S¢ent of Revitalization

Group 8

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Agenda

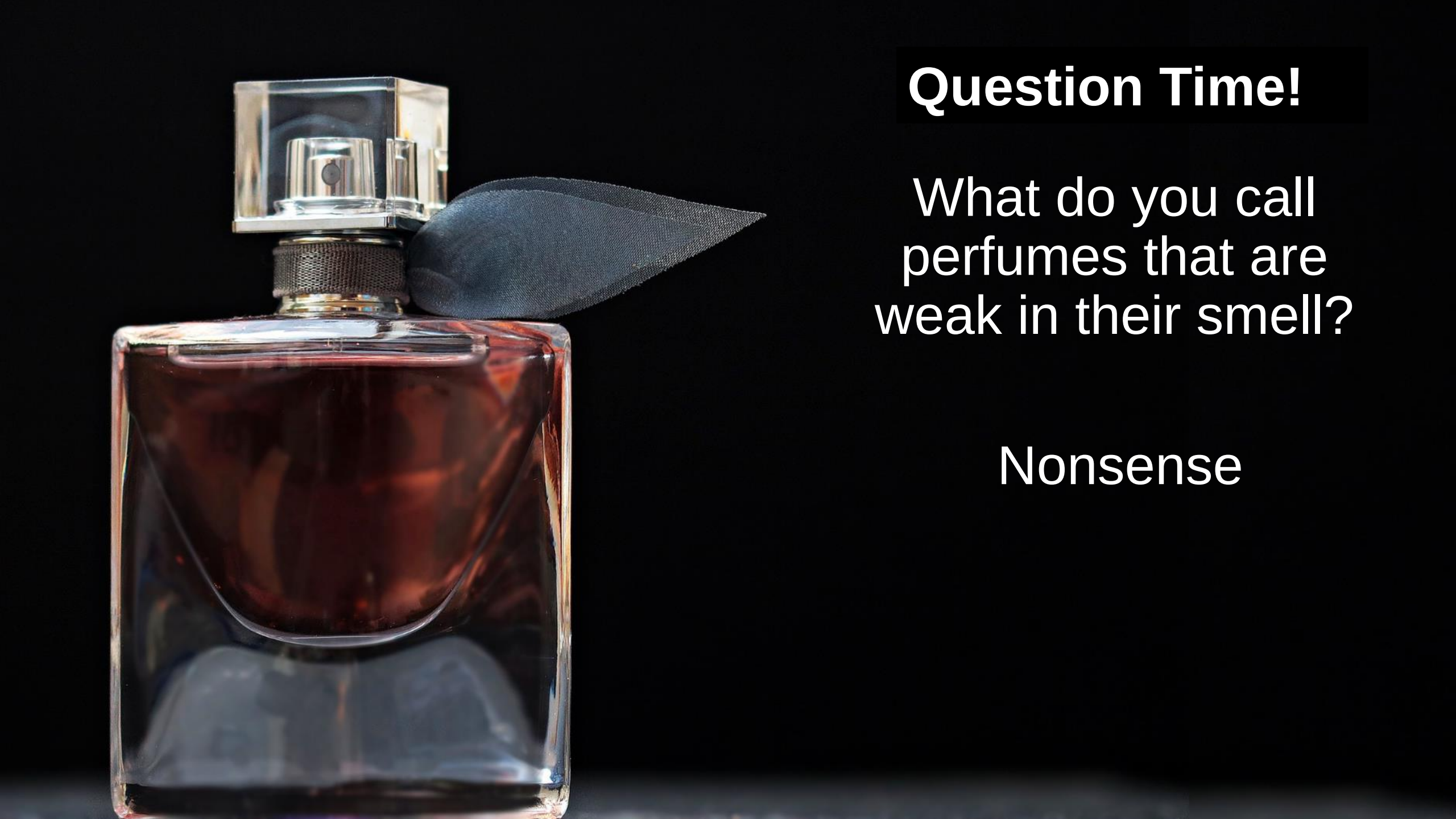
Problem
What are the problems faced?

Analysis
Internal validity of our approach

Benefits
Potential benefits and external validity

Model
Decisions for the client

Client
Who is the client? What is their line of business and operational details



Question Time!

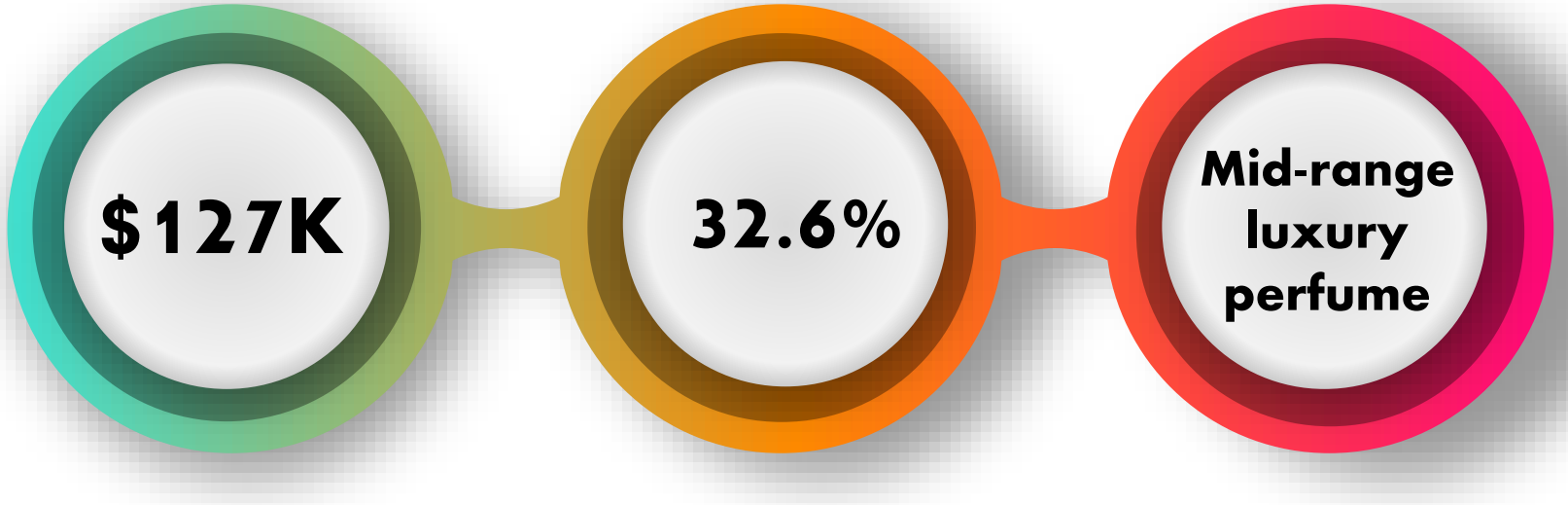
What do you call perfumes that are weak in their smell?

Nonsense

Client

Perfumery startup with their own patented technology that only produces Eau De Parfum grade perfumes.

