

Themen Bachelorarbeit FSS 2018

Literaturrecherche

Thema 1: Quality-dependent Used-Product Acquisition

In recent years, many companies have emerged which buy used products in order to process and re-sell them. Used products can exhibit considerable quality differences which is why it may make sense to first determine the product conditions (through testing/grading) and then to offer product holders a quality-dependent acquisition price for their product. The goal of this thesis is to give a well-structured overview of the scientific literature that is concerned with the grading of used products before their acquisition.

Thema 2: Principal-agent models in reverse/closed-loop supply chain management under asymmetric information

Different activities as the collection of used products, the reprocessing, and remarketing are dispersed over multiple reverse supply chain members which have private information. To overcome resulting incentive conflicts, supply chain members can offer contracts to other members. The investigation of such contracts is often based on principal-agent theory. The goal of this thesis is to give a well-structured overview of the scientific literature that is concerned with contracting in reverse/closed-loop supply chains under asymmetric information based on principal-agent theory.

Thema 3: Incomplete Contracts

Past research on inter-firm interactions has centered on the role of contracts in achieving mutually efficient outcomes. Many of these studies have advocated the use of complete contracts that specify a particular course of action for each possible future contingency. In reality, such complete contracts are virtually impossible to implement—therefore practice relies heavily on so-called incomplete contracts. The primary purpose of this thesis is to give an introduction to the theory of incomplete contracts. In particular, the thesis should outline how incomplete contracts effectuate desired outcomes, what are their advantages and disadvantages, and when they should be applied, and when not.

Thema 4: Hierarchical Production Planning

Widely used Advanced Planning Systems, as provided by software vendors such as SAP or Oracle, rely on the philosophy of Hierarchical Planning (HP). In the production domain, Hierarchical Production Planning (HPP) divides the overall production planning problem into a mid-term (tactical) problem and a short-term (operational) problem and solves them successively. The two models used to solve these problems are neither solved completely independently of each other nor simultaneously as a monolithic integrated model. Instead, a balance between these two extremes is sought, following the ideas of anticipation, instruction, and reaction (see Schneeweiss, 1995). However, finding such balance is not an easy task. The first goal of this thesis is to present the concept of HPP, identifying the benefits and problems arising from its implementation. The second goal of the thesis is to identify different approaches developed to integrate mid-term and short-term production planning models, explaining their advantages and disadvantages.

Thema 5: Supply Chain Risk Management

Supply chains of global companies are vulnerable to many different types of risks. Given their size and complexity, even though disruptions might hit one specific part of the supply chain (SC), their consequences are felt along the entire SC. Moreover, the nature and magnitude of these disruptions are very hard to forecast/anticipate, and they can have very serious effects for the company. Supply Chain Risk Management (SCRM) is therefore extremely important for any company that wants to remain healthy and competitive in today's business environment. The aim of this thesis is to identify and classify the risks faced by global SCs, as well as presenting the techniques to assess and mitigate them found in the literature.

Thema 6: Stochastic Programming in supply chain planning problems

Stochastic programming (SP) is a well-established approach for modeling mathematical programs in which some of the input parameters are not known with certainty (see Birge and Louveaux (2011)). Deterministic models either assume that all parameters are known with certainty or use expected values as estimates for uncertain parameters, while stochastic programs explicitly model uncertain parameters as random variables, which

follow a known probability distribution. The first goal of this thesis is to present the methodology of SP, comparing it to other approaches developed in the literature to deal with uncertainty. The second goal of this thesis is to perform a thorough literature review of the applications of SP in supply chain planning settings.

Thema 7: Inventory control for perishable products

Most inventory models assume that inventory can be stored indefinitely to meet future demand. However, certain types of products, such as food, deteriorates in storage and may no longer be fit for consumption after a certain time. The goal of this thesis is to review the scientific literature on inventory control for perishable products and to classify the state-of-the-art approaches.

Thema 8: Revenue management with flexible products

This thesis should provide a literature review on revenue management of flexible products. Flexible products are menus of alternative or substitute products offered by a supplier in a booking process. Customers who buy flexible products do not know which specific alternative will be assigned to them. The supplier assigns each order to one of the alternatives at a time towards the end of the booking process, once most of the demand has realized. This allows supply-side substitution between resources and can help to maximize overall revenue and capacity utilization when demand is uncertain.

