



# Forming an Inventory Policy and Forecasting Model for an E-commerce Company

## A Study at LSBolagen

Patrik Lorentsson &  
Nilan Nabavieh

Department of Production Management  
The Faculty of Engineering, Lund University

*Increasingly competitive business environments forces companies to develop better control of the material flows in their supply chain. Inventories are often kept in large amounts in order to buffer against uncertainties, resulting in high average holding costs. An important part in controlling this flow of material and inventory is to decide upon when to order and how much. Two important components when evaluating these two, is the inventory policy used as well as the method of forecasting. This article presents the development of an inventory policy and forecasting model for the e-commerce company LSBolagen, that operate within these circumstances.*

### Background

LSBolagen is an e-commerce company with web sites in the Nordic countries, the UK, Germany and France. Their office is located in Ängelholm, Sweden, with approximately 30 employees (as of 2018). They are specialised in durable goods and retail products such as wine cabinets, large range cookers and table tennis products. The main goal of LSBolagen is to deliver their range of products to all of Europe with short lead times and low cost.

LSBolagen is a growing company with a turnover of 100 MSEK in 2017. Their present business model involves purchasing products from China. One warehouse is located in Klippan, Sweden, and another in the UK, rented through a 3PL company. These warehouses distribute the products to customers in the European region.

### Purpose

The purpose of the master thesis is first to analyse the current purchasing process and inventory policy used by the company, then to propose and evaluate an improved inventory and forecasting policy adequate for the company's operations. The thesis answers the following research questions:

- RQ 1. How can the inventory policy for the warehouse in Sweden be improved?
- RQ 2. What is an adequate forecasting model for the purchasing department?

### Methodology

The research approach in this thesis was based on the literature of Hillier & Liebermann (2001), with their Operations Research (OR) framework.

The research quality of the thesis followed the literature of Yin (2009), by testing certain logical tests for validity and reliability.

The data has been collected for conducting quantitative analyses. Data regarding sales, procurement, lead times and item master data has been collected through the available Enterprise Resource Planning (ERP) system at the case company. Inventory data has been collected from their separate Warehouse Management System (WMS).

The main theory used to construct an inventory policy and forecasting model in this master thesis was from the literature "Inventory Control", written by Axsäter (2006).

## Results

For RQ 1, a simple inventory policy could be constructed. Lack of historical data and previous analysis meant that an exact representation of the current situation could not be constructed, and approximations had to be made. The demand could be approximated to follow a normal distribution. As the company currently orders in batches, a continuous review (R, Q) policy was chosen. A retrospective test was conducted to see how the constructed model performed according to the past years sales data. This result was then compared to the performance of the company's current inventory policy. It was found that the inventory levels could be decreased in almost all cases when setting a 95 % fill rate constraint.

In order to answer RQ 2, three Alternative Forecasting Application Models (AFAMs) were programmed in Excel. These AFAMs were constructed for the theoretical forecasting models: moving average, simple exponential smoothing and exponential

smoothing with trend. With these software application models, the company can themselves apply and evaluate the different forecasting models. The different AFAMs will aid the company in adjusting, evaluating and comparing each forecasting method, as well as forecasting future demand.

Unfortunately, the data was not sufficient to evaluate and compare the performance of the different forecasting models. However, when more demand data becomes available, the AFAMs can be applied in order to find an adequate forecasting model for the company.

## Summary

This thesis applies existing scientific theories and approaches to construct an inventory policy and forecasting model for an e-commerce company.

The models and methods are based on fundamental theory within inventory control and demand forecasting. Even though the models are developed for the case company, their applications can be implemented to other companies operating within and outside e-commerce environments.

## References

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