Trust in the Collaborative Sharing of Logistics Resources

LogDynamics
International Graduate School

Today's logistics industry is challenged by demand for efficient deliveries, rising delivery costs, and regulations to protect environment. In particular, customers' demands are becoming more customized and dynamic, and have to be taken care of in a timely manner. Equally, delivery costs per shipment are rising for many reasons, including an increase in the price of energy fuels. Moreover, the world is emphasizing on green movements to reduce emission of harmful gases (NOx, CO2). To mitigate all these challenges, stakeholders in logistics are gradually considering to share logistics resources through a collaborative strategy. Through this strategy, companies and individuals are encouraged to share the physical and non-physical assets such as vehicles (trucks), information (and information systems), warehouses, and distribution centers. In this aspect, sharing enables partners to reduce the underutilization of assets, empty backhauls, transport costs, and harmful emissions.

The resource sharing is however becoming a challenge to implement because of many uncertainties underlying the collaboration itself. Much of such uncertainties stem from supporting environments in which companies/individuals have to work under new and uncommon business relationships. These relationships are featured with partners' behavioral discontents, and are influenced further by collaborative logistics processes, which eventually impose trust uncertainties. Trust uncertainties reduce confidence of partners to engage in the sharing process. It is for these reasons that trust is needful to encourage and increase confidence of the collaborating partners. Its presence facilitates planning and operations of logistics activities among the partners involved while reducing suspiciousness, fear, and opportunism.

Towards mitigating this trust problem, among others, companies and individuals have to understand how networks of sharing they configure might behave when they are implemented. This understanding can be unveiled by building a mechanism that can estimate trusting outcomes of the collaboration scenarios on sharing. The mechanism has to depict operational sharing of logistics resources, and is experimented in controlled laboratory settings. Therefore, a Trust Mechanism (TrustMech) concept is developed. It stands on a conceptual paradigm of socio-cognition in artificial intelligence. It has to be validated under Multi-Agent System (MAS) simulation to allow interactions of autonomous agents who mimic human trusting processes.

The overall goal is to set variations in partner behaviors and logistics processes, and observe resulting trusting outcomes, as the consequence. Afterwards, results obtained have to be analyzed to depict trusting patterns, their pathway explanations, and inform logistics stakeholders accordingly.

Need for trust to support collaboration
on shareable resources in logistics

As an outcome of this investigation, logistics industry is expected to benefit as follows: to gain a deeper understanding on trustworthy behaviors of networks they configure before implementing them, and to estimate both trust-based strengths and pitfalls of the logistics networks that are going to be implemented.

Dr.-Ing. Morice Daudi
M.Sc.

Production Engineering

Morogoro, Tanzania
Finished in May, 2018

International Graduate School for Dynamics in Logistics
Contact: Dr.-Ing. Ingrid Rügge

Universität Bremen
Hochschulring 20
28359 Bremen, Germany

www.logistics-gs.uni-bremen.de
info@IGS.LogDynamics.de

Universität Bremen