IE3100M System Design Project
Department of Industrial Systems Engineering and Management
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FROM PEN TO CODE

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Background

Kimberly-Clark is a multinational corporation that manufactures disposable diapers, pants and baby wipes.
Asia Pacific is Kimberly-Clark's biggest international region with a footprint in over 30 countries with its headquarters based in Singapore.

Problem Overview

In recent years, Kimberly-Clark has seen an **increase in demand** for their products.

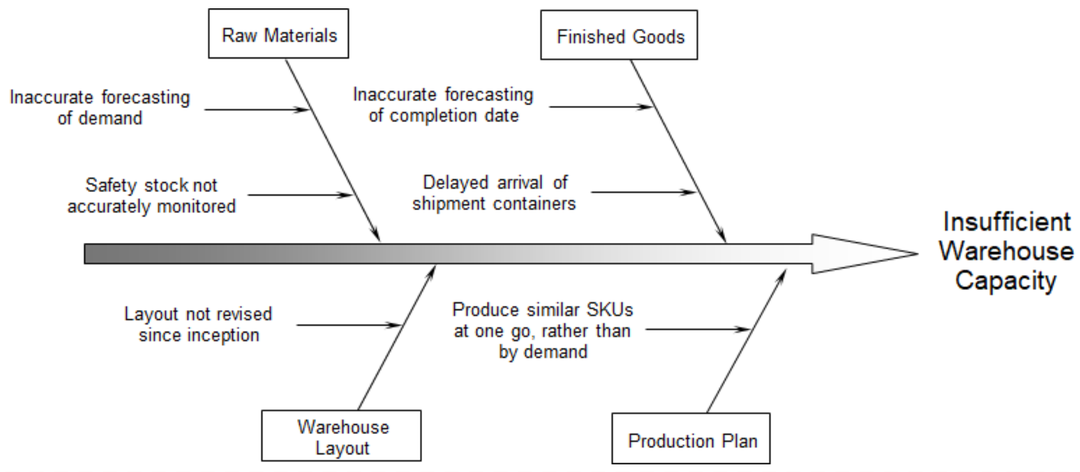
We need to produce more, but we can't just increase the size of our production and storage facilities in such a short time!

We will look into solutions to improve the way you utilize the warehouse space.

Objective:

To improve the **storage efficiency** or **throughput** of products to address the increase in demand.

Root Cause Analysis



Key Skill Sets

Data Analysis Data was analysed and manipulated to obtain useful and actionable insights.

Operations Research Linear programming was used to recommend an optimal job schedule that would minimise the number of shipments missed due to production delays.

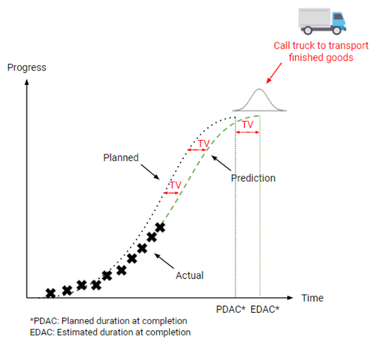
Systems Thinking Key issues were identified by understanding the interactions between the production process and warehouse workflow.

Approaches/Solutions

1. Finished Goods Forecasting Prediction

Method 1: ***Kalman Filter Forecasting Model (KFFM)***

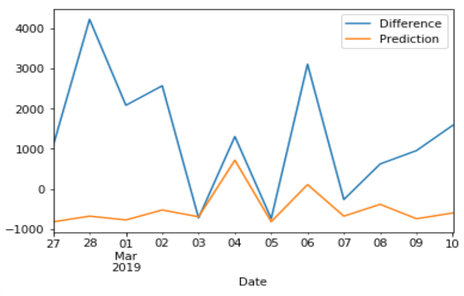
- To optimize the scheduling transportation to transfer finished goods out of warehouse
- Estimate for Date of Completion (EDAC)
- Better liaising with logistics companies



Ideal Output: Time variation for each job (Predicted Completion Date - Forecasted Completion Date)

Method 2: ***AutoRegressive Integrated Moving Average Model (ARIMA)***

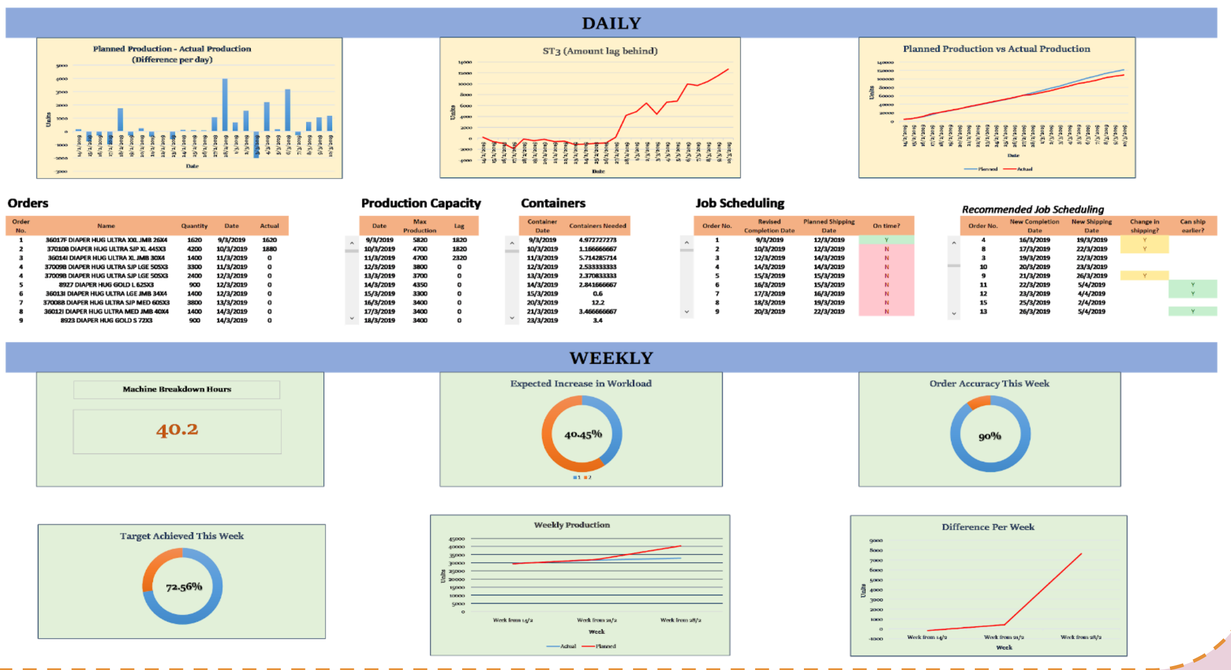
- To predict the difference between planned and actual production
- Similar trends can be observed, However the discrepancy is too large for the prediction to be useful



2. Data-Driven Decision Making

Method: ***Dashboard & Linear Programming Model***

- To offer actionable insights
- Key metrics:
  - No. of containers to call each day
  - Recommended job rescheduling
  - Expected increase in workload



Conclusion

- To obtain a more comprehensive model, all the **parameters which affect the actual production** must be provided leading to better predictions
- A more practical approach: **building a dashboard** with the relevant metrics, following the unsuitability of the prediction models
- With the dashboard, the organization is able to make **data-driven decisions** and act on the insights drawn from the data sets

Future Work

- **Predict machine breakdowns** with better data collection systems to anticipate and prepare for potential issues
- **Optimise the warehouse layout** since there is no methodology used currently to optimise storage space