Standard deviation and safety stock analysis on Morrisons Plc.

Executive summary

This project successfully analysed and increased the understanding of standard deviation and safety stock. The project experiments on different standard deviation and safety stock calculation. Besides that, it also tried to understand the standard deviation provided by the new system on Morrison and make a comparison with the other calculation method. Furthermore, a propose safety stock calculation method from the new system is also analyzed and compared with the theoretical calculation method.

Challenge overview

Morrison has around 25,000 products and has around 400 stores in the UK. Morrison has a plan to change their system to Oracle enterprise resource planning (ERP) system. Two of the modules, which are prepared for the migration of the system, are Retail demand forecast and Advanced inventory planning. By using both package Morrison can calculate the standard deviation and safety stock. Morrison wants to understand the implications on the new system for the standard deviation and safety stock.

The problem

The agreed project objectives were:

- Understand expected standard deviation levels when forecasting across our Frozen categories at different points in time
- Understand the levels of safety stock we are likely to generate by utilizing the Oracle replenishment systems
- Provide recommendations on how we could control the standard deviation fed to AIP at different points in time (e.g. during a promotion) in order to optimize stock levels while protecting availability

The data used on this experiment is an aggregate sales data from all stores that are served from a particular distribution center. The experiments try to calculate standard deviation on different methods. The different method is in term of type of data used and length of the data used. The result then compared to the RDF standard deviation calculation or forecast interval.

Morrison is planning to use a dynamic replenishment method on AIP. In the experiment, the method is being compared with the theoretical safety stock calculation. The performance of the standard deviation and safety stock

The safety stock calculation performance is being measured by the probability of out of stock and the over stock cost and under stock cost due to a certain inventory level that includes safety stock.

Results and achievements

The results of the experiment were presented to the Evolve Team of Morrisons.

- From the analysis it can be concluded that the best method to calculate standard deviation is forecast error and using the last 26 weeks length
- The RDF standard deviation ensures the target service level is achieved. The downside is that the level of inventory carried is too high. It is recommended to use the forecast interval with addition to analyze more on the percentage of minimum cap
- The AIP dynamic replenishment creates more out of stock and increases the cost due to the out of stock. It is recommended to not use the AIP dynamic replenishment.

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