Thema 9: Digitalization in supply chain management

Digitalization is a widely publicized current trend in supply chain management. The digital transformation affects numerous supply chain processes and even the design of a supply chain as a whole. Yet many companies are struggling to identify the specific impact and potential of digitalization for their supply chain. At the same time, research on digitalization in supply chain management is fragmented, addressing a multitude of disparate aspects. Against this background, the goal of this thesis is twofold. First, it should summarize and structure the different constituents of supply chain digitalization. Second, it should discuss, based on academic literature, the impact of these elements on supply chain management.

Thema 10: Supply chain organization

Supply chain management is concerned with managing end-to-end product flows in order to match supply with demand. Companies use different organizational structures for this supply chain function. These include, for example, centralized corporate supply chain organizations versus decentralized supply chain organizations within different business units or in different markets. The goal of this thesis is to review the scientific literature on organizational structures of a company's supply chain function. The review should identify common structures and discuss their advantages and disadvantages. In addition, the literature review should be complemented with real-life examples through a small exploratory study.

Explorative Studie**Thema 11: The recommerce business for electronic equipment in Germany**

The business field of recommerce is characterized by the acquisition, re-processing, and re-selling of used products. Among other things, those firms apply a quality-dependent online acquisition process for their supply. The goal of this thesis is to characterize the business field of recommerce in Germany with regard to its main properties. Questions that shall be clarified are e.g.: What kind of reprocessing is involved? Is the reprocessing outsourced or executed in house? What are the main remarketing channels? What other acquisition channels are there besides the online channel? This investigation shall be based on an explorative field research, e.g. web search, interviews, etc.

Thema 12: Capacity Allocation & Emission Trading

A central concern of many companies is how to distribute access to scarce capacity to the different business units that require capacity. Oftentimes, fierce battles for capacity access lead to a severe overstating of the real demand from the business units, which ultimately leads to an inefficient allocation decision. One potential pathway to mitigate this issue is to introduce an internal capacity exchange, where access rights can be traded. This approach is quite similar to the current implementation of emission certificates in the EU. Therefore,

this thesis should investigate the similarities and differences between the two settings and outline how such an internal capital market for capacity could be implemented. Special focus should be given to existing trading mechanisms that are already in place for trading emission certificates.

Thema 13: Big Pharma and the Biotech Landscape

Due to skyrocketing costs, large pharmaceutical companies more and more refrain from engaging in early stage drug development processes, but instead procure new molecules (i.e., future candidates for drugs) from small biotech companies. This shift in big pharma's R&D process has given rise to a huge ecosystem of small and medium-sized biotech companies whose sole ambition is to sell their molecules to larger companies. This thesis should give an overview of the most recent trends in the pharmaceutical R&D process, and present data on current and future (supply) market structures. The goal is to understand for which kind of molecules big pharma companies are willing to interact with small biotech companies, and for which type of molecules traditional in-house drug development remains the preferred option.

Thema 14: Supply chain management and corporate social responsibility

Corporate social responsibility (CSR) refers to the responsibility of an organization for the impact of its activities and decisions on society and to a commitment to sustainability. Supply chain management (SCM) decisions affect many of a company's stakeholders. Therefore, SCM is an important lever for implementing a CSR strategy. The goal of this thesis is to review the scientific literature on the role of SCM in CSR. In addition, it should support its conclusions with illustrative real-life examples.

Quantitative Analyse

Thema 15: Data Driven Supply Chain Analytics

Data driven supply chain analytics are rapidly gaining popularity, given the ever growing capabilities of digitalization. This thesis is meant to explore approaches to data-driven supply chain analytics, based on a freely available commercial software. As an application, the tool will be used to analyse data from a competitive supply chain simulation. The corresponding dataset will be provided. The goal of the thesis is twofold. First, it should provide a systematic overview of data-driven approaches to supply chain analytics and review corresponding literature. Second, it should apply these approaches to gain insights

into the dynamics of the aforementioned supply chain simulation and reveal crucial success factors.