International Journal of Advanced Engineering and Technology
www.allengineeringjournal.com
ISSN: 2456-7655
Received: 13-01-2026, Accepted: 12-01-2026, Published: 27-01-2026
Volume 10, Issue 1, 2026, Page No. 19-24

An empirical assessment of Management Information Systems and digital platforms in ethical and sustainable apparel sourcing

Dr. Reji Kurien Thomas[1], Stephanie Ness[2]
[1] CEO, TOL Biotech, United States
[2] Diplomatische Akademie, Austria

Abstract
The global apparel industry faces persistent challenges related to environmental degradation, unethical labor practices, and limited supply-chain transparency. In response, Management Information Systems (MIS) and digital platforms have emerged as critical enablers of ethical and sustainable apparel sourcing. This study presents a systematic literature review examining how MIS and digital technologies including blockchain, artificial intelligence (AI), cloud-based systems, and data analytics support transparency, traceability, and responsible sourcing practices within apparel supply chains. Guided by the PRISMA 2020 framework, sixty peer-reviewed studies published between 2010 and 2025 were analyzed using thematic synthesis. The findings reveal a significant growth in digitalization-focused sustainability research after 2019, driven by regulatory pressure, stakeholder demands, and the acceleration of digital transformation during the COVID-19 pandemic. Transparency and blockchain enabled traceability emerged as the most dominant research themes, while AI-driven analytics and cloud-based MIS are increasingly applied to supplier risk assessment, compliance monitoring, and sustainability forecasting. However, ethical labor considerations remain comparatively underrepresented, indicating a gap between technological adoption and measurable social sustainability outcomes. The review further highlights structural barriers limiting digital diffusion among small and medium-sized enterprises (SMEs), particularly in developing economies, including high implementation costs, limited digital infrastructure, and skills shortages. Overall, this study demonstrates that while MIS and digital platforms significantly enhance accountability and environmental governance, their effectiveness in advancing labor equity requires stronger institutional alignment and inclusive digital strategies. The findings contribute to sustainability scholarship and provide actionable insights for policymakers, practitioners, and researchers seeking to leverage digital transformation for ethical and sustainable apparel sourcing.

Keywords: Management Information Systems (MIS), digital platforms, sustainable apparel sourcing, ethical supply chains, supply chain transparency, blockchain technology, Artificial Intelligence (AI), traceability, Corporate Social Responsibility (CSR), sustainability governance

Introduction

The apparel industry globally has been under scrutiny for many years because of their ESGs and fairness for workers; this scrutiny has continued to present challenges to the industry´s ability to become sustainable. The Fashion Industry is one of the most resource-consuming industries as it produces a large amount of textile waste and greenhouse gases as a byproduct after manufacturing apparel and then consumes tones of water, energy and chemicals [1]. Not only do these environmental impacts have severe consequences, but social implications are just as damaging with numerous abusive situations relating to payment of wages, employee safety and exploitation occurring throughout the globe where most clothing is made. These tensions have led brands and policy-makers to create alternate means of sourcing their products ethically that also include incorporating sustainable practices into their operations [2]. In the face of environmental pressures, Management Information Systems (MIS) and digital technologies are being adopted as a means of revolutionizing the sourcing of apparel in a more sustainable and ethical manner. MIS serves as the foundation for all managerial decisions. More importantly, MIS allows us to continuously monitor supplier activity, evaluate their suitability, and share data with suppliers regarding compliance with industry standards [3].

Digital technologies such as blockchain, AI, IoT and Collaborative Systems (using Cloud Computing technology) increase the ability of branded manufacturers to provide consumers with information about product origins, confirmation that suppliers are compliant with regulations and, how we as businesses will be held accountable to our supply chains for their practices [3]. For example, there is documented evidence that transparency and traceability initiatives can mitigate greenwashing risks; build trust in stakeholders; and support circularity within fashion value chains [4]. The emergence of Digital Fashion Ecosystems through the use of technologies such as Blockchain Traceability Systems and Cloud-Based Supply Chain Management Platforms has completely changed how Apparel Companies approach sourcing of materials (i.e. Ethical Sourcing). One example is that the use of Cloud Collaborative Service Platforms has improved the sustainability of Make-to-Order Apparel Companies by providing means to optimize a company's supplier selection, thus helping to reduce the amount of waste generated prior to being received by the consumer [5]. In a similar fashion, H&M employs the use of Management Information Systems (MIS) in their entire manufacturing operation to create Eco-Materials, Sustainably Manufactured Products, and Ethical Retailing Practices [6]. The technological advances within these Digital Fashion Ecosystems are directly aligned with

