischer, 2019). The importance of assessing retail worker readiness to use BCT in the supply chain performance context varies based on fast-moving consumer goods.

Although blockchain-based food traceability systems have been discussed in the literature (Creydt and Fischer, 2019; Pearson, 2019), few studies have explored consumer preferences for such systems. This represents an important research gap because the cost of implementing a new traceability system depends on consumer preferences and perceptions (Jin *et al.*, 2017). Numerous studies have examined the impact of traceability systems on retailers (Sangal *et al.*, 2022), commonly analyzing such systems in relation to brand- or product-related outcomes, such as willingness to pay or purchase intention (Creydt and Fischer, 2019; Sangal *et al.*, 2022). Retailers also make decisions about traceability according to practical evidence. Despite several factors – e.g. consumer psychological states – being identified as significant predictors (Spiggle and Sewall, 1987). According to recent research, there is a need to study consumer perceptions of traceability systems and their effect on their trustworthiness.

Numerous studies have examined the impact of retailer pricing strategies on consumer behaviors. Our study was aimed at better understanding of retailer pricing strategies under conditions of duopolistic competition. Studies have examined the pricing strategies of differentiated enterprises in duopolistic competition. Belleflamme and Vergote (2016), while Valletti and Wu (2020) examined retailer pricing strategies in oligopolistic competition. According to Kehoe *et al.* (2018), big data impacts price competition for brand experience

products in oligopolistic markets. Seetharaman and Che (2009) examined price competition in markets characterized by consumer demand for variety. Chen *et al.* (2020) investigated the segmentation pricing of competing companies with complete consumer information. According to Aviv and Pazgal (2008), consumer behaviors influence price segmentation. According to Li *et al.* (2021), greater availability of information about providers increases the likelihood of consumers' purchasing.

Belleflamme *et al.* (2020) examined the possibility of competitive firms gaining market power by discriminating against prices. In the retail sector, BCT plays a significant role in enterprise operations management (Belleflamme *et al.*, 2020). BCT also poses several risks, which hackers may exploit and compromise or leak the data stored in the blockchain (Belleflamme *et al.*, 2020). Manufacturers can also take advantage of the agility of small retailers to explore emerging opportunities in more challenging ways with larger customers. This study differed from previous studies wherein strategic supplier partnership was less heavily weighted in supply chain management (SCM) practices. Long-term relationships are less relevant to extracting value from supply chain relationships because organizational learning concentrates more on the owner/manager.

As BCT gains momentum, many players are participating in its applications. Platform-based business models are anticipated to enhance competitive advantages as one of the select emerging technologies (Burkett *et al.*, 2016). Supplier-based attention and motivation through BCT lead to supply chain performance in multiple ways, as some firms may achieve collaborative benefits through effective customer account management. According to Ramaswami *et al.* (2008), customer account management refers to identifying and understanding value generators to provide customers with a complete experience. Keller's ARCS model was one of the pioneering works in motivational design, aimed at making instruction more appealing to learners (Keller, 1983). Motivation is often considered an input variable of the id that each learner brings to the process and should be considered a potential distraction during the working environment. In an emerging economy or in the process of developing their retail skills, chilled temperature-controlled distribution is one of the most demanding disciplines in logistics and is a critical sector for retailers in an emerging industry. This shows the importance of taking a whole channel approach rather than an attitude of "I've done my part; let others do theirs". Retailers in emerging economies need to get the fresh food sector right to build consumer trust and confidence that the products will be tasty and fresh.

A successful implementation of BCTs within a supply chain requires understanding how the supply chain network impacts professional behaviors within and among companies (Dai *et al.*, 2019). The addition of an environmental component will further complicate the adoption of BCT in SCM due to the increased number and type of stakeholders involved (Dai *et al.*, 2019). Some of the example applications of BCT in the supply chain are the timeliness of supply chain related transactions in the food chain supply of McDonald's, KFC and similar fast-food restaurants (Marsden *et al.*, 2000; Aung and Chan, 2014). Incorporating BCT into the supply chain creates a new channel for the distribution of goods between suppliers and customers. In emerging country retail markets, blockchain management lacks organization (Nigam *et al.*, 2022a, b). In emerging markets, blockchain implementation in retail is rare, despite the industry's challenges (Jin *et al.*, 2017). In the retail market, monetary transaction policies lack transparency for consumer buy-and-sell transactions (Creydt and Fischer, 2019; Pearson, 2019). The acceptance of blockchain for retailers following the implementation of Blockchain Adoption policies in emerging country retail markets has yet to be studied (Creydt and Fischer, 2019; Pearson, 2019).

The role of blockchain, transaction policies and the experience of blockchain in determining blockchain implementation. Some of the examples are shipping (Song, 2021; Vernimmen *et al.*, 2007) and insurance industries (Lin *et al.*, 2010) in emerging economies.

There is a growing consensus in regard to the outdatedness and inadequacy of retail buying and selling processes for online (P2P) transactions (Creydt and Fischer, 2019; Pearson, 2019). In addition, no further initiatives are being taken to implement customer payment systems and BCT in the retail sector. As BCT can facilitate sustainable SCM, SCs can help in addressing unethical behaviors (e.g. Gurtu and Johny, 2019; Kshetri, 2021), which tend to occur most often in developing countries (Kshetri, 2021). In areas such as the environment (Fikru, 2014) and child labor practices (Doepke and Zilibotti, 2005), emerging countries lack adequate regulations and enforcement mechanisms. In relation to sustainability, most companies operating in emerging countries do not go beyond compliance requirements (Jeppesen and Hansen, 2004).

Should developing economy companies invest substantially in new technologies, training employees, and obtaining international certifications, their products would become more expensive. In developing countries, sustainability issues are challenging because of a lack of trust and high intermediation costs. BCT may be suited to address these issues. Besides decentralization, BCT, which can eliminate the need for institutional and personal intermediaries, facilitates trust and disintermediation (Gurtu and Johny, 2019; Kshetri, 2021), for which there is a critical need in developing countries.

Several factors have contributed to the use of BCT to facilitate the development of sustainable SCs in developing countries. Regulations, activists and consumers increasingly force companies to build sustainable supply chains, which may also combat corruption and unethical behaviors (LeBaron, 2021) in these countries. However, researchers have hitherto examined BCT in the developing world (Kshetri and Voas, 2019; Gurtu and Johny, 2019; Kouhizadeh and Sarkis, 2018). A lack of adequate record-keeping systems, commonplace public mistrust in regulators, and widespread smartphone use explain the early adoption of BCT in developing countries (Hald and Kinra, 2019). It has been suggested that BCT can play a significant role in tackling corruption (Kenny, 2017; Kshetri and Voas, 2019), protecting property rights (Kshetri and Voas, 2019) and creating secure digital identities (Kshetri and Voas, 2019). The above discussion led to our research question.