REVENUE AND MARKET FOCUS



KEY FINANCIALS

Last valued at 5 million	Currently aiming to be valued 100 million by 2028	Positive growth and growing consumer conversion rate

Problem

01

Competitive Pricing

- Prices need to be reoptimized and calibrated
- Currently $63 for 30ml, too close for comfort with Chanel's $226 for 100ml (Eau De Parfum)

02

Inventory

- Stocks need to be updated periodically instead of once per month
- Order quantity
- Inventory forecasting to meet demands

03

Valuation

- Long-term goal of having Venture Capital firms takeover at a higher premium

Black Box Model

INPUT

Decisions (Controllable)

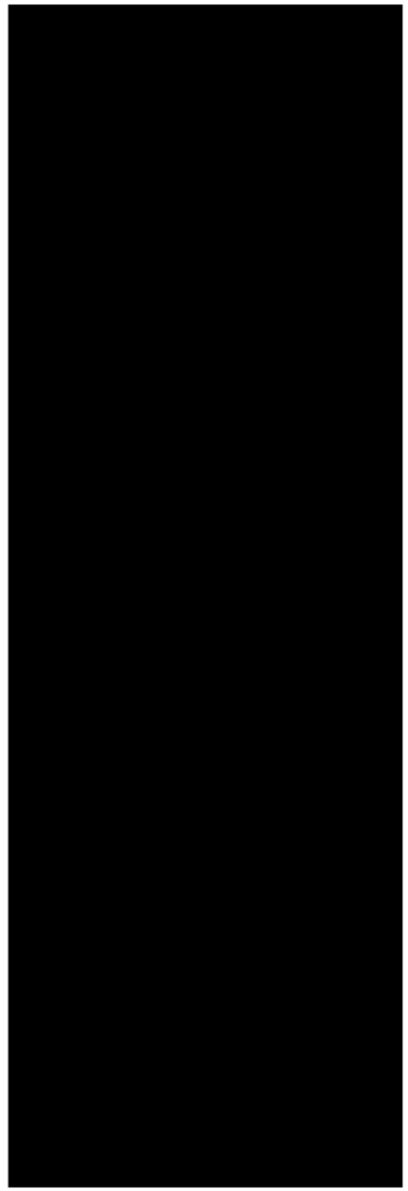
Perfume Prices
Bodymist Prices
Marketing

Parameters (Uncontrollable)

Allocated Fixed Cost
- Shop Rental
- Electricity
- Pay for Part-time and Full-time workers
- Others

Variable Cost
- Ingredient costs per volume /ml (30ml, 50ml and 100ml Bodymist)
- Costs of bottle (30ml, 50ml and 100ml Bodymist)

Seasonality
Borrowing Interest Rate (SME)
Current Company Valuation
Company Target Valuation in 2028
Average Lead Time
Max. Lead Time



