Inter-O rganizational Collaboration for Optimizing Textile Supply Chains

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Avhandling för doktorsexamen inom Textilt management, att läggas fram för offentligt försvar tisdagen den 19 juni 2018 kl. 10.00 i sal Amphí A, ENSAIT, allée Louise et Victor Champier, Roubax, France.

Disputationen kan följas via länk i sal T369, Högskolan i Borås

Seminariet ges på engelska

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Abstract

Nowadays, as the increasing trend of customization and personalization in fashion market, mass customization and small-series production has become more and more important in the textile supply chain. However, there are still many drawbacks in existing supply chain models that are used to cope with this trend. Collaboration plays a vital role in supply chain management in past decades. However, supply chain collaboration is rarely applied in textile industry, neither in research nor in practice. Considering the potential advantages of the application of supply chain collaboration, to bridge the gap, this thesis employs multiple supply chain collaboration strategies to optimize existing textile supply chain models.

In this PhD research, a thorough investigation and literature review regarding supply chain collaboration was conducted. Several emerging supply chain collaboration paradigms and strategies were identified, which provided a theoretical foundation and research direction for the subsequent research. Consequently, three innovative supply chain models with corresponding optimization strategies were developed: (1) a novel resource sharing mechanism for optimizing garment manufacturing echelon in textile supply chain, (2) a central order processing system for optimizing demand-driven textile supply chain, and (3) a collaborative cloud service platform for optimizing make-to-order textile supply chain. Identified supply chain collaboration strategies, viz. resource sharing, information sharing, joint decision-making, profit sharing, were employed for developing the three collaborative models. Optimization heuristics were also designed for different objectives in three models respectively. The three proposed supply chain collaboration strategies were realized in three simulation models by employing discrete-event simulation technology or multi-agent simulation technology. Several experiments were conducted to demonstrate the advantages of such collaborative structure under different conditions.

Based on simulation experiment results, multiple supply chain performances were improved significantly in each model under different conditions. The developed models with corresponding strategies can optimize current textile supply chain and help companies maintain competence in the trend of mass customization in textile industry.

**Keywords:** supply chain collaboration; mass customization; resource sharing; discrete-event simulation; multi-agent simulation; optimization heuristics; textile supply chain