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Blockchain Technology in Fashion Management, Merchandising & SCM: A Comprehensive Literature Review and Conceptual Framework for the Textile Industry in TN

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***Abstract* - Block Chain Technology (BCT) is a decentralized and immutable digital ledger that records transactions across multiple computers, enabling secure, tamper-proof, and transparent data management in complex networks. This research uniquely investigates the application of BCT in Supply Chain Management (SCM) within the textile industry of Tamil Nadu (TN), a region recognized as the powerhouse of India's textile sector. The study addresses the research problem of how BCT adoption can revolutionize fashion management and merchandising in TN by enhancing traceability, transparency, and operational efficiency throughout the supply chain. A systematic review of literature from 2019–2024 is conducted, focusing on BCT's impact on supply chain performance, information transparency, and buyer-supplier relationship in TN's textile sector. The methodology includes analysing empirical studies and industry reports to test hypotheses regarding BCT's effect on SCM performance, its role in delivering transparent information for fashion management, and the challenges of adoption in TN's textile industry. Findings highlight, BCT enables real-time tracking of products from raw materials to final goods, automates processes through smart contracts, and assures product authenticity, significantly improving transparency and trust among all stakeholders. Consumers benefit from the ability to verify product origins and quality, while manufacturers experience enhanced operational efficiency and reduced risk of counterfeiting. However, challenges such as high implementation costs, technological barriers, and the need for industry-wide collaboration remain prevalent obstacles to widespread adoption. This study's novelty lies in its region-specific, comprehensive evaluation of BCT's transformative potential and practical challenges within TN's textile industry, providing actionable insights for future research and industry practice.**

***Keywords*: Blockchain Technology, Fashion Management, Textile Industry, SCM, TN, And Transparency**

I. INTRODUCTION

An exhilarating advent of BCT has been modernizing several industries over the preceding decades. Also, BCT has exhibited incredible potential to prevail as the groundwork for the current transformation of exemplary concerning numerous perceptible and translucent supply chains (Oguntegbe et al., 2023). Blockchain has been capable of protecting and safeguarding the central core identities along with establishing the legitimacy within fashion management, SCM, and merchandise (Agrawal & Pal, 2019; Akhtar et al., 2023). An awareness about the vast application and utilization of BCT among the textile industry is comparatively less among the entrepreneurs (Rani & Prakash, 2021). The technology of BCT permits the transmutation of resources without the intervention of third parties, thus upsurging the endways encryption of transparency and accessibility of SCM (Agi & Jha, 2022). Moreover, the transparency and persistency of the BCT decrease the variations of information (Treiblmaier, 2019; Ayan et al., 2022).

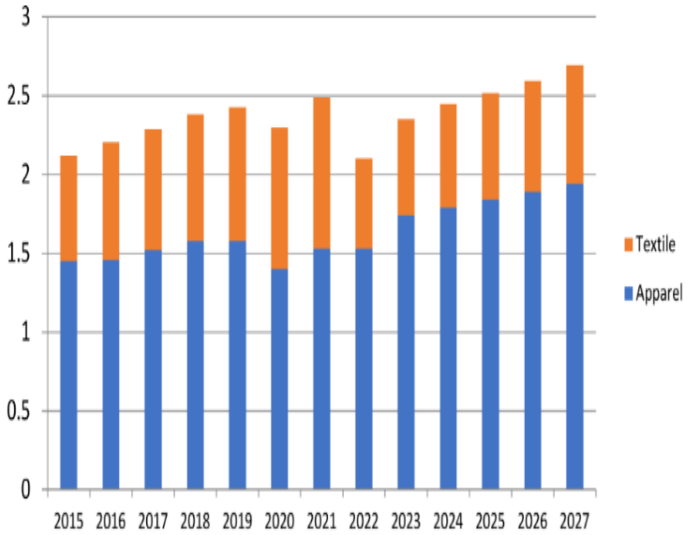

Fig. 1 Potential of Blockchain Technology in Fashion Management (Cuc, 2023).

