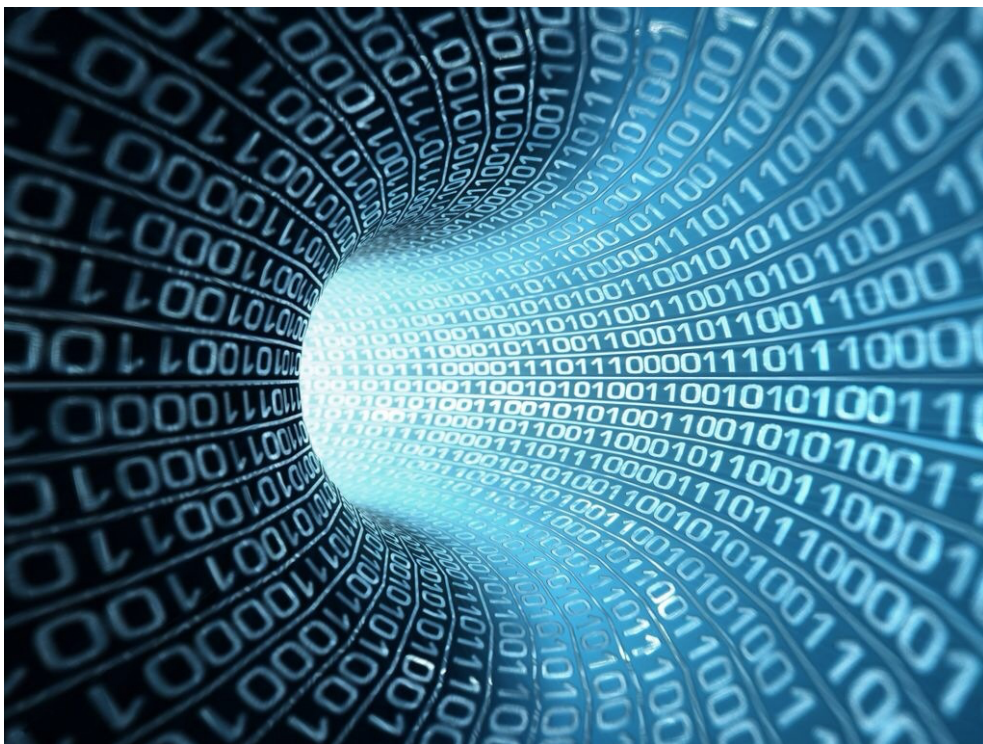# MSc IN MANAGEMENT: MARKETING ANALYTICS

HOMEWORK 4

Prepared by: Daniëlle Kotter

Designed for: Prof. Mohammad Ghaderi

Executive summary

The following report aims to provide valuable input for the decision of the brand ZTE to launch a new handset. A conjoint analysis with a clustering approach has been applied to find the optimal design for various purposes. The survey results conducted for this conjoint study are analyzed thoroughly and data-driven insights developed to achieve a competitive position in the Spanish market.

Primarily individual attribute importance is defined to come up with patterns of preferences used to group consumers into segments. Three segments are distinguished as *price-sensitive, internet-fond* and *brand-conscious consumers.* Each segment values different attributes of a handset such as battery-life and weight. Subsequently, the upcoming analysis can be used to find the optimal combination of attributes that achieves the most ideal outcome for ZTE.

Diverse marketing strategies can be adopted depending on the preferred outcome such as targeting specific segments, finding a gap in the market, generating the highest revenue or achieving the highest market share. The highest market share of ZTE's product portfolio can be achieved by chosen a handset that is Internet Capable, retails at $50, weighing 3 ounces and has a 12-hour battery. However, if the goal is to have the highest estimated revenue, it is recommended to launch the model with internet capability, retailing at $250, weighing 3 ounces and having a 12-hour battery. An increase in revenue of 166% can be achieve compared to not launching the product.

This latest handset would be most attractive to the *brand-conscious* and *internet-fond* consumers whilst the product already launched in the market fits the preferences of the *price-sensitive* consumer. Achieving a diverse product portfolio with a model that is lower in price but offers less attributes such as internet and a model that is more of a "premium". Specific marketing efforts should be aimed towards the importance these consumer groups place on the different attributes in the product configuration.

Technical Report

The following report aims to discover the optimal design of a new handset to be launched by ZTE. Primarily the proposed handset #4 will be evaluated to determine whether this new model adds value to the company and should be introduced into the market. Based on the relative importance of attributes the market share simulation, assisted in understanding the market impact of the different product configurations. The regression equation for the conjoint analysis is:

$$U = b_0 + b_1 Internet + b_2 Price200 + b_3 Price100 + b_4 Price50 + b_5 OZ6 + b_6 OZ3 + b_7 HR30 + b_8 HR24 + b_9 HR12 + b_{10} Evertek + b_{11} Haier$$

The profile of handset #4 is the following:

- Internet Capable
- Retail at $250
- Weighing 6 ounces
- 24-hour battery
- ZTE brand

