

Master Thesis Khanda Ahmad

Do brand image or product attributes drive consumer choice?

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1. Abstract

The importance of brand image is widely accepted in the world of marketing. Apart from that the attributes of a product are given a lot of attention. Both seem to have an effect on the consumer choice. This paper examines which of the two components has a stronger effect on the consumer choice. A choice based conjoint analysis is designed to collect the data. By using a binary logistic regression model, these effects of the brand image dimensions and product attributes variables are examined. To test these relationships, the product category 'smartphones' is used in this study. Three product attributes (camera, battery and prices) and three brand image dimensions (design, popularity of the brand and match of the brand with the personality) are used as the independent variables. These independent variables are used as the product attributes in the conjoint analysis.

The results show that all the three product attributes have a significant effect on the consumer choice. There is also a significant positive relationship between the three brand image dimensions and the consumer choice.

By comparing the effects of the variables of both components, brand image dimensions have a stronger effect on the consumer choice. An interesting recommendation for advertising managers is that the focus in the ads should be more on the emotional messages, instead of focussing on the rational messages.

Keywords: consumer choice, brand image, product attributes, smartphones

2. Preface

Proudly I present this thesis that I have been working on during my Master Economics and Business Marketing at the Erasmus University Rotterdam. I did this thesis about the relationship of brand image and product attributes on consumer choice with great pleasure, because this is something I am interested in. I worked on it with great enthusiasm and I was highly motivated to conclude my academic career with this research.

First of all I would like to thank my thesis supervisor, Dr. V.G. Hariharan. He had a solution for every problem. All the guidance, ideas and feedback he gave me, were of much value and helped me to get the most out of the research and deliver a high quality research.

I would also like to thank my family and friends for all the support and motivation they provided me throughout the whole process. My family and friends helped me to collect 200 respondents for my survey within a week, which helped me to start faster with the analysis of the results.

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3. Introduction

In this chapter the research topic will be introduced, by discussing the problem indication, the relevance of the topic and the managerial relevance. This will lead to the research questions and the research method used. The end of the chapter will be about what can be expected from the remaining report.

3.1 Problem indication

"People talk about technology, but Apple was a marketing company".

-Former Apple CEO John Sculley

When companies see that a new business idea is successful, they follow them and imitate the products (Ekekwe,2012). An article in the Fortune magazine (Rice, 1991) states that US business have lost over 60 billion annually of their revenue, because of product counterfeiting. Because of the high competition, it is essential to create a distinctive brand image (Kohli & Suri, 2002). Hence why companies are investing a lot of money in brand building. B2C- product companies are spending an average of 15,6% of their annual revenues on marketing. This can reach a total amount of 10 billion dollar per year (Moorman, 2014).

Both components are becoming important. Because companies are spending a lot of time and money on these components. It is assumed that the consumer considers both components when they make a purchasing decision. But it is interesting to know which of these two is more important when the consumer makes the final decision. This leads to the main question: '*Do brand image or product attributes drive consumer choice?*'

Research has been done that focuses on consumer decisions based on the effect of product features (Fader & Hardie, 1996) and also research that focuses on consumer decision based on the effect of brand image dimensions (Birdwell, 1968). But none of the prior studies have examined the relative effect of these two.

3.2 Relevance of research topic

There are several studies about the effect of brand image and SKU's on consumer choice and the importance of these two variables.

However, no research has been done integrating both components, to see which of the two has a greater effect on the choice of the consumer.

3.3 Managerial implications

For marketing managers this paper will show the relationship of brand image and product attributes on consumer choice. Besides these relationships, it will also show which of the two (brand image or product attributes) has a stronger effect on the consumer choice.

For a lot of industries it is not clear what to focus on. For example the pharmaceutical industry, is often seen as an industry that is responsible for the development of medicines to help people save their lives and not as an industry that is focused at making profits and the industry is expected to need a lot of money for R&D. However, a lot of articles claim that the marketing costs of the pharmaceutical industry are much higher than the R&D costs (Anderson, 2014; "Big Pharma Spends More On Advertising Than Research And Development, Study Finds," 2008, January 7).

Image 3.1 shows these figures.

