Summary

Inventory management is a key component in the modern supply chain and is used to optimize service levels, while at the same time minimizing the cost of keeping stock. Several forecasting techniques can be used to aid in the decision making regarding *when* inventory should be replenished. This research will compare different forecasting techniques by experimenting on a self-developed simulation model of an inventory control system. These techniques will be compared on a quality- and cost basis.

A literature research has given insight into the various forecasting techniques, of which nine are selected for this research. It seems that the forecasting techniques are linked to certain demand models, which include a mean demand, demand error and, optionally, a trend and/or seasonal effect. As inventory control model, the Economic Order Quantity (EOQ) model is selected, as it is basic and sufficient to determine with *how much* the inventory should be replenished.

After acquiring the theoretical knowledge, the simulation model is described. The system requirements are first described in terms of performance indicators and model in- and output. The key performance indicators are the Average Total Cost per day of keeping inventory and the Mean Absolute Deviation and mean Square Error of the forecasts. Next, the outline of the model is basically described in the conceptual model which is the first step of implementation. The second step is a more in-depth description of the model, in so-called Process Description language (PDL).

To build the model, the system description is translated into Pascal language in the Delphi programming environment. A graphical user interface is created to assist the program's user to provide the required input for the model. The next step is to verify the simulation model. Every element of the model is verified by different tests, e.g. comparing it to hand-made calculations.

In order to significant results, an experimental plan has been made which produces input parameter sets for four different input types, thus creating a total of nine different experiments. Furthermore, the minimal simulation runtime for valid results is determined and chosen to be two years.

After execution of the experiments it can be concluded that the relationship between quality of the forecasting technique and average cost of the inventory control isn't identifiable. In most accounts, the forecasting technique with the lowest mean square error doesn't produce the lowest cost. It is therefore advised that optimization of inventory control is aided by a simulation model alike the one presented in this report, in order to find the forecasting technique which is most fit to minimize cost.