OUTPUT

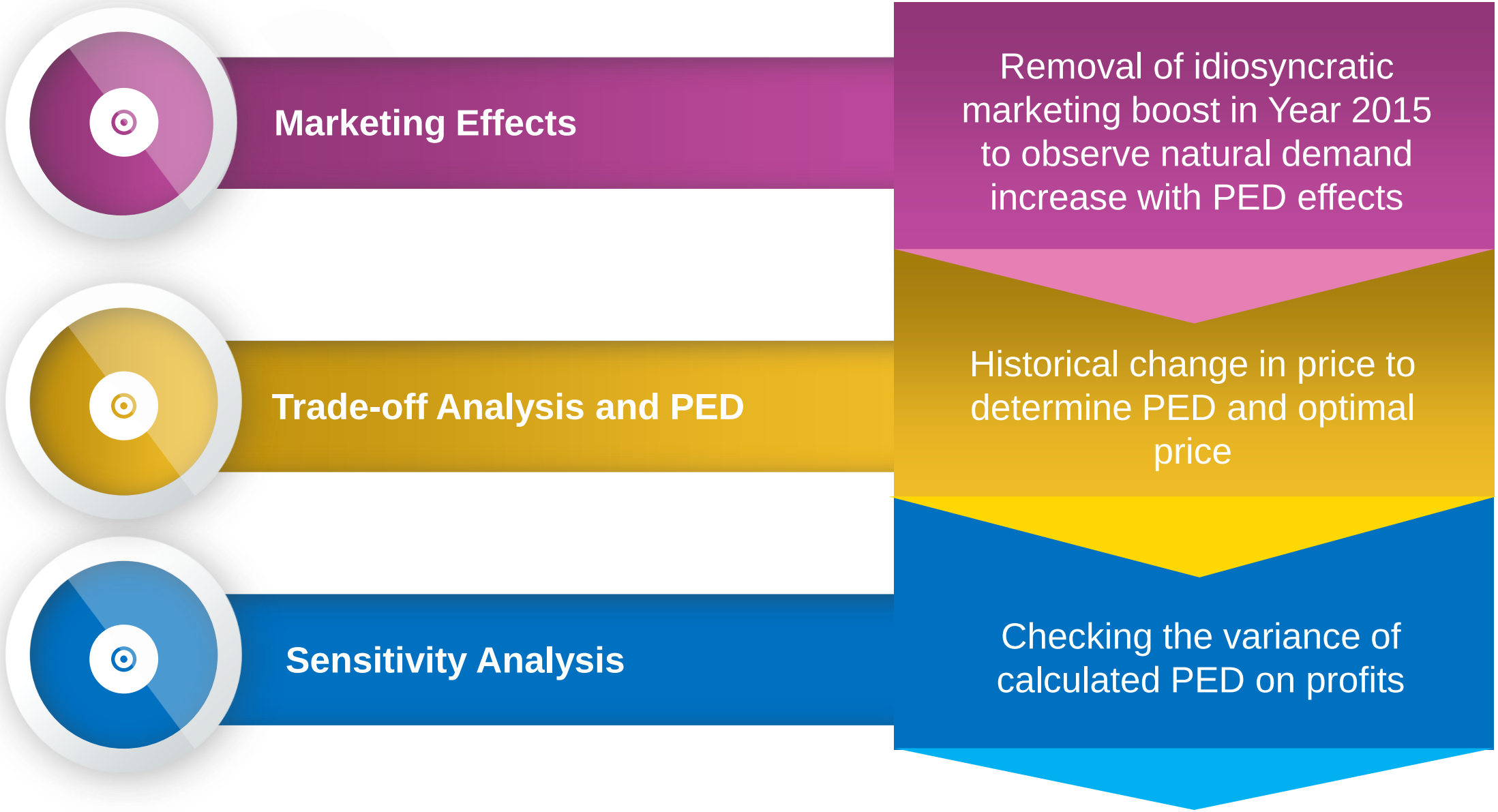
Performance Measures

Profit
Inventory Forecasting
Probability of hitting Company Valuation in 2028

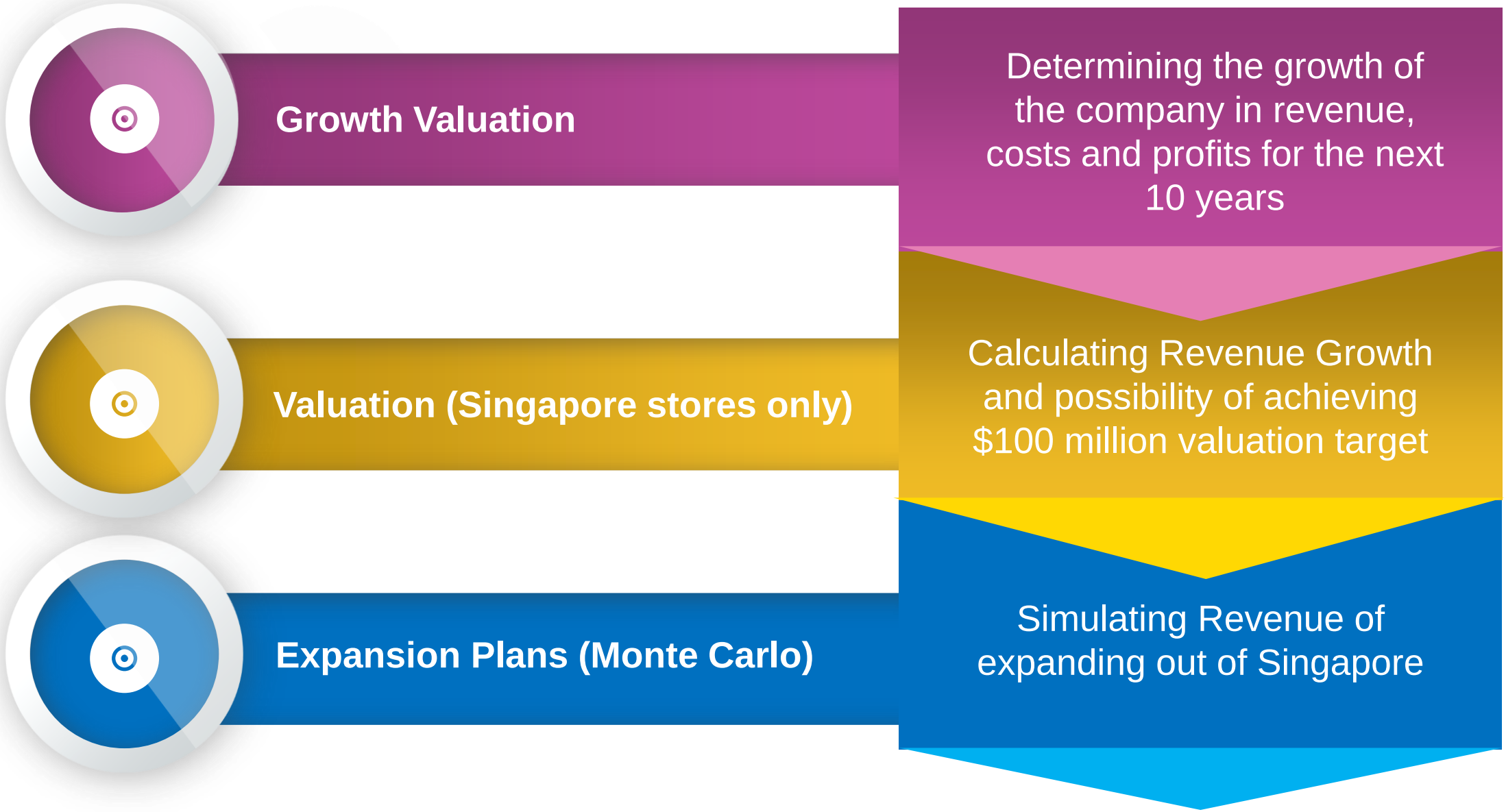
Consequence Variables

Perfume Demand
Bodymist Demand
Price Elasticity of Demand
Total Revenue
Total Cost
Seasonality Index
Forecasted Demand
Forecasting Error
Seasonalised Forecasted Demand
Deseasonalised Forecasted Demand
Max. Forecasted Demand
Safety Stock Level
Forecasted Revenue
Forecasted Costs
Initial Investments for Overseas Expansion
Forecasted Profits
Forecasted CAGR
Average Forecasted CAGR
Standard Deviation of Forecasted CAGR
Forecasted Company Valuation in 2028
Target CAGR

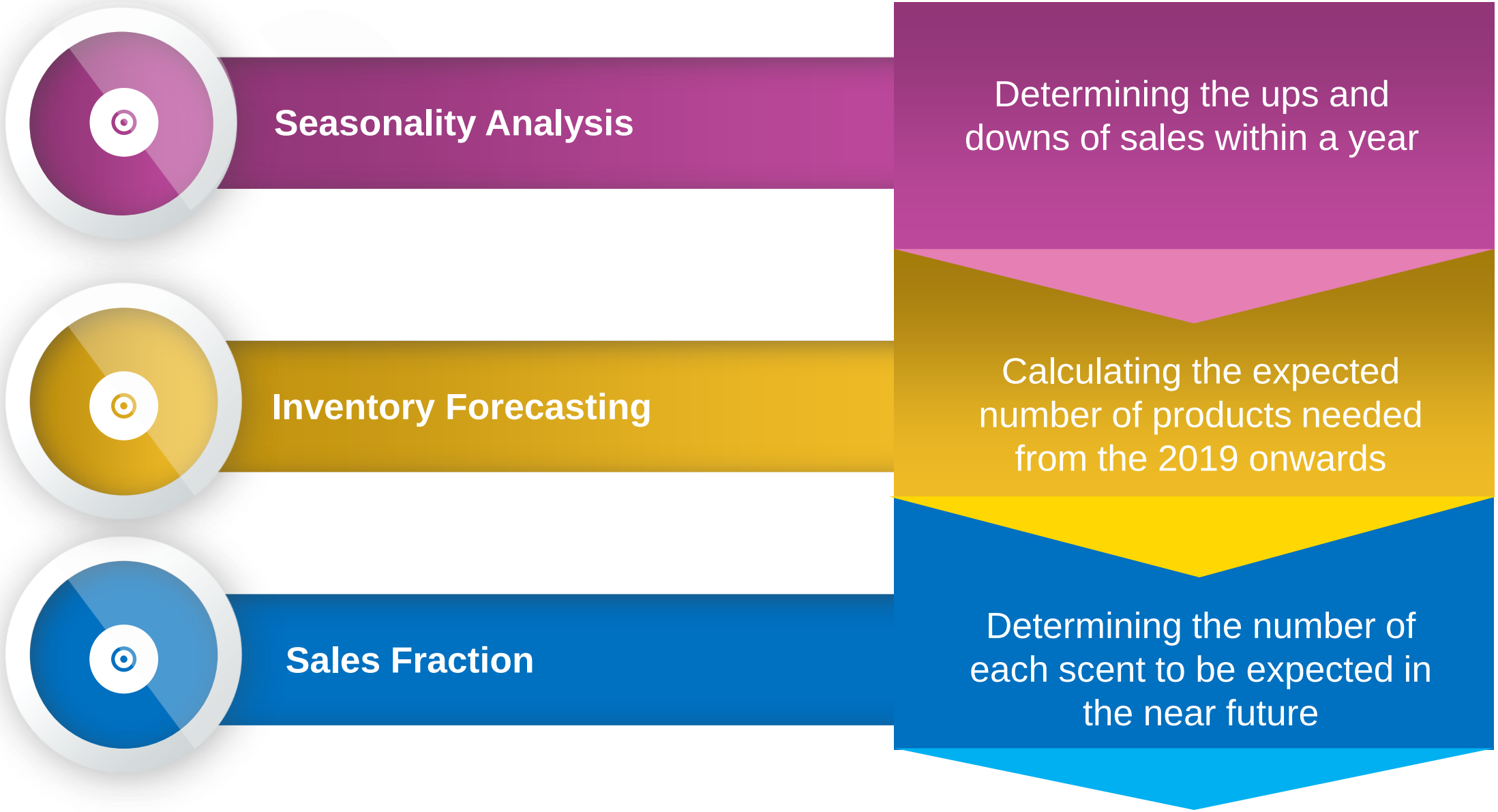
Solution to Issue 1: Price Optimisation Model