Fig. 1 illustrates the potential of BCT in fashion management from 2015 to the upcoming year of 2027. It further demonstrated the overall progression of fashion management and the downturn in the textile industry during the COVID-19 pandemic era (2020). Furthermore, it depicts that the vast

application of BCT in fashion management along with SCM might lead to an extensive progression of fashion management, By2027, the textile industry is expected to expand to 755.38 USD (Cuc, 2023).

BCT can be divided into four types such as public BCT, private BCT, consortium BCT, and hybrid BCT (Elangovan et al., 2020). Furthermore, public BCT is an initiative of aiding the public populalion to scrutinize the transparency and access towards the networking systems without any interruptions (Warkentin & Orgeron, 2020). Secondly,(Yang et al.2020) have demonstrated the significance of private BCT, which explicitly safeguards the consent grants in an unambiguous pattern. Such phenomena might lack within the present networking technologies and varied supply chains (Kong et al.,2024). The conventional study (Elisa et al., 2020) has briefed about the specializations of constrictive BCT as it shelters the e-governance websites from being manipulated and secures the sensitive information of consumers from being siphoned. Also, (Marar et al., 2020) has demonstrated the relevance of hybrid BCT, which interrupts the attackers from instigating unnecessary mal practices within networking systems and patterns.

The application of BCT has been effectively instigated within fashion management companies such as ‘Zara’ and ‘H&M’ (Álvarez, 2023). The mordernization of technology has initiated the implementation of BCT due to its contribution towards preserving every nook and corner of the data without manipulation (Stodt et al., 2021). A predominant feature of BCT is that it assists the consumers to transcribe, skim, and evaluate the net banking and transactions invested in various e-buying platforms (Moretto & Macchion, 2022). Similarly, it also allows for preserving a piece of detailed evidence, about the chronological order of transactions in the form of precise documentation (Guo et al., 2022). Moreover, BCT allows the networking patterns of fashion management and SCM to differentiate the data in accordance with the relevance of any goods and products. BCT has been described as a user-friendly approach to enhance their experience towards networking schedules (Okoye & Kim, 2022).

The fashion and textiles industry is experiencing radical change through increasing needs for transparency, sustainability, and responsible practices within global supply chains (Gapparov et al., 2025). Although economically important, the industry has also traditionally suffered from secrecy in the way it interacts, counterfeiting, and difficulty in guaranteeing the authenticity and sustainability of the products. BCT has been identified as the solution that may end these challenges, providing unchanging record-keeping, immediate traceability, and increased confidence between stakeholders (Benstead et al., 2024).

Recent research points out that the adoption of BCT can transform supply chain management, prevent fraud, and bolster consumer confidence through traceable product histories (Shukla, 2025) and backing responsible sourcing programs (Ciurel, 2025). Large-scale deployment is, however, hindered by technology immaturity, exorbitant costs, and a shortage of industry-wide standards, leaving a huge gap between pilot initiatives and widespread adoption. Additionally, consciousness and pragmatic appreciation of BCT's potential among textile entrepreneurs are still low, constraining large-scale integration and innovation within the industry

This study is timely because it confronts such barriers, maps the existing state and future direction of BCT in fashion and textiles, and seeks to fill the knowledge gap by offering practical guidance for decision-makers. In its consideration of the pitfalls, potential, and practical application of blockchain technology in textiles, this research adds to the strategic discussion of digital change and sustainable development in one of the globe's most vibrant industries (Skhiri, 2017; Ahmed & Pandey, 2024).

Relevance of BCT in Fashion Management

The increasing societal impact of fashion as a field has also been made possible due to the changes that occurred in technology and to the interactions that the fashion sector has been able to develop within the digital framework (Piazza & Abrahamson, 2020). The crucial participation of BCT within fashion management has resulted in an exclusive improvisation of discernibility and auditability along with the SCM the present realm of modernization (Kouhizadeh, Saberi, & Sarkis, 2021). The primary initiative of BCT was carried out by the Commission of the European which presented the EUBOF (Europe Blockchain Observatory and Forum) in the year 2018 (Bucci et al., 2019). Furthermore, BCT is adversely capable of supporting the digital amalgamation within the intricate SCM to balance the future complexities (Baharmand et al., 2021; Muñoz-Torres et al., 2021).

