RETAIL STORE STOCK INVENTORY ANALYTICS LITERATURE SURVEY

ABSTRACT

Today's challenging business environment, with unpredictable demand and volatility, requires a supply chain strategy that handles uncertainty and risks in the right way. Even though inventory models have been previously explored, this paper seeks to apply these concepts on a practical situation. This study involves the inventory replenishment problem, applying techniques that are mainly based on mathematical assumptions and modeling. The primary goal is to improve the retailer's supply chain processes taking store differences when setting the various target stock levels. Through inventory review policy, picking piece implementation and minimum exposure definition, we were able not only to promote the inventory reduction as well as improve sales results. The inventory management theory from literature review was then tested on a single case study regarding a particular department in one of the largest Latam retail chains.

KEYWORDS

Inventory, distribution, retail, risk, safety stock, sales, uncertainty.

INTRODUCTION

In a globalized economy, the goal of multinational corporations is to find a more efficient flow of goods and services for corporate or individual consumers. The search for new sources and, the acquisition of increasingly competitive advantages, have been a constant challenge in today's highly competitive world in its marketing, finance, operations, logistics and sourcing. The main challenge for retail managers is to provide items on the shelf, matching replenishment and demand, for several different products on various stores while overcoming out-ofstocks and excess at the same time. As inventory must be allocated optimally across the stores, regarding the total available inventory, supply chain management is a complex task which requires careful planning and execution .

Retail inventory models, when exploited appropriately, lead to significant profits increase once it reduces stock over at stores and ensures customer service level as well as

improves the company's assets and capital expenses. An automated inventory replenishment system recommends order quantities to the store manager every order cycle but, system inadequacy arises because inventory management in a retail store is a complex problem involving many constraints and varying product attributes. For the most part, management's understanding of the effect on safety stocks of uncertainty in lead time is based on an approximation of the demand during lead time using the normal distribution.

The context of our research involves the inventory replenishment problem for products follows with demand rate fluctuation, seasonality, automated ordering system for stores replenishment, lead time variability, periodic delivery, monthly forecast and purchase with occasionally supplier product unavailability. Thus, this paper seeks out to identify inventory procedures and metrics that ensure stores replenishment towards stock reduction.

LIETRATURE REVIEW

The research was carried out using a deductive logic starting from the literature review for a better acquaintance with inventory management theory and the current academic debate. According to [6], a deductive approach is concerned with developing a hypothesis based on existing theory, and then designing a research strategy to test the hypothesis. The deductive approach can be explained by means of hypotheses, which can be derived from the propositions of the theory deducing conclusions from premises or propositions.

The inventory management theory from literature review was then tested on a single case study regarding a specific department of the retail stores' chain. Reference defines the case study approach as a research strategy which focuses on understanding the dynamics presented within single settings through multiple levels of analysis and multiple types of data collection. The inventory management theory from literature review was then tested on a single case study regarding a specific department of the retail stores' chain.

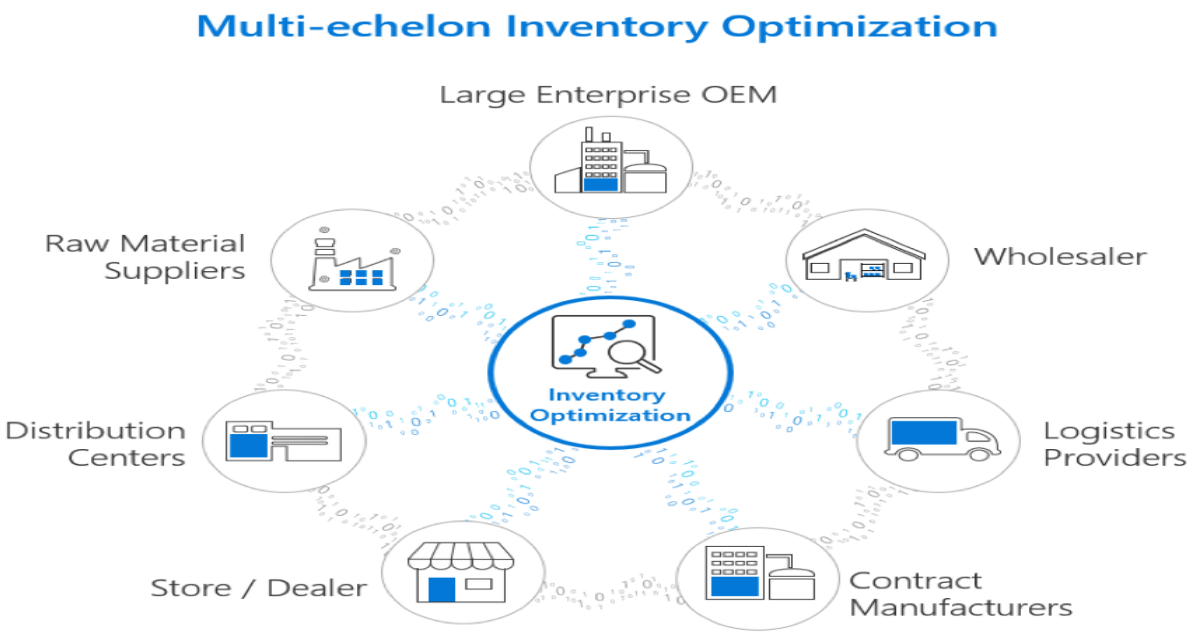
In retailing, a variety of products competes to be displayed in the limited shelf space since it has a significant effect on demands. To affect customers' purchasing decisions, retailers properly make decisions about which products to display and how much to allocate the stocked at the stores.