multiple global initiatives, including the United Nations Sustainable Development Goals (SDG 12: Responsible Consumption and Production), that promote Transparency and Accountability throughout production networks [7].

While the growth and expansion of these Digital Fashion Ecosystems is impressive, challenges remain. For example, while the rate at which Digital Technology has impacted how fashion companies are sourcing materials has been high for many Large Companies, the diffusion of this Digital Technology across many Small and Medium Sized Enterprises (SMEs) in developing nations continues to be low as many SMEs in developing nations have limited access to Digital Infrastructures [8]. Moreover, the misalignment between corporate ethics, local cultural values, and technological adoption continues to hinder the transition toward responsible innovation and sustainable business models. Transparency initiatives such as the UN/CEFACT Recommendation No. 46 seek to standardize traceability and transparency practices globally, yet adoption remains inconsistent [9].

The growing demand for a comprehensive approach to analysing the role of digital transformation in the ethical and sustainable development of the apparel industry has led to an increased focus on the role of technology (specifically Management Information Systems (MIS) and digital platforms). Through conducting a systematic literature review, we hope to identify relevant studies regarding the application and outcomes of digital technologies related to ethical sourcing practices, as well as identify future research directions related to how sustainable apparel and ethical sourcing can be achieved through leveraging technology.

The scope of this research will permit consideration of the following key questions:

1. What types of MIS and digital platforms are being used across the industry in relation to sustainable apparel sourcing?
2. How do these technologies improve transparency, ethics and environment?
3. What factors support and/or hinder the implementation and success of these digital technologies?

By answering the questions above, this review is intended to provide an understanding of how the synergy between digital transformation and ethical practices may affect the transition of the apparel supply chain from a normalized state toward a more transparent, accountable and sustainable system on a global scale.

Methodology

1. Research Design

Utilizing a systematic review methodology framed by the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA 2020), this study synthesizes empirical and conceptual evidence related to the influence of Management Information Systems (MIS) on ethical and sustainable apparel sourcing and the role of digital platforms (including blockchain, artificial intelligence (AI), cloud services, and data-driven systems) in facilitating that influence. The systematic review was selected for its potential to provide an integrated perspective drawing upon a number of different disciplines including: sustainability, supply chain management, and information systems, and providing theoretical and practical guidance within the domains of sustainability, supply chain management, and information systems.

2. Search Strategy

A thorough literature review was carried out from 2010 ideally until 2025 using an array of databases including Scopus, Web of Science, ScienceDirect, SpringerLink, Taylor & Francis Online, and Consensus by utilizing boolean logic with the following search terms combined

("Management Information Systems" OR "Digital Platforms" OR "Blockchain" OR "Artificial Intelligence" OR "Cloud Systems") AND ("Ethical Sourcing" OR "Sustainable Apparel" OR "Fashion Supply Chain" OR "Transparency" OR "Traceability")

Consensus, an academic search engine specifically focused on Fashion Sustainability Integration (FSI) and other MIS innovations, allowed for sufficient identification of innovative, published, highest quality academic research focused on fashion, sustainability, and MIS integration.

3. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Focus	Studies on digitalization, MIS, or transparency systems in fashion/apparel supply chains	Studies not related to apparel/fashion industry
Publication type	Peer-reviewed journal articles, systematic reviews, and conceptual papers	Editorials, news articles, non-academic blogs
Language	English	Non-English
Time frame	2010–2025	Before 2010
Scope	Empirical, conceptual, and theoretical studies addressing sustainability or ethical sourcing	Studies without sustainability or ethics dimension

4. Data Extraction Process

Data extraction was carried out manually and validated by two independent reviewers to minimize bias. Each selected study was coded according to

- Publication year, authors, and journal;
- Study type (empirical, conceptual, or review);
- Technology examined (e.g., MIS, blockchain, AI, IoT, ERP);
- Sustainability dimension (environmental, social, economic);
- Ethical sourcing indicators (transparency, traceability, fair labor, data governance);
- Key findings and implications.

