The future inventory control method that should be applied at Duni Group is coordinated inventory control

The importance of efficient inventory control of supply chains has increased during the last decades. Efficient inventory control can contribute to improve the competitiveness of a company, where the objective is to minimize the total costs of inventory while simultaneously meeting customer requirements. This thesis was conducted at Duni Group where they seeked guidance on the most suitable method to control their inventory. Recent research has discovered that the use of coordinated inventory control can decrease the inventory levels while still being able to maintain customer service requirements. Hence, this thesis investigated if this was the case for Duni as well.

Duni is a swedish founded company with HQ in Malmö and operates within the industrial sector that supplies tabletop concepts i.e. napkins, table covers, candles and meal packaging mostly B2B. The products are single-use, low-valued products and available in more than 40 markets across the world (Duni, 2020a). Duni is facing large changes regarding their global supply chain, where improvements of inventory control are necessary. The overall objective has been to provide guidance to Duni and analyze the advantages of using coordinated or uncoordinated inventory control in a new future supply chain structure. Broadly described, uncoordinated control refers to optimization of inventory without regard to the interdependence between inventories in the supply chain while coordinated control takes this interdependence into account (Axsäter, 2015). Furthermore, Duni seeked guidance on how the inventory control would be affected by changing the location of their central warehouse or implementing a consolidation point. This was illustrated by changing the lead times and reducing the batch sizes.

In order to determine the most optimal inventory control method for duni two mathematical models were used - an analytical model and a simulation model. Both models were developed and validated from *Production Economics at Lund university, Faculty of Engineering*. The result showed that the most appropriate inventory method for Duni to apply in a new future supply chain structure was coordinated inventory control. This since the method best fulfilled the objective to meet end customer service requirements with as little inventory as possible. However, the benefits with reducing inventory levels and hence tied up capital could not be explicitly determined due to the fact that the model was not able to render results that actually meet the predetermined customer service requirement for all items.

The result also showed that stock should be reallocated when lead times changed, which was expected and in alignment with theory. No improvement in the model performance could be determined. Furthermore, when the batch sizes were adjusted, the analytical model was able to improve the performance. Thus, the final recommendation to Duni was to apply coordinated inventory control but consider if the batch sizes can be reduced. However, as the model seemed to have problems in fulfilling the service requirements further research could be to investigate if there exists other distributions that can be more suitable to approximate end customer demand with. This is one major reason for why the model undershoot target fill rate was that the demand had a large variation in order sizes compared to its mean.

This thesis project has contributed in two ways. Firstly, by conducting the research with real data from Duni, the result has increased Dunis understanding within the area of coordinated inventory control. Secondly, the master thesis project has also contributed to existing research within the area inventory management by testing existing inventory models and thus evaluating factors that may affect model performance.

Author: Mirja Björning and Johanna Rådemar
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University: Lund university, Faculty of Engineering