



SKU portfolio optimization

Right product mix is the key to reduce complexity in the business

Performance



- What is the current portfolio along with its performance, and cost to company?
- What is the best approach to assess the performance of SKUs?
- How much inventory is tied up with the non-performing SKUs?
- What is the increase / decrease in market share because of SPO?

Strategy



- How to treat tail of the tail SKU's?
- Which SKUs are low contributors but important for the business?
- Of the non-delisted SKUs, which marketing strategy to apply to increase penetration?
- Which combination of SKUs in each RBU would increase revenue?
- Which metrics to consider for calculating SKU performance
- How to relate drivers/drainers of market penetration to SPO?

Data



- Which metrics are used to analyse the performance ?
- What is the availability of the data for the metrics considered?
- How to measure performance with multi-hierarchical data?

Collaboration



- Are all the stakeholders in alignment with the SKUs selected as low contributors and can be delisted?
- What is the reconciliation time to delist a SKU in an RBU?



Typical business challenges on SKU portfolio decisions



Performance

- Lack of visibility on assessing SKU performance using right metrics
- High value inventory tied up with the non-performing SKUs
- Failure of prediction of SKU demand decline pattern leading to excess inventory and shelf-life expiry
- Failure of prediction of SKU End of Life leading to additional costs to recall and destroy excess inventory.



Strategy

- Lack of strategy and standard process in finding right product mix that would reduce cost
- Limited exposure on exceptional SKUs which are low contributors but important for the business
- Impact of SPO on market share is not visible for the business
- Limited visibility into inventory redeployment opportunities across the network



Data

- Harmonization of multiple data sources
- Regular Manual intervention
- Need of an optimal model selection for multi-hierarchical data



Collaboration

- Aligning all the stakeholders with the SKUs selected as low contributors to be considered for delisting
- Transparency for selection of right portfolio mix

Our solution approach to identify 'right mix' for the portfolio



SKU Segmentation

- Segment the SKUs based on volume, NIV, and gross margin



Actionable SKUs & SKU Ranking

- Identify actionable SKUs in each segment based on historical sales, shipments, and inventory for each SKU.
- Rank SKUs with highest distance as lowest rank – high deviation from mean SKUs with low rank.



SKU Phase out Prediction

- Predict SKU end of life 6-18 months in advance using stage transition model from sales and inventory data.
- The model predicts the SKU to be in planning stage or phase out stage based on its demand type and distribution.



Drivers Analysis

- Perform root cause analysis on the key drivers and develop corrective strategies to improve SKU performance



Recommend On SKU De-listing

- Recommend product mix for the portfolio based on segment and SKU Rank

Analytical techniques

- K-means
- Density based clustering

Analytical techniques:

- Classification approach
- Mahalanobis distance
- Euclidean distance

Analytical techniques:

- Stage Transition Model

Analytical techniques :

- Ensemble algorithms
- Bagging and boosting algorithms

Analytical techniques:

- Cost based linear optimization

Outcomes & Impact

\$ 26.5 Million

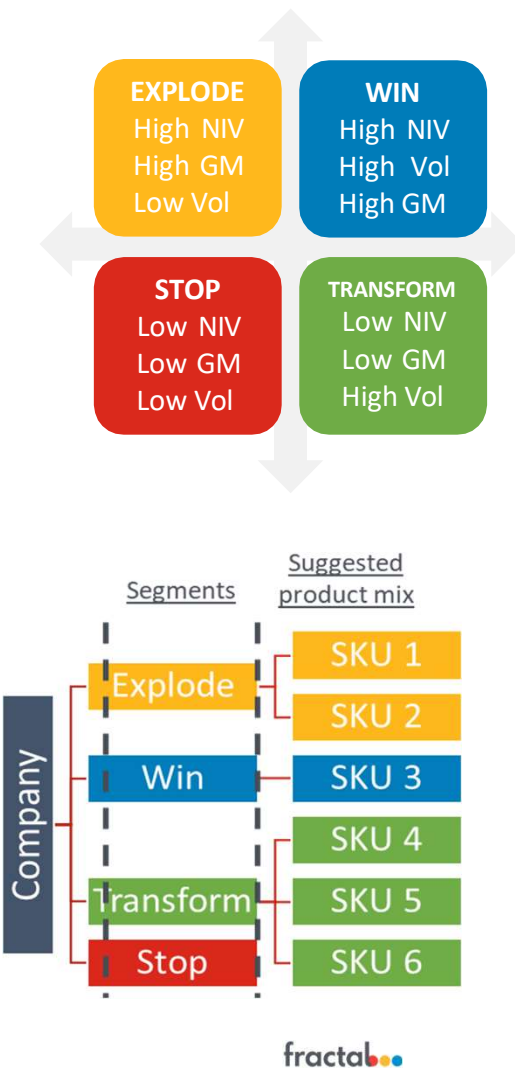
Inventory value for the bottom 1% SKUs (983 SKUs) of one quarter (JAS'18) – basis P12M sales