(Bovenzi et al., 2023; Tyagi et al., 2024) has demonstrated the investors’ perspective about the fashion management in reverence with the specification of the textile industry. An additional beneficiary for stakeholders is the assistance of SCM, which has led them to invest the share in fashion management entwined with the BCT. Furthermore,(Hader et al.2022) have illustrated that BCT has created a trustworthy and realistic platform to integrate their efficiency, and reduce their risk factors. Also, BCT has prohibited the unwanted and unethical variations within the fashion management phenomenon(Schmidt et al., 2019). Likewise, the revolutionary modification by BCT within the textile industry does not permit the deletion or reciprocal of payment history. (Bai & Sarkis, 2020). Also, instigation of BCT might assist in integrating and dividing the appropriate data throughout the whole process of fashion management thus resulting in an unambiguous transformation of goods and services within fashion management (Benstead et al., 2021). Moreover, BCT yields a security in protecting the online data of consumers along with protecting the organizational

reputations and rational properties (Wang et al., 2020;Wang et al., 2021).

The fashion industry has been blamed as a source of pollution by the public for a long time (Singh et al., 2023) . Given the developing environmental consciousness of the people, the combination of environmentally and socially friendly materials influences the demand of the market in an aspect of purchasing fashion products (Patel et al., 2024). The conventional study (Guo et al., 2020) demonstrated the information revelations that meets the environmental determinations in the supply chain of fashion. Mainly focus on the BCT application and its effect on the information revelation games on the environmental efforts. The outcome highlights the significance of BCT in sustainable practices in supply chains of fashion industry (Nuttah et al., 2023; Wang et al., 2020).

II. METHODOLOGY

This review follows a narrative approach to synthesize and analzse the existing scenario of BCT applications in the textile and fashion supply chain. The methodology was framed to obtain thorough coverage of academic and industry views, prioritizing traceability, transparency, sustainability, and operational enhancements.

Literature Identification and Selection

Relevant literature was identified through structured searches in major academic databases such as Scopus, Web of Science, and Google Scholar. Keywords included "blockchain technology," "textile industry," "fashion supply chain," "traceability," and "transparency." The search was limited to publications from 2018 to 2025 to capture the most recent advances and trends. Both peer-reviewed journal articles and significant industry reports were considered, ensuring a broad and balanced perspective.

Inclusion Criteria

Studies were included if they addressed the application, impact, or challenges of BCT in textile and fashion supply chains. Priority was given to research focusing on traceability frameworks, case studies of implementation, and analyses of transparency and sustainability outcomes. Exclusion criteria were set for papers lacking substantive discussion of BCT or those outside the textile and fashion context.

Exclusion

Articles not directly related to blockchain in textile/fashion contexts, non-peer-reviewed sources (except influential industry reports), and publications lacking substantive analysis or data.

Data Extraction and Synthesis

Selected studies were reviewed in detail to extract key themes, technological frameworks, and real-world outcomes. Thematic analysis was employed to categorize findings into major areas:

- Traceability and transparency improvements
- Operational efficiency and error reduction
- Barriers to adoption and stakeholder perspectives
- Comparative analysis of block chain frameworks and standards

Whereas systematic reviews like (Badhwar et al., 2023) offer comprehensive protocol-based syntheses, this review focuses on practical lessons and new findings, filling the gap between scholarly research and business practice. The methodology is designed to identify nascent trends, implementation challenges, and the changing regulatory situation in the textile and fashion industries.

Visual Representation

For increased clarity, a flowchart of the process of literature review is given below (Fig. 2). This chart defines the steps from identification of literature, screening, assessment of eligibility, to end inclusion, for easier visualization of the systematic approach followed in this narrative review.

