Curved TV Conjoint Analysis Study

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1. Introduction

Sony is looking to launch a brand new Curved TV product into the market as there has been steady growth of demand for curved TVs since it was first introduced into the market. At present there are two direct competitors to Sony that already has a share in the curved TVs market which is LG and Samsung. Both competitors have different features to each other, where LG has gone to market with a 65-inch TV, 120HZ refresh rate, 4000 pixels and priced at $4000. Samsung on the other hand has opted for a larger screen size of 85 inches, it has the same refresh and pixel rate as LG, and it priced at a much higher price point of $9000. Sony can only go to market with a TV that is 4000 pixels and 120Hz refresh rate which is the same as its direct competitors, but is flexible with the size of the screen and price.

The aim of this report is to cover the considerations on the different combinations of attributes that Sony could potentially decide to go to market with, and to identify the product profile that has the largest purchase probabilities. This report will outline the attributes that are important to the consumers which will be used to support the decision on deciding the right combination of product attributes.

To understand what attributes consumers value the most, Sony had conducted a pre-test study by surveying 20 participants to identify what are the main attributes that they consider when purchasing a TV. With this pre-test study, Brand, Screen size, Refresh rate, Resolution and Price were identified as the main attributes that Sony should include in the product profiles when running the conjoint analysis study to identify what is the best combination Sony should choose when designing the new product.

This report will cover the outline and methodology of the conjoint analysis study that has been conducted, and based on the finding of the study will cover some recommendations for Sony to consider.

2. Methodology

Conjoint analysis a form of a regression technique that marketers use to conduct product and pricing research. This technique will enable marketers to gain a deeper understanding on what is it in a product that drives consumers to purchase it, is it a single attribute that is driving the sales or is it a combination of product attributes that makes the product appealing to consumers. Conjoint analysis will also enable marketers to gain a deeper understanding on consumer's willingness to pay for the different attributes of a product, thus making it a useful tool to develop sales forecasts and predict market shares of a product.

Rather than asking consumers directly what is it that they would want in a product, which in most cases would lead to ambiguous answers, utilising conjoint analysis, marketers ask people about their overall preference for a combinations of attributes of a product, the results from this is then decomposed into identify the weighting a consumer places for each attribute in a product.

There are 4 parts to a conjoint analysis study that Sony had undertaken to gain a deeper understanding on consumer's preferences for curved TVs. The first step in a conjoint analysis study is to come up with a combination of product profiles based on a combination of the 5 main attributes that were identified in the pre-test study. To avoid participant fatigue, Sony had opted to use a fractional factorial design in this study which is a selection of the possible combinations of product profiles. The combinations were selected in a way that each attribute level appears the same number of times to ensure that the design is balanced. The correlations between each attribute should ideally be zero, in this case due to way the data was presented, we were not able to test this so this is a limitation of this study. In total there were 18 product profiles that was included in the conjoint analysis and these are:

Profile	Description
1	LG 75in 120 HZ 4000 pixels $4000
2	LG 85in 120HZ 4000 pixels $4000
3	Sony 65in 120HZ 2160 pixels $6000
4	LG 85in 120HZ 2160 pixels $6000
5	Samsung 85in 120HZ 4000 pixels $9000
6	LG 75in 240HZ 2160 pixels $9000
7	Sony 65in 120HZ 4000 pixels $9000
8	LG 65in 120HZ 4000 pixels $6000
9	Sony 85in 240HZ 4000 pixels $6000
10	Samsung 75in 120HZ 40000 pixels $6000
11	Sony 85in 240HZ 4000 pixels $4000
12	Sony 75in 120HZ 4000 pixels $9000
13	LG 65in 240HZ 4000 pixels $9000
14	Samsung 65in 120HZ 4000 pixels $4000
15	Sony 75in 120HZ 2160 pixels $4000
16	Samsung 65in 240HZ 2160 pixels $4000
17	Samsung 75in 240HZ 4000 pixels $6000
18	Samsung 85in 120HZ 2160 pixels $9000

Once the possible product profiles have been identified and collated, the second step is to collect data to assess the consumers' preferences. In this study, 20 participants were presented with a survey to rank the likelihood of them purchasing the product on a 1-7 scale, where 7 represents the most likely that they will purchase the product, and 1 represents the least likely.