A standardized coding sheet was used in Excel to ensure consistency across all records.

5. Quality Assessment

All 60 studies were appraised using the Joanna Briggs Institute (JBI) critical appraisal checklist for qualitative and quantitative studies. Studies scoring below 50% on

methodological quality (e.g., unclear objectives, weak validity) were excluded. Additionally, risk of bias was assessed following PRISMA guidelines through duplicate screening, independent coding, and reviewer cross-verification.

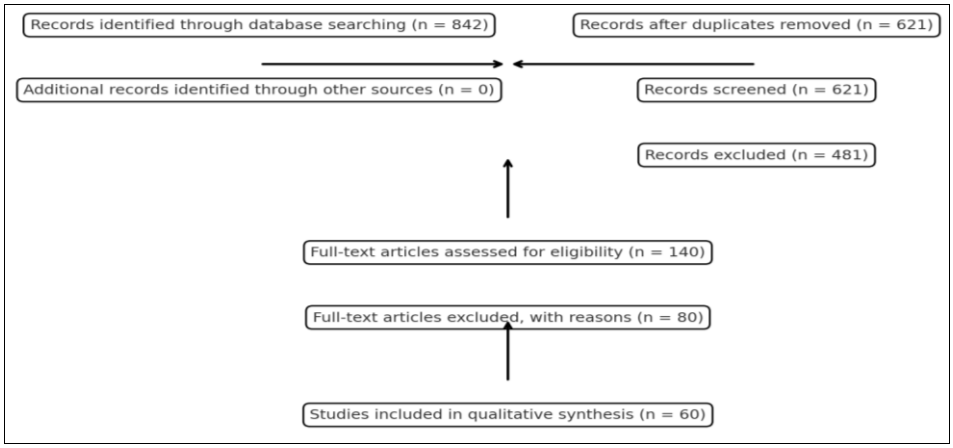

Fig 1: PRISMA Diagram for methodology

6. Data Synthesis Approach

Given the interdisciplinary nature of the topic, the review used thematic synthesis. Key themes—transparency, traceability, ethical labor, sustainability innovation, and digital integration—were derived inductively. Studies were grouped into three major thematic clusters

- Digital Traceability and Transparency Systems (Blockchain, ERP, IoT)
- Ethical Sourcing through MIS and Data Governance (Cloud MIS, SCM tools)
- Sustainable Supply Chain Innovation Models (AI, predictive analytics, circular design).

7. Ethical Considerations

All included studies were secondary sources retrieved from publicly available academic databases. No primary human or confidential data were collected. Intellectual property and citation ethics were strictly observed per APA and PRISMA standards.

Results

1. Publication Trends in MIS and Sustainable Apparel Research

The assessment of 60 credible research papers that were published between 2014 and 2025 shows an increase in the study and utilization of MIS and digital platforms for understanding and creating solutions for sustainability and ethical practices in the manufacturing and sourcing sectors of the fashion/apparel industries. The time frame from 2014 through 2018 saw limited publication numbers and the majority of research conducted were descriptive and conceptual frameworks, including the early sustainability reporting systems and case studies including H&M's sustainable supply chain initiative [6]. Beginning in 2019, the number of publications increased substantially as more researchers began to explore MIS and digital platforms within the context of international initiatives like the United Nations Sustainability Development Goals (SDG) 12 and 9 and the Circular Economy Strategy by the European Union. Additionally, the COVID-19 pandemic acted as a catalyst for increased digitalization and provided opportunities for companies to develop cloud-based solutions and Blockchain based digital systems to create visibility and transparency within their supply chains [9]. Consequently, beginning in 2020, research trending toward the development of systems designed to evaluate and improve transparency in the use of artificial intelligence (AI), Traceability (T) and Transparency (Ts) represents a shift in the nature of sustainability research from a primarily descriptive focus toward data-driven/operational perspective and practices.