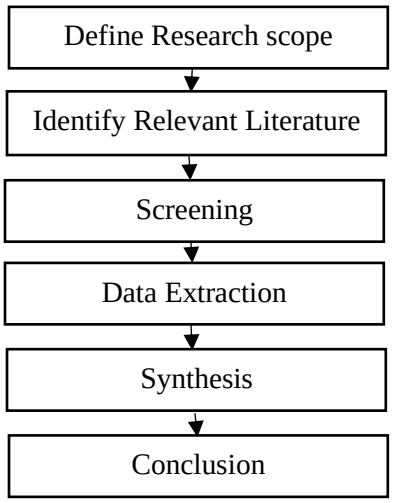

Fig. 2 Process Flow (Author's creation)

III. OVERVIEW OF THE TEXTILE INDUSTRY IN TN

Textile industries within TN have been considered as an ancient craft which contributes an approximation of 30% of textile exports of India (Bhaskaran, 2023;Ahmed & Pandey, 2024). Furthermore,(Rajasekaran & Sangeetha.,2020) observed that Coimbatore has been declared as the Manchester of TN and Karur has been declared as the textile capital of TN. Textile industries of TN are extensively reported to export an advanced quality of clothes, innovations in designs, and production at an appropriate duration. (Härri

& Levänen, 2024). The textile sector of TN is the fourth largest usage of water and raw materials and the second highest user of land. BCT has enabled better tracking through making origin and travel more transparent. (Shou & Domenech, 2022; Qvist, 2022) explored the use of life cycle assessment (LCA) to determine the influence of reduction capabilities of circular strategies and suggest a protocol for the implementation of LCA and blockchain to precisely examine circular practices. The findings illustrate circular fashion technique reduces the environmental influence of fashion and the main challenge for precisely assessing influence is data transparency and acquisition (Dhayaneswaran & Amudha, 2024). An integrated LCA blockchain agenda enables the circular strategies assessment more significantly and increases the transparency of fashion influences (Karthikeyan et al., 2021).

Various organizational firms of fashion management have implemented BCT for obtaining effective results and production. The prevailing study (Heim & Hopper, 2022) has demonstrated that an extreme consumption and production of textile-oriented products has led to an urge to produce an enormous quantity of cutting-edge textile products. Moreover, an efficient rotational flow of overall production can be achieved through the commencement of SCM (Li, Ceong & Lee, 2021; (Michie et al., 2021).

Discussed the BCT from a perspective of Triple Bottom Line. It has also emphasized transparency as a major factor for attaining accountability, enhancing the environmental protection. Blockchain assisted competencies offer chances to support enhanced information transparency to customers and sub-suppliers. The existing study highlights SCM and blockchain challenges, its capabilities, limitations, and operational improvements. The findings represent challenges such as integration challenges, data complexity, and enhancing the implementation procedures. Lack of supply chain visibility and complexity are the biggest limitations and challenges in managing SCM using blockchain (Yousif & Mirza, 2025; Sheetal et al.,2025).

The Concept of the Textile Industry of TN

The textile industry of TN has been providing employment opportunities to several people in TN. Likewise, TN has been contributing to an approximation of 16% to the overall export share of the world. The concept of textile industries comprises of export and import of raw materials, processing of the raw materials, and incorporating the finalized goods for the process of sale and exports. Also, there are several variations in the finalisation of raw materials such as sarees, salwars, ethnic, dhotis, shirts, and kids' wear (Vetrivel, 2021). Districts such as Erode, Tirupur, and Coimbatore consist of numerous textile industries, and they are also known as the "Textile Valley of Tamil Nadu" (Premalatha et al., 2021). The textile industries of TN comprise many variations such as silk, cotton, wool, jute, hemp, and linen. Apart from clothing textiles, various textiles such as apparels and furniture.

Fig. 3 International exports of textiles in TN (Manikandan et al., 2021)

The above fig. 3 interprets the international brands that have a partnership with various textiles in TN. Textiles of TN has been exporting various extensive quality of clothing and apparels to the above-stated organizations associated with fashion management (Manikandan, Sengottuvel & Practices, 2021; Marar & Marar, 2020).