After the data has been collected from the survey respondents, the third step is to obtain the part-worth's for each attribute. From the data of the survey, the rankings placed by the survey respondents is placed in reverse order, where now a score of 1 is the most preferred option and 7 is the least preferred option. The preference score that a participant place is in fact the measure of the product's overall worth, and not the products attributes worth. Part-worth's are the weightings a consumer places on each attribute, which can be used to identify what are the most important

attribute in a product for a consumer. The product attribute part-worth's for each survey participant is derived using regression analysis. To perform the regression analysis, the first step is construct dummy variables for each attribute where the number of dummy variables needed is always 1 less than the number of variables. In this study, the dummy variable that has been left out were coded with a value of -1 to identify that these attributes are the reference level attributes, and the remaining attributes take a form of being coded as 0 or 1. The reference level attributes for this study were: 85In screen, the brand LG, 240 Hz refresh rate, 2160 pixels and a price point of $9000. With the completion of the dummy coding, the regression was run on all of the 20 participant's preferences to identify the part-worth's of each attribute for each participant.

With the part-worth's, the part-worth's range can then be identified which is the maximum value of each part-worth minus the minimum value of each part-worth. With this range identified, we could then calculate the relative importance of each attribute to a participant, this is done by dividing the part-worth range for the attribute against the part-worth range for all attributes. With the relative importance calculated, Sony can identify of the 5 main attributes, which attribute is the most important to the participants and use this information when deciding on the final product combination.

The fourth and final step of the conjoint study is to develop a conjoint simulator which will evaluate the purchase probabilities for each product profile. To evaluate the purchase probability, first the conjoint utilities needed to be calculated which is an additive process of adding up the part worth's for the relevant attribute levels.

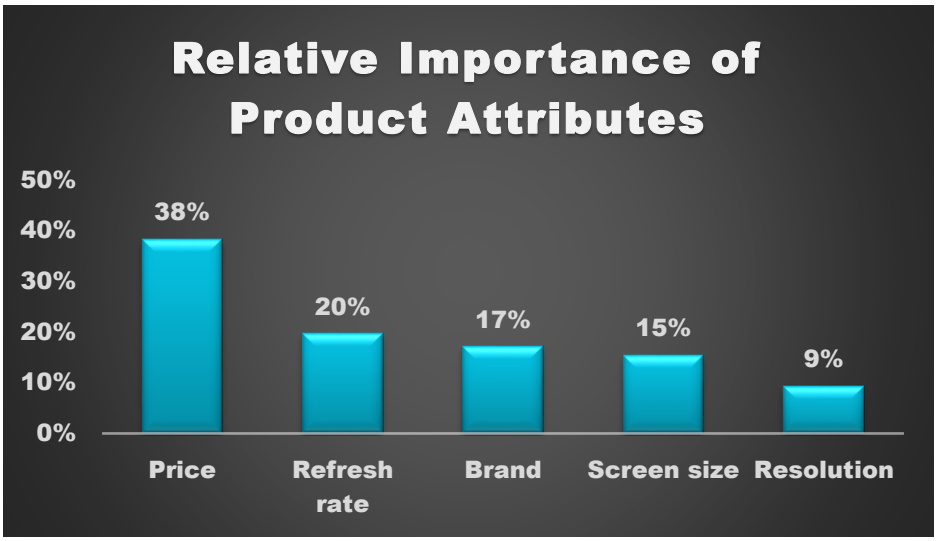
By evaluating the purchase probability for each product profile for each participant, Sony is then able to calculate the potential market share of a certain product. To calculate the purchase probability, the Multinomial Login Model (MNL) was used where the assumption is made that the purchase probability of a product is equal to its share of the exponentials of the utilities for the competing products. An average of the participants purchase probability will provide an estimate on the market share for each product profile. With the market share available, Sony is also then able to calculate the profitability and find the combination that is the most profitable.

3. Study Results

There are a total of 9 possible combinations that Sony could go to market with to break into the curved TVs market, the table below outlines the possible combination and the product ID which will be referenced throughout the rest of this report.