RQ1. How can retailer readiness toward BCT help improve supply chain performance?

The next section of this paper discusses the theoretical underpinnings used in developing the study. The subsequent sections discuss the research design, focusing on how the data was collected. The results are then discussed, with their clear contribution to theory and practice.

This study makes two main contributions to the literature. First, several scholars have argued that supply chains currently do handle quality data that can be transferred immediately among each process, such as procurement (Doepke and Zilibotti, 2005), purchasing (Ellram, 1996; Gurtu and Johny, 2019), retailing (Ganesan *et al.*, 2009), raw materials handling (Kain and Verma, 2018) and other internal supply chain related activities. To assess retail worker readiness to use BCT to improve supply chain performance (Nigam *et al.*, 2022a, 2022b), we developed a conceptual framework based on the theoretical constructs of Keller's motivation model. We did so by means of a quantitative approach suited to track the slow and manual ongoing processes within supply chain activities. It is true that supply chains are currently capable of handling large, complex datasets, but many of the related processes, especially those enacted in the lower supply tiers, are very slow (Kain and Verma, 2018; Behl *et al.*, 2022). The purpose of this study was thus to identify the weak points within the overall management structure.

Second, this study assesses the readiness of retail workers to use BCT to improve supply chain performance. Based on the results, supplier-based attention, motivation, supplier-based satisfaction, trust, supplier-based relevance to raw material selection, and confidence with higher levels of trust and motivation contribute to supply chain performance. This could be further investigated by future researchers in the context of various industries, particularly

the shipping one, in relation to mitigating the high costs of reputational damage (Qu *et al.*, 2019; Kamalapur and Lyth, 2020).

2. Theoretical underpinnings and hypotheses development

To create a conceptual framework suited to investigate retailer readiness toward BCT to improve supply chain performance, our study was conducted based on the theoretical frameworks of Keller's motivation model and self-determination theory (Kshetri and Voas, 2019). This section justifies in detail the applicability of the three theories of Keller's motivation model and self-determination theory (Kshetri and Voas, 2019).

2.1 Keller's ARCS motivation model

This model of motivational design (Keller, 1983) includes a synthesis of the motivational concepts and theories that fall into four categories: attention (A), relevance (R), confidence (C) and satisfaction (S). Keller's ARCS model was one of the pioneering works in motivational design, aimed to make instruction more appealing to learners (Keller, 1983). Motivation is often considered an n input variable of the id that each learner brings to the process and that should be considered a potential distraction during teaching. Motivation is also a variable in the instructional process and should be protected within it (Keller, 1983). In the ARCS model, learning motivation is seen not only as an input and process variable but also as an output one (Keller, 1983). Ideally, a motivational design stimulates a learner to continue his studies due to the interaction with well-designed instructional material (Kshetri and Voas, 2019). Developing the ability to appeal to learners would result in high levels of motivation (Kshetri and Voas, 2019).

2.2 Self-determination theory

According to self-determination theory, supervisory support for basic psychological needs is associated with autonomous self-regulation at work, social well-being and work-related functioning in employees (Gagné and Deci, 2005; Pine *et al.*, 1993). In recent years, manufacturers have begun to realize the benefits and importance of cooperative relationships, thereby calling for an expanded approach to SCM (e.g. Farooque *et al.*, 2022). A sense of autonomy is usually associated with something important to the individual. The need for competence reflects a desire to feel capable of producing any desired outcome and preventing undesirable ones, rather than controlled motivation and choice (Vallerand and Ratelle, 2002).

2.3 Hypotheses development

Supply chain collaboration is as relevant today as it was two decades ago (Bowersox *et al.*, 2003; Dyer and Singh, 1998; Mentzer *et al.*, 2000). Companies have worked together to achieve successful outsourcing and offshoring initiatives, and collaborate to take advantage of reshoring opportunities (Tate, 2014; Yang *et al.*, 2015). An SC collaboration maximizes synergistic benefits, improves operational performance and increases competitiveness (Daugherty, 2011; Whipple and Kenis, 2010). Fawcett *et al.* (2008) suggested that SC collaboration is based on a commitment that goes beyond what is expected of a discrete market transaction. By sharing resources, risks and rewards between partners, collaboration creates a competitive advantage for firms and consumer product value (Davis *et al.*, 2019; Esper *et al.*, 2010). As BCT gains momentum, many applications and players begin to participate in its applications. BCT has been described as the most important invention since the inception of Internet, and has been identified as one of the top ten strategic technology

trends. As a select emerging technology, platform-based business models are anticipated to enhance competitive advantages. This led us to formulating our first hypothesis:

H1a. Satisfaction has a positive influence on user trust in supply chain performance

There is growing evidence that attitudes and their formation can explain various observable behaviors and predict future behaviors and intentions. By effectively managing customer accounts, some firms may achieve collaborative benefits through supplier-based satisfaction and motivation. In relation to providing customers with a complete experience, Ramaswami *et al.* (2008) defined customer account management as identifying and understanding value generators. According to Mentzer *et al.* (2001), SCM can lead to customer loyalty and preference. Once they have understood the needs and wants of their customers, firms may collaborate with SC partners to enhance their value to them. By means of a differentiated offering powered by SC collaboration, they may be able to create competitive advantage and build long-term relationships with their customers. We thus hypothesized the following:

H1b. Satisfaction has a positive influence on user motivation toward supply chain performance

Despite its positive impact on user trust in supply chain performance, attention has been widely featured in the investigation of various aspects of information security in organizations. Within a value chain's functions, a lack of security awareness is considered one of the primary causes of vulnerability. We examined security awareness and behavior in an organizational setting. A cognitive behavior context is related to how an individual perceives objects, such as people, products, brands, etc. For mobile users, cognitive behavioral stage motivations are conscious decisions relating to behavioral purpose of serving user-driven needs (functional service delivery anywhere, anytime, and the ease of use and usefulness of smartphones), social needs connecting with others, or enjoyment of using the device. An object's affective behavior (smartphones) is the way one feels about it. Engaged behavior is characterized by energy, involvement and efficacy, and is defined as a behavioral flow devoid of any intentional mindset, such as control, attention, focus, curiosity and/or intrinsic interest (Whipple *et al.*, 2015). There is no such thing as a momentary or specific state of engagement; a cognitive-affective state is pervasive and persistent (Whipple *et al.*, 2015). Through customer satisfaction, increased sales, and employee retention, engagement and profitability are strongly related at both the organizational and individual levels, focusing mainly on the component of user trust in supply chain performance.