Challenges Faced by the Textile Industries of TN

- Non-availability of raw materials and goods – Availability of raw materials has been affected by various factors such as climatic conditions and scarcity of importing raw materials at an appropriate time, period (Olive et al.,2021; Felgueiras et al., 2021).
- Machineries- It is clear and unambiguous that the textile industries of TN contain an enormous proportion of machineries and certain machineries might not function in an appropriately, manner, thus affecting the overall productivity of finalised goods (Cao et al., 2019).
- Power supplies- Power supplies within textiles are utilised in an enormous amount, and an improper supply of electricity might lead to an adverse loss in productivity and profit (Nagaveni et al., 2019).
- Scarcity of labor- Labour scarcity is another factor affecting the optimization of production, thus leading towards an additional factor affecting the production (Tamilarasu & Nandhakumar, 2024).

Insights into BCT in the Textile Industry

Textile industries of TN have been experiencing certain challenges regarding the sustainable modifications in association with export and import, technological improvisation, and a fissure amidst the branded outfits and relevance of consumers (Vijaya et al.,2024). Hence, the insights into BCT have resulted in the reduction of all the above-stated factors. Insights of BCT in the textile industry aid in analysing the reasons for factors such as reduction in production, waste management, consumer satisfaction, and improvisation of overall efficiency of textiles (Saberi et al.,2019; Geethanjali et al., 2022; Seranmadevi, Kumar & Hariharan, 2022).

Reduction in production is well explained by (Muñoz-Torres et al., 2021), which demonstrated that the factors such as revelation towards chemical formulations, cutting-edge expectation of high quality raw materials, and complete dependency on manual energy have resulted in a resistance of overall productivity of textile industries. Among all the resistors, manual dependency has led to the complexity of the progression of textile industries (Ramamurthy, 2021). Waste management has resulted to prevail as another factor of concern (Saccani et al., 2023). The prevailing study (Mohan & Oke, 2020) has demonstrated that an enormous amount of supplementary chemicals, which are a mixture of dyes and hazardous has affected the eco-friendliness of environment.

Monitoring and traceability are considered a significant factors to guarantee the final product value (Centobelli et al., 2022). Blockchain provides users the opportunity to track information about the place and time of elaboration , especially raw material origins, and quality involved in the process (Ayan et al., 2022). Additionally, companies and people involved can also be monitored. The prevailing researches (Bullón Pérez et al., 2020;Mubarik et al., 2021) has demonstrated the current traceability agendas for apparel industry with the combination of framework which guarantee the transparency in supply chain, reliability and integrity, worth of final products, elements in supply chain and clothing authenticity. The findings addressed the traceability and transparency concept in the clothing industry with blockchain involvement, therefore highlighting BCT allowing the user to track all stages and confirm the authenticity of the garment purchased.

Moreover, (Hemamathi et al., 2023 ; de Boissieu et al., 2021) has encouraged the utilization of the activated carbon method to effectively reduce the hazardous pollutants affecting the eco-friendliness of our environment. (Periyasamy, Kumar & Viswanathan, 2019) Demonstrated the utilization of activated carbon adsorption of hazardous metals from wastewater outlet by textile industries. Another factor of manual dependency has resulted in an adverse modification within the wide-ranging productivity and profit of the textile industry. The conventional study (Sakthi Nagaraj et al., 2019) has briefed about the adoption of manual dependency within textile industries, thus leading towards the urge of implementing various measures to eradicate the loss incurred through manual dependencies.

The textile and fashion industry is a rapidly developing sector that involves a complicated supply chain at global and local levels to acquire raw materials and supply completed products to the market (BR et al., 2022). The classical study (Tripathi et al., 2021) demonstrated the different perspectives of the usage of BCT in the textile and fashion industry while highlighting the benefits of implementing blockchain. In addition, (Karuppiah et al., 2023) addressed the challenges involved in integrating BCT, which have been elaborated under consideration of the existing process. Moreover, (Kalithazan et al., 2024) demonstrated that BCT helps in achieving sustainability through addressing the various economic, environmental, and social aspects. The existing study (Xu et al., 2021) represented that integrating block chain into fashion industry operations bring transparency, traceability, flexibility and scalability in the fashion system hence offering risk reduction, fault detection, value creation and elimination (Ghode et al., 2020; Guo & Yu, 2022).