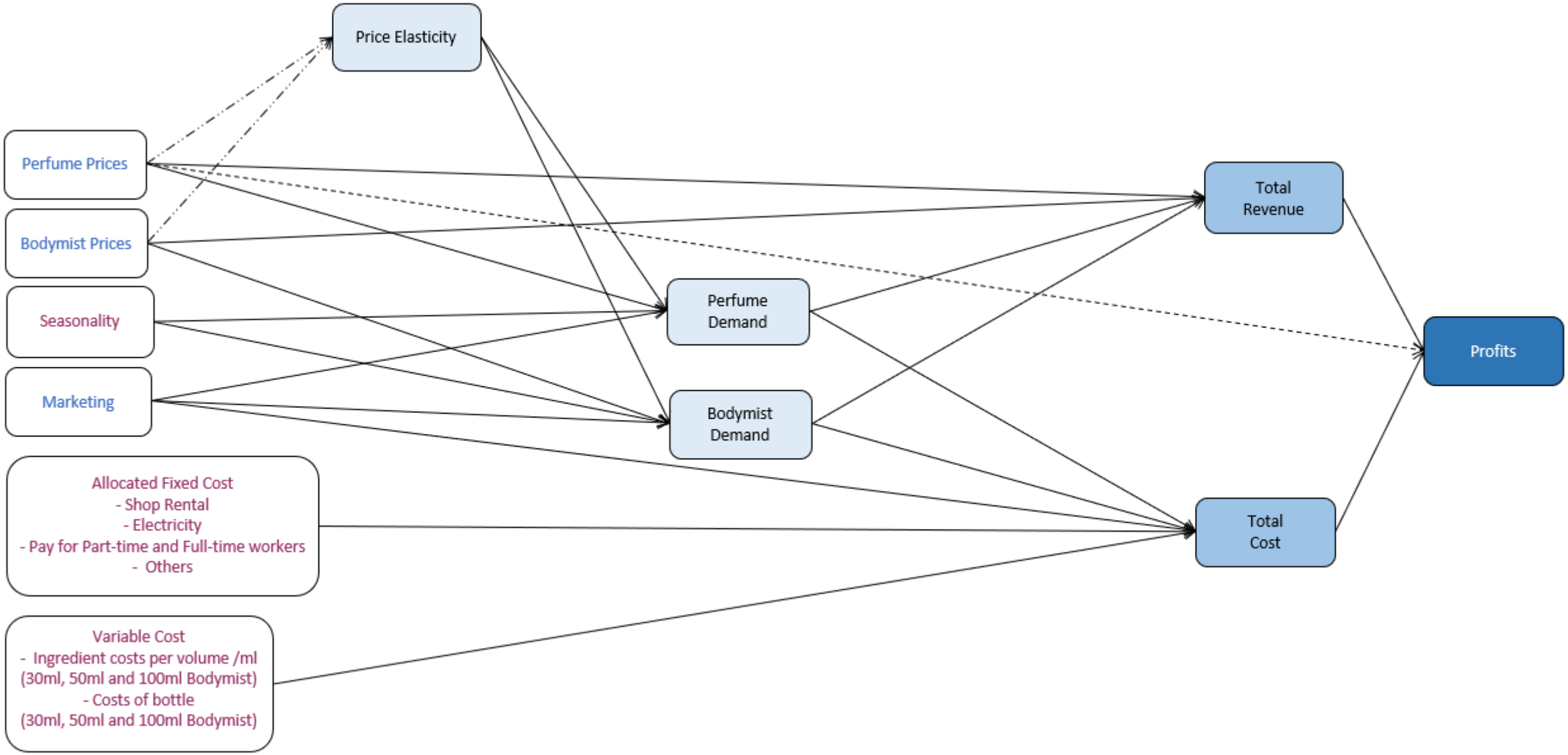
Solution to Issue 2: Valuation and Forecasting Model



Solution to Issue 3: Inventory Management Model



Influence Diagram: Price Optimisation Model



Analysis 1: Price Optimisation Model

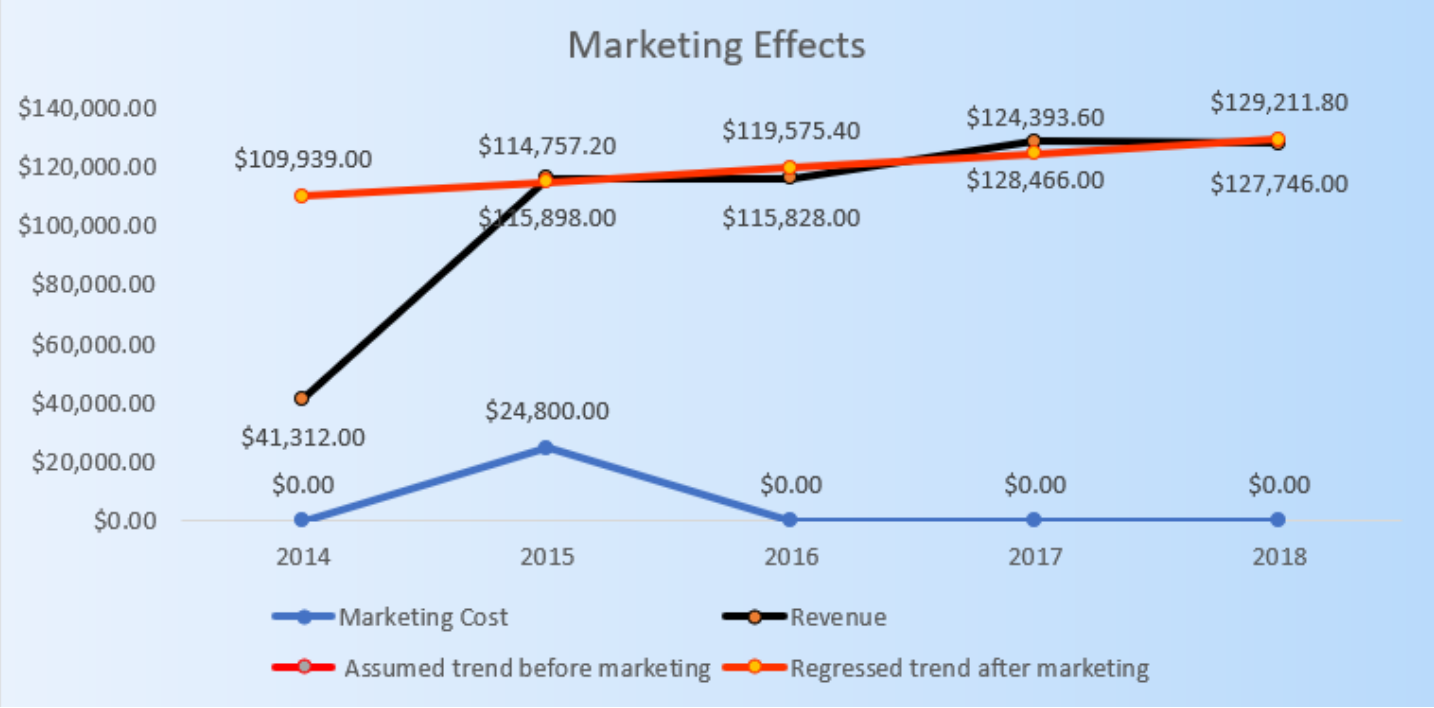
Analysis of marketing effects

Removal of idiosyncratic marketing boost in Year 2015 to observe natural demand increase and PED effect

Step 1: Regression Discontinuity in Year 2015

Adding in marketing effects for 2014

Assumptions: No residual marketing effects after year 2015, 100% marketing effect on sales growth