Moralized content within a value chain has an emotional component, such as maintaining relationships with suppliers and buyers. Perceptual SCM systems are naturally tuned to detect any stimuli associated with morality and emotion. The use of social media provides instant access to a wide variety of information. Initially, this feature is likely to be beneficial in maintaining customers within the value chain by enabling them to learn about or become aware of ideas they would not otherwise encounter (e.g. news, education and products). It is important to note, however, that increased access to information comes at a price. Although access to information has increased, our ability to pay attention to has decreased. Emerging technologies may engender customer loyalty and preferences when a firm uses effective SCM and SC collaboration. Zakaria and Dhar (2021) defined collaborative process competency as an intraorganizational skill that lays the foundation for successful SC collaborations (Whipple *et al.*, 2015). Hence, in the literature, supplier-based attention and motivation through BCT have been identified as having the potential to improve performance levels within the supply chain (Whipple *et al.*, 2015). This can be achieved by increasing the number of players participating in applications when dealing with suppliers. We thus hypothesized the following:

H2a. Attention has a positive influence on user motivation toward supply chain performance

Companies often collaborate with their supply chain partners to manage goods and information flows, but not cash ones. For example, Zhao *et al.* (2008) documented some prominent examples in the automotive industry. Other sectors can also be disrupted by systematic payment term extensions (Garcia-Appendini and Montoriol-Garriga, 2013). According to Garcia-Appendini and Montoriol-Garriga (2013), financial flows need to be managed better. Median inventories were 18.3% of all assets in the 1980s, but decreased to 7.4% in the 2000s. Management tools should be explored in order to improve the supply chain. Flow occurs when an activity is difficult and involves risk (Whipple *et al.*, 2015). As a result, individuals' capacities are stretched, and their skills are challenged. As it provides the best user experience, it has become the critical element of the theory of optimal experience (Whipple *et al.*, 2015) with regard to user trust and attention within the supply chain. We hypothesized the following:

H2b. Attention has a positive influence on user trust in supply chain performance

Due to the rapid development of IT networking, social networks are becoming increasingly popular. Due to some unresolved issues, such as trust, security and privacy, social networking applications cannot however be widely accepted by many users. Further, when considering the theoretical constructs in terms of user trust in supply chain performance, trust graphs consist of trustors, trustees, recommenders and the trust relationships between them (Mentzer *et al.*, 2001). Using trust value and confidence level as trust factors, we can derive four trust metrics based on these two factors: maximum flow of trust value, maximum flow of confidence level, minimum uncertainty cost with maximum flow of trust, and minimum mistrust cost with maximum flow of trust. Trust on technology is related to relatedness to perform task and more importantly its relevance in a specific context. While most studies refer to testing the relationship between trust, but they miss on understanding its antecedent of relevance. We hypothesized the following:

H3a. Relevance has a positive influence on user trust in supply chain performance

Csikszentmihalyi (1990) stated that flow occurs more often at work than during a person's free time. Flow states are more easily achieved in activities such as performing music, dancing and writing because they have rules and require skills. As a result of participating in enjoyable activities, people become deeply engaged and motivated. Passive activities like watching television do not usually lead to flow. According to Steven Pritzker, television shows can elicit audience flow if they are relevant to viewers. By applying theoretical viewpoints, it is possible to justify how supplier-based satisfaction and trust can lead to supply chain performance.

In today's competitive business environment, SCM is widely recognized as an essential tool for cost control and economic performance improvement (Dubé *et al.*, 2017; Perakis and Sun, 2014). However, given rising issues – such as the increased complexity of supply chains, transparency and flexibility demands – task-based challenges and supply management practices must be modernized if companies and industries wish to remain competitive (Dubé *et al.*, 2017; Perakis and Sun, 2014; Goldsby *et al.*, 2013). The success of SC collaboration may be influenced by factors other than collaborative process competency. As a result, we formulated the following hypothesis:

H3b. Relevance has a positive influence on user motivation toward supply chain performance

BCT can further improve supplier-based relevance on the raw material selection with higher trust and motivation levels. It can enhance supply chains by speeding up delivery and reducing costs, traceability, coordination between partners, and financing (Lavoie *et al.*, 2021). As globalization has made managing and controlling supply chains more challenging (Lavoie *et al.*, 2021), BCT – which ensures transparency, traceability and security – may be helpful in global SCM. The literature focuses on conceptualizing the impact of BCT on SCM. Kouhizadeh *et al.* (2021) identified several barriers to the adoption of BCT in supply chains and considered how supplier-based relevance on the raw material selection with higher trust and motivation levels could affect the supply chain performance of local and global supply chains. There are two fundamental reasons to focus on this aspect: higher motivation and trust levels. As a result, the following hypothesis was formulated:

H4a. Confidence has a positive impact on user trust in supply chain performance

According to Lee *et al.* (2018), SCM encompasses logistics, operations, materials, marketing, purchasing and information technology. Devaraj*et al.* (2007) stated that organizations should optimize their organizational (Gupta and Starr, 2006) and quality performance. Ensure the health and optimal functioning of end-to-end supply chains (SCs) by monitoring each component (Gautam *et al.*, 2017). Therefore, the technology adopted by organizations should be able to meet a variety of needs, and business decisions should be able to maximize the value of technology. Additionally, disparate systems in SCM limit transparency and visibility. In uncertain environments, these factors impede decision-making in SCs that revolves around "control and adaptation", which improves confidence within the supply chain activities.

