

SIMULATION CASE

Data-Driven Management of Blue Detergent

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Business Review:

Overview of the Business:

Kelsey-White is a multinational company, focusing on providing consumer packaged goods to consumers across the world via brick-and-mortar retailers mostly. Blue – a laundry detergent brand is one of the K-W key products, presented with three formulations: powder, liquid, and single-used pod. The previous year's marketing and manufacturing decisions were based on gut feeling and not using any supportive facts. Hence, the brand was meeting with some challenges compared with Turbo, Fresh, and Store.

Market Environment and Business Result of Key Product (BLUE) in 2018:

- a. From market share data, Turbo was leading with 44.1% while Blue took the smallest portion of 11% market share only. (Figure 1)

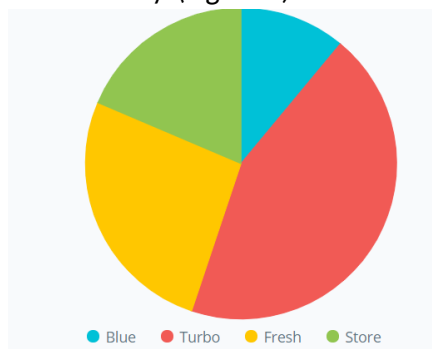


Figure 1 Market Share Data (2018)

- b. With profitability data, Turbo was shown to be leading with 231.97M, about 6 times of Blue's profitability (37.79M). (Figure 2)

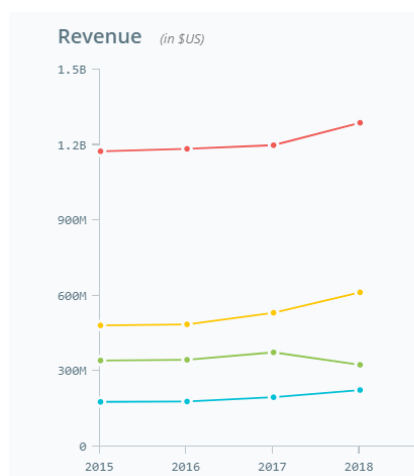


Figure 2 Revenue Data (2018)

- c. Likewise with Revenue, Turbo was charged ahead with 1.3B while Blue stopped at 225.2M. (Figure 3)

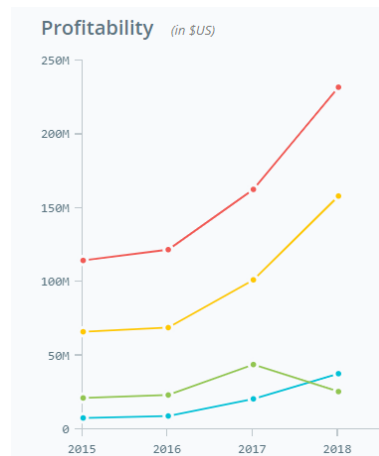


Figure 3 Profitability Data (2018)

- d. West and Southeast region highly demand BLUE products (Figure 4)

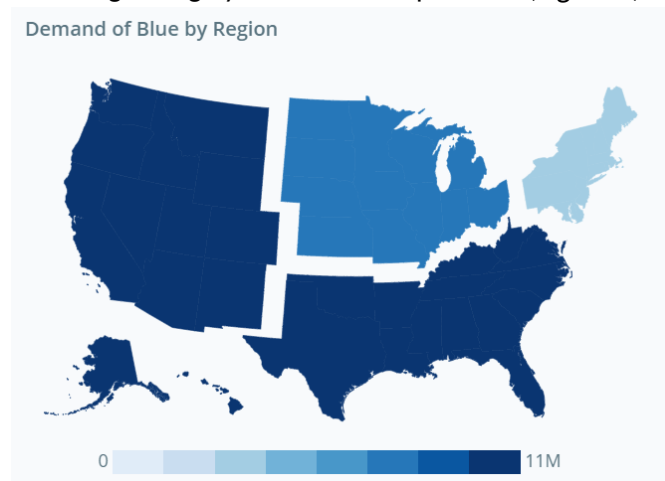


Figure 4. Demand of Blue by Region (2018)

Blue portrays as the smallest player in the market, however, there is room for improvement as there was a steady rising in both revenue and profitability over a period of 4 years from 2015 to 2018.

Vision:

To be the timeless largest household and environmentally friendly low-cost detergent brand while reshaping brand and consumer in the marketplace by providing youthful, solid, and exciting products.

Approaches:

Formulation:

- a. Pod was introduced in 2012 by Turbo, known as the latest innovation in fabric care. It remains the most popular choice among the wealthier and younger generation. However, the cost will be affected by a rise of 15%. The U.S poison control centers reported 12,299 calls in the year 2017 due to pod consumption by children. On

another note, despite the convenience of a detergent pod, it contains a very damaging chemical cocktail than can be detrimental to the environment, as the water-soluble polymer (the outer packaging of a pod) contains a toxic monomer called vinyl acetate which harms aquatic lifeforms and causes tumor in rats.

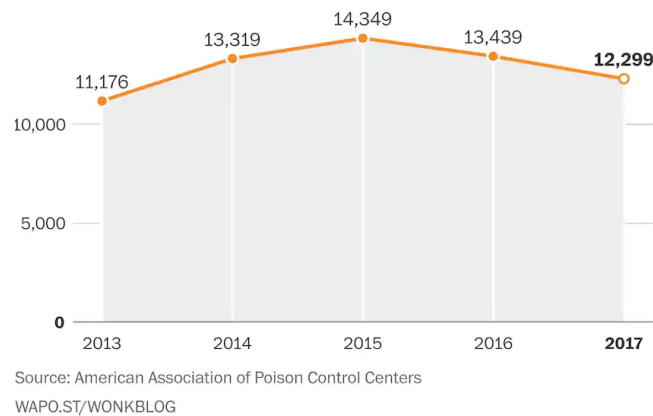


Figure 5. Total poison control call for laundry pod (2013-2017)

- b. Liquid ranked 2nd in popularity, semi-modern technology, widely used by the middle and as well as the lower-income class. Cost is affected by 7%. The liquid form is proven to be dispersed better at any temperature, even at a low one. The liquid itself has a lesser impact on the environment as the “builder” is water, except the bottle is made from recycled plastic and it is difficult for consumers to measure an appropriate amount to be used.
- c. Powder is the least popular amongst the 3 formulations, as its portrait to be an old-fashion way to do laundry. No extra cost needed to produce. Can help cut down on excess packaging cost. However, the “builder” in powder (sodium carbonate) can have an adverse effect on soil and waterways.

According to our new vision, Liquid is the most suitable form of formulation to be focused on the new strategy.

Top 2 everything:

By drilling down further with data explorer, we have:

- Income: Blue is mostly demanded by the lower and middle-income class.
- Age: Favoured by Gen X, Millennials, and younger.
- Race: Chosen mostly by White and Hispanic.
- Region: welcome in Southeast and West
- Popular in household size of 4 and above

Putting together data, to narrow down our strategy for implementation, a correlation calculation between each factor vs sales has been made:

	<i>Sales</i>	<i>Age</i>	<i>Income</i>	<i>Race</i>	<i>Region</i>	<i>Household >4</i>
Sales	1					
Age	0.9996	1				
Income	0.99972	0.99865	1			
Race	1	0.9996	0.99971	1		
Region	0.99993	0.99949	0.99963	0.99994	1	
Household	0.99705	0.99447	0.99853	0.99703	0.99715	1

Figure 5. Correlation between sales and others

In this table, **the region has the highest correlation with sales, while the income group second that and follow by age.**

Using regression to find out that 99.993% proves there is a true relationship between region and sales.

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.99993
R Square	0.99986
Adjusted R Square	0.99979
Standard Error	0.04537
Observations	4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	29.27175837	29.2718	14221.23554	0.000070
Residual	2	0.004116627	0.00206		
Total	3	29.275875			

	<i>Coefficient</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	23.7044	0.041527228	570.816	0.000003	23.52572285	23.88307733	23.52572285	23.88307733
Region	0.71181	0.005968954	119.253	0.00007	0.686132319	0.737496995	0.686132319	0.737496995

Positioning of products:

The demand for product attributes per region differs according to the average temperature. In the Southeast, the temperature is ranging from 75 to 85 Fahrenheit degree, consumers prefer Scent and odour elimination from their laundry. There is 90 percent of the energy used by a washing machine to heat the water, the West prefers cold water positioning detergent as a utility bill saver. Considering the popularity of odour elimination in the Central which is also our 3rd contribution in the sales (Figure 7), **we will keep alternating our product positioning between Odour Elimination and Cold Water.**

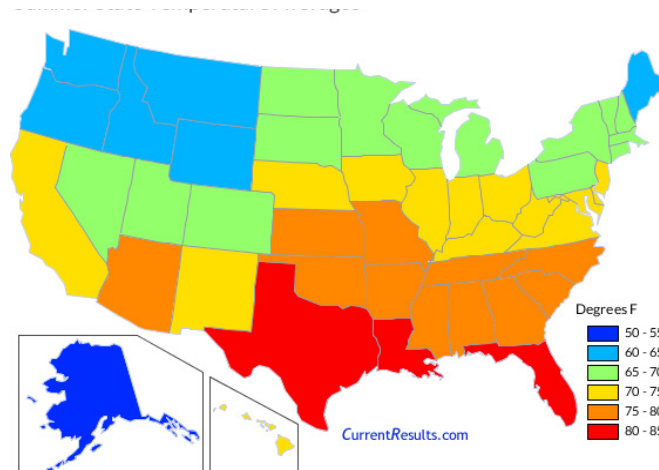


Figure 6. Average Heat Map

Demand of Attributes Ranking				
	Northeast	Southeast	Central	West
Softness	1	2	4	3
Cold water	1	3	2	1
Scent	2	1	3	4
Odor elimination	2	1	1	2

Figure 7. Ranking of Demand by Attributes (2018)

Region segmentation:

The Southeast population is ahead by almost 1.6 times of the West and according to U.S News, 9 out of 10 of the fastest-growing states are in the Southeast region (4 states, average at 1.155%) and in the West region (5 states, at 1.588%). Aside, As the census population estimates show, the migration of people from the Northeast and Central to the Southeast and to the West continues to be a trend.

	Southeast	West	Central	Northeast
Population by 2018 (mil)	46.8	29.33	26.2	21.72
Marketshare of Blue	9.20%	16.40%	12.70%	5.70%
Population growth average	1.155%	1.588%		
Expected population growth (mil)	47.34	29.80		

Figure 8. Population by Region (2018)

Both Southeast and West should be our focus, but Southeast will be our priority target as this region can outgrow West and increase our market demand with the right strategy.

Costing:

Sales vs Production Cost:

The number of units sold does have a strong effect on price per unit, and that plays a major contribution to our future pricing.

	<i>Sales</i>	<i>Production cost (Fixed + Variable)</i>
Sales	1	
Production cost (Fixed + Variable)	0.999994643	1

Sales vs Other costs (Trade Channel & Media Spend)

The correlation is not significant between sales vs other costs. Fund will be spent across all trade channels, however, a slight focus on Convenience and Club as they are the top 2 trade channels in the market. There are more than 150,000 convenience stores and 1500 club stores which touch much of the U.S.

Promotion will be done via all platforms with a higher focus in Digital Ads to attract younger generations (study 98% of younger adults from 18 to 29 using the internet) and shifting consumer behaviour since an early age without taking notice, similarly to Japanese companies enlisting 'otaku' culture to younger future consumers.

	<i>Sales</i>	<i>Other Cost (Trade channel + Media)</i>
Sales	1	
Other Cost (Trade channel + Media)	0.935176237	1

Pricing:

According to price point demand vs current pricing of all detergent brands, there is no company that is offering the lowest price point of below 5\$ which is a potential market with a lot higher demand than current pricing as 60% of people (303.3M) prefer pay 5\$ or less and 50% demand are from the lower-income group (156.9M).

