

Department of Industrial Engineering & Management

Dyadic design of interoperable relationships in LARG Industrial Ecosystems

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Objectives

- To develop an Axiomatic Design (AD) based methodology that describes how to set up a seamless business cooperation, assuring high levels of interoperability.
- To use the latest advances in Business Interoperability to develop a broad perspective of business relationships involved in four kinds of coordination mechanisms: supply chain management (SCM), relationship management, innovation and outsourcing partnerships.
- To test and validate the methodology using simulation and in companies.

Methodology

- A research was conducted on the Business Interoperability findings, in order to determine the Business Interoperability Parameters (BIP) required to establish any kind of cooperation. Further investigation will concentrate in linking these BIP's with the context of business where is applied.
- A methodology is being developed to design cooperation using a case study approach. A interoperable self-supported reverse logistics management system was designed using AD (Fig.1, Fig.2 and Fig.3).
- Test and enhance methodology using Markov Monte Carlo simulation.
- Further work will act on findings from the developed case studies and compiled into a management methodology.

Expected Results

- This research is expected to provide a management tool to help companies set up business cooperation incorporating strategic, operational and information technology parameters to guarantee high levels of interoperability.
- With the case study approach in known SCM situations it is expected to distinguish between the interoperable design approach from the regular approach, to study the improvements that one can achieve in business cooperation establishment and management.

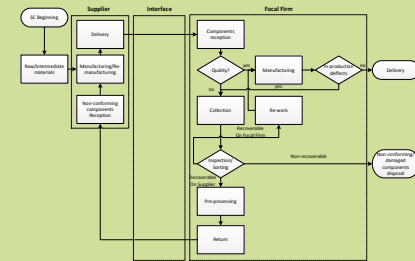


Figure 1. Self-supported RL activities.

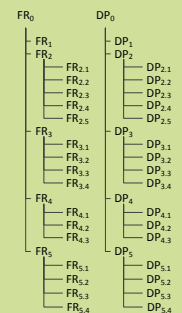


Figure 2. The RL system architecture.

	DP1	DP2	DP3	DP4	DP5	DP2.1	DP2.2	DP2.3	DP2.4	DP2.5	DP3.1	DP3.2	DP3.3	DP3.4	DP4.1	DP4.2	DP4.3	DP5.1	DP5.2	DP5.3	DP5.4	
FR1	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR2	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR3	X	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR4	X	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR5	0	X	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR2.1	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR2.2	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR2.3	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR2.4	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
FR2.5	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0
FR3.1	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0
FR3.2	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0	0
FR3.3	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0	0
FR3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0	0
FR4.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0	0
FR4.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	0
FR4.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0
FR5.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0
FR5.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0	0
FR5.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	0
FR5.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X

Figure 3. Design matrix of self-supported reverse logistics between a focal firm and a 1st tier supplier.

Funding: