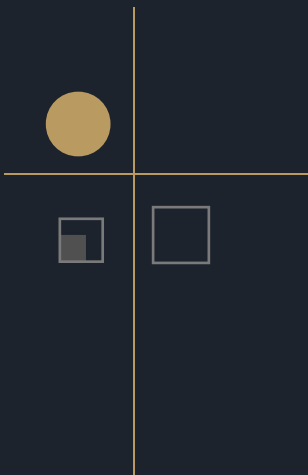


SHELF SPACE OPTIMIZATION FOR A LEADING UK GROCER



THE CLIENT PROBLEM

Our client, a leading **UK grocery/supermarket chain** with 550+ stores wanted a **space optimization solution** which could be used by their merchandizing department for **space recommendations**. Specifically they wanted a solution/tool that would help them **optimize space using space elasticity and SKU curves**. They also wanted us to optimize for squeeze space as well as additional space. They wanted the tool to contain rigorous optimization techniques for space allocation and be rich in reporting and visualization.

THE AQ SOLUTION

We implemented a four step approach to create this tool.



COLLECTED AND PROCESSED LIVE DATA

- We collected live sales data from the transaction system
- We processed current and historical space allocation to create data for space elasticity curves
- We collected data for creating SKU curves



CREATED ELASTICITY AND SKU CURVES

- We measured point estimates of elasticity for each store and aisle length cluster
- We fit negative exponential curves in point elasticity to create elasticity equations
- We used negative exponential fits for SKU curves



DESIGNED THE SPACE OPTIMIZATION PROCESS

- We defined objective functions to capture the sales lift associated with space changes
- We used SKU curves to measure the increase and decrease in SKU allocation due to space changes
- We set inventory constraints at a category level



DESIGNED THE TOOL PLATFORM

- We automated the entire process to facilitate quick re-runs of scenarios
- We built capabilities for exporting reports and data
- We designed user-friendly tools with features which facilitated scenario comparisons

We developed a mathematically robust optimization approach that worked with real-time data.

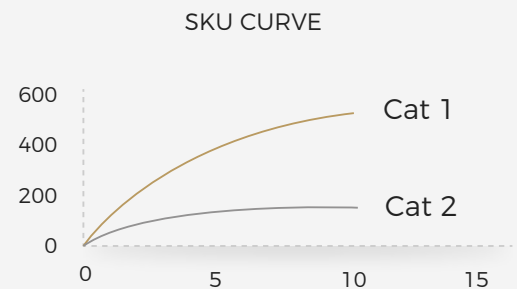
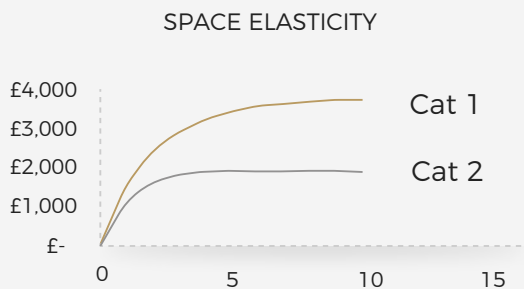
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PROCESS LIVE DATA

- Sales data
- Waste data
- Space and modular data
- Inventory constraints
- Category structure
- Elasticity data

2

SPACE ELASTICITY AND SKU CURVE



$$\text{Sales} = \beta_0 * (1 - e^{-\beta_1 * (\text{Bays})})$$

3

SPACE OPTIMIZATION SETUP

$$\text{Max} \sum_{i=1}^I \beta_0 * (S_i)^{\beta_i} - \sum_{i=1}^I \alpha_0 * f(\text{SKU})$$

$$\text{S.T.} \sum_{i=1}^I S_i \leq S_{\text{max}} \rightarrow (1)$$

$$\text{Min}_i \leq S_i \leq \text{Max}_i \quad \forall (i \in I) \rightarrow (2)$$

Where,

I is the set of products

S_i is space allocation for

β_i is the space elasticity

α_0 is the SKU loss coefficient

S is total available Space

f(SKU) is SKU curve equation

4

TOOL PLATFORM: EXCEL BASED MODEL

Users were able to access and use the optimization model through a user-friendly application.

Store 1	Existing bays	Optimal number of bays	Pure bays	Change in sales	Constraints	SKU Count	SKU Count for optimal	(Optimal +1) Bays - Change in sales	(Optimal -1) Bays - Change in sales
COMBINED BI CAKE	8	10	6.6	£1,800	Min 7 ; Max 11	190	250	£224	-£278
BI MORNING GOODS	5	5	5.5	£1,200	Min 5 ; Max 7	161	161	£203	-£343
BI BREAD	11	10	10.7	-£231	Min 9 ; Max 12	110	101	£128	-£156
CAKES ISB SCRATCH	4	4	4.4	£0	Min 4 ; Max7	165	165	£20	-£107
CREAM CAKES BI	3	3	3.0	£0	Min 2 ; Max 4	102	102	£213	-£409

Net Change in Sales = £2,769

THE CLIENT BENEFIT

The tool provided a good way to run space optimization for different levels across the product hierarchy. It saved time in preparing data. Its reporting features enabled key insights at the click of a button. The tool facilitated batch runs showcasing stores across the nation which could be optimized for space. The usage of **scientific optimization** for space allocation resulted in better space recommendations.



Thank You

For any queries, get in touch with us.

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