(Cole et al.,2019) Investigated the BCT from the SCM and an operations perspective. The hype across the chances that digital ledger technologies provide is high for SCM. The findings highlighted the advantages in a way to transform practices and included improving product security and safety, enhancing quality management, decreasing illegal counterfeiting, enhancing sustainable SCM, and improving inventory and replenishment. Also,(Vijaya et al.2024) have further addressed decreasing the requirement of intermediaries, influencing different product strategies and development. Overall, reduce the supply chain cost.

Implementation of BCT in Supply Chain

BCT is been revolving around various aspects that cover numerous purposes in the textile industry (Saravanan et al., 2022; Bhuvaneshwarri & Ilango, 2023;Guo et al., 2020)Have demonstrated the purposive consideration of BCT adoption in the Supply Chain procedures. For the reasons that avoid risk causes, the research has identified a conceptual setting that provides a positive influence in gaining better operations in the supply chain management. The proposed model had delivered a heighten development in handling more risk cause such as disease crisis, disasters and pandemic attacks and several cases that uncertain business environment in addition with, research attempts in comprehending the sustainability and feasibility maintenance in the supply chain operation after the usage of BCT in process (Hussein, 2020). As well, BCT's implication in promoting the effectiveness in the supply chain of textile business that potentiated the textile industries' long-term practices (Sandhiya et al., 2021). In regard to, (Nazam et al., 2022) observed the relativity of BCT impact in the textile sector that strived to produce an excellence impartation in supply chain barriers through the conduct of in-depth research on existing research whereas, deviated conditions are schemed as a data source.

By employing this use, the demanded concerns have been resolved, that which mutually attains a better progress in the confining procedures. Concerned to recognize the impactful attention among experts, the research also approached it with a Delphi method in neutralizing the BCT establishment in industry by collecting experts' perceptions (Rehman et al., 2024). The obtained significance weights have been produced with BCT execution in fortifying the stakeholders' reliable status towards BCT in strategic developmental procedures. Another study (Muggulla, 2022; Remme et al., 2022) paved the way for emphasizing the necessity of BCT implementation in altering positive effects on aspects such as transparency, Traceability, and long-lasting capacity, since it

is familiar the crucial aspects that construct consumer trustworthiness for monitoring are essential. And so, the typical research proposed the appropriation in BCT employment to label product validation and inferred assistance at enriching the transparency involved with developing dependency pathways for the competitive markets in the focus of the textile industry. The discovered system has prominently delivered in the mechanism of security assurances that is intended to produce stable processes in supply chain balances, as well as augmenting the high productivity influence on brand reputation.

The prior research (Alves et al., 2022) deliberates in denoting the BCT interventions to robust the Supply chains, the research performs with a globalised crisis context in a centralised oversight assumption in providing the usefulness acquired with BCT-based techniques in the policies. In screening for internal threats in Supply chains, the existing research (Gong & Xie, 2023) aimed to expose the tackling action by BCT in reliance on, upon medium and multi-tier drivers, which can promote management compliance in the textile industry. The research explored the investigation through evaluating several features that imply the immutable efficacy in enduring sub-suppliers-based workings in supply chain processes. The recent exploratory study (Abreu, Afonso, & Freitas, 2020) in field research determined the significant effect of BCT automation in regulating improver act in optimizing supply chains, wherein, with a focus on proof checks, the established signatures of BCT were noted in various facilitation in the sector.

