PURDUE UNIVERSITY

DAUCH CENTER FOR THE MANAGEMENT OF MANUFACTURING ENTERPRISES
CMME

Report

Preliminary Data Analysis

Table of Contents

1. Introduction

The biggest challenge of Company 'J' (further, COJ) is an excessive amount of capital tied up in an inventory. Origin of the challenge is coming from an absence of demand forecast.

According to CoJ calculations, there is an overall overstock of over 8 million dollars (Figure 1 in Annex). Current capital in inventory is $26 million. One of the first steps taken by CoJ in direction of solving inventory overstock challenge is implementation of Demand Works. The acquired software will help them to forecast better and to assess their inventory value.

CoJ contacted Dauch Center for the Management of Manufacturing Enterprises (further, DCMME) to provide consulting service covering expensive data analysis in sales, inventory, transportation domains.

DCMME created a project to discover, assess, and propose a viable solution for these issues. Duration of the project was 8 weeks with assigned team of 2 (a Project Manager and an Analyst).

Below you can see a Gantt chart for the project.

Phase/Week	07/05 - 07/09	07/12 - 07/16	07/19 - 07/23	07/26 - 07/30	08/02 - 08/06	08/09 - 08/13	08/16 - 08/20	08/23 - 08/27
Planning								
Reseach								
Analysis								
Results								
Presentation								

2. Scope

The main goal of the project was to find main supply chain pain points that CoJ have through data analysis. Thus, the scope of the project is a supply chain process of CoJ.

All information was shared by CoJ and obtained from their own systems with modifications if needed. It is an overview of the company's operations and thus the team will not go past those boundaries to provide a clear view and good results.

It was discussed and agreed that the main structure of the project would be focused on 3 aspects: Inventory management, Sales margins, and Supplier composition.

3. Methodology

The team held weekly meetings with the company's designated champion to discuss findings, request different types of additional information and agree on next steps. Once the team gathered the

required information, different data manipulation and data analysis as well as the academic/professional background would be used to determine the best course of action.

During the project DCMME's team leveraged Microsoft Excel as a main tool, and best practices of supply chain management.

4. Analysis

In order to unveil core issues the team analyzed data from the first six months of. The analysis included summaries of the different transportation used, suppliers, sales, etc. Another important factor during this phase was to structure found issues into different categories. This helped to direct the analysis towards a defined objective. For this, a good overview was a priority.

Weekly meetings shed light to some policies and protocols that were in place, such as the margin that CoJ was looking to gain in general from each location. These weekly conversations like classic Agile project management sprints, helped both parties understand the focus and ideas as well as providing the team with the client's point of view and may times these discussions developed in a change of strategy. All that proved positive to finish the project successfully and on time.

Sales records analysis by comparing sales to their target margin. Sales were divided by number of items sold and number of different items sold at each location, then the team took the least revenue earning items, with low inventory turn, and did the same division (Figure 3 in Annex). Results showed they were doing good overall, but some locations were underperforming and needed to be revised. All these analyses gave the team and the company a good idea of which locations were performing at an optimal level and which ones were not.

Overstock and reordering points were assessed by analyzing the different locations and items. Although the company was overstocked in some locations, they were unsure about the optimal stock and reorder point. After analyzing the data for each location, a simple calculation was made to define the real overstock and reorder point. The calculation is regarded as "simple" because it does not consider lead times for each of the items for all the locations. It is assumed that the supplier will deliver promptly after sending the PO. The assumption is chosen because of the number of items and location combination that has more than 128k in total.

Transportation between locations. It was analyzed that there were a lot more shipments between CoJ locations than needed and that hurt the business financially. Optimization of this issue would bring up profits fast for the company by reducing the spending in an inefficient transportation system.

Suppliers analysis showed that among more than 1600 companies almost half of them were supplying less than 10 items. Even if there are some suppliers that can produce a very specific, high revenue items it seems that CoJ could potentially reduce the number of suppliers and by consolidating them lower the costs. The full list of the mentioned suppliers that sold CoJ less than 10 items was submitted to the company for further analysis.

5. Results

During the project we discovered three main issues related to the supply chain of CoJ:

- Transportation between the different COJ's locations was excessive and not efficiently managed (See Figure 2 in annex). Fixing this problem will allow CoJ to save money in unnecessary transportation.
- Identification of suboptimal points of order management process. Multiple items were found to be either over or understocked and this correlates to an inefficient reorder point. This issue alone, if not controlled, can damage CoJ as it will result in backlogs and decrease of client satisfaction.
- Erroneous min and max stock levels for item-location combination. While it is certain that different items and locations require a different stock level, it seemed that these minimum and maximum where not monitored. It resulted in overstock for one item in one location, but opposite in another location.

6. Conclusion

In the end of the project, DCMME formulated three solution-oriented projects to address the discovered issues:

- Transportation optimization project
- Project for identification of suboptimal points of order management process
- Redefining and implementing min and max stock levels for item-location combination.

DCMME provided projects' outline covering goals, timeline, and stakeholders, from which a buy-in is required.

After a discussion, CoJ chose transportation optimization project as a paramount in solving the overarching business need of limiting excessive capital captured in inventory.

Current project was vital as it allowed CoJ to pinpoint the problems and prepare a course of further actions, leading to an optimization of CoJ's operations.

7. Annex

Figure 1. Overstock according to CoJ, before the project

Grand Total $ 8,220,998.16

Figure 2. Transportation between CoJ's locations

	Shipments		Receipt	
# Transfers	7,475		7,475	
Transfers <10	3,678	49.20%	3,663	49.00%
Over Average	895	11.97%	905	12.11%
Month				
January	1,217	16.28%	1,197	16.01%
February	1,231	16.47%	1,301	17.40%
March	1,406	18.81%	1,321	17.67%
April	1,214	16.24%	1,248	16.70%
May	1,141	15.26%	1,107	14.81%
June	1,266	16.94%	1,301	17.40%
Avg # of Units	238.34		239.90	
Max # of Units	52,296.95		52,296.95	