FAKULTÄT FÜR BETRIEBSWIRTSCHAFTSLEHRE
Lehrstuhl für Allgemeine BWL und Logistik
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UNIVERSITY OF MANNHEIM
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Themen der BWL Bachelorarbeiten FSS 2021

Literaturrecherche

1.) Blockchain Technologies in Supply Chain Management (German or English)

Blockchain technologies are mostly associated with the cryptocurrency bitcoin. However, their applications go far beyond. The ability to create transparency and trust, while saving time and money by automating processes makes them interesting for several fields. The goal of this thesis is to review the literature on blockchain applications in supply chain management. It should give a structured overview of problems in SCM that can benefit from blockchains and critically discuss how the use of this technology can help overcome these issues. Additionally, already existing approaches should be reviewed as well as the challenges that come with implementing them.

2.) Integrating emission-reduction in last-mile delivery planning (German or English)

The global demand for online delivery services is increasing, and the last mile, i.e. the delivery of ordered goods to customers, is a crucial part of the demand fulfillment process. However, last-mile delivery is considered the least efficient part of the supply chain, posing a major challenge for operations management. At the same time, increasing demand is leading to an increase in delivery activities, which is a major factor in traffic and pollution. Therefore, and because of increasing public pressure, emission-reducing measures are becoming more relevant and, in some cases, even mandatory (e.g. carbon taxes, diesel driving bans, car-free zones).
The aim of this thesis is to identify and classify existing approaches that adapt to this development and integrate emission-reducing measures into last-mile delivery planning. The classification is to be based on the planning horizon, i.e. strategic, tactical and operational planning. Relevant approaches can range, for example, from environmentally conscious delivery concepts to the integration of emissions-related goals into tactical or operational decision-making. In addition, the student should present implications for traditional cost efficiency measures.

3.) Multi-objective supply chain planning for the global supply chains of agrochemical industries (English)

Many typical agrochemical industries have complex supply chains due to their global supply networks, large product portfolios, production's interdependencies for product families, and uncertain demand markets. All these factors increase the complexity of supply chain planning and challenge its performance improvement. This research is structured in three stages. First, the goal is to find the challenges in the supply planning of agrochemical supply chain in a holistic view. The second is to classify different criteria (KPIs) and the tradeoff between them for analyzing supply chain performance, and finally to have a structured review on the literature in agrochemical supply chains to propose possible improvement in those performance criteria by supply chain planning tasks in the strategic, tactical, and operational level.

4.) **Big Data Analytics in Supply Chain Management (German or English)**

The efficient use of the ever-increasing amount of data has become an important factor in optimizing business operations. Hence, there is a huge amount of papers being published dealing with the question of how to incorporate available data in the decision-making process. The goal of this thesis is to review the literature on big data analytics in supply chain management and give a structured overview of the current state of the art in this field. Particularly, the following questions should be answered: In which SCM fields has big data been used so far? Which fields are still missing, and is there an apparent reason for this? What are the main methods used, and how do they perform compared to traditional methods? What are the advantages and disadvantages?

5.) Planning approaches for warehousing operations in online retail (German or English)

The online retailing market is booming and is expected to reach a market share of 22 percent of the worldwide retail sales by 2023. One big advantage of online retail, compared to traditional stationary retail stores, is the provision of continuous and instant access to a huge assortment right from the customer's home. However, this service promise also poses great challenges for order fulfillment operations which have caused many online retail initiatives to fail. One of these challenges lies in the field of warehousing, i.e. the planning of efficient picking, sorting, and packaging of the ordered goods.
The aim of this thesis is to elaborate on the current status of scientific research on planning approaches for warehousing operations in online retail – including strategic, tactical, and operational planning problems. The student should give a well-structured overview of relevant scientific literature and identify research gaps and future research directions.

6.) **Balancing in Bike Sharing Systems (German or English)**

Due to the ongoing mobility shift, bike sharing systems have emerged in almost every major metropolitan region. For example, one large local provider, based in the Rhine-Neckar transport association is VRNnextbike. To ensure that the stations are not completely overloaded with bikes or completely empty, a regular redistribution of bikes takes place.
The goal of the thesis is to provide an overview of the literature dealing with balancing of bicycles within such bike sharing systems. First, it should be discussed why this is a relevant problem in this industry and which approaches have been developed to solve this problem. Then, the different approaches should be classified and compared.

7.) Carbon leakage and emission displacement (English)

With the increase in public attention towards climate change in the last decades, many global and regional climate goals are set to reduce the emission of greenhouse gases (GHGs). Despite such global efforts, the actions remain firmly in the hands of states who try to achieve their own national goals by implementing emission reduction mechanisms. In this environment, reliable methods are needed to ensure that emissions reductions on a national level are not offset by carbon leakage and emission displacement.
The goal of this thesis is to give a thorough introduction to the topic of carbon leakage and emission displacement and show its relevance by bringing up information about the scope and magnitude of this phenomenon, and to then provide an academic literature review on the topic with regard to global supply chains and to work out the difficulties that emerge in designing emission reduction mechanisms.