Analysis 1: Price Optimisation Model

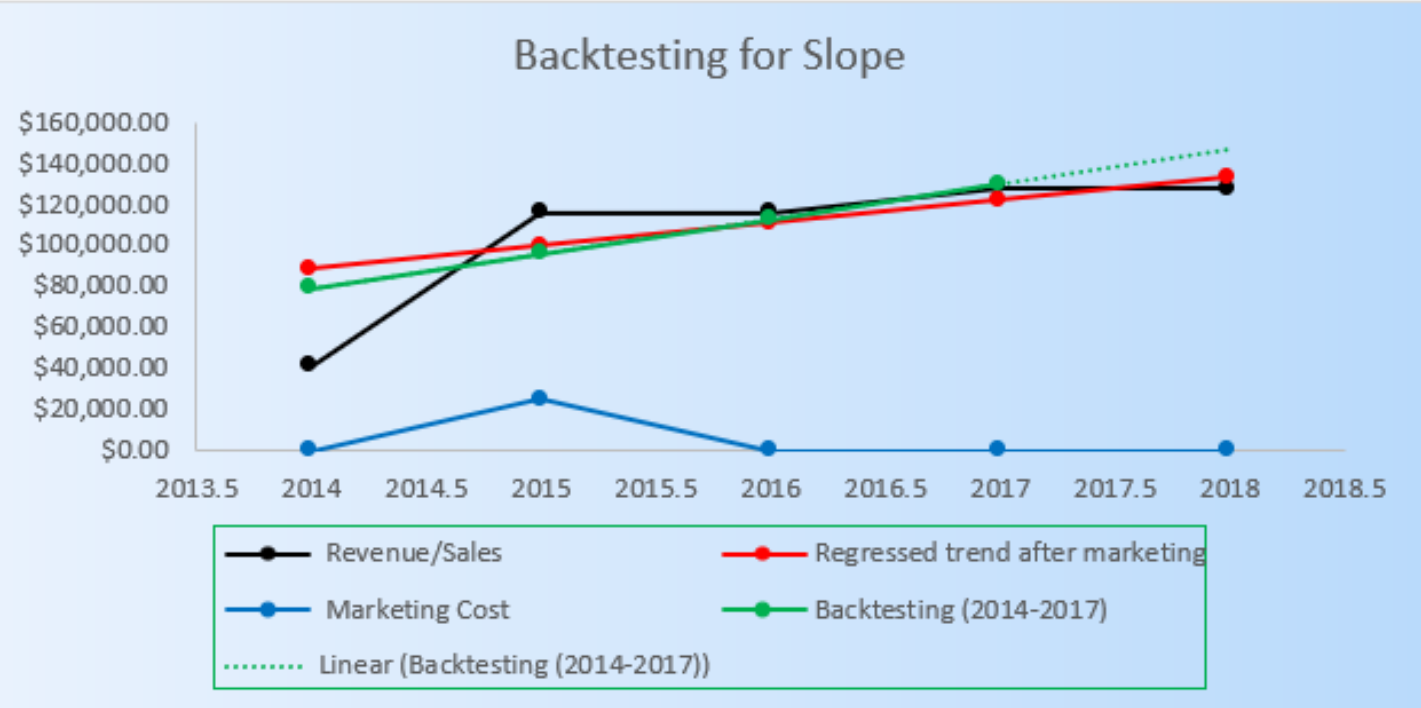
Level of marketing effects

Estimating the true trend with reasonable constraints

Step 1: Determine level of effect of marketing. Graph shown is 65% marketing effects.

Step 2: Sensitivity analysis done to determine marketing effects using 95% confidence interval (lowest 38%)

Step 3: Back-testing using Years 2014 to 2017 to be within 10% error for the slope.
Lowest marketing effect = 71.5%



Analysis 1: Price Optimisation Model

Trade-off Analysis and PED

Historical change in price from $60 to $63 for 30ml and $100 to $90 for 50ml in Year 2017 to determine PED after removing natural demand increase

Step 1: Remove marketing effects and natural increase in demand of each product from sales difference

Step 2: Rebase quantity demanded to base year of 2017

Step 3: PED = % Δ QD / % Δ P
PED (30ml) = -1.782
PED (50ml) = -1.690

Step 4: Trade-off analysis done in tandem

Analysis 1: Price Optimisation Model

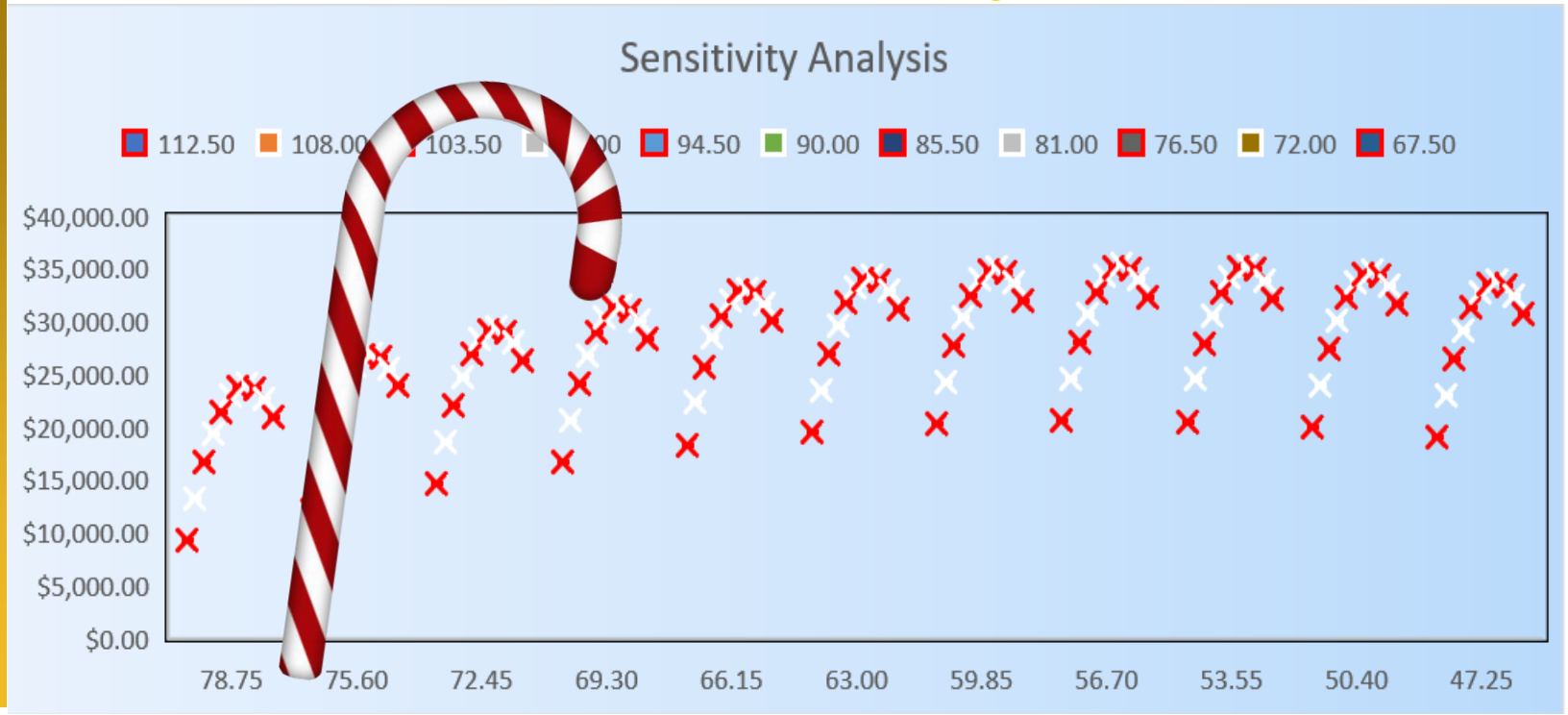
Trade-off Analysis and PED

Price Optimisation

Step 1: Data Table plotted to eyeball the highest growth

Step 2: Solver to maximise profits

Step 3: **Optimal Price** obtained at **$56 and $82** respectively, rounded off to nearest dollar for cognitive appeal



