



MIT SCALE RESEARCH REPORT

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This reprint is intended to communicate research results of innovative supply chain research completed by faculty, researchers, and students of the Global SCALE Network, thereby contributing to the greater public knowledge about supply chains.

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Research Report: ZLC-2009-11
An Analysis of Human Intervention on Inventory Decisions
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An Analysis of Human Intervention on Inventory Decisions

Salomon Daniel Lasry

EXECUTIVE SUMMARY

A one or two percent increase in inventory efficiency can significantly impact a company's bottom line. This is particularly true for retailers, due to the large amount of inventory they hold.

This study explores the interaction between retail store managers and automated inventory calculation systems. Most of these automated systems allow for manual modifications and users generally take advantage of this option. This begs the question: do these modifications have a negative or positive effect on a company's revenue? That is, can human intervention improve inventory management?

The data for this study came from a Fortune 500 Company with stores in several countries whose product line features Do-It-Yourself (DIY), building, gardening and interior decorations. The primary database consisted of 15 weeks of sales data from 7 stores, 13 categories, more than 35,000 SKUs summing up to 3,780,000 lines of Point-of-Sale (POS) data. The methodology used to analyze the data can be replicated in other companies.

Methodology

This study involved developing a simulation that reconstructed the automated system's results as compared to those of the managers at different store locations. This simulation was based on random demand generated using the same probability distribution for each Stock Keeping Unit (SKU).

Main Results

Overall, the automated system performed better than the store managers. That said, results did vary depending on a specific SKU's sales history, and in some cases, the manager performed better than the computer system.

- Of the 45 periods studied, the system offered better results 80% of the time
- The algorithm generated 20% greater net profit than store managers

Additional Insights and Findings

Computer Performs Better

- when the products is less profitable for the store
- when the replenishment period is shorter

Manager Performs Better

- when the potential profit is greater
- when the replenishment period is longer
- when there is a historical problem with inventory accuracy

Recommendations

By understanding the strengths and weaknesses of automated and manual inventory replenishment systems retailers can improve their decision-making processes, and ultimately, their bottom line.

One recommendation is that any company using an automated replenishment system conducts a thorough assessment of the automatic store replenishment (ASR) already in place. For example, companies like the one from this study can save managers time by calculating the products with less total profit on a computer.

Another recommendation is to analyze how successful managers make decisions and help underperforming managers with their decision-making process. It would also be useful to compare decisions made by the same groups from various department stores.