The International Graduate School (IGS) is concerned with research questions regarding all aspects of dynamics in logistics. The following research topic for a dissertation project is of particular interest for the IGS.

Robust Collaborations in Logistics – Learning from Nature

Abstract

Due to very low in-house production depths, the dependence on suppliers and value-adding partners is very high in the industrial production. The ability to ensure a reliable information and material flow along the value chain is one of the most important issues in today's supply chains. In consequence, the loss of shipments due to problems along the supply chains has to be avoided. The aim has to be to establish robust supply chains which are able to compensate potential lacks of deliveries or even low delivery capacities of certain partners.

In the industrial reality, it can be recognised that in case of a low performing partner within a supply chain, a single lack of shipment can cause a total deadlock of the supply chain. In collaborative systems, the dependency of the participating partners is very high.

In comparison, many collaborative systems can also be identified in nature. Colonies of bees or ants can also be described as a collaborative system of entities, realising their collaboration by applying work sharing principles. In opposite to industrial supply chains, these systems are able to compensate the loss of even larger parts of their colony quite fast and without complex management decisions.

The objective of the research is to identify different collaboration scenarios in nature and to describe the principles how these systems guarantee their serviceability. One part of the research is to develop a generic model to describe and compare different collaboration scenarios including nature and industrial based systems. In a second step, the identified mechanisms should be discussed regarding the chance to transfer them to industrial cases.

Research question

What are existing collaboration principles in nature and how do these systems ensure their serviceability in case of lacks or black-outs? How could industrial supply chains learn from these principles to establish robust supply chains?

Expected methodologies

Modelling languages to model collaboration principles

For further information on the application procedure please visit our website at http://www.logistics-gs.uni-bremen.de/

Universität Bremen