According to the pressure to reduce inventory investments in supply chains increases as competition expands and product variety grows. In order to do so, managers seek for

inventories reduction without hurting the provided service level. To compensate the increased risk, which is a fruit of the turbulence of recent periods, companies need to develop programs to mitigate and eliminate them. The great challenge of logistics management is to structure a good responsiveness and flexibility to respond to changes in business strategy and impacts generated by external events, while it earns through lean production.

STUDY CASE

The study case department accounts for R$23MM in stock, encompassing 8,500k pieces of 1,123 items. Only 35% of those items are active ones – that still under purchase orders - the others are either suspended or canceled items. For the last three years, the department has shown more than 55 days of coverage, which is not a good KPI when compared to other companies and departments on the same store. Besides that, basic items have more than 50% of absence in the warehouses and 20% at the stores.



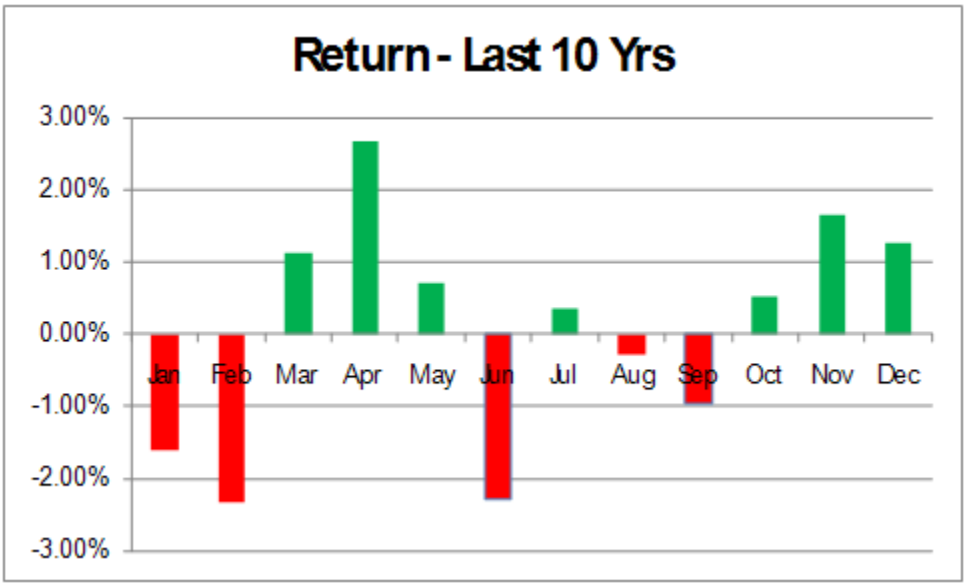
Inventory reference level at each store has been planned accord to;

RL = (LT + COVERAGE)*D+MEXP

where: RL = Reference Level, LT = Lead Time (Service Order + Transportation), Coverage = Number of days planned to ensure product availability, D = Daily Forecast, MExp = Minimum Exposure.

The objective of this phase is to achieve a clear insight in the inventory situation and thorough understanding of the cause(s) of the inventory control problem. To that end, the inventory system needs to be described and analyzed. With regard to describing an inventory system, it is important to obtain a comprehensive description of it. This is to ensure a large amount of factors that might play a part in the inventory control problem are included in the description. We obtained detailed sales and replenishment data from all the stores of the retail chain since 2014. For our in-depth analysis, we selected one department that represented a diverse set of values of selling space and turnover and were considered by the retail chain's management to be well operated and representative of the chain.

Jan	-1.61%
Feb	-2.33%
Mar	1.12%
Apr	2.66%
May	0.71%
Jun	-2.28%
Jul	0.34%
Aug	-0.29%
Sep	-0.97%
Oct	0.51%
Nov	1.66%
Dec	1.26%



Monthly inventory and performance

Resizing the inventory at stores not only reduced the material resource planning requirement, as it also ensures some quantities at the warehouses to promote replenishment at stores with good sales performance.

The aim of our study was to provide insights on how to reduce inventory without affecting product availability, in a practical situation, where business is already running. Using the strategies of inventory review policy, picking piece implementation and minimum exposure definition, we promoted the inventory reduction reflected in the decreasing tendency of the inventory coverage, without compromising the availability of the products and also improved the purchasing and sales.