SWP 4

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Summary

The purpose of this document is to describe and analyze the survey data gathered from 593 people regarding different Bluetooth speakers. The main task is to understand the preferences of the respondents as good as possible. To achieve this goal, we use the method of choice-based conjoint analysis (CBC). In the previous paper (SWP 3) the users were directly asked about their preferences in the Bluetooth speakers' market. Compared to this approach the CBC is the more appropriate, because the task of choosing a preferred concept is more similar to what buyers actually do in the marketplace and can give more insights over the direct survey. Each participant is given 12 sets of choices. Each choice set consists of 4 options (three conceptual ones created from different variations of attributes from the table below) and the respondent is required to choose only one of them.

Price	Battery	Sound	Weight
70	8 hours	3.5 stars	400 grams
90	10 hours	4 stars	500 grams
110	12 hours	4.5 stars	600 grams
130	14 hours	5 stars	700 grams
150	16 hours		

Data cleaning

Before using the data for the CBC, it is useful to try to clean and find outliers who could probably influence the results. There are, for example, 11 people that have chosen "None" for each choice set they were given. It seems that those respondents were choosing the "None" option on purpose or were not interested at all in this kind of product. For this reason, we can exclude them from our data set.

Descriptive prediction

We have computed the choice counts for each attribute before estimating the choice model. Analyzing this way gives a basic idea about the choices people have made as part of the survey. This could be helpful to make sure the model predictions match the basic logic of the data and the raw choice counts of the respondents.

Looking at the price, there are substantial differences between the different price levels. The option "70" was chosen 5 times more than option "150". The same pattern is observed on the "sound" attribute, where "sound 4.5 stars" is chosen around 2000 times and "sound 3.0 stars" only 500. On the other hand, the different levels of the "weight" attribute were much more balanced and were chosen almost the same amount of times. This leads to the conclusion that

price and sound play a much more important role in the decision making than the weight. This conclusion matches the direct survey results from previous paper.

Analysis

Using a logistic regression, we are able to extract from the data the dependencies of the different variables and how they influence the choice of the consumers.

	Estimate	Part Worth	Range	Importance	WTP in Euro
Intercept	-5.2940				
price	-3.1053		3.1053	47%	
Battery16h		0.5382	1.1287	17%	
battery8h	-1.3357	-0.7975			43.01
battery10h	-0.7250	-0.1868			23.35
battery12h	-0.4234	0.1148			13.64
battery14h	-0.2070	0.3312			6.67
sound5.0s		1.1793	1.8912	29%	
sound3.5s	-2.5347	-1.3554			81.62
sound4.0s	-1.5388	-0.3596			49.55
sound4.5s	-0.6435	0.5358			20.72
weight700g		-0.3989	0.4384	7%	
weight400g	0.7566	0.3577			-24.36
weight500g	0.5210	0.1220			-16.78
weight600g	0.3182	-0.0807			-10.25
Sum Range			6.5636		

Table Nr.2

The Table Nr. 2 gives us the most important coefficients that are needed for the analysis of the conjoint analysis. Looking at the importance, we conclude the price is obviously the variable that is most influential with 47% importance in the distribution of the variance. It is followed by the sound, leaving the battery and the weight as the most unimportant in the decision-making process. This completely fits our prediction before implementing the model.

The most practical value derived in the Table 2 is the WTP (willingness to pay). Its calculation is based on the values of the coefficients of the different variable's levels and the influence of the price on the preference of the respondents. This means for example that to go from the base value of the "battery" variable – 16h – to 8h, we should reduce the price of the product by 43,01 euros. Interpreted differently this means the consumers are willing to pay 43,01 euros to move from a product with an 8-hour durable battery to a product with a 16-hour durable battery.

Probably logical for a Bluetooth speaker, but it can be observed that sound plays unimportant role for the customers – they are willing to pay an additional price of 81,62 euros to jump from the worst quality of sound to the best one possible in the survey – 5-star sound quality.

Regarding the weight not surprisingly the lightest speaker costs the most and it is also confirmed by the willingness of the participants to pay 24,36 euros more to buy a speaker that is 300 grams lighter than the heaviest one.