H4b. Confidence has a positive impact on user motivation toward supply chain performance

The literature has recently reported that motivation levels vary with BCT-based supply chain performance in various ways (Lavoie *et al.*, 2021). A modern supply chain is characterized by multitiered and geographically dispersed entities competing to serve consumers (Lavoie *et al.*, 2021). Globalization, various regulatory policies and cultural differences make it hard to evaluate information and manage risk in this intricate network. Due to inefficient transactions, fraud, pilferage and poorly performing supply chains, there is a lack of trust and a need for better information sharing. Supply chain entities and customers cannot determine the actual value of an item without transparency (Lavoie *et al.*, 2021). Agri-food (Costa *et al.*, 2022), pharmaceuticals and medical devices (Razak *et al.*, 2021) and high-value goods (Nitsche *et al.*, 2021) are just some of the industries in which traceability is critical. Often, expensive and high-value items the provenance of which is based on paper certificates and receipts can be lost or altered (Nitsche *et al.*, 2021). A supply chain's traceability is further complicated by the costs and reliability of intermediaries (Lavoie *et al.*, 2021), which creates strategic and reputational competitive issues. This further shows the link between supplier-based relevance in the raw material selection and higher trust and motivation levels due to cost-effectiveness, the usefulness of updated technology, and supplier networking abilities. We hypothesized the following:

H5. Trust has a positive impact on the use of BCT toward supply chain performance

SCM relies on the collaboration and coordination of several stakeholders to optimize the flow of goods, information and financial resources through the entire supply chain, as in supplier-based confidence with higher trust and motivation levels enhanced through BCT (Mentzer *et al.*, 2001). As supply chains are heavily reliant upon centralized, sometimes disparate, and stand-alone information management systems within organizations, increasing supplier confidence and trust levels through BCT leads to improved supply chain performance

(Mentzer *et al.*, 2001). Enterprise resource planning systems, for example, have their own setbacks. To rely on a single organization or broker for the storage of sensitive and valuable information, supply chain entities must establish high levels of trust (Kouhizadeh *et al.*, 2021). As a result of the single point of failure of centralized information systems, the entire system has the potential for error, hacking, corruption and attacks (Vallerand and Ratelle, 2002), which emphasizes the increased levels of trust and motivation achieved by BCT within supply chain functions.

H6. Motivation has a positive impact on the use of BCT toward supply chain performance

BCT has emerged as a potential solution to the erosion of trust in traditional institutions and online intermediaries because it eliminates the need for trust between the parties sharing information (Dolgui and Ivanov 2021). Rather than submitting themselves to the authority of a centralized institution, users submit themselves to the authority of BCT. Regardless of its purpose and when it is functioning correctly, a public blockchain undeniably mitigates the principal–agent issues associated with trusted relationships (e.g. moral hazard and shirking). As a result, many refer to BCT as a "trustless" or "trust-free" technology. However, the academic discussion of BCT emphasizes this central property from a negative perspective: BCT does not depend on trust to function. It has been relatively difficult to examine the implied positive perspective, namely what. In order to address this gap, this article embeds the discussion about trust in BCT within a broader sociological and philosophical discussion on trust and confidence (Razak *et al.*, 2021). Hence, our next hypothesis was the following:

H7. The use of BCT positively impacts supply chain performance

The current call for papers in BCT-based research pertains to the fact that the four perspectives of satisfaction, relevance, attention and confidence have yet to be investigated from the perspective of the self-determination theory and Keller's ARCS motivation model (Lavoie *et al.*, 2021). This led to our study's conceptual framework development (Refer Figure 1).

3. Methodology

In order to test the relationships proposed in the conceptual model, we collected primary data through a structured survey. We tested the survey questionnaire for face validity with ten

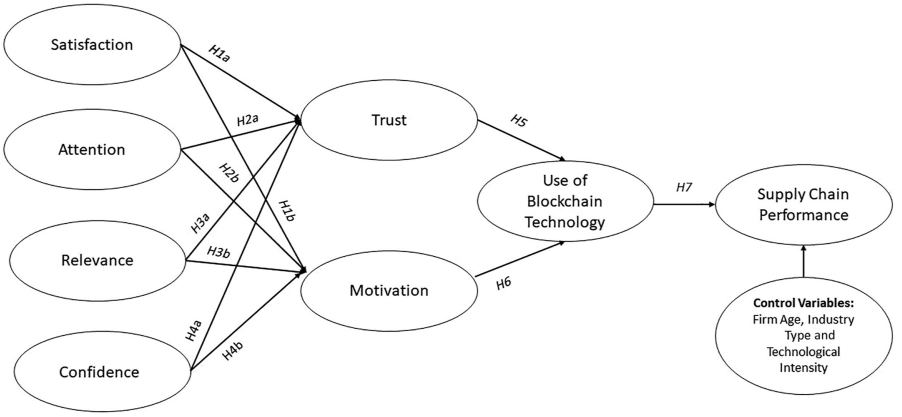

Figure 1.
Conceptual framework

academic experts who had more than six years of experience in teaching information systems and who had published research on emerging trends in supply chains. Additionally, we invited ten retail store supply chain managers to participate in the pilot testing of the questionnaire. We incorporated the suggestions made by our 20 pilot participants to improve the questions' brevity and flow and eliminate any ambiguity in the questionnaire by rephrasing certain measurement items. We modified previously studied constructs to suit our study's context. For item finalization, our adapted constructs were further approved by the experts, leading to their operationalization. We then administered the final questionnaire to 567 retailers from India. The following section describes the operationalization of the constructs, which played a vital role in designing the structured questionnaire.

3.1 Instrument design and the operationalization of our constructs

We designed the initial questionnaire by borrowing items from established scales. We collected the data for each measurement item using a five-point Likert scale ranging from 1 = "Strongly Disagree" to 5 = "Strongly Agree". We gauged the study's constructs using subjective measures, in line with the practice found across the organization and information literature (Behl *et al.*, 2022). Eighteen items were adapted from the ARCS model (Keller, 1987). Trust was measured using the scale suggested by Dennis *et al.* (2012). Motivation was measured based on the scale developed by Behl *et al.* (2022). The use of BCT was measured in line with Shin (2019). Supply chain performance was measured using Queiroz and Wamba's (2019) scale.

The experts also checked for completeness and flow. The final version of the questionnaire was structured in two parts. The initial section pertained to the demographic profile of the respondents, with questions aimed at inquiring about their socio-economic and cultural backgrounds. The questionnaire was further shared with eight practitioners and seven academics who all had rich experience in working with technologies in the retail sector. They reviewed it in regard to various aspects like readability, relatedness, completeness and structure and suggested improvements (Lang *et al.*, 2022). The authors took the suggestions into account to perform a final revision of the questionnaire. The questionnaire thus finalized was then used for the data collection.