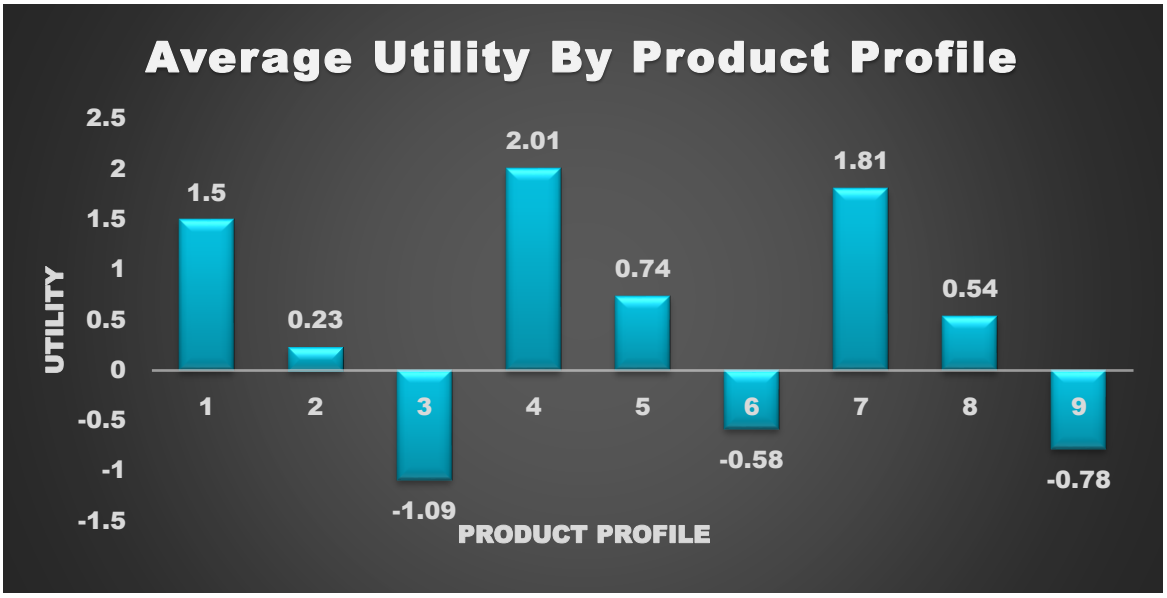
Product ID	Description
1	SONY 65 in 120 HZ 4000 Pixels $4000
2	SONY 65 in 120 HZ 4000 Pixels $6000
3	SONY 65 in 120 HZ 4000 Pixels $9000
4	SONY 75 in 120 HZ 4000 Pixels $4000
5	SONY 75 in 120 HZ 4000 Pixels $6000
6	SONY 75 in 120 HZ 4000 Pixels $9000
7	SONY 85 in 120 HZ 4000 Pixels $4000
8	SONY 85 in 120 HZ 4000 Pixels $6000
9	SONY 85 in 120 HZ 4000 Pixels $9000

With the part-worth's results from the regression analysis, we are able to analyse the relative importance of all 5 of the attributes that have been included in this study. By analysing the average figures of the relative importance of each participant for Screen Size, Brand, Refresh Rate, Resolution & Price. It is quite evident that price is the most important attribute a consumer assesses before making a product purchase. From this study, price scored a high average score of 38% followed by refresh rate at 20% and brand at 17%. The refresh rate is irrelevant in this study as Sony is only able to offer a refresh rate of 120Hz for its product, so the key attributes that Sony needs to consider is making sure the product is priced well.