Another study (Agrawal et al., 2021) conducted a case study in which beneficiary aspects entranced through blockchain-based system in applying traceability processes. Since, it is well-known that traceability acts as one of the prominent requisites in promoting the quality assurance and transparency that leads to progress in customer satisfaction (Dohale et al., 2023). The research framed an authentic application that delivers development in the interaction between supply chain providers and validating rules that aim to explore suited operations in the delivery of garments and apparels. The architecture encompasses a moderate and verifiable concern in enhancing privacy policies. In addition to that, notions in establishing a blockchain system have also been schemed for accelerating the organisation's governance. Relatively, the other study (Xiaoying & Lijun, 2020) analysed the collaboration of blockchain with the demanded traceability issues on the garment supply chain. The research performed a feasibility test in identifying the fusion of BCT that can resemble a transparent trading system and collaborative transformation in the supply chain of garment products.

Furthermore, (Remme et al., 2022) highlighted the blockchain sustainability marking in the fashion industry and its impact on consumers while purchasing fashion products. The finding emphasized the prominence of educating customer on blockchain and the interrelated advantages for enhancing future transparency in the fashion industry sustainability (Pandey & Sen, 2022). This highlighted the valuable benefits acquired through the implementation of BCT in the fashion industry among both companies and consumers in the market. Moreover, (Yadlapalli & Rahman, 2022) discussed the challenges in transparency and aids in the improvement of the sustainable apparel industry. Benefits provided by BCT employment differ among the members in the supply chain. The findings discovered that lack of skilled expertise, compatibility issues, privacy issues, and lack of government regulation clarity are the major challenges in implementing BCT.

(Caldarelli et al., 2021) Examined the ways to overcome challenges in the adoption of BCT in the fashion supply chain and introducing sustainability in the industry. The study's outcome highlights that including blockchain in a sustainable supply chain can significantly influence better management and emphasizes understanding BCT to successfully integrate such advanced technology to maintain the success rate of the company. Examined the ways to overcome challenges in the adoption of BCT in the fashion supply chain and introducing sustainability in the industry. The study's outcome, along with the highlights including blockchain in sustainable supply chain, can significantly influence better management and emphasize understanding BCT to successfully integrate such advanced technology to maintain the success rate of the company. (Khan et al., 2023) challenge in adopting blockchain are trust management issues, lack of upgraded technologies, and lack of information sharing.

BCT Interventions in Merchandising Stratagems

Likely to achieve transparency, traceability, secure and safety assurances, the potential of BCT was also deliberated in the utility of technology facilitation among apparel manufacturers (Crawshaw et al., 2023). The prior research (Mubarik et al., 2021) investigated in gauging the better operations on manufacturing phases in the textile industry. The depiction of intended dependencies provided by BCT to garment manufacturers in India was systematically analysed through primary data sources (Lohmer et al., 2020).While, the research's (Hankonen, 2021; Michie et al., 2021) contemplated conclusions have evidenced that the management and resolution of opportunities through the use of blockchain adoption has greatly enhanced merchandise's trust (Akhtar et al., 2023). The research utilised a mixed approach to broaden analysis, as well as to bound on the comprehensive assumption groups through thematic assessment. Test results demonstrated the greater engagement of garment merchandisers has identified and boosted through unifying BCT into ERP systems that held with more efficacy in trustable product reputation (H. Wang et al., 2021).

Another typical research (Nermain et al., 2022) has stated the concurrent working of BCT in merchandising the modified interaction in constructing the proactive measures for activating competencies of exchange mechanisms and shipping cases for the enhancement of data security. Several BC systems have emerged for monitoring the safe handling

of inventory from falsified inventory processes (Madhani, 2022). The prevailing research (Pal, 2023) exemplified the merchandising maintenance on the value–chain network, which is been improvised by BC-enabled application. The research (Hastig & Sodhi, 2020; Mubarik et al., 2021) observed the progress in effective powering and capability at securing the acquired data and modelled a service-base and structured architecture design with BC-enabled system have assessed the merchandise goals including brand loyalty, brand reputation for significant attention from competitive markets(Fig 4).