Analysis 1: Price Optimisation Model

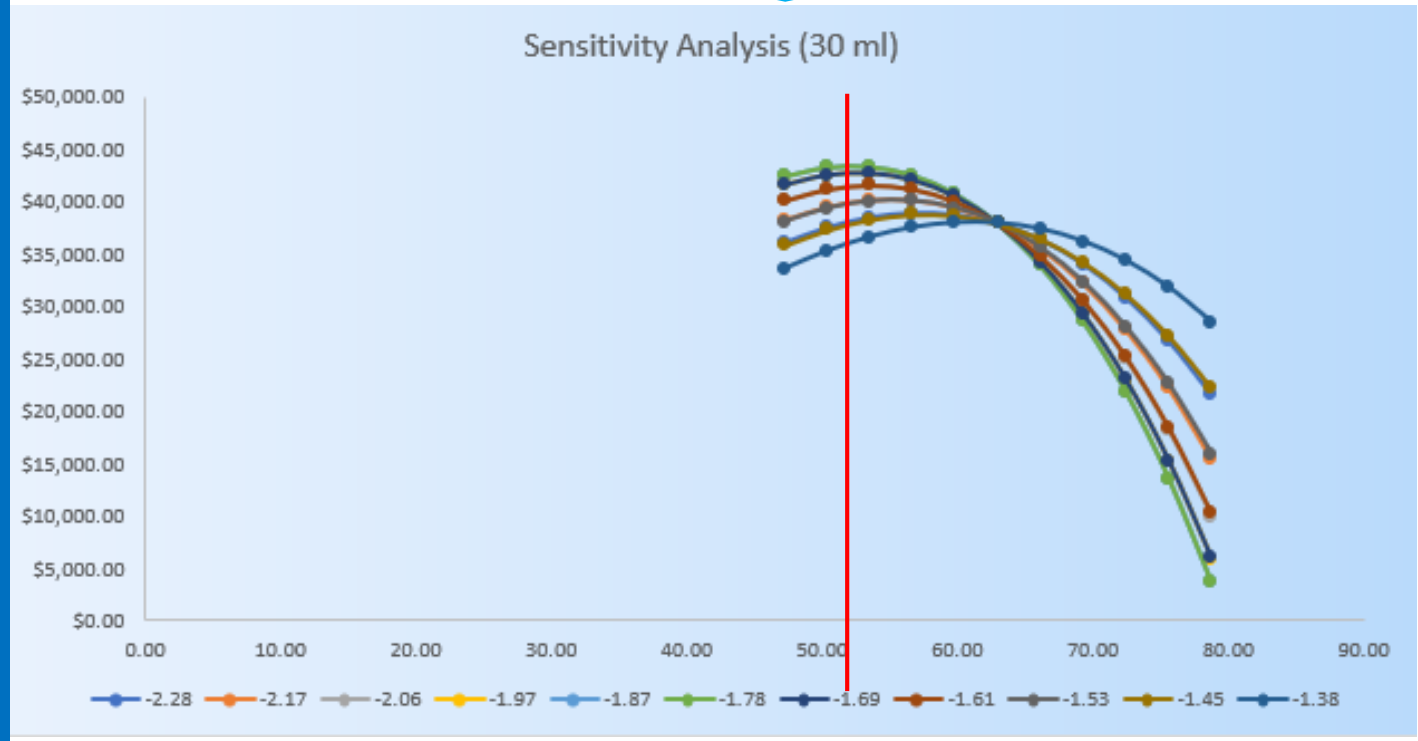
Sensitivity Analysis for PED

What if we measured PED wrongly, or certain regression methods work less effectively?

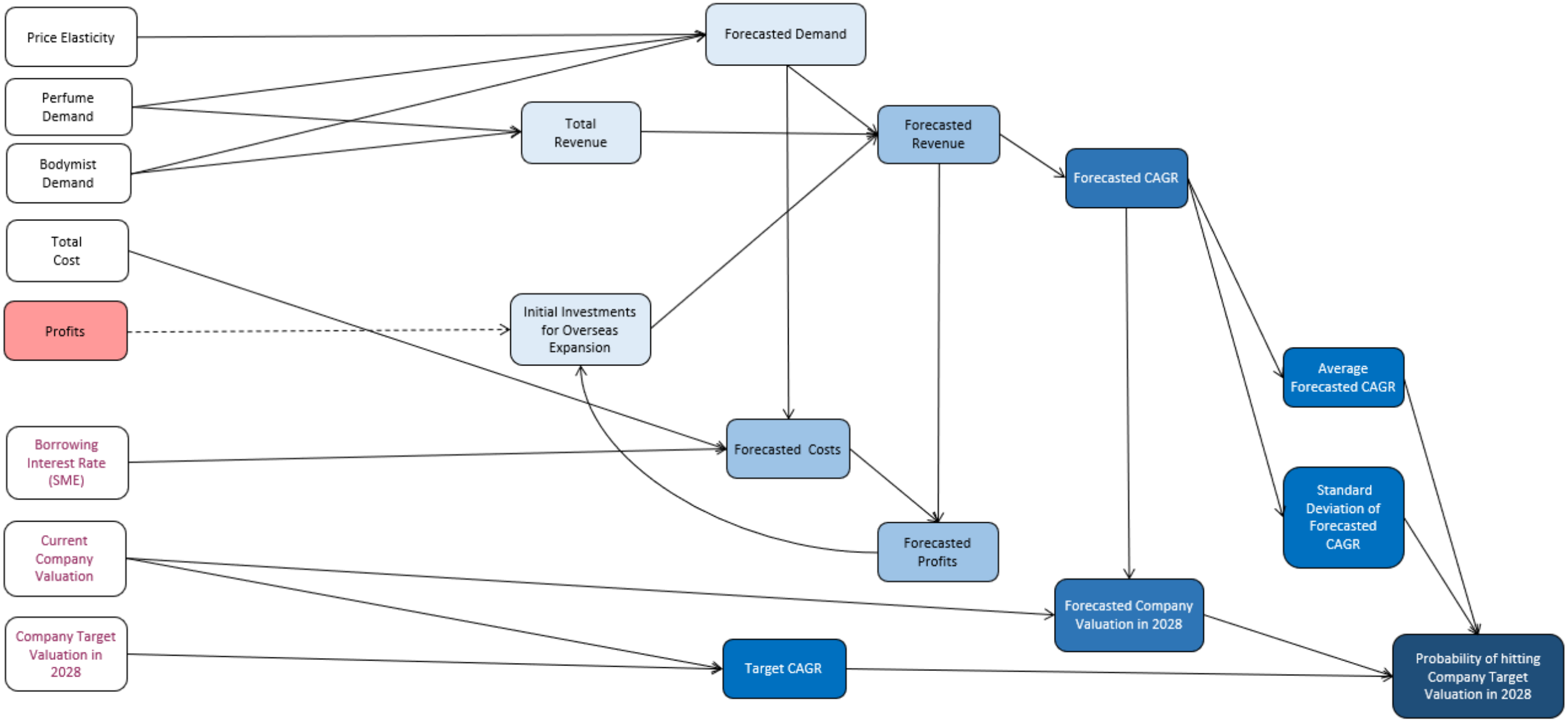
Step 1: Sensitivity of PED plotted by +/- 25% of the calculated PED at the current price, to generate product profit

Step 2: Green line is the calculated PED and is shown to be highest profits at $52

Should we measure the PED wrongly, our profits wouldn't deviate much at $52 as well



Influence Diagram: Valuation



Analysis 2: Valuation

Growth Projection

Determining the growth of the company in revenue, costs and profits for the next 10 years

Step 1: Demand for Eau De Parfum from 2014-2018 rebased to current prices using PED

Step 2: Forecasted demand through Simple Linear Regression until Year 2028

Step 3: Total Revenue, Costs and Profits are then tabulated

	Eau De Parfum (30ml) Price	Eau De Parfum (50ml) Price
PED	-1.783625731	-1.689661177
Price (2014-2016)	$60.00	$100.00
Price (2017-2018)	$63.00	$90.00
Price (2019+)	$56.00	$82.00