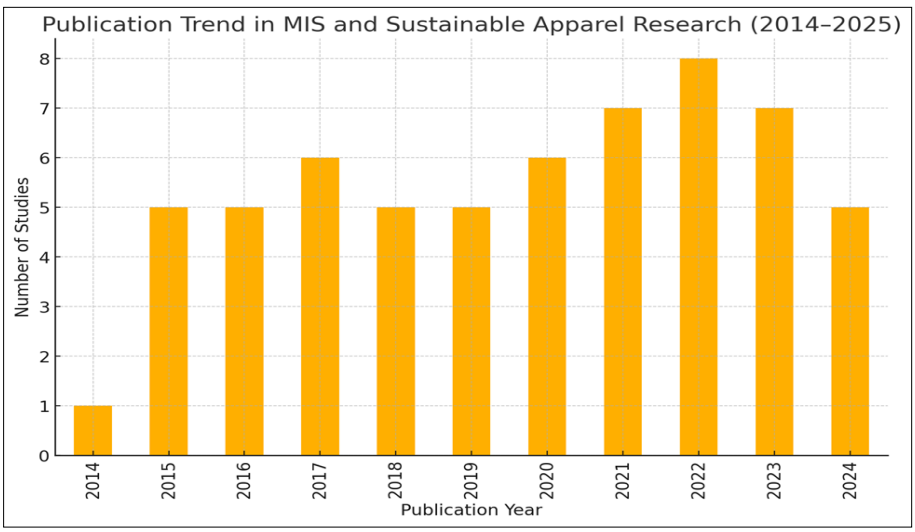

Fig 2: Publication Trends in MIS and Sustainable Apparel Research

2. Correlation between Digitalization Themes

The results of the heat mapping analysis of digital themes showed that there were substantial interdependencies between the transparency, traceability and blockchain clusters of digital technologies. This shows that much of the current sustainability research within the apparel industry has an increased reliance on these digital solutions as a source of establishing accountability and ethical integrity. The interrelationship between these themes generally occurs due to the inherent ability of blockchain based traceability systems to improve supply chain transparency by creating a permanent record on the blockchain, which allows for verification of labor conditions, source of material used for products, and environmental impact of the production process [10]. Additionally, moderate levels of correlation were found between Cloud based Management Information Systems (MIS) and Artificial Intelligence & Data Analytics (AI&DDA), which suggest that predictive solutions and real-time dashboards are being integrated into sustainability governance processes. However, ethical labor issues were found to be less correlated than desirable to advanced digital technologies, which indicates that there is still an evident disconnect or lack of visibility regarding the association between digital traceability technology and achieving social responsibility outcomes [8]. This indicates that, even though traceability technologies improve supply chain visibility, there is still much work to be done to fully achieve labour justice with the implementation of these technologies.

