

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.

Principles to Establish Flexible Logistics Networks in Dynamic Production Environments

Abstract

Customised products and low batch sizes are the today's challenges for industrial production. The economic crises 2009 demonstrated that there is a paradigm shift regarding the desired flexibility in production. In the past, flexibility was understood as the ability of a production system to increase the produced units and to provide the necessary logistics capacity. Now we learned that production and even logistics systems are not able to deal with a large decrease in shipments on turbulent markets.

Logistics has to be seen as service function to fulfil the demands of both consumers and the production systems. This means that logistics capacities need to be flexible and adaptive according to the current market need. Especially the ability to provide efficient resources in case of low batch sizes are a main challenge in this context. Logistics is based on long-term operating infrastructures providing fixed capacities. The question is how logistics resources can be combined to be able to realise the appropriate capacity in an efficient way.

The objective of this research is to identify principles how logistics entities can be combined to fulfil any capacity need in an efficient way including the extreme situation of one piece flow along the supply chain. The following approaches should be considered:

Collaboration opportunities: All transport modes should be considered in this context, including new approaches such as consideration of private passenger/goods traffic integration.

Transition of logistics resources to dynamic capacities: Most of the logistics infrastructures require a fixed minimum capacity to be efficient. Principles to increase the range of possible capacities of a certain resource have to be identified.

Life cycle of logistics resources: In general, the life cycle of logistics resources and infrastructures (trucks, airplanes, ships etc.) have very long usage phases. This is in opposite to the dynamic change of the need for those resources. It has to be identified how the life cycle of logistics resources and infrastructures can be designed in a flexible way.

Research question

What are principles to increase the flexibility of logistics infrastructures regarding the provided capacities? What are collaboration/integration chances of all traffic modes including the private passenger traffic to realize one piece flow in a supply chain?

Expected methodologies

- Definition of collaboration principles
- Modelling of dynamic logistics resources
- Life cycle models for logistics infrastructures

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