8.) Extensions of the newsvendor model (English)

The newsvendor model (NVM) is one of the most famous inventory management models. The classic NVM applies to settings in which there is a single opportunity to produce/order a product before a limited single selling season with uncertain demand. Many real-world settings meet some but not all the assumptions of the classic NVM, making it difficult to directly apply the model for decision-making. Moreover, the classic NVM neglects many aspects of the real-world inventory problems faced by companies. The goal of this thesis is to provide a literature review on extensions of the classic NVM which improve its practical applicability.

9.) Managing supply chain disruption risk (English)

Supply chain (SC) disruption risks include operational risks and risk arising from natural hazards, terrorism, and political instability (Kleindorfer and Saad, 2005). A recent example of such disruptions is the Covid-19 outbreak, which has stressed the importance of disruption risk management for SCs. The goal of this thesis is to review the literature on SC disruption risk management. The focus of this literature research should be on studies which provide clear managerial guidelines to manage disruption risks based on mathematical models.

References: Kleindorfer, P. R. and Saad, G. H. (2005). Managing Disruption Risks in Supply Chains. Production and Operations Management 14(1), 53–68.

Explorative Studie

10.) Covid 19 pandemic impact on the operations of supply chains (English)

The aim of this thesis is to, first, collect relevant information from non-academic sources, i.e. expert interviews, webinars, consulting companies' reports, documenting the impact of Covid 19 pandemic on the operations of supply chains in the general field of operations management (OM). The thesis should then classify them according to different OM research streams. Finally, the thesis is supposed to give a qualitative conclusion specifying which areas were hit the worst and what potential remedies and paths for future work are suggested by the industry experts.

11.) Integration of drone technology and crowdsourcing for last-mile delivery (English)

The "last-mile delivery" as the last part of the supply chain is considered to be the most inefficient, costly, and polluting activity of the supply chain. Transportation for the last-mile delivery is 28% of the total transportation, and accounts for 40% of CO2 emissions. Spatial distribution and small size of shipments in last-mile delivery lead to the use of small vans rather than higher capacity trucks. So, the carbon footprint per kg is higher. Due to the inefficiency of the traditional last-mile delivery, new solutions by integrating new technologies such as drones and autonomous vehicles are considered as research trends in this field. Using UAVs or drones as an alternative to traditional delivery is being promoted by many companies such as DHL, Amazon, and Google. However, from an operational perspective, there are some limitations in utilizing drones, including limited capacity, battery charging, and limited flight range. This research aims to collect recent research studies and to propose a conceptual model for taking advantage of crowdsourcing to resolve the operational limitation of drone utilization.

12.) Same-day delivery in online retailing (German or English)

One of the trends in online retailing is decreasing delivery lead times. In particular, several players are now offering same-day delivery. While a short response time may be attractive to customers it also poses significant challenges for the retailer's fulfillment process. The goal of this thesis is to explore and discuss same-day delivery in online retailing. To this end, the thesis should first describe the current market situation, identifying relevant players and their delivery offerings. It should then proceed to analyze implications of same-day delivery both for customer demand and for the planning and execution of the fulfillment operations. The analysis should be based on both empirical evidence and the academic literature.

13.) Supply chain management for decarbonization (German or English)

Reducing emissions of greenhouse gases, notably CO2, is a key focus in the fight against climate change. Many countries are in the process of setting corresponding reduction targets. The goal of this thesis is to investigate the role of supply chain management in the quest to achieve these targets. To this end, the thesis should identify relevant levers in the domain of supply chain management that affect a company's greenhouse gas emissions. It should then discuss potential underlying trade-offs and review corresponding planning models in the academic literature.

Quantitative Analyse

14.) Sensitivity of the Newsvendor and EOQ Model (German or English)

Two of the most fundamental inventory models are the EOQ and the Newsvendor model. While the EOQ model tries to balance ordering- and holding costs under deterministic demand, the newsvendor's goal on the other hand is to achieve a balance of lost sales and leftover inventory under uncertain demand. The results and quality of both models depend on several parameters that are unknown, a priori, in reality and thus have to be estimated. This entails the risk of misspecifications. This thesis should numerically investigate the sensitivity of both aforementioned inventory models with respect to wrongly specified parameters ((expected) demand, costs…) and suboptimal decisions. For this purpose, the fundamental theory behind both models should be explained with the help of relevant literature, including a discussion about the issue of unknown parameters and their estimation. Subsequently, both solution approaches should be implemented in order to carry out a numerical sensitivity analysis. The sensitivities of both models should then be compared and discussed.

15.) Inventory Management under Demand Uncertainty (English)

The introduction of demand uncertainty significantly complicates the decision-making process of inventory management (IM), and if handled poorly can in turn lead to either high costs or low service levels for a company. There are many different approaches for managing inventory under uncertain demand. However, a group of such approaches are more popular and have proved to be both sufficiently simple and cost/service-effective at the same time. Among these are, the (s, Q) and (s, S) policies as continuous review systems and the (R, S) and (R, s, S) policies as periodic review systems of inventory management.
The goal of this thesis is to develop a numerical study for a fictitious case of inventory management, i.e. using Microsoft Excel (or similar software), in order to compare the performance of different IM systems in the face of changing uncertainty patterns for multiple product groups. Moreover, and based on the obtained results, a summary stating pros and cons of these approaches should conclude the thesis.