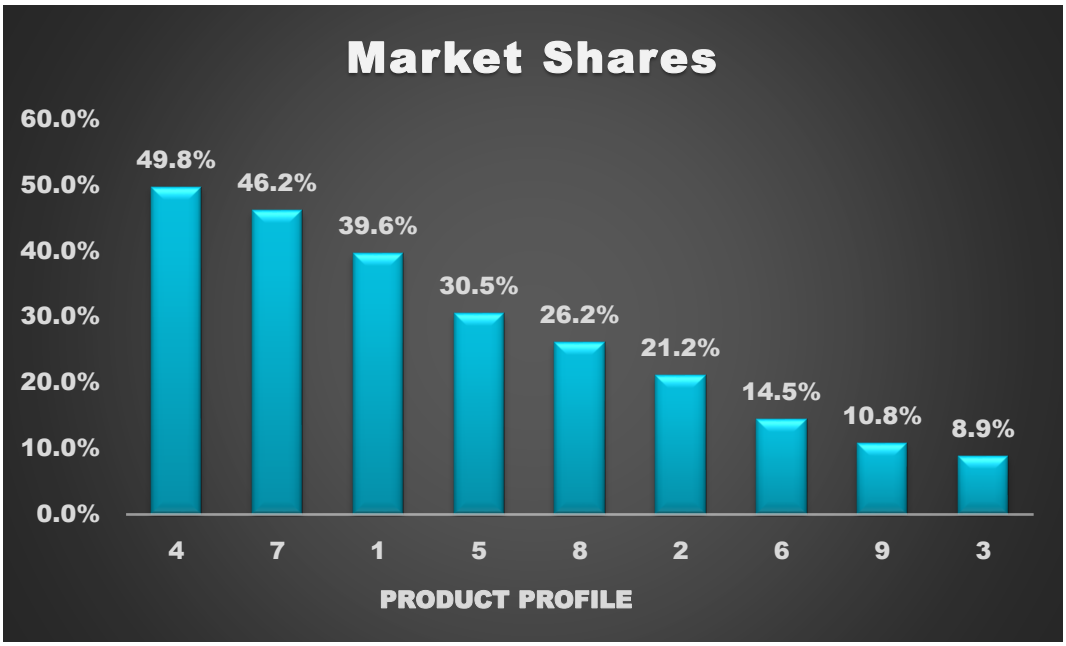


The table below provides an outline of the average utility weighting of all participants for each possible product combination that Sony can offer. Based on this average utility, it's quite evident that the combinations priced at $9000 is the least preferred option, as all three combinations for $9000 has a negative utility score. The graph below provides a visual representation of the utilities and clearly shows that the options priced at $9000 is least preferred. This also supports the results from the relative importance scores where price was the highest driver in making a purchase. From this it is advisable that Sony do not go to market with a TV priced at $9000.

Product ID	Average Utility
1	1.50
2	0.23
3	-1.09
4	2.01
5	0.74
6	-0.58
7	1.81
8	0.54
9	-0.78



With the results from the utility calculations, we are able to analyse the purchase probabilities of all 9 product profiles compared to the 2 existing products that are already in the market from Sony's direct competitors. An average of the participant's purchase probabilities was calculated to estimate the market share of each product profile. The findings for this were quite interesting as apart from the products with the lower price point of $4000, even though the relative importance of the screen size was the 2nd lowest consideration a consumer considers (15%), the profiles with the highest market share (49.8%) was the Sony TV priced at $4000 with a screen size of 75 inches which is the middle range of the 3 sizes that Sony is able to offer. This means, apart from price, Sony should also give consideration to the size of the TV that they go to market with and bigger is not necessarily the most preferred option, as product profile 4 & 7, both with the highest market share and both priced at $4000, the bigger TV of 85 inches scored a slightly lower market share of 46.2% compared to product profile 4.



By calculating the market shares, we are then able to estimate the profitability for each product profile. The table below outlines the total costs for each product, the estimated number of sales unit and the profitability. The most profitable product profile which is the 75-inch TV priced at $6000 (5), does not have the highest market share, however the product with the highest market share, is the 75-inch TV priced at $4000, is the 2nd most profitable product that Sony can offer. Sony needs to assess the balance of going into the market with a higher priced product to increase profitability, or to go to market with a slightly lower profitable product to gain a higher market share.

Product ID	Market share	Base cost	Feature cost	Total variable cost	Sales (Unit)	Price Per Unit	Profit ($)
1	39.64%	$800	$0	$800	39637	$4,000	$124,836,864.02
2	21.16%	$800	$0	$800	21160	$6,000	$108,030,504.67
3	8.90%	$800	$0	$800	8896	$9,000	$70,946,707.76
4	49.77%	$800	$600	$1,400	49769	$4,000	$127,399,753.87
5	30.55%	$800	$600	$1,400	30548	$6,000	$138,518,556.75
6	14.52%	$800	$600	$1,400	14521	$9,000	$108,360,396.56
7	46.22%	$800	$1,000	$1,800	46224	$4,000	$99,692,743.75
8	26.19%	$800	$1,000	$1,800	26186	$6,000	$107,981,014.70
9	10.84%	$800	$1,000	$1,800	10836	$9,000	$76,022,522.09

4. Recommendations

Based on the results from the study there are 2 questions that Sony need to consider when deciding which product to go to market with. Does Sony want to enter the market with a higher market share, thus potentially attracting potential buyers from its direct competitors or does Sony want to go to market with a product that has a higher profit margin.

It is recommended that Sony breaks into the market with the product that has the highest market share to test the market. The 75-inch TV priced at $4000 has the highest market share of 49.7%, this means that should Sony decide to go with this product, Sony could potentially hold half of the curved TV's market. We know that price is an important factor to consumers, so entering the market at a lower price point of $4000 will make the product attractive to its potential consumers thus increasing the number of units sold. Going into market at a lower price point, will allow Sony the space and time to build its brand in the curved TV market.

If profitability is a main driver for Sony, the best option to go to market with which is the most profitable option due to the higher pricing, is also the 75-inch TV but priced at $6000 instead of $4000. Even with the reduction in market share of nearly 20%, Sony is still able to make an extra estimated profit of $11 million by pricing the same TV at a higher price point of $6000. However, consideration needs to be given to the fact that if Sony decides to go to market at a higher price point, it will have a much lower market share compared to its direct competitors of LG and Samsung as the estimated market share for this product sits at 30.5%.