Strategy

- Price Point demand: attacking market aggressively by dropping the price & market penetration pricing.
- Formulation demand: providing right product positioning (odour elimination & cold water)

The result from simulation:

Income Statement <small>(in \$US)</small>								
	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	\$178.2M	\$179.7M	\$196.7M	\$225.3M	\$257.5M	\$249.8M	\$283.6M	\$352.3M
Costs								
Variable Costs	\$53.5M	\$53.9M	\$59.0M	\$67.6M	\$82.6M	\$86.3M	\$106.2M	\$158.7M
Fixed Costs	\$87.0M	\$87.0M	\$87.0M	\$87.0M	\$87.0M	\$87.0M	\$87.0M	\$87.0M
Other Costs	\$30.0M	\$29.7M	\$30.0M	\$32.9M	\$37.6M	\$43.0M	\$41.7M	\$47.4M
Total Costs	\$170.5M	\$170.6M	\$176.0M	\$187.5M	\$207.2M	\$216.3M	\$234.9M	\$293.1M
Operating Profit	\$7.8M	\$9.1M	\$20.7M	\$37.8M	\$50.2M	\$33.4M	\$48.7M	\$59.3M
Cumulative Operating Profit	\$7.8M	\$16.9M	\$37.6M	\$75.4M	\$125.6M	\$159.0M	\$207.7M	\$267.0M

What have been done:

Descriptive Analysis: using data & dashboard given of what happened in past 4 years to segment the data and explore the differences.

Predictive Analysis: with the usage of forecast demand tool, data mining, statistics to make predictions about the future outcome.

Forecast demand tool:

- Using Monte Carlo simulation as business intelligence to approach model of probability in forecasting demand, proving different outcome bases on changes of a different factor. Hence, using this to make production decisions with maximum profitability.
- Based on brand demand per region, we calculate the growth between each year, then decide on the Min, Expected, and Max amount.

2019:

- Introducing new 'BLUE' with 2 times odour eliminator power, liquid detergent at the same price of 7\$
- Focusing on top 2 income classes (lower & middle income) and top 2 regions (Southeast & West)
- Trade channel spend distributed across 4 channels with a slight focus on Convenience & Club.
- Media spend distributed was higher on Digital Ads.
- A drop in the West and Northeast market to be expected.
- Production decision: 36.78M for the year 2019

Forecast demand:

	Forecast Year	Min	Expect	Max
Northeast	2019	2.2	3.1	3.6
Southeast	2019	7.9	12.1	12.1
Central	2019	6.1	9.4	9.4
West	2019	9.2	12.2	12.8

Result:

- Overall Market Share: 12.8% (+1.8% compared to 2018)
- Cumulative Operating Profit: 125.6M (+66.6% compared to 2018)
- A surge in overall demand by 19.9%
- Southeast market grew by 100% and Central grew by 42.95%

2020:



- Introduce the newest product: “Blue ColdWash”, a cold-water technology, ultra-concentrated liquid detergent.
- Price was set relatively low at 6.5\$
- Focusing on top 2 income classes (lower & middle income) and top 2 age groups (under 35 and under 45-year-old)
- Trade channel spend distributed across 4 channels with a slight focus on Convenience & Club.
- Media spend distributed was higher on Digital Ads.
- Production decision: 68M
- Expect a rise in the West region.

Forecast demand:

	Forecast Year	Min	Expect	Max
Northeast	2020	1.8	1.1	2.2
Southeast	2020	7.9	40.4	40.4
Central	2020	6.1	15.9	15.9
West	2020	9.2	10.5	12.3

Result:

- Overall market share: 12.9% (+0.1% compared to 2019)
- Cumulative Operating Profit: 159M (+26.6% compared to 2019)
- A drop in overall demand by 12%
- Social media responded positively to Blue.
- Southeast dropped 37.62% and Central dropped 14.80%
- Remaining in inventory 29.6M units.

BRAND DEMAND	Northeast		Southeast		Central		West	
Year	Demand	Growth	Demand	Growth	Demand	Growth	Demand	Growth
2015	2.19		7.91		6.1		9.2	
2016	2.2	0.46%	7.97	0.76%	6.2	1.64%	9.3	1.09%
2017	2.7	22.73%	8.4	5.40%	6.5	4.84%	10.5	12.90%
2018	2.9	7.41%	10.1	20.24%	7.8	20.00%	11.3	7.62%
2019	1.8	-37.93%	20.2	100.00%	11.15	42.95%	10.9	-3.54%
2020	3.3	83.33%	12.6	-37.62%	9.5	-14.80%	13.04	19.63%

Rectification:

- Focus on the wrong segmentation (age group) 3rd place in correlation significance hence it yields noticeable results. Focusing on both income and age groups reduces the product reachable by almost 1/3.