The combinations of these attributes leads to the new estimated market shares of:

Handset	#1	#2	#3	#4
Estimated Market Share	27%	24%	22%	27%

Prior to handset #4 being adopted in the market, the estimate market share was:

Handset	#1	#2	#3
Estimated Market Share	37%	33%	30%

The *cannibalization rate* represents the sales loss of the existing product (handset #1) / sales of the new product (handset #4). Hence, if handset #4 is introduced to the market, there is a cannibalization rate in market share of:

$$(37\text{-}27)/27 = 37\%$$

Implying that 37% of the sales from handset #4 is taken from handset #1. Considering handset #1 from ZTE has a current estimated market share of 37%, there is a 10% decrease to the 27% after the new model would be introduced in the market. However, the combined estimate market share of both models for ZTE is now 54% which leads to an increase of total market share of 17%.

Moreover, besides market share the revenue is additionally important to consider when evaluating whether the cannibalization effect is justified. Even though in market share % handset #1 & handset #4 are the same, handset #4 will have a much higher product revenue due to the selling price of $250.

To provide a relevant comparison, the estimated market share is used to calculate revenues. If a total of 1000 cell phones are sold in the market and the estimated market share is applied to calculate each model's revenue, this leads to:

Handsets	Handset #1	Handset #2	Handset #3	Proposed #4
Market Share	27%	24%	22%	27%
Selling Price	100	250	200	250
Revenue	$ 27.000,00	$ 60.000,00	$ 44.000,00	$ 67.500,00

This is a combined estimated revenue of **$94.116,31** for ZTE. As can be seen from the calculations below, ZTE's revenue without the newly introduced handset model was **$37.000,00**.

Handsets	Handset #1	Handset #2	Handset #3
Market Share	37%	33%	30%
Selling Price	100	250	200
Revenue	$ 37.000,00	$ 82.500,00	$ 60.000,00

Introducing the new handset provides an increase in revenue of 154%. Upon these conclusions, it would be recommended to launch this new handset even if the percentage in market share for their initial handset becomes lower.

Another way to evaluate product potential is by looking particularly at what happens within the market share of each segment. Before the introduction of handset #4, the segment that handset #1 attracted the most was segment 1 with a partial market share of 42%. After the introduction, the most attracted segment is still segment 1 with now a market share of 32%. However, segment 1 is the lowest attracted segment for handset #4. The opposite goes for segment 2 where handset #1 has the lowest share before and after the launch while this is the one of the top segments for handset #4.

Estimated Segment Shares	Handset #1 before	Handset #1 after	Handset #4
Segment 1	42%	32%	23%
Segment 2	31%	22%	28%
Segment 3	40%	28%	29%

These estimated differences suggest that either way, while there is overlap in share of segments, there is a possibility to target specific segments through marketing. ZTE could advertise handset #1 specifically for the profile of segment 1 and handset #4 for segment 2 & 3.

Optimal product configuration

Whilst the initial recommendation would be that launching handset #4 to the market would be valuable, there is absolutely potential to find an even better product configuration. Though there are various methods to get to an appropriate solution.

Market share
Primarily, I aimed to find the highest increase in market share for a new product by designing a handset model with the maximum utility obtainable. Hereby I averaged the regression coefficients for each individual and chose the attribute levels that had the highest estimated increase in utility (ratings). This method led to the following combinations of attributes and an estimated market share of 38%:

- Internet Capable
- Retail at $50
- Weighing 3 ounces
- 12-hour battery
- ZTE brand

For simplicity of evaluating all product configurations, this model will be called handset #5. The proposed handset #4 had an estimated market share of 27%, representing 11% less than handset #5. The profile was able to capture mostly the share of segment 1 who has previously been described as the price sensitive group. However, due to the much lower selling price, this model was only able to generate a revenue of $19.000,00 (with the example of selling 1000 phones in total). Below the calculations for handset #5 can be found:

Handsets	Handset #1	Handset #2	Handset #3	Proposed #6
Market Share	24%	21%	19%	38%
Selling Price	100	250	200	50
Revenue	$ 23.000,00	$ 52.500,00	$ 38.000,00	$ 19.000,00

The combined revenue for ZTE is now estimated at **$42.000,00,** an increase in revenue of 14%, compared to without the model being introduced. Thus, it was concluded that the model proposed by ZTE (handset #4) has more potential for revenue capture. However, if the goal of the marketing strategy is to have the highest possible market share, for reasons such as growth or publicity, handset #5 would be more appropriate.

Segmentation & profiling
The second method adopted for finding the optimal product design was through analyzing the segments. The profiling is performed by evaluating the highest and lowest mean importance of each segment. Segment 2 is the largest in size and its biggest average attribute importance found through the clustering method are for internet capability and price. The attribute they value least is weight of handset.