World's largest pharmaceutical firms					
Company	Total revenue (\$bn)	R&D spend (\$bn)	Sales and marketing spend(\$bn)	Profit (\$bn)	Profit margin (%)
Johnson & Johnson (US)	71.3	8.2	17.5	13.8	19
Novartis (Swiss)	58.8	9.9	14.6	9.2	16
Pfizer (US)	51.6	6.6	11.4	22.0	43
Hoffmann-La Roche (Swiss)	50.3	9.3	9.0	12.0	24
Sanofi (France)	44.4	6.3	9.1	8.5	11
Merck (US)	44.0	7.5	9.5	4.4	10
GSK (UK)	41.4	5.3	9.9	8.5	21
AstraZeneca (UK)	25.7	4.3	7.3	2.6	10
Eli Lilly (US)	23.1	5.5	5.7	4.7	20
AbbVie (US)	18.8	2.9	4.3	4.1	22

Image 3.1

There must be a reason why pharmaceutical firms spend so much money on marketing. It is important therefore to get a better understanding of the main reason for the choice of the consumer and the relationship between brand image and product attributes.

3.4 Thesis contribution in short

Table 3.2 shows the contribution in short of this research. This table shows some examples of studys which have been conducted about the effect of product attributes and brand image on consumer choice. But as can be seen from the table, none of these studys has integrated both components.

Authors	Branding dimensions	Product attributes	Outcome (dependent) variable	Industry
Fader & Hardie (1996)	Brand name *	Different dimensions of Sku's	Consumer Choice	Soft drink
Graeff (1997)	Consumption situations & Brand image	-	Brand evaluations	Beer
Birdwell (1968)	Image Congruence	-	Consumer choice	Cars
Dhar & Sherman (1996)		Common and unique features	Consumer choice	Vacation
This research (2015)	Brand image (benefits and attitude)	Product attributes	Consumer choice	Smartphones

* Fixed effect (constant) for each brand which captures the effect of all brand-related factors.

Table 3.2

3.5 Thesis Outline

In the next part of this chapter the research questions (main and sub questions) and the research method used are described. The fourth chapter, the desk research, describes the conceptual framework. In this chapter the theoretical background is given about brand image, product attributes and consumer choice. Based on this conceptual framework some assumptions are made. In the fifth chapter, the 'methodology' chapter, the used model will be explained. The sixth chapter, the field research, will test the assumptions in the context of brand image and product attributes in relationship with consumer choice and the trade-off between these two and the results of the field research will be analysed.

The conclusions are given in chapter seven. In the last two chapters the managerial implications and limitations and suggestions for future research of the paper are described.

3.6 Research Questions

The main research question: *'Do brand image or product attributes drive consumer choice?'*

To answer the main question the following sub questions are formulated.

Sub questions:

Secondary research

For a chosen industry, which are the most important:

1. What are the dimensions for brand image?
2. What are the dimensions for product attributes?

Primary research

3. Which brand image dimensions have the most effect on consumer choice?
4. Which product attributes have the most effect on consumer choice?

The first two questions will be answered by desk (secondary) research from existing literature and primary research by conducting a pre-test. These questions are important because they show the relationship between the used variables (brand image and product attributes) and consumer choice. It is important to see which dimensions can be used for the field (primary) research, that is why these questions are answered first. The last two questions will be answered through primary research. These will show which dimensions have the most effect on consumer choice. By combining the primary and secondary research, it can be concluded which of the two independent variables have a stronger effect on the consumer choice (dependent variable).

- *Dependent Variable:* Consumer choice
- *Independent Variables:* Brand image dimensions and product attributes

3.7 Research Method

For the field research part, conjoint analysis will be used. The type which will be used is a choice based conjoint analysis. A conjoint analysis is used in order to test the different levels of brand image dimensions and product attributes.

Because of the orthogonal design, the variables will be completely independent (Janssens et al., 2008). In this case this means that the product attributes will not have an effect on the brand image dimensions and vice versa.