	General	top 2 income	top 2 age	top2 income + age
Demand of cold water 2019 (million units)	145.124	99.119	57.904	39.548
%		68%	40%	27%

- Cold-water positioning is not welcome in the Southeast which is our top priority segment. This product will not be focused on the 2021 strategy.

2021:

- Introduce 'BLUE' with 3 times odour eliminator power, liquid detergent at the price of 6\$
- Focusing on top 2 regions (Southeast & West), top 2 income classes (lower & middle class)
- Expecting a rise in Southeast & Central
- Production decision: 37.6M units as there are 29.6M units in inventory after maximizing profitability.

Forecast demand:

	Forecast Year	Min	Expect	Max
Northeast	2021	1.8	6.1	6.1
Southeast	2021	7.9	7.9	25.2
Central	2021	6.1	8.1	13.6
West	2021	9.2	15.6	15.6

Result:

- Overall Market Share: 15.8% (+2.9% compared to 2020)
- Cumulative Operating Profit: 207.7M (+31% compared to 2020)
- Store price reduced, Blue losing the market share.

BRAND	Northeast	Southeast	Central	West
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DEMAND									
Year	Demand	Growth	Demand	Growth	Demand	Growth	Demand	Growth	
2015	2.19		7.91		6.1		9.2		
2016	2.2	0.46%	7.97	0.76%	6.2	1.64%	9.3	1.09%	
2017	2.7	22.73%	8.4	5.40%	6.5	4.84%	10.5	12.90%	
2018	2.9	7.41%	10.1	20.24%	7.8	20.00%	11.3	7.62%	
2019	1.8	-37.93%	20.2	100.00%	11.15	42.95%	10.9	-3.54%	
2020	3.3	83.33%	12.6	-37.62%	9.5	-14.80%	13.04	19.63%	
2021	1.9	-42.42%	21.6	71.43%	11.9	25.26%	11.8	-9.51%	

2022:



- Implemented the same strategy with spice, as this model works for years 2019 and 2021 with proven data.
- Launch new product "BLUE NANOX" that not only eliminate odour but as well remove the invisible odour-causing stain, in a form of ultra-concentrated liquid detergent at an aggressively low price of 4.99\$
- Targeting Southeast and West
- Targeting similar income groups: low and middle income.
- Production decision: 63.7M units with forecast operating profit after maximization at 79M

	Forecast Year	Min	Expect	Max
Northeast	2022	1.8	1.1	3.5
Southeast	2022	7.9	37.0	43.2
Central	2022	6.1	14.9	17.0
West	2022	9.2	10.7	14.1

Result:

- Overall market share: 23.4% (+7.6% compared to 2021)
- **2nd largest in market share**
- Cumulative Operating Profit: 267M (+29% compared to 2021)
- **2nd most favourite product across 4 regions.**
- **2nd most demand product in the U.S.**
- Gain a noticeable percentage in demand.
- Highest profitability of all 4 detergent brands.

BRAND DEMAND	Northeast		Southeast		Central		West	
Year	Demand	Growth	Demand	Growth	Demand	Growth	Demand	Growth
2015	2.19		7.91		6.1		9.2	
2016	2.2	0.46%	7.97	0.76%	6.2	1.64%	9.3	1.09%
2017	2.7	22.73%	8.4	5.40%	6.5	4.84%	10.5	12.90%
2018	2.9	7.41%	10.1	20.24%	7.8	20.00%	11.3	7.62%
2019	1.8	-37.93%	20.2	100.00%	11.15	42.95%	10.9	-3.54%
2020	3.3	83.33%	12.6	-37.62%	9.5	-14.80%	13.04	19.63%
2021	1.9	-42.42%	21.6	71.43%	11.9	25.26%	11.8	-9.51%
2022	3.62	90.53%	31.51	45.88%	17.42	46.39%	18.045	52.92%