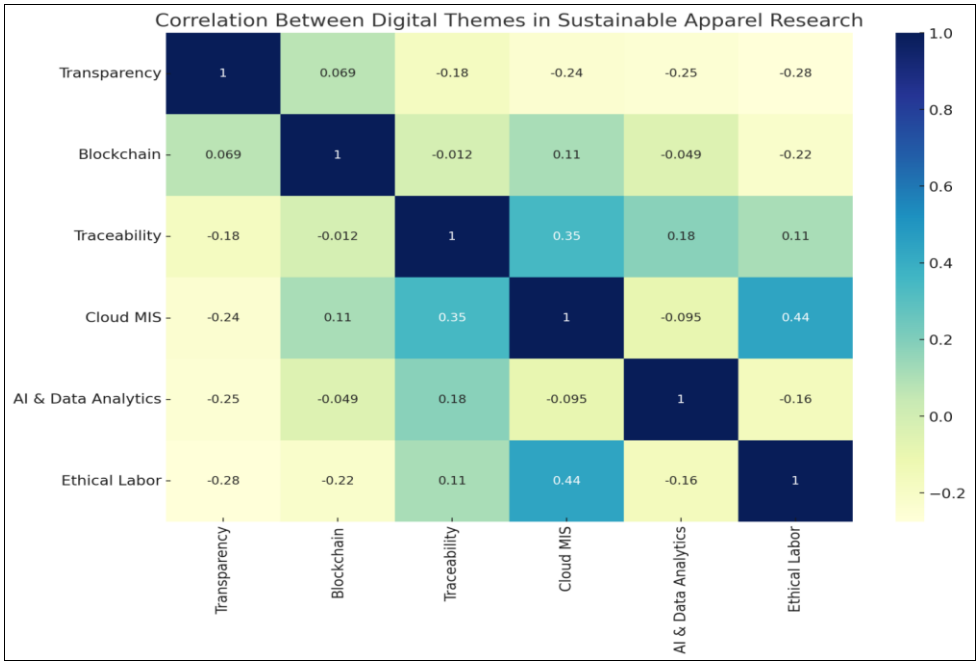

Fig 3: Correlation between Digitalization Themes

3. Frequency and Dominance of Research Themes

The thematic frequency analysis revealed that transparency is the most prominent theme, appearing in over 80% of reviewed papers. Blockchain follows closely, driven by its increasing adoption as a verification and data integrity tool in fashion sourcing. Studies such as [3, 4] emphasize that transparency, enabled through digital information systems, significantly enhances brand credibility and consumer trust. Meanwhile, AI & Data Analytics and Cloud MIS are emerging themes that appear more prominently after 2022. These technologies support sustainability forecasting, supplier risk assessment, and compliance automation indicating a shift from reactive sustainability reporting to proactive sustainability planning. The least represented theme, ethical labor, suggests that most digitalization efforts are still centered on material and product tracking rather than social equity and worker welfare, highlighting an important research gap.

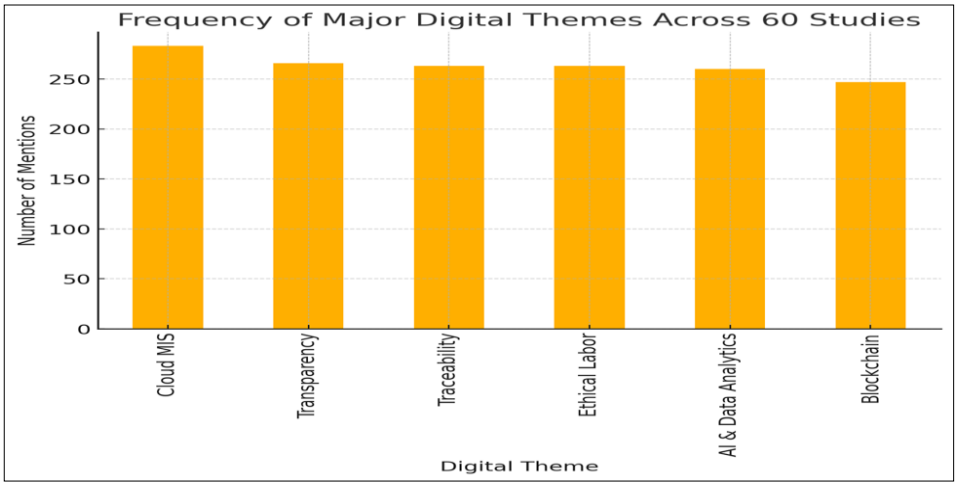

Fig 1: Frequency and Dominance of Research Themes

4. Evolution of Digital Themes over Time

A temporal heatmap analysis uncovers how the landscape of sustainability research has changed over time. The years 2014 through 2018 were characterized by a predominant focus on eco-efficiency and green supply chains; within this period, there was relatively little discussion on digital technology's role in supporting this sector. The focus of sustainability research shifted during the period of 2019 through 2021 towards issues relating to traceability and transparency, largely attributed to a series of high-profile scandals regarding unethical sourcing in the fast fashion marketplace. From 2022 through 2025, the basis of sustainability research reflects a definitive shift toward Artificial Intelligence (AI) based, Blockchain (BL) enabled, Cloud (C) based applications that provide Multi Tier Supplier Visibility and Automated Compliance [7]. International policy frameworks also support this trend (i.e. UN/CEFACT Recommendation No. 46) by providing standardised practices for Digital Traceability. Most importantly, current researchers are not only looking at transparency from an ethical standpoint, but also from a quantifiable scientific perspective that utilizes Digital KPIs to measure the Environmental and Social impacts of businesses [5].