3.8 Scope of the paper

For this study the product category 'smartphones' is used. The aim of this research is to see the relationship between the product attributes (camera, battery and price) and the brand image dimensions (popularity, design and personality match) and their effect on the consumer choice and which of these variables (product attributes or brand image dimensions) have a higher impact on the consumer choice. This will be tested by combining smartphones with different levels of these variables and see which has a higher preference (Choice based conjoint analysis). A pre-test is done to see which variables to choose for these smartphones. After the data gathering, a binary logistic regression will be used to see what the importance is of each variable. The variables 'age' and 'gender' are used as control variables.

This paper is useful for managers because it shows what is more important and valuable for consumers when they are making a choice between a product with better attributes or a product with a 'better' brand image.

The next chapter will give a literature review about the topics in this paper (the conceptual framework). After that the methods used will be described and the results will be presented. At the end some managerial implications, limitations of the paper and suggestions for further research will be given.

4. Conceptual Framework

In this chapter some interesting literature and the most important subjects of this research are explained: the consumer decision process is explained, the definition of brand image is given, the dimensions of brand image are portrayed and researches are discussed that show the relationship between brand image and consumer choice. Additionally, an explanation of product attributes is given, the used product attributes are presented and some examples of researches that show the relationship between alternative combinations of product attributes and the consumer choice are discussed.

4.1 Consumer decision making process

There is a diverse distinction across consumer evaluation of shopping experiences. Sherry, McGrath and Levy (1993) describe the negative experiences of consumers, 'the dark side of the gift' and Jones (1999) describes the entertaining shopping experiences.

The business dictionary defines *consumer decision making* as: 'a process by which consumers identify their needs, collect information, evaluate alternatives and make the purchase decision' ("Business Dictionary,").

Besides these consumer evaluations, research has shown that the motivation for a lot of consumption activities consists of a hedonic and utilitarian value:

Triandis (1977) describes in his book the hedonic value as an outcome a consumer loves and the utilitarian value as an outcome for a more tangible reward. Holbrook (1982), focuses in his research on the more 'symbolic, hedonic nature of the consumptions and describes this as the outcome of fantasies, feelings and fun. Strahilevitz and Myers (1998) Describe the utilitarian value, as the consumption which is more rational and functional oriented.

Dhar (2000) also says that hedonic consumptions are more fun and excitement related. Utilitarian is more instrumental and functional related. Consumers make a consideration between hedonic and utilitarian consumption outcomes.

With regards to this research brand image will be examined from a hedonic perspective and product attributes from a utilitarian perspective.

4.2 Brand Image

As mentioned before, brand image will be examined from the hedonic perspective view. This section of the paper will explain what brand image is and discuss study's which show the relation between brand image and consumer choice.

4.2.1 Brand vs. Product

The American Marketing Association definition for brand is: 'name, term, sign, symbol, or design, or a combination of the intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competition'. Keller's (2013) definition for product is: 'anything we can offer to a market for attention, acquisition, use, or consumption that might satisfy a need or want'. As seen from the definitions above, a brand means more than a product, because with a brand one can differentiate oneself from the competitor with a product that has the same function. These differences can be tangible and rational or symbolic, intangible and emotional (K.L. Keller, 2013).