Conjoint analysis based on clusters

	Cluster1		Cluster2		Cluster3		Cluster4	
	Importance	**WTP in Euro**	**Importance**	**WTP in Euro**	**Importance**	**WTP in Euro**	**Importance**	**WTP in Euro**
Intercept								
price	46%		46%		49%		46%	
Battery16h	14%		17%		19%		18%	
battery8h		35.11		41.05		45.50		49.52
battery10h		17.92		23.49		24.23		27.02
battery12h		8.28		14.45		16.46		11.32
battery14h		4.07		5.51		7.42		10.05
sound5.0s	33%		32%		24%		28%	
sound3.5s		88.89		94.23		69.61		74.28
sound4.0s		48.55		58.34		43.11		45.77
sound4.5s		18.35		25.48		20.42		14.01
weight700g	7%		5%		7%		8%	
weight400g		-22.44		-20.56		-25.24		-33.29
weight500g		-19.60		-14.48		-17.10		-19.00
weight600g		-7.70		-9.51		-10.36		-14.87

Table Nr. 3

The next step in our analysis is based on our previous paper where we conducted cluster analysis on the same people using the direct preference survey. There were 4 different clusters created:

- Cluster 1: Mostly young females with occupational status “Student”, low income level and low educational status (directly linked to the age and the occupational status)
- Cluster 2: Mostly young males with occupational status “Student”, low income level and low educational status. It differs to the 1st cluster mainly by the gender characteristics
- Cluster 3: Mostly older males with higher income and educational level, working as employees
- Cluster 4: Mostly older females with higher education, higher income level (the group with the highest income level), employed

The conjoint analysis showed differences between the four clusters, mainly in the importance of the different features and their willingness to pay for the different levels of the attributes. This data is summarized in Table Nr. 3. Some of the predictions made here matches to the predictions of Cluster analysis. On the other hand, there are some results that are quite different. Findings are provided below:

It is observable that the sound is more important for the 2nd cluster than for the others. This could have been derived from their own answers in the first part of the survey as well. Even though second group mainly consists of low-income male students, as data shows, they are one willing to pay most to upgrade from low level sound to higher. It is worth noting that in general this group tends to pay most for majority of the features. They could be targeted by higher end Bluetooth speaker manufacturers like Bose, Beats and HarmanKardon, even though at first glance, that might not seem the target audience. Changing strategy will also require using new sources for promoting the product. Turning from more traditional, TV and Outside Advertisement to social media and YouTube product placements.

Another match of the both methods was the importance for the 3rd and 4th clusters to buy products with reliable batteries. These are employed people with higher income and better standard of living. They are more likely to pay more to get the best feature when we are talking about the weight as well. This means that they are putting much more importance on the practical features than on the hard to measured ones - like sound quality. This could be a hint in the shift of the paradigm on the market as many companies would think the high-price products would sell to their wealthier customers, who according to this study care more about utilities. Putting this much emphasis on those features can be linked to other major trends and reveal fact that people are using Bluetooth speakers not only for enjoying music at home or the places which provides reliable electricity. The trend of healthy lifestyle is becoming more popular these days, especially for the people described in the 3rd and 4th cluster. This trend effects people's behavior and determines their preferences for using free time. Combining these facts, we can assume that these are people that spend the weekends outside of the city, doing activities in nature where weight and battery life of speaker plays important role. Brands who target these groups can benefit by decreasing weight of product and increasing battery life. From data we can see that 12-hour battery life seems most optimal for most people in these two clusters. Considering these assumptions, other than these two factors, product makers can also promote the built quality and rigidness of their product to gain even further advantage over competitors.

The main difference between cluster and conjoint analysis on these clusters is group 3. Unlike predictions from cluster analysis, conjoint analysis revealed, that there are least likely to pay for the sound.

The difference between Clustering and Conjoint Analysis can be explained by two factors. First, the data they are based on are quite different, even though same people filled both forms and some patterns are still visible. As mentioned before, choice data is more reliable as it gives people opportunity to compare actual product choices and measure tradeoffs.

Other findings:

If we take a look at the sound category, we can see that people are not willing to pay as much to move from 4.5 stars to 5 stars as they are willing to pay to move from 3.5 to 4 stars. In the process of product creation, it could noted that customers tend to strive for middle class sound when choosing their Bluetooth speaker. The sound difference between the higher categories might also be hard to notice which makes the average consumer indifferent to this improvement.

In the cluster analysis we pointed out that the 1st and 2nd clusters are more concerned about the prices of the product which could be linked to their lower income level. It is notable that pattern in the relative importance is similar throughout the four groups, but their willingness to pay differs. Hereby looking only at relative importance can be misleading and give us an idea that all of the groups are similar, but we further drill into their willingness to pay substantial differences can be observed.

Conjoint analysis also gives one more important hint. Taking into account that 1st and 2nd cluster on one hand, and 3rd and 4th on other, display almost similar behavior and the only difference between them are their gender, it can be concluded that there is no need for four clusters and two is sufficient to display main categories of people. 1st and 2nd combined would give group of youngsters with low income, mainly students. 3rd and 4th combined – Middle-age people, employed, with higher income. The main difference between these two groups are displayed by the fact that first one puts sound quality on top of other features, while for second group battery life and weight play more important role.