Actual Demand

Yearly Demand	2014	2015	2016	2017	2018
Eau De Parfum (30ml)	283	769	758	760	762
Eau De Parfum (50ml)	212	647	652	839	827
Body Mist (100ml)	174	281	286	282	295

Previous Demand after PED Balancing

Yearly Demand	2014	2015	2016	2017	2018
Eau De Parfum (30ml)	317	860	848	911	913
Eau De Parfum (50ml)	276	844	850	965	951
Body Mist (100ml)	174	281	286	282	295

Forecasted Demands

Yearly Demand	2019	2020	2021	2022	2023
Eau De Parfum (30ml)	1143	1267	1391	1516	1640
Eau De Parfum (50ml)	1219	1366	1513	1660	1807
Body Mist (100ml)	337	361	385	409	434

Analysis 2: Valuation

Valuation (Singapore stores only)

Calculating Revenue Growth and possibility of achieving $100 million valuation target

Step 1: Variance of Yearly Quantity Sales taken across the 3 product types and assumed normally distributed

Step 2: CAGR of Company using Revenue as proxy is below 12% year on year

Step 3: Target of $100 million by end 2028 mean CAGR = 34.93%

Step 4: 0% chance of hitting valuation

CAGR Company %
8.03%

Company Valuation by end 2028
$10,828,384.54

Current Valuation	$5,000,000
Target by 2028	$100,000,000
Target CAGR	34.93%

Probability of hitting target
Definitely 0%

Analysis 2: Valuation

Expansion Plans (Monte Carlo)

Revenue CAGR expanding out of Singapore into other countries such as UK, UK, EU, India, Philippines, Vietnam.

Step 1: Profits from 2014-2018 will be reinvested into 2019 expansion plans.

Step 2: Proportion of revenue and costs assumed same as the previous 5 years. Borrowing & interest rates, and GST, included into calculations.

Step 3: Two rounds of expansion in 2019 and 2024

Step 4: Total Revenue in 2028 CAGR over Total Revenue in 2018

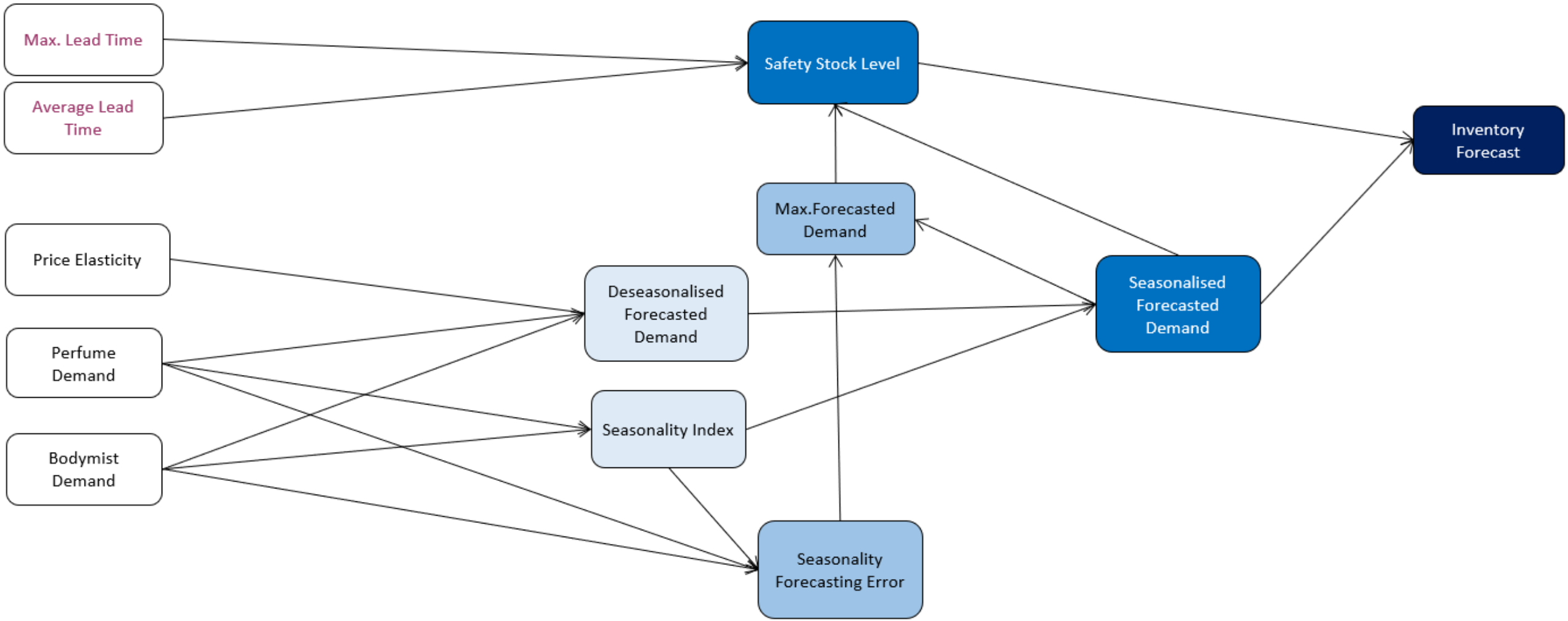
% of Profits Taken Out
20.00%

Interest Rate (SME)
7.00%

Optimised Prices	
Average CAGR Company Revenue %	36.18%
Current Valuation (2018)	$5,000,000
Target by 2028	$100,000,000
Target CAGR	34.93%
Standard Deviation of CAGRs	0.006569946
Probability of hitting target	97.14%

Previous Prices	
Average CAGR Company Revenue %	35.76%
Current Valuation (2018)	$5,000,000
Target by 2028	$100,000,000
Target CAGR	34.93%
Standard Deviation of CAGRs	0.006657072
Probability of hitting target	89.39%

