

**ENHANCING SUPPLY CHAIN TRANSPARENCY AND
BLOCKCHAIN ADOPTION IN
APPAREL PROCUREMENT PROCESSES:
A COMPREHENSIVE ANALYSIS**

PALLEGEDARA SAWANI BUDDHIKA MADUMALI

218118U

Degree of Master of Science

Department of Transport Management and Logistics Engineering

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DECLARATION OF ORIGINALITY

I declare that this is my own work, and this thesis/dissertation does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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(Sawani Madumali)

Date: 15th July 2024

STATEMENT OF THE SUPERVISOR

The above candidate has carried out research for the Degree of Master of Science under my supervision.

Name of the supervisor: Prof. A. I. T. Gamage

Signature of the Supervisor:

Date: 15th July 2024

Prof. A. I. T. Gamage,
Senior Lecturer,
Dept. of Transport Management & Logistics Engineering,
Faculty of Engineering,
University of Moratuwa.

ABSTRACT

The textile and apparel industry, a significant global economic player, has seen a resurgence post-COVID-19, with market revenue reaching 1.74 trillion USD in 2023 and projected to hit 2 trillion USD by 2028. This growth is paralleled by increasing demands for transparency due to the complexity of supply chain management and consumer concerns about traceability and sustainability. While many fashion brands have started sharing detailed product processing information, comprehensive evaluations of transparency in textile and apparel supply chains remain sparse. To bridge this gap, we conducted a systematic literature review, identifying research clusters focused on sustainable approaches, supply chain perspectives, traceability implementation, and information transparency.

Our study underscores the 'implementation of traceability for transparency' as a critical need, highlighting blockchain technology as a promising solution. Despite its recognized potential in other industries, the apparel sector lacks extensive empirical studies on blockchain applications. We thus focused on the procurement process, identified as a pivotal area for enhancing transparency, and investigated barriers to blockchain adoption through industry collaboration in Sri Lanka.

Using the Delphi technique and Interpretative Structural Modeling (ISM), we analyzed twelve identified barriers, revealing key challenges such as underdeveloped technology, lack of expertise, and security concerns. Our findings offer strategic insights for overcoming these barriers, proposing the development of Key Performance Indicators (KPIs) to support initial blockchain implementation stages. The study advocates for further research to validate and expand upon these findings, aiming to create effective implementation frameworks and advance the technological landscape of the apparel supply chain.

Keywords: textile, apparel, fashion, supply chain, transparency, traceability, systematic review, blockchain, procurement

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LIST OF ABBREVIATIONS

DLT	Distributed Ledger Technology
FRM	Final Reachability Matrix
IRM	Initial Reachability Matrix
ISM	Interpretative Structural Modeling
KPI	Key Performance Indicator
SSIM	Structural Self-interaction matrix
T&C	Textile & Clothing