Leveraging Optimization & Business Intelligence for Production Planning

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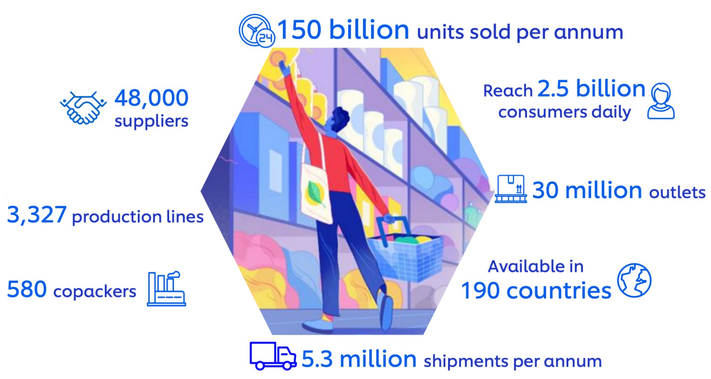
Problem Statement

Unilever's **supply chain production planning** is a vital component of its operations. Production planning allows Unilever to produce its finished goods efficiently.



75 Number of Brands

17 Number of Categories

10+ Different Production Lines

What ?

Carry out long-term capacity planning by optimizing Unilever's production plan for different manufacturing sites in North-America Region for the next 4 years.

Why ?

- Cost Saving
- Waste Reduction
- Meeting Demands
- Inventory Management
- Efficient Line Utilization
- Eliminate Manual Process

How ?

Develop a capacity planning optimization tool to transform the existing manual approach into a streamlined, automated, user-friendly and agile approach.

Business Impact

Quantitative Impact

- **$ 1.44 M** Savings (USD)*
- **97%** Reduction in computational time

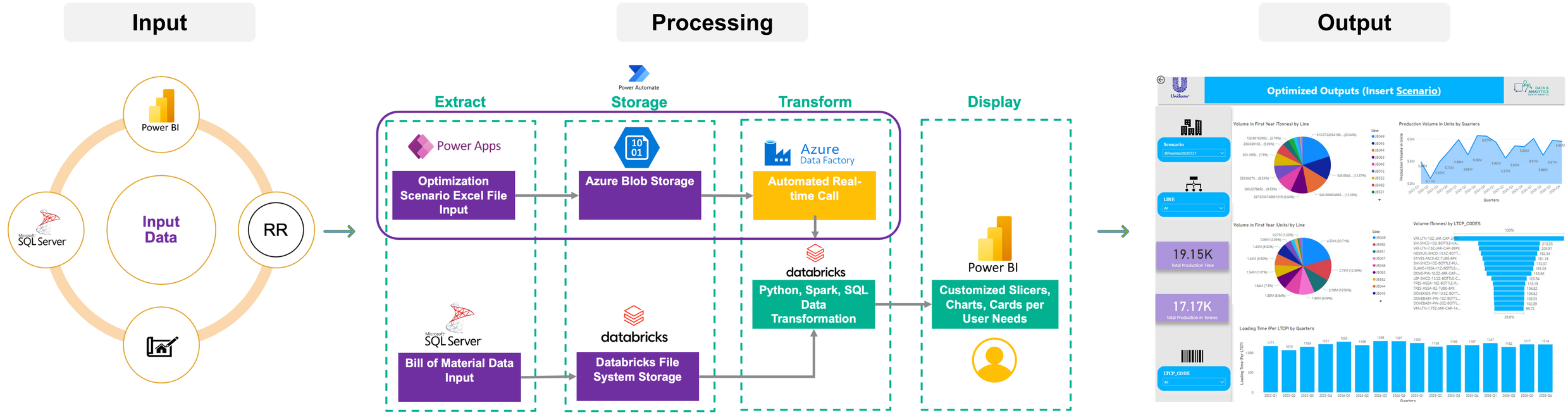
Qualitative Impact

- Global Scalability
- In-house tool
- Scenario Analysis
- Insights

Business Questions that we can answer now:

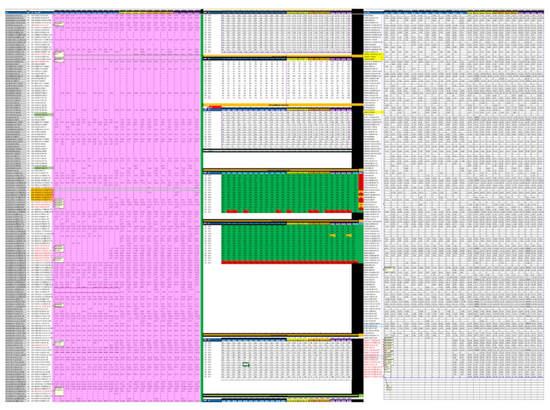
- Should we manufacture a product in a particular time window?
- How expensive it is to plan a production on third party lines instead of internal lines?
- Is installing a new production line profitable in the longer run?
- How one production plan is different from other production plans in terms of cost saving and units manufacturing?

Optimization Tool



Final Product

From Here



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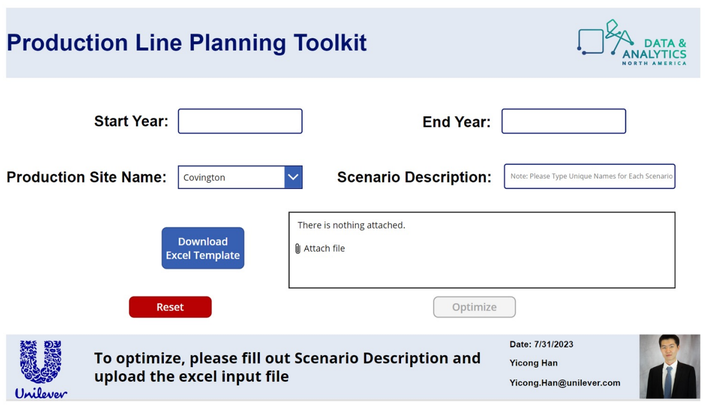

Recommendations

- Multi-Objective Optimization
- Introduce Robustness
- Insights on Infeasibility
- Cost-Centric Business Metrices

Experts Review

*The MIT Analytics Capstone team has seamlessly integrated with our supply chain and data analytics teams, and quickly grasped our business needs. Their dedication to solving business challenges has left **a notable impact on our operations**.*

Gary Bogdani
Head of Data Science

*This project aimed for production line optimization by converting original pipeline with manual operation on original excel format to web automation application with visualization. It has **great potential to save huge labor cost** for Unilever production planning, and model run time.*

Ye Xu
Senior Data Science Manager

*The work done in this capstone **unlocks significant capabilities** for our team. As we look to embark in more prescriptive capabilities, this is a tried and true way to package complex concepts in an easy to use experience for our users.*

Franklin Tapia
Analytics Product Manager

Image Source: https://www.unilever.com/files/origin/aa2b7261b82d3493319d4f46176e4e245a45c051.pdf/Investor-Event-2019-Marc-Engel-Supply-Chain.pdf
*This cost is only due to automation. Additional cost savings due to waste reduction, line utilization, and inventory aren't included due to a lack of business numbers.