3.2 Data collection

We collected cross-sectional data by reaching out to retailers in the supply chains of products. In the first collection round (February 2022), we contacted a total of 1,013 firms, from which we received a total of 342 responses. After four weeks (March 2022), we engaged in a second wave of data collection in which we took a snowballing approach to increase the sample size, contacting 594 respondents by posting on various groups on LinkedIn and professional associations with a global presence. In those cases in which we received multiple responses from the same organization, we took their average score so that the dataset would have a unique representation of data from each organization. In order to verify the profiles of the respondents, we shared two emails – one before and one after the data collection process – to validate their email addresses by sharing a one-time password on their associated/reported email addresses. The final questionnaire was administered using an online form that included clear instructions to avoid any confusion. While we collected our data through a single platform, we did take into account any cognitive biases that could have affected our findings. We thus performed a wave analysis, as proposed by Armstrong and Overton (1977). We split our respondents into two groups (waves 1 and 2), which included, respectively, the first 40 and the last 40, and performed a *t*-test to check whether there was any statistically significant difference between their responses. Based on the *T*-test results, we were able to conclude that there was no such difference between the two groups

($p = 0.18$), which confirmed the absence of nonresponse bias in the study. Table 1 shows the demographic profiles of the respondents.

4. Data analysis and results

4.1 Measurement model

We evaluated our conceptual framework using the Warp PLS 7.0 software, which uses partial least squares structured equation modelling (Kock, 2019). The latent variables needed to be estimated as weighted aggregations of indicators without adjusting for the measurement errors found in typical partial least sqaure (PLS) estimations (Kock, 2019). According to Henseler *et al.* (2016), measurement errors dominate actual indicators, which can be seen in the composite indicators. Kock (2019) asserted that measurement errors cannot be eliminated as deficiencies in composite indicators may lead to an unknown bias. In recent years, PLS-SEM has become a common alternative to survey-based research. With PLS-SEM, complex models can be examined without imposing distributional assumptions. Therefore, although our framework is based on current theoretical models, PLS-SEM was the best tool for reviewing our study's proposed complex framework (Kock, 2019; Sarstedt *et al.*, 2014).

We examined the nomological validity of the theoretical model also using WARP PLS 7.0. To do so, we carried out three types of validations: construct, content and discriminant, along with testing the effect size and model fit parameters. We then examined the structural model to assess the strength of the associated variables. Content validity was established through the feedback obtained by the experts on the questionnaire. The internal consistency of the constructs was examined using Cronbach's alpha and Composite Reliability (CR). Their values were found to be above 0.7, indicating that construct reliability and validity were met. The average variance extracted (AVE), factor loadings and CR values were found to be above the threshold values – AVE > 0.5 (Fornell and Larcker, 1981), factor loadings > 0.7 (Hair *et al.*, 2017) and CR > 0.7 (Hair *et al.*, 2011) – thus satisfying the criteria for construct reliability and convergent validity (Hair *et al.*, 2006). The psychometric properties of the constructs are presented in Table 2.

Factor	Classification	Respondent count	Percentage of respondent count
Gender	Male	374	74.8
	Female	126	25.2
Years of experience	Less than 5 years	75	15
	5–10 years	89	17.8
	10–15 years	124	24.8
	15–20 years	67	13.4
	20–25 years	59	11.8
	25–30 years	48	9.6
	More than 30 years	38	7.6
Education qualification	Undergraduate degree	289	57.8
	Postgraduate degree	174	34.8
	PhD	5	1
	Professional degree	32	6.4
Age of the firm	Less than 10 years	45	9
	10–20 years	69	13.8
	20–30 years	124	24.8
	30–40 years	74	14.8
	40–50 years	66	13.2
	50–60 years	59	11.8
	More than 60 years	63	12.6

Table 1. Respondent demographic characteristics

Construct	Items	Factor loading	Variance	Error	SCR	AVE
Satisfaction (SAT) (α = 0.834)	SAT1	0.78	0.61	0.39	0.87	0.53
	SAT2	0.77	0.59	0.41		
	SAT3	0.71	0.50	0.50		
	SAT4	0.69	0.48	0.52		
	SAT5	0.72	0.52	0.48		
	SAT6	0.71	0.50	0.50		
Attention (ATT) (α = 0.774)	ATT1	0.79	0.62	0.38	0.84	0.57
	ATT2	0.74	0.55	0.45		
	ATT3	0.72	0.52	0.48		
	ATT4	0.76	0.58	0.42		
Relevance (REL) (α = 0.749)	REL1	0.77	0.59	0.41	0.84	0.58
	REL2	0.72	0.52	0.48		
	REL3	0.8	0.64	0.36		
	REL4	0.74	0.55	0.45		
Confidence (CON) (α = 0.802)	CON1	0.69	0.48	0.52	0.82	0.54
	CON2	0.78	0.61	0.39		
	CON3	0.74	0.55	0.45		
	CON4	0.72	0.52	0.48		
Trust (TR) (α = 0.739)	TR1	0.75	0.56	0.44	0.84	0.57
	TR2	0.76	0.58	0.42		
	TR3	0.73	0.53	0.47		
	TR4	0.79	0.62	0.38		
Motivation (MOT) (α = 0.751)	MOT1	0.73	0.53	0.47	0.88	0.55
	MOT2	0.75	0.56	0.44		
	MOT3	0.77	0.59	0.41		
	MOT4	0.79	0.62	0.38		
	MOT5	0.74	0.55	0.45		
	MOT6	0.68	0.46	0.54		
Use of blockchain technology (UBCT) (α = 0.783)	UBCT1	0.72	0.52	0.48	0.80	0.58
	UBCT2	0.81	0.66	0.34		
	UBCT3	0.75	0.56	0.44		
Supply chain performance (SCP) (α = 0.813)	SCP1	0.82	0.67	0.33	0.91	0.57
	SCP2	0.75	0.56	0.44		
	SCP3	0.73	0.53	0.47		
	SCP4	0.75	0.56	0.44		
	SCP5	0.78	0.61	0.39		
	SCP6	0.74	0.55	0.45		
	SCP7	0.72	0.52	0.48		
	SCP8	0.74	0.55	0.45		

Table 2. Factor loadings of the variables

Note(s): Cronbach's alpha – α, Scale Composite Reliability – SCR and Average Variance Extracted – AVE

We tested for discriminant validity using two methods: (1) Fornell–Larcker's criterion, whereby the square root of the AVE of the construct (the italicized bold-face values in Table 3) was found to be greater than its correlations with the other variables, (2) the heterotrait-monotrait ratio of correlation (HTMT) ratio values, which were found to be greater than 0.85 (as mentioned in Table 4), thereby confirming discriminant validity (Franke and Starsted, 2019). The study did not suffer from any multicollinearity issues, as the items' variance inflated factor (VIF) values were found to be lower than 5 (Kock, 2015a, b).

