



MIT SCALE RESEARCH REPORT

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This reprint is intended to communicate research results of innovative supply chain research completed by faculty, researchers, and students of the Global SCALE Network, thereby contributing to the greater public knowledge about supply chains.

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Research Report: ZLC-2009-7
European Distribution and Warehouse Review
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European Distribution and Warehouse Review

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EXECUTIVE SUMMARY

The company that originated this study is a very important player of the international oil services industry, operating in 80 countries around the world. With a significant investment in R&D, a sizeable amount of the goods that go through the supply chain are developed in-house; the goods are highly specialized and sophisticated and consequently are valuable both for the Company and the customers. These characteristics require a very large network of logistics facilities. To manage this complex system The Company uses both owned and outsourced resources to manage the goods and information throughout its supply chain.

This thesis focuses on the analysis of the current distribution and warehouse network for maintenance, repair, and operating supplies (MRO) in Europe to determine whether total costs in the network can be reduced and what changes in the supply chain of The Company should be made to optimize its total logistics costs.

Approach to the problem:

Data gathering: The first step was to gather actual data from The Company. The data provided included up to one year's information from The Company's European orders.

Data Analysis: An analysis of the MRO orders was made to assess the possibility of improvements in the ordering policy and the development of an optimization model.

Optimization model: The current decentralized distribution and warehousing network in Europe was evaluated with a mathematical optimization model developed using ILOG-CPLEX software. Then, several scenarios using different transportation costs were evaluated. By far, transportation cost is the most important variable in the study.

Findings analysis: Based on the results of the model, a reconfiguration of the current warehouse network was proposed as well as a reclassification of orders, based on the results of the analysis. Also, the feasibility of the application of cross-docking for the European network was analyzed, based on the characteristics of the products and routes that The Company has, compared with the characteristics of cross-docking in the literature. Finally, further recommendations were made about the possibility of outsourcing logistics processes, implementing new ordering policies and developing a specialized logistics IT system.

Findings:

Ordering policy analysis: The Company classifies its orders as standard and urgent. The latter are 39% more expensive than the former. Last year, 27% of the orders were urgent. By reclassifying the most frequent urgent orders as standard, The Company could save about €1.1 million.

Centralization: According to the results provided by the optimization model, by centralizing the warehousing network, The Company could save about 20% of its actual logistics costs, i.e. almost €0.5 million. Up to 48% of the total annual weight can be centralized in three locations: Bremen, Germany, Coevorden, Netherlands, and Szeged, Hungary.

Key recommendations:

Centralization: This process not only directly benefits the current ordering systems, but could also benefit The Company by increasing the percentage of standard vs. urgent orders due to Risk-Pooling effect that can enable keeping more items in storage in the central warehouses. This can also be extended beyond MRO to include other supplies such as safety equipment and office consumables, among others.

Cross-docking: This is not recommended for the European network, given the relatively low frequency of the products and the high dollar value of most of the items transported. Cross-docking is more suitable for low monetary value products with very frequent replenishments.

Outsourcing: The final warehouse network should be kept in-house in order to maintain control of the operations. However, outsourcing could be more attractive at first sight due to economic benefits, given the small portion of the logistics costs that it represents, according to the results obtained from the optimization model. Nevertheless, transferring the warehouse operation to a third party could risk exposing The Company's intellectual property. These risks could cause it to lose business, and in an extreme case, endanger The Company's sustainability in the long-term. Therefore, the in-house option is kept as the best.

IT Systems: Developing and implementing a specialized information system is essential for supply chain management. This could help The Company have a better coordination in the value chain. Finally, a supply chain information systems could also help The Company to keep this mathematical model updated, thereby enabling it to make more accurate decisions about its warehouse networks design.

Conclusions:

The findings and recommendations from this research could be extrapolated to other scenarios in the same or other geographic areas of The Company. This research can also be complemented with further studies on demand forecasting for MROs of The Company, lead time minimization, and keeping safety stock at optimum levels. This would ultimately help The Company achieve better results in controlling holding and labor costs.