Influence Diagram: Inventory Management



Analysis 3: Inventory Management

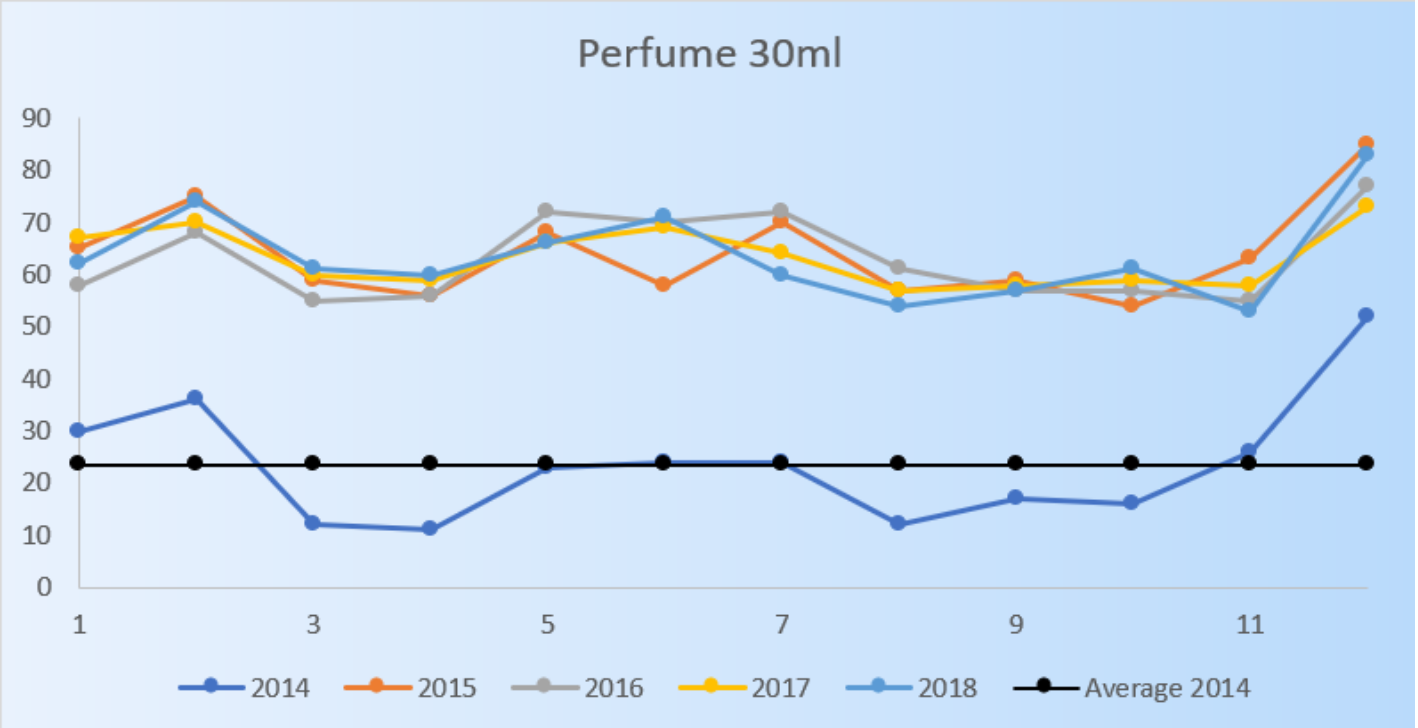
Seasonality Analysis

Determining the ups and downs of sales within a year

Step 1: Divide into 30ml perfume, 50ml perfume and 100ml body mist bottles.

Step 2: Identified months of high growth due to festivity

Seasonality Factor = Month's sales / Averaged monthly sales



Analysis 3: Inventory Management

Inventory Forecasting

Calculating the expected number of stock needed from the next year onwards

Step 1: Deseasonalised sales taken from forecasted growth and averaged by 12

Step 2: Seasonality factor added into each month

Step 3: Quantity of products to be ordered each month
= (Max monthly Demand * Max Lead Time) – (Forecasting Monthly Demand * Lead Time)

Forecasted Demands

Yearly Demand	2019	2020	2021
Eau De Parfum (30ml)	948	1031	1115
Eau De Parfum (50ml)	1066	1228	1390
Body Mist (100ml)	337	361	385

Month	Seasonality Index	Deseasonalised Forecast	Seasonalized Forecast
1/Jan/19	101.55%	95	97
1/Feb/19	108.70%	95	104
1/Mar/19	91.46%	95	87
1/Apr/19	91.46%	95	87
1/May/19	108.37%	95	103
1/Jun/19	101.58%	95	97
1/Jul/19	111.79%	95	106
1/Aug/19	91.46%	95	87
1/Sep/19	91.46%	95	87
1/Oct/19	91.46%	95	87
1/Nov/19	91.46%	95	87
1/Dec/19	128.86%	95	123

Analysis 3: Inventory Management

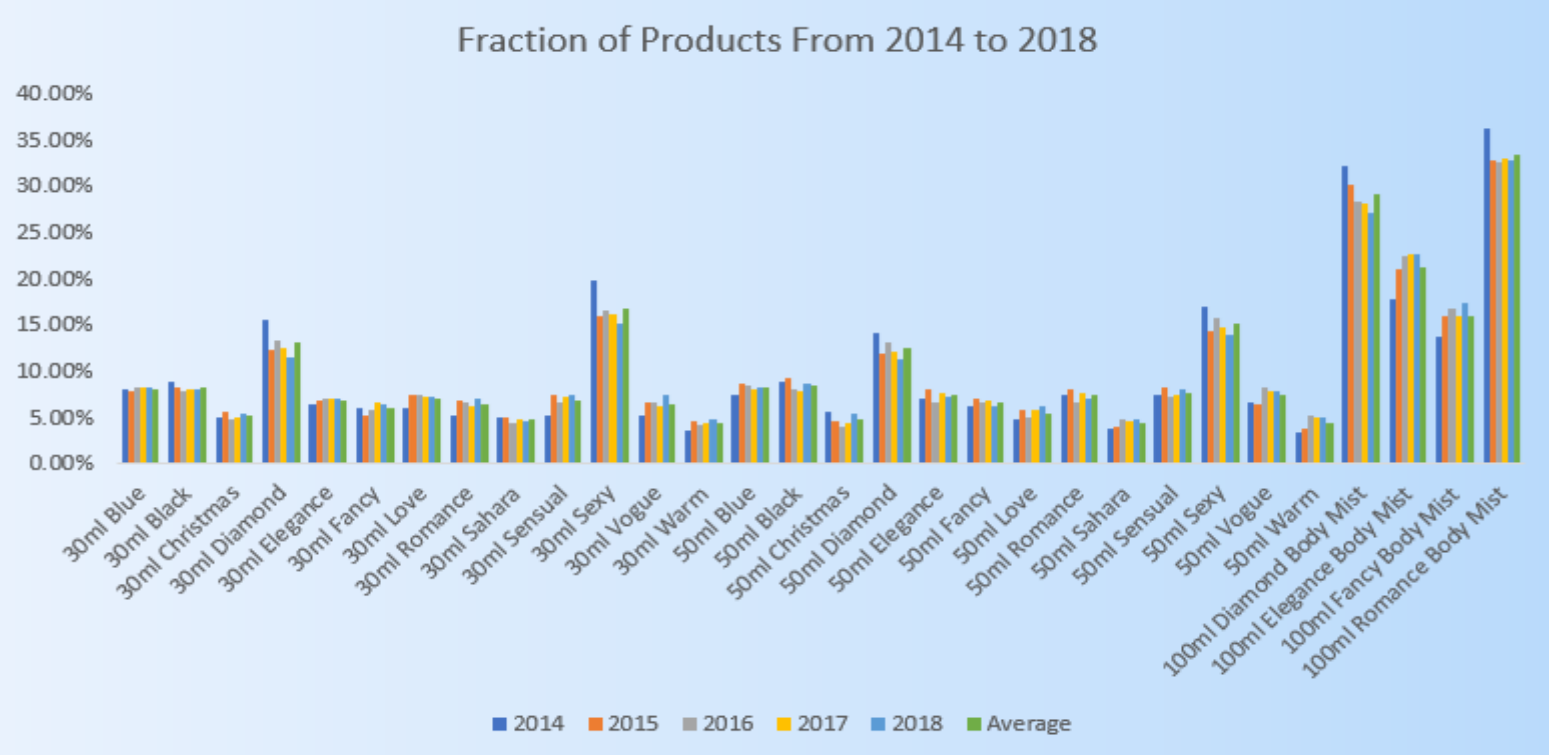
Sales Fraction

Determining the number of each scent to be expected in the near future

Step 1: Past quantities of each scent are taken (arbitrary numbers used)

Step 2: Weighted average of fractions are taken

Step 3: Weighted averages being assigned into forecasted demand



Business Improvements

Marketing Effects

Natural Demand Increase

PED and Optimised Prices

Growth Projection

<u>Maximised Profits & Valuation</u>

Business Improvements

Growth Projection

Seasonality

Sales Fraction

Inventory Forecasting

Inventory Management

Benefits

Solution: Price Optimization
Benefits: Profit Maximization

Solution: Valuation (Monte Carlo)
Benefits: Hitting Target

Solution: Inventory Management
Benefits: Seasonality Forecast & Signalling

THANK YOU!

Q & A