With convergent and discriminant validity having been established, we concluded that construct validity was established. Further, we examined the model fit indices (Table 5), the values of which were found to fall within the thresholds suggested by Sarstedt *et al.* (2014) – Average Path Coefficient (APC) = 0.42 ($p < 0.001$); average R^2 = 0.51 ($p < 0.001$); average

block VIF = 4.112 (<5); Tenenhaus Goodness-of-Fit (GoF) = 0.559 (large ≥ 0.36; medium ≥ 0.25; small ≥ 0.1) – suggesting that model fit was acceptable.

4.2 Common method bias

The data for our study were cross-sectional, wherein we collected the data for both the dependent and independent variables at a single point in time from the same participants, which could result in common method bias (CMB) (Kock, 2015a, b). To reduce the effect of any CMB caused by social desirability bias, we informed the respondents that their responses would be treated with the utmost confidentiality and used only for academic purposes. We encouraged them to answer the survey to the best of their knowledge. Further, we randomized the questions in the study and self-administered the questionnaire to control for CMB. Next, we performed Harman's single-factor test, the results of which indicated that the latent factor explained 36.4% of the total variance, thus being lower than the acceptable threshold of 50% (Podsakoff *et al.*, 2003).

The data were further checked for causality using the nonlinear bivariate causality direction ratio (NLBCDR) (Kock, 2015a, b), which yielded a value of 0.787, thus being higher than the threshold value of 0.7, as indicated in Table 6, implying that our study did not suffer from causality.

Table 3. Fornell–Larcker criterion

	SAT	ATT	REL	CON	TR	MOT	UBT	SCP
SAT	*0.66*							
ATT	0.32	*0.71*						
REL	0.41	0.32	*0.64*					
CON	0.24	0.41	0.32	*0.67*				
TR	0.25	0.22	0.21	0.24	*0.71*			
MOT	0.11	0.23	0.24	0.32	0.25	*0.68*		
UBT	0.18	0.1	0.02	0.16	0.28	0.26	*0.66*	
SCP	0.34	0.18	−0.05	0.15	0.15	0.29	0.25	*0.74*

Note(s): The diagonal italic-face values are the square root of AVE

Table 4. HTMT results

	SAT	ATT	REL	CON	TR	MOT	UBT	SCP
SAT	0.34							
ATT	0.22	0.45						
REL	0.26	0.23	0.44					
CON	0.30	0.27	0.36	0.39				
TR	0.22	0.30	0.44	0.28	0.36			
MOT	0.29	0.23	0.38	0.42	0.30	0.43		
UBT	0.20	0.40	0.49	0.27	0.28	0.42	0.46	
SCP	0.19	0.24	0.38	0.28	0.38	0.38	0.33	0.58

Table 5. Model fit indices

Model fit and quality indices	Values (threshold values, if any)
APC	0.42 ($p < 0.001$)
Average R^2	0.51 ($p < 0.001$)
Average block VIF	4.112 (acceptable if ≤ 5)
Tenenhaus GoF	0.559 (large ≥ 0.36; medium ≥ 0.25; small ≥ 0.1)

4.3 Hypotheses testing

Figure 2 presents the path model obtained from PLS-SEM after testing the proposed associations using Warp PLS. We used the bootstrapping method in PLS to estimate the standard error and significance of parametric estimates.

The hypotheses testing revealed a positive association between satisfaction and trust and satisfaction and motivation, thereby supporting H1a and H1b. For a hypothesis to be supported, the path coefficient needed to be significant, with a p-value lower than 0.05 (Hair *et al.*, 2011). The significance of the paths was found to indicate positive empirical support for H1a ($\beta = 0.34$, $p < 0.001$), H1b ($\beta = 0.37$, $p < 0.001$), H2a ($\beta = 0.26$, $p < 0.001$), H3a ($\beta = 0.33$, $p < 0.001$), H3b ($\beta = 0.35$, $p < 0.001$), H4a ($\beta = 0.41$, $p < 0.001$), H5 ($\beta = 0.44$, $p < 0.001$), H6 ($\beta = 0.41$, $p < 0.001$) and H7 ($\beta = 0.38$, $p < 0.001$) as indicated in Table 7. Figure 2 represents

Table 6. Causality assessment indices

Causality assessment indices	Values (thresholds)
Sympson's Paradox Ratio (SPR)	0.774 (acceptable if ≥ 0.7)
R^2 contribution ratio	0.918 (acceptable if ≥ 0.9)
Statistical Suppression Ratio (SSR)	0.741 (acceptable if ≥ 0.7)
Nonlinear bivariate causality direction ratio (NLBCDR)	0.787 (acceptable if ≥ 0.7)

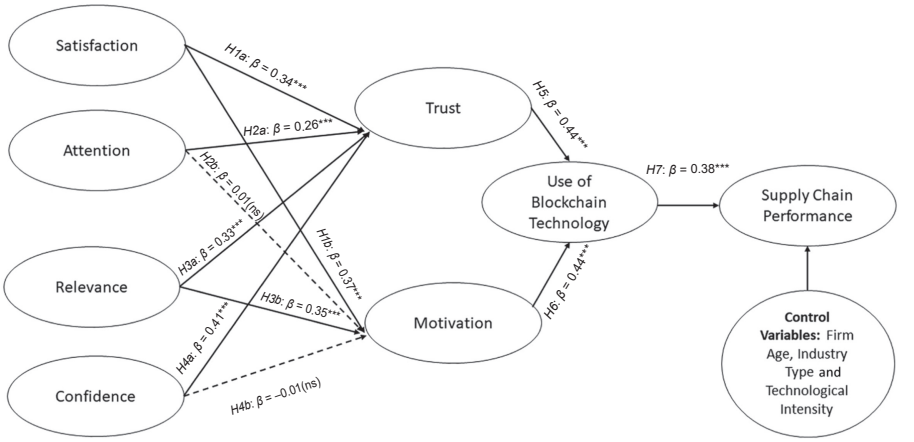

Figure 2. Conceptual framework after SEM analysis

Table 7. Summary of hypotheses testing

Sr. No.	Hypothesized path	Path coefficient	p-value	Hypothesis testing results
H1a	SAT → TR	0.34	<0.01	Supported
H1b	SAT → MOT	0.37	<0.01	Supported
H2a	ATT → TR	0.26	<0.01	Supported
H2b	*ATT → MOT*	*0.01*	*0.28*	*Not supported*
H3a	REL → TR	0.33	<0.01	Supported
H3b	REL → MOT	0.35	<0.01	Supported
H4a	CON → TR	0.41	<0.01	Supported
H4b	*CON → MOT*	*−0.01*	*0.43*	*Not supported*
H5	TR → UBT	0.44	<0.01	Supported
H6	MOT → UBT	0.41	<0.01	Supported
H7	UBT → SCP	0.38	<0.01	Supported