\$ 2.5 Million

Inventory released in one quarter (JAS'18) by delisting 959 SKUs

\$ 587,000 per SKU

Working capital released in FY1617 due to delisting of SKUs



CASE STUDY

Partnered with client to drive \$2.5M release of working capital in a quarter due to SKU delisting

Business problem

- Excess inventory tied up on low performing SKUs
- High performing SKUs going out-of-stock due to supply shortage, high forecast bias and long supply lead time
- Attributing profitability to individual SKUs is cumbersome and driving less business value
- Lack of visibility on key drivers of total landed & operating costs for specific SKUs at regional level

Solution Approach

SKU Portfolio Optimization by delisting low performing SKUs and reduce WC

SKU segmentation

- Segment the SKUs based on volume, NIV and gross margin
- Identify actionable SKUs in each segment based on historical data

SKU ranking and driver analysis

- Delisting SKUs through a composite ranking algorithm
- Identify supply chain KPIs for clustering

Product mix recommendation

Suggest product mix for the portfolio based on segment and SKU Rank

Advanced planning & visibility, SC flexibility

Pick Power SKUs

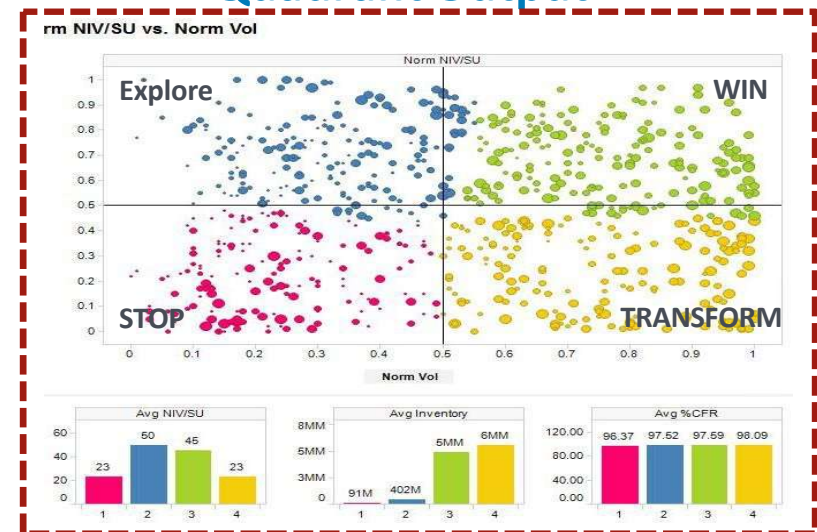
Focus on portfolio optimization

Focus on financial, differentiated strategy

Outcome

- Identified critical SKUs in STOP quadrant for business and recommended SKU portfolio optimization
- Optimized SKU Portfolio with the help of segmentation principles, strategies on clustered segment, ranking algorithm & K-means clustering
- \$587,000 per SKU working capital has been released in Fiscal Year due to delisting of SKUs

Quadrant Output



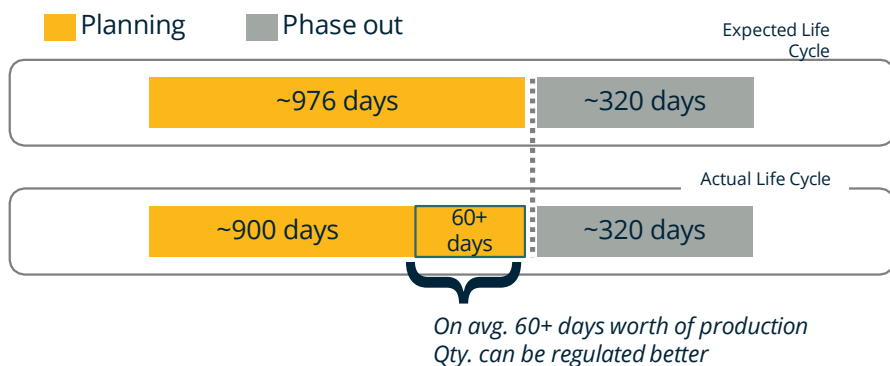


"SKU Phase Out Planning" prevents excess production by predicting Product Life Cycle stages

Business challenges

- Lack of insights on SKU decline pattern leading to excess inventory & manufacturing
- Incur additional Supply chain costs to recall & destroy excess inventory
- Heuristics based decisions for SKU delisting & Portfolio optimization

A typical product is marked by the system to be in planning phase for 60+ days more than required



Solution approach & outcomes

- Predict SKU Life cycle stage and map the current life cycle – using Stage Transition models
- Predict beginning time of phase-out based on sales & inventory patterns, age of product, and similar products (features)
- Map regions in network to identify scope for redeployment
- Recommended strategies to increase utilization of running (OH + WIP) inventory

Number of SKUs the model predicts an item to be in phase out stage while the actuals say it is in planning stage.