Variable	Cluster1 (6 obs)	Cluster2 (8 obs)	Cluster3 (6 obs)
Price	0.528144	0.36952	0.190683
Weight	0.056207	0.05223	0.080000
Battery Life	0.199459	0.13018	0.215341
Internet	0.076025	0.31719	0.094891
Brand	0.140165	0.13087	0.419191

I have chosen to categorize segment 2 as the *internet-fond* consumer. Segment 1 is mainly concerned about price and least values weight. This is similar to segment although their relative importance of price is much higher than segment 2. Therefore, they are classified as the *price-sensitive* consumers. Segment 3 gives most weight to the brand and also cares the least about weight of the handset. Segment 3 will be categorized as the *brand-conscious* consumers. Luckily ZTE is the most preferred option from all the brands, which will be in our favor to be attractive to segment 3.

In order to target specific segments, I calculated the average increase in utilities for each attribute subsetted by segment. It is assumed that the consumer would purchase their preferred product. Each segments preferred product configuration on average is the same: the handset #5 solution. However, this did not result in the highest revenue for ZTE. Subsequently, this didn't bring much additional discoveries.

Increased revenue
In order to find an optimal design, adjustment of the selling price might be valuable. Therefore, the next step was evaluating the effect of adjusting the selling price on market performance. The highest average increase in utilities are by introducing a phone that is $50 USD, then a price of $100 USD. We initially established that handset #1 mainly attracts segment 1. Handset 1 does not have internet capability but already has the price of $100 USD. Adopting a similar handset could lead to even higher cannibalization and therefore potential for lower overall revenue. Moreover, a higher price selling price leads to a higher profit margin. Therefore, the product configuration that seemed the most promising is considered handset #6:

- Internet Capable
- Retail at $250
- Weighing 3 ounces
- 12-hour battery
- ZTE brand

This solution provides the following estimated market share and revenue:

Handsets	Handset #1	Handset #2	Handset #3	Proposed #6
Market Share	26%	24%	21%	29%
Selling Price	100	250	200	250
Revenue	$ 26.000,00	$ 60.000,00	$ 42.000,00	$ 72.500,00

The combined estimate revenue for ZTE is **$98.500,00**. An increase in revenue from prior to introducing a new handset of 166% and in absolute terms, $4383.69 more than the proposed handset #4. The model cannibalized 11% market share from handset #1. Leading to a cannibalization rate of:

$$37\text{-}26/29 = 38\%$$

Compared to handset #5, there is a lower estimated market share (38% vs 29%). However, this new model was able to capture 29% market share at a selling price of $250 dollars which ultimately drove the monetary success.

200 vs 250

Throughout the decision process, consumers make trade-offs upon attribute improvement and selling price which impacts market share. Subsequently, having a higher selling price can affect market share as consumers might not want to pay the premium. Ultimately, I compared the results of handset #6 with a same configuration that has a selling price of $200. Below these results can be found:

Handsets	Handset #1	Handset #2	Handset #3	Proposed #7
Market Share	25%	23%	21%	32%
Selling Price	100	250	200	200
Revenue	$ 25.000,00	$ 57.500,00	$ 42.000,00	$ 64.000,00

Introducing handset #7 leads to an estimated combined revenue for ZTE of **$89.000,00,** 11% less than handset #6. The cannibalization rate is additionally 38%. Lowering the selling price to $200 dollars would generate a combined estimated market share of 2% more than having a price of $250. However, this does not compensate for the $50 less in profit margin.

Conclusion
Through trial and error, evaluating the segment preferences and choosing the features that give the higher increase in utility, I have been able to find a different product configuration that has a higher combined revenue for ZTE than the one proposed in the assignment. Aiming only for the highest market share, would give a different solution for the optimal product design. However, as a business our number one goal is to make profit. Subsequently the model with the most market potential in regard to revenue is handset #6.

Naturally these calculations do not consider the difference in resource commitments. To provide an example, a price of 50 USD might not be realistic if the COS to introduce this handset with the required attributes is similar to the selling price. Perhaps this could be included to improve the analysis. Furthermore, an optimization algorithm such as solver excel would be valuable to optimize the outcome applied to a larger sample set. Alternative advanced methods that measure consumer preferences as dynamic would be more applicable.

References

Agarwal, James. 2014. *An Interdisciplinary Review of Research in Conjoint Analysis: Recent Developments and Directions for Future Research.* Available at: https://ecampus.bsm.upf.edu/pluginfile.php/281171/mod_resource/content/0/Agarwal%20et%20al.%20-%202015%20-%20An%20Interdisciplinary%20Review%20of%20Research%20in%20Conjoint%20Analysis%20Recent%20Developments%20and%20Directions%20for%20Future%20Resea.pdf. > [Accessed 7 June 2021].

Hauser, J. and Rao, V., 2004. Conjoint Analysis, Related Modeling, and Applications. *Marketing Research and Modeling*.

Vithala R. Rao. Handbook of marketing analytics. 2014. *Industry applications of conjoint analysis*. [online] Available at: <http://ndl.ethernet.edu.et/bitstream/123456789/67963/1/13.pdf> [Accessed 7 June 2021].