the strengths of the relationships proposed in the conceptual model with their associated significance level. We then tested the effect of the control variables (firm age, industry type and technological intensity) and found that none had any significant impact. The results were found to suggest a nonsignificant association between attention and motivation, thus refuting H2b ($\beta = 0.009$, $p < 0.01$). Likewise, the relationship between confidence and motivation was found to be nonsignificant, thus not supporting H4b ($\beta = -0.008$, $p < 0.01$). R^2, which represents the model's explanatory power, was found to be 0.918, within the acceptable threshold. Next, we examined the effect size using Cohen's f^2 formula (Cohen, 1992). We calculate the model's predictability power using Q^2. The values were 35% (trust), 26.7% (motivation), 31.1% (use of BCT) and 43.4% (supply chain performance). The next section discusses the results and presents the implications for retailers.

5. Discussion of the findings

This section discusses the hypotheses' results in detail.

5.1 Supplier-based satisfaction and motivation through BCT lead to supply chain performance

The first hypothesis (H1) posited that supplier-based satisfaction and motivation through BCT lead to supply chain performance. The results were found to indicate a strong positive coefficient value. BCT has significantly disrupted traditional business processes; centralized transactions and applications, which were previously verified by third parties or centralized architectures, can now be decentralized and maintain the same level of assurance (Tschorsch and Scheuermann, 2016). There is further justification for the performance of suppliers based on BCT, as cryptocurrencies (Chen, 2018), demonstrate the importance of BCT in today's society. Due to the heterogeneity of cryptocurrency applications, interoperability issues may arise in the future (Tschorsch and Scheuermann, 2016; Haferkorn and Quintana Diaz, 2015). Beyond cryptocurrencies, Smart Contracts play a central role in BCT applications. In 1994, Szabo defined smart contracts as computerized transaction protocols that execute the contract's terms (Szabo, 1994), minimizing external participation. Despite their lack of trust, the terms of an agreement are automatically enforced. Thus, within the context of BCT, SCs are scripts that run decentralized and are stored on the blockchain in a decentralized manner, without relying on trusted authorities (Christidis and Devetsikiotis, 2016).

5.2 Supplier-based satisfaction and trust through BCT lead to supply chain performance

The second hypothesis (H2), which predicted that supplier-based trust and satisfaction lead to supply chain performance, was supported. It is well known that blockchains are timestamped, append-only data structures (Christidis and Devetsikiotis, 2016). Using BCT, non-trusting members can interact without the need for a trusted authority (Christidis and Devetsikiotis, 2016). Numerous platforms support the use of blockchain-based applications, such as OpenChain, Corda, Ethereum and Hyperledger Fabric, which holds great promise in the field of SCM. As a distributed ledger system, Hyperledger Fabric is an open-source project. The use of BCT in applications has received relatively little attention in spite of several reviews (Tama *et al.*, 2017).

A number of studies have examined the role played by BCT in the IoT, including decentralized and data-intensive applications (Conoscenti *et al.*, 2016) and data decentralization (Karafiloski and Mishev, 2017). BCT has been studied for its security issues (Meng *et al.*, 2020), as well as for its potential to enable trust and decentralization in service systems (Berner *et al.*, 2019) and peer-to-peer networks (Hald and Kinra, 2019). The security and privacy issues associated with blockchains are discussed by Meng *et al.* (2020).

Through the use of BCT, the detailed identification of these factors will enhance supplier-based satisfaction and trust.

5.3 Supplier-based relevance on raw material selection with higher trust and motivation levels improved through blockchain technology leads to supply chain performance

Our third hypothesis (H3) – which posited that supplier-based relevance on raw material selection with higher trust and motivation levels improved through BCT leads to supply chain performance – was found to be supported. Outsourcing and global sourcing have led to longer, more complex and fragmented supply chains. There are multiple challenges associated with supply chain (Håkansson and Persson, 2004; Lamming *et al.*, 2000; Pathak *et al.*, 2007). Aside from nonlinear dynamics, self-organization, emergence and coevolution, MSCs also exhibit nonlinear dynamics, reverse loops and multi-way exchanges (Pathak *et al.*, 2007). The objective is to gain a deeper understanding of the structure, behavior and performance of MSCs by analyzing the factors that influence the supplier-based relevance of raw material selection through BCT. By integrating the circular economy concept throughout the entire supply chain process, stakeholders within the supply chain can develop innovative business models and relevant supply chain functions. During the entire supply chain life cycle, all the appropriate resources can be upcycled to achieve zero waste. This is known as circular supply chain management, and is crucial to operationalize a circular economy at the micro level (Govindan and Hasanagic, 2018). As a result of its implementation, tracking the upcycling of materials over multiple life cycles becomes a challenge across various stakeholders in the supply chain.

5.4 Supplier-based confidence with higher trust and motivation levels improved through BCT leads to supply chain performance

In supply chains, certain entities – e.g. manufacturers, distributors, retailers and customers – participate in the production and sale of commodities (Karafiloski and Mishev, 2017; Corazzini, 1977). The purpose of SCM is to prepare, plan, execute, supervise and track SC operations in order to increase profit, develop strategic infrastructure, optimize global logistics, synchronize supply with demand, and/or assess global efficiency. Our fourth hypothesis (H4), which proposed that BCT leads to higher supplier-based confidence, trust and motivation levels, thereby improving supply chain performance, was found to be supported. Some factors have contributed to the attention given to BCT. This technology has led to significant growth in supply chain traceability, sustainability and information security (Francisco and Swanson, 2018). Multiple circular economy challenges can also be addressed simultaneously with this technology. There are many ways to view trust, which is relevant in interpersonal and economic interactions (Corazzini, 1977). Corazzini (1977) defined trust as a belief in the fulfillment of one's obligations by others. According to Glynn *et al.* (1995) "affect-based trust", which pertains to one's judgments about another's competence and reliability, is considered to be an emotional bond between individuals. It is possible to define trust as "the expectation that an individual can have confidence in, or rely on, some quality or attribute when engaging in a business transaction" (Laeequddin *et al.*, 2012). Due to the current call for papers in BCT-based research, the four perspectives of satisfaction, relevance, attention and confidence have yet to be investigated from the perspective of the self-determination theory and Keller's ARCS motivation model (Lavoie *et al.*, 2021) by considering various supply chain performance aspects such as impact of traceability systems on retailers (Sangal *et al.*, 2022). It is common for traceability systems to be analyzed in terms of brand- or product-related outcomes, such as willingness to pay or purchase intention (Creydt and Fischer, 2019; Sangal *et al.*, 2022).