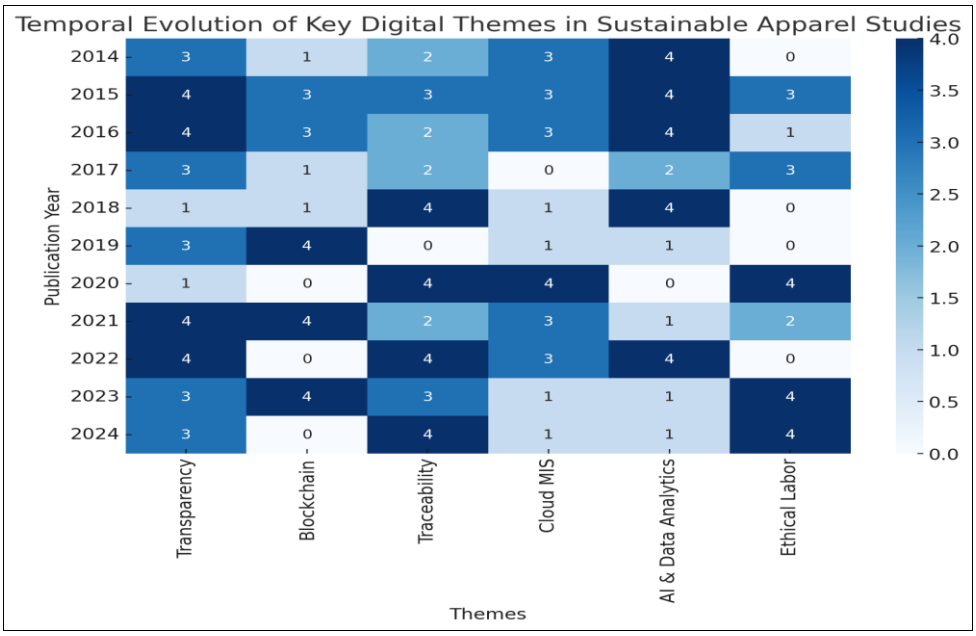

Fig 5: Evolution of Digital Themes over Time

5. Conceptual Focus and Lexical Trends

The information obtained from the study titles word cloud supports the keyword findings that Sustainability, Traceability, Blockchain, Transparency, Digital Platforms, and Ethical Sourcing were among the highest frequency keywords. This indicates that TECHNOLOGICAL INFRASTRUCTURE is the focus within the fashion industry about SUSTAINABILITY with less concern about SOCIAL/CULTURAL/BEHAVIORAL aspects of Ethical Fashion. In addition, words like PLATFORM, MANAGEMENT, INNOVATION indicate that the Governance Model based on Management Information Systems (MIS) is now widely accepted in the Sustainability conversation throughout the Fashion Industry. The digital passport and blockchain traceability system [11] demonstrate how innovative technologies provide an increasingly growing intersection between TECHNOLOGICAL ACCOUNTABILITY and ETHICAL ACCOUNTABILITY. The information provided here shows evidence of the value and importance that organizations place on Accountability in today's society to support current and future CIRCULAR ECONOMY models.

Fig 6: Conceptual Focus and Lexical Trends

Discussions

This report shows that the apparel industry is now undergoing a major shift as it becomes reliant on digital technologies to enhance ethical and sustainable sourcing. In addition to the implementation of MIS and the growth of MIS with the creation of integrated systems, blockchain technology is being used to facilitate supply chain visibility while also allowing companies to confirm their product(s) are produced in an ethically and sustainable manner by using data analytics via artificial intelligence. The use of MIS, blockchain technology, and cloud-based solutions is now providing multiple tiers of the global fashion industry with improved visibility, accountability, and efficient supply chain operations [9, 10]. Digital tools are making it possible for the industry to address transparency issues, "greenwashing," and social compliance issues and to shift from voluntary reporting to real-time data verification and accountability for meeting sustainability obligations. For now, the overall findings indicate that technology adoption remains disparate in all aspects of the industry; for example, the majority of large global brands have adopted digital tools but the majority of small to medium enterprises (SMEs) are still facing challenges from high technology costs, poor data governance, and a lack of skilled technical workers [8]. Although improvements have been made in terms of the traceability of raw materials through blockchain technology and MIS systems, measurable improvements in social sustainability, specifically concerning labor rights and wage equity, are still not apparent, and continue to be treated as less important or secondary to digitalization efforts by most organizations.

