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 give 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 “sound3” is chosen around 2000 times and “sound1” 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 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



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 significant differences between the four clusters, mainly in the importance of the different features and their willing to pay for the different levels of the attributes. This data is summarized in Table Nr. 3.

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.

The wealthier respondents are to pay more to get the best feature when we are talking about the weight and the battery life. This means they are putting much more importance on the practical features than on the hard to measure 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.

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.

Some of the predictions of the cluster analysis matched the results from the conjoint analysis. For example, it is obvious that the sound is more important for the 2nd cluster than for the others which could have been derived from their own answers in the first part of the survey.

Another match of the both methods was the importance for the 3rd and 4th clusters to buy products with reliable batteries. These are people with higher standard of living and it can be assumed that these are people that spend the weekends outside of the city.

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.