6. Theoretical and managerial implications

6.1 Theoretical implications

By making both theoretical and practical contributions to the BCT literature, we offer guidance to managers and policymakers on how to better direct their efforts to enhance its adoption in supply chains (Creydt and Fischer, 2019; Sangal *et al.*, 2022). This study is the first attempt to provide a comprehensive list of the enabling factors of BCT adoption in supply chains, evaluate their effects and map their interdependencies from a theoretical perspective. Furthermore, it adds to the very limited body of research that has used a multi-theoretic framework to establish the theoretical context of BCT adoption in SCM (Creydt and Fischer, 2019; Sangal *et al.*, 2022). Assimilation and learning are natural human behaviors in which people engage because they are enjoyable or interesting. In particular, supply chain performance is beneficial for a buying firm if it improves the flow of goods from the supplier. Moreover, it provides managers with useful information regarding interfirm information sharing and supply chain practices (Pathak *et al.*, 2007).

Strategic alliances are defined as long-term relationships that extend beyond traditional ones in terms of benefits and are beneficial to both parties. In spite of the development of some advanced forms of supply chain integration, the results indicate that interorganizational information integration is not well developed in strategic alliances (Pathak *et al.*, 2007). Several firms do not invest in technology to integrate information flow, and thus are not structurally integrated. Partners still share a lot of information using nonintegrated systems. The success of strategic alliances with limited information flows is perceived to be lower (Govindan and Hasanagic, 2018).

In addition, our data confirm that IT supply chain applications are used in dynamic environments (Pathak *et al.*, 2007). The use of IT supply chain applications does not replace more traditional methods of communication, such as faxing, emailing and phone calls. Rather, they provide partners with new communication tools. Furthermore, it allows for advanced forms of integration, such as joint planning and goal-setting (Corazzini, 1977; Pathak *et al.*, 2007). Our results suggest that information flow strategies develop in a trust-based, interdependent manner. Investing in IT supply chain applications is fueled by high levels of trust. Partners should invest in traditional media before investing in IT supply chain applications in order to share information and establish trust.

6.2 Practical implications

Artificial intelligence, big data and the Internet of Things are now widely used in SCM to improve efficiency (Lavoie *et al.*, 2021). There is a growing interest in leveraging BCT to store and exchange data. Experts also believe that integration, communication, compatibility and interoperability are important components of introducing agility in the supply chain. Under the heading Supply Chain Agility, we should treat these constituents as a single, coherent, functional element of the supply chain (Lavoie *et al.*, 2021). Experts emphasized the use of next-generation SaaS platforms that natively offer cross-platform integration capabilities and provide standard semantics for enterprise business information to support their belief. Companies can generalize business rules and processes across the supply chain ecosystem and deploy supply chain processes more quickly with no-code or low-code customizations based on unified data semantics (Meng *et al.*, 2020).

According to supply chain experts, traceability is an essential component of supply chains. By reducing the theft and misplacement of goods, traceability creates a value proposition for the supply chain (Meng *et al.*, 2020). Track-and-Trace systems connect the dots in supply chains to track goods from source to consumer. As a result, retail firms can protect their brands against crises such as recalls and counterfeit products with such systems, which also reduce the risk of mislabeling (Lavoie *et al.*, 2021). Retailers can adopt

progressive procurement strategies to mitigate the risk of changing customer demands by implementing IoT and blockchain-enabled Track-and-Trace systems (Lavoie *et al.*, 2021). As a result of the progressive procurement approach, retailers' profits increase, losses due to expiration of product shelf life are minimized, and supplier relationships are strengthened (Meng *et al.*, 2020). Moreover, our study contributes to practice by evaluating and analyzing the interdependencies of the enablers of BCT adoption in the supply chain. In order to achieve such adoption, managers and policymakers may use the findings of this study to inform their decisions and action plans. By gaining knowledge and capabilities, all participants within the supply chain ecosystem will not only understand the value of the technology, which will also make it easier to implement BCT in service-oriented sectors such as education, high-tech firms, tourism and travelling (Biswas and Gupta, 2019; Chin *et al.*, 2021).

7. Conclusions, limitations and future research perspectives

The purpose of this study was to contribute to the literature by assessing the readiness of retail workers to use BCT to improve supply chain performance. We found that supplier-based attention, motivation, supplier-based satisfaction, trust, supplier-based relevance to raw material selection, and confidence with higher levels of trust and motivation contribute to supply chain performance. However, due to the broadness of the scope, it could be argued that the sample was not large enough. Therefore, future researchers could remedy this by increasing the sample size by including participants from various countries.

BCT adoption in assessing retail worker readiness is a promising area of research with several avenues for further research. First, we believe this approach to be insightful because relationships differ based on context – e.g. insurance, shipping and service sector. Supply chain relationships and performance were measured from the perspective of a single stakeholder. If generalized, the results may not accurately reflect the real state of the relationship, which points at the need for future researchers to expand the scope of their investigation. In spite of its limitations, this study contributes substantially to the literature on BCT adoption in supply chains. For example, beyond our methodological limitations, we see the need for broader research to be conducted on BCT in SCM. Future research could be conducted to address the management of several integrated BCT platforms in multi-actor supply chains. This study focused on the single-actor supply chain processes such as those enacted by parties in the supply chain subsequent to buyers, third-party agents and suppliers (Bumblauskas *et al.*, 2020). We would encourage future researchers to further investigate BCT adoption in supply chains with regard to a firm's management commitment and to the cooperation between supply chain partners on issues such as data sharing, confidentiality and system (Wang *et al.*, 2017).

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