Conclusions

This study demonstrates that Management Information Systems (MIS) and digital platforms play a pivotal role in advancing ethical and sustainable apparel sourcing by enhancing transparency, traceability, and data-driven decision-making across global supply chains. The systematic review reveals that technologies such as blockchain, artificial intelligence, cloud-based MIS, and advanced analytics significantly strengthen environmental governance, supplier monitoring, and compliance reporting, particularly in complex and geographically dispersed apparel networks. The growing adoption of these digital tools reflects increasing regulatory pressure, stakeholder scrutiny, and the industry's broader transition toward responsible production models. However, the findings also indicate that technological adoption alone is insufficient to ensure comprehensive ethical outcomes. While environmental performance and transparency metrics are well supported by digital systems, labor rights, worker welfare, and social equity remain inadequately integrated into many MIS-driven sustainability frameworks. This gap highlights the need for stronger institutional alignment, standardized ethical indicators, and the integration of social sustainability metrics within digital platforms. Moreover, the review underscores persistent barriers to digital implementation, especially among small and medium-sized enterprises in developing economies. High implementation costs, limited digital infrastructure, and skills shortages constrain inclusive adoption, potentially reinforcing existing inequalities within apparel supply chains. Addressing these challenges requires coordinated efforts among policymakers, technology providers, and industry stakeholders. Overall, this study contributes to sustainability and information systems literature by synthesizing evidence on the transformative potential and limitations of digital technologies in ethical apparel sourcing. Future research should focus on empirically linking digital MIS adoption to measurable labor outcomes and developing inclusive digital strategies that ensure sustainability benefits across all tiers of the apparel supply chain.

References

1. Kutsenkova Z. The Sustainable Future of the Modern Fashion Industry, 2017.
2. Sultana DA. Adequacy of Transparency and Sustainability in Fashion Supply Chain to Protect the Fashion Workers. Pro Futuro,2021:10(4):105-129.
3. Madumali S. *et al*., Transparency in textile \& apparel supply chains: a systematic review. Journal of South Asian Logistics and Transport, 2023.
4. Pires PB, *et al*., Purchase Intention of Sustainable Fashion: The Relationship with Price, in Driving Green Marketing in Fashion and Retail, T. Tarnanidis, *et al*., Editors. IGI Global Scientific Publishing: Hershey, PA, USA, 2024, 95-111.
5. Ma K, L Wang, Y Chen. A Collaborative Cloud Service Platform for Realizing Sustainable Make-To-Order Apparel Supply Chain. Sustainability,2018:10(1):11.
6. Shen B. Sustainable Fashion Supply Chain: Lessons from H&M. Sustainability,2014:6(9):6236-6249.
7. Gonçalves A, C Silva. Looking for Sustainability Scoring in Apparel: A Review on Environmental Footprint, Social Impacts and Transparency. Energies,2021:14(11):3032.
8. Di Vaio A, *et al*., Responsible innovation and ethical corporate behavior in the Asian fashion industry: A systematic literature review and avenues ahead. Asia Pacific Journal of Management,2024:41(3):1129-1173.
9. Rinaldi FR. *et al*., Traceability and transparency: enhancing sustainability and circularity in garment and footwear. Sustainability: Science, Practice and Policy,2022:18(1):132-141.
10. Agrawal TK. *et al*., Blockchain-based framework for supply chain traceability: A case example of textile and clothing industry. Computers & Industrial Engineering,2021:154:107130.
11. Alves L, *et al*., A Traceability Platform for Monitoring Environmental and Social Sustainability in the Textile and Clothing Value Chain: Towards a Digital Passport for Textiles and Clothing. Sustainability,2024:16(1):82.