Improving supply chain performance

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Impact of the Thesis

In this thesis we study two lines of work, first the order picker routing problem in a warehouse, and second, the multi-commodity network design problem. Both problems play a pivotal role in shaping operational efficiency, customer satisfaction, cost reduction, and ultimately, an enhanced supply chain performance.

From an economical perspective, using the proposed models and algorithms can improve the efficiency of warehouse and distribution center operations, which can contribute to economic growth and development. Another economical outcome of this thesis is that the proposed models can result in an increased competitiveness for different logistic businesses This can benefit society by promoting innovation and economic growth. One of the social benefits of this thesis is improving the working conditions for warehouse and distribution center employees. This can improve job satisfaction and employee retention. Moreover, the proposed models in this thesis can result in a better resource allocation in warehouses and distribution centers which can help organizations allocate resources more effectively and make better use of their labor force.

As a take-away from this thesis, our proposed models and algorithms in the field of supply chain optimization can bring benefits to researchers by helping them working on these problems to develop new mathematical models, algorithms, and software tools to solve them. These innovations can lead to improvements in supply chain management and logistics, as well as new business opportunities for companies in the industry. In an industrial perspective, the current research can help improving the efficiency of warehouse and distribution center operations, resulting in reduced costs, improved delivery times, and increased customer satisfaction. This can benefit

both the industry and society by increasing customer loyalty and promoting economic growth.

Moreover, improving supply chain performance in the fields of order picking and service network design can result in increased industry profitability, enhanced customer satisfaction, and a market advantage. Moreover, our proposed algorithm could be easily integrated in existing warehouse management software, and it would help companies to rely on higher-quality solutions (optimal) for a realistic problem size resulting in a very fast and efficient delivery system. To do so, some additional steps are needed to put our results into practice, such as designing a new software, prototyping, programming, marketing etc.

In addition to all the results and contributions to the literature, achieved by this thesis, our approaches for the studied problems are versatile in the sense that they can be used in combination with other approaches to help improve the further research or initiate further research on their respective problems.