The recent research envisioned BC with a TBL approach i.e., sustainability goals, in compromising the multifaceted-based organization level. The research focused on analysing the practical application ensured services by BCT integration to TBL missions. The subsequent amplification in describing garment products has enabled the customer to linkage to the retail stores. Also, the BCT allowances constructed a consistent value–chain network in authenticating a legitimate record of clothing products. Similarly, the existing study (Chen, 2024; Seranmadevi, Kumar, & Hariharan, 2022) proved that the BCT implication in the added value of authenticity in accounting the luxury merchandise through spacing-up product cycle, proof origins, and digital tokens distribution. As, the applied countenance of BCT built the capability to counteract the customers' benefits and avoid data outbreaks. The reality transmission by BC credibility in revolutionizing the merchandisers' aspects in the textile industry, which led to instigating the provenance of garments and apparels (Long et al., 2023; Wang et al., 2021).

Research Gaps

- (Caldarelli et al., 2021) Has limited to a qualitative research approach and failed to cover a wide range of aspect in adopting BCT and overcoming challenges in integration rather than highlighting the importance of understanding the technology.
- (Cole et al., 2019) has not focused on examining the services, product characteristics, and has failed to discuss whether supply chains would be benefit sufficiently from BCT adoption rather than discussing the advantages of implementing.
- (Batwa & Norrman, 2020) has established a conceptual framework on the basis for the future, however, performed limited interview cases and did not discuss the challenges regarding the implementation of blockchain in SCM
- (Benstead et al., 2024) has predominantly concentrated on the perception of the triple bottom line and has failed to explain various ideologies regarding BCT
- (Premalatha et al., 2021) Has significantly concentrated upon the textile industries of TN and has failed to explain various parts of the country. Hence, it might affect the generalizability of the study.
- (Hemamathi et al., 2023) has emphasized about the utilisation of adsorbed carbon technology and has failed to highlight various techniques to manage water pollution due to textile industries.

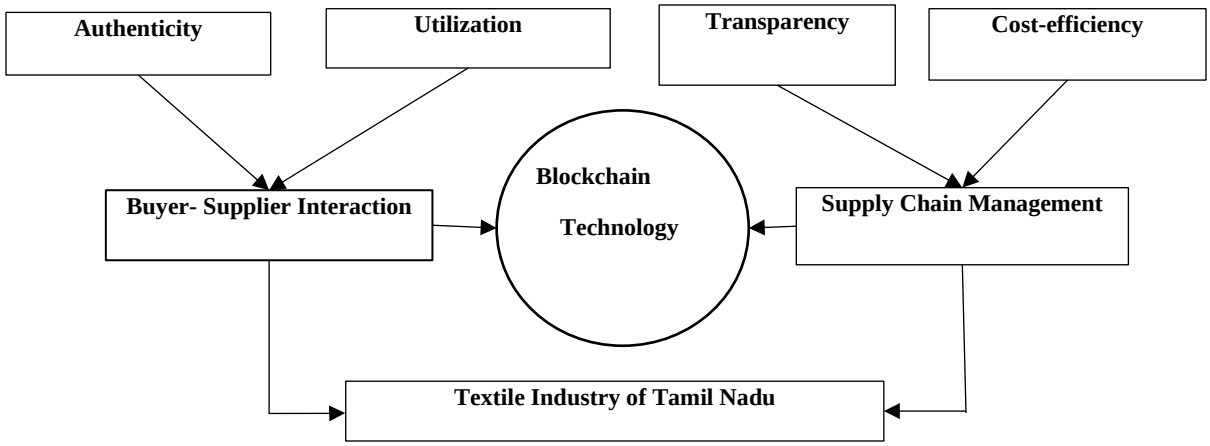

Fig. 4 Conceptual framework

Hypothesis

H_{01} – Blockchain technology impacts the overall performance of supply chain management

H_{11} - Blockchain technology does not impact the overall performance of supply chain management

H_{02} – Blockchain technology yields transparent information, within fashion management strategy

H_{12} – Blockchain technology does not yield a transparent information within fashion management strategy

H_{03} – Challenges in adopting Blockchain technology are prevalent among the textile industries of Tamil Nadu

H_{13} – Challenges in adopting Blockchain technology are not prevalent among the textile industries of Tamil Nadu

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