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Exploring fully integrated textile tags and information systems for implementing traceability in textile supply chains

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Opponent: Professor David Grant



Abstract

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Traceability, in general, refers to keeping track of information to a certain degree. The concept of traceability is considered important to verify the various aspects of products in different industries and their global supply chains. Textile industry is among those which are accused time-to-time for opaque supply chains and unsustainable practices. Particularly, the aftermath of a series of industrial catastrophes, customers and non-government organizations have started to scrutinize the brands to bring transparency in their supply chains. In this direction, traceability has been identified as a tool for organizations to trace their supplies throughout the supply chains and collect relevant information to ensure transparency and claim validation. Traceability has been further acknowledged as a competitive element and often acts as a decisive factor in purchase process. Moreover, the textile products are one of the most counterfeit-prone items around the world. As a result, the demand for traceability has been intensified for supply chain monitoring and security, and product authentication.

The principal aim of this thesis was to address the implementation of traceability information systems in the textile supply chain. Further, it investigates the feasibility of yarn-based integrated tracking tags as a means to impart traceability in textiles. It has been pursued through several independent studies in the domain of textile manufacturing, supply chain management and information systems. The appended papers in this thesis address various aspects of traceability implementation in the textile supply chain and how traceability information can be encoded into the textiles using yarn-based coding.

Traceability consists of two components namely information system and tagging. The latter component is used to uniquely identify the product in the supply chain which assists in recalling and/or storing the relevant traceability data from/in the information system. Different actors in the supply chain manage the traceability data in their information systems, therefore traceability tag acts as a linking agent for information exchange. In this direction, this thesis introduces the concept of yarn coding and yarn coding-based integrated tags which can be potentially used in future for textile traceability applications. In addition, a framework is proposed for the implementation of traceability information system in the textile supply chain. The work highlights various elements which can play a significant role in promoting and/or implementing traceability. Regardless of perspective or viewpoint, traceability is interwoven between technical and managerial aspects; therefore traceability implementation requires a techno-management approach to obtain an optimal solution.

Keywords: Traceability, Textile, Yarn coding, Integrated tag, Supply chain management