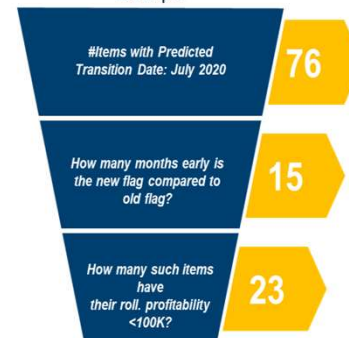
		Predicted	
		0	1
Actual	0	TP 49%	FN 6%
	1	FP 3%	TN 40%

89%
Accuracy

$$\frac{TP + TN}{TP + TN + FP + FN}$$

Number of SKUs the model predicts an item to be in planning stage while the actuals say it is in phase out stage

Example





Building a multi-step approach to optimizing SKU performance

Objectives & Challenges

Objectives:

- ▶ Build framework that will help the business to understand several fundamental questions about SKU performance optimization
- ▶ Ability to align organization strategy with SKU performance drivers

Business Challenges:

- ▶ Multiple data sources
- ▶ Regular Manual intervention
- ▶ Non-sustainable performance measure across different SKU categories
- ▶ Non-standardized process and data flow

Outcomes & impact

- ▶ A global database providing standard report, driver & root cause analysis
- ▶ Single point of truth for SKU performance indicators
- ▶ Data validation and rectification at the source

Solution Approach

Measure SKU Performance:

- ▶ Objectively quantify the current performance using KPI combinations
- ▶ Score SKUs based on historical performance and generate a score for individual SKUs

Identify Drivers of Performance:

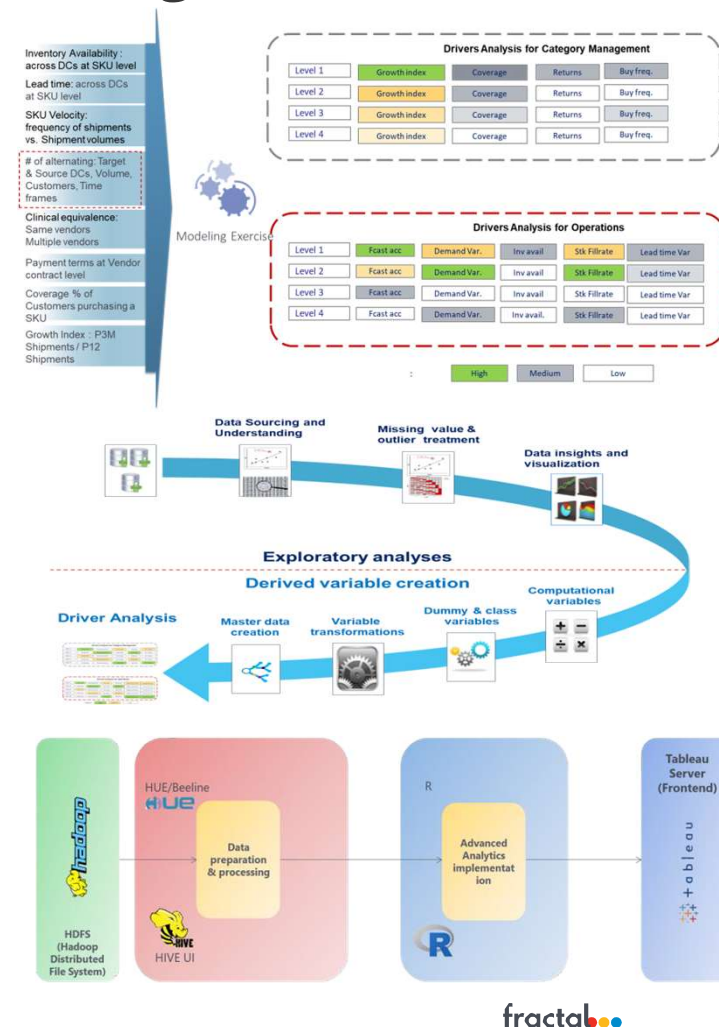
- ▶ Build statistical models using historical data to identify drivers of performance
- ▶ These drivers will provide insights into the 'why' behind performance (good or poor)

Perform Root Cause Analysis:

- ▶ Perform root cause analysis on the key drivers and develop corrective strategies to improve SKU performance
- ▶ Quantify value of corrective strategies and develop a rank ordered list to pursue

Operationalize Framework

- ▶ Develop a framework to implement corrective measures
- ▶ Operationalize codes and automate recommendations



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