Dimensions of brand knowledge

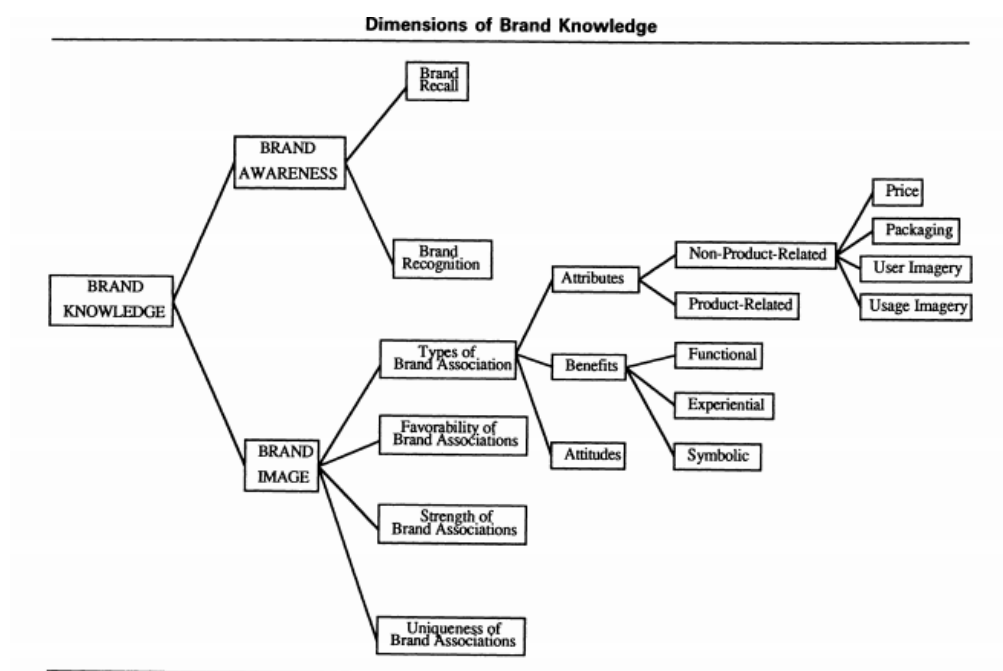


Image 4.2

Image 4.2 shows which parts the term brand knowledge consists of (Kevin Lane Keller, 1993).

4.2.2 Brand knowledge

Before defining brand image it is important to understand what brand knowledge is, because brand image is one of the two dimensions of brand knowledge.

Brand knowledge is defined as what someone has learned, felt, seen and heard about the brand as a result of their experiences over time, marketing activities or word of mouth. This knowledge drives the brand equity (Kevin Lane Keller, 1993; 2013). Keller (2013) defines brand equity as: 'the differential effect that brand knowledge has on consumer response on the marketing of that brand'. The construction of brand knowledge is crucial, because this influences what comes to the mind of a customer (Keller, 2013). Brand equity is salient during the consumer choice (Ghose and Lowengart, 2013).

Through the '*Associative Network Memory Model*' one can see how the mind of a consumer 'works'. This model says that a consumer has different nodes about the brand which are connected with each other (Collins & Loftus, 1975). These nodes represent stored information or concepts and links represent the strength of association between the nodes. These informational nodes are the brand associations (K.L. Keller, 2013). For example, when you ask someone what comes to their mind when they think of Disney and if someone thinks of 'magic' and 'fun', then these are the brand associations for Disney (K.L. Keller, 2013).

4.2.3 Brand awareness

The first dimension of brand knowledge is brand awareness. Brand awareness shows in what ease and how well a customer recognizes a brand in certain situations (Rossiter & Percy, 1987). For example, 94% of the world's population recognizes the red and white logo of Coca-Cola (Bhasin, 2011). Brand awareness consists of brand recognition and brand recall (K.L. Keller, 2013). Brand awareness influences the consumer choice and especially in a repurchase situation. Brand awareness also helps consumers to have preferences for certain brands and to make a quick decision (Macdonald and Sharp (2000).

4.2.4 Brand image

The second dimension of brand knowledge is brand image. Before presenting the relation between brand image and consumer, it is important to understand what brand image is.

In this part of the paper, different perspectives of the brand image will be given and at the end the most appropriate definition for this research will be selected.

In the research of Dobni and Zinkhan (1990) it is shown that brand image is an important subject in consumer behaviour research and cannot be missed because of the great impact.

According to Keller (2013) brand image is: '*perceptions about a brand as reflected by the brand associations held in consumer memory*'.

Brand image consists of certain associations one has in his/her mind about a brand (Low & Lamb Jr, 2000). People also assume that certain products have a personality, just as their selves (Sirgy, 1985).

Definition of brand image which will be used for this research:

'Brand image is all the other associations a consumer has in his/her mind about the product and/or brand with the exception of product attributes.'

Now that we have a better understanding of what brand image is and from which perspective it will be used for this research, some interesting results of brand image researches will be discussed.

Before going deeper into the meaning of brand image it is interesting to see some examples of researches where brand image is used as the subject.

If consumers associate themselves with a brand, then the brand image is consistent with their self-image. Consumers have more favourable brand associations when the brand is considered for public consumption (Graeff, 1997). If one forms a brand image about a brand, it will be easier to make a choice when considering two brands with almost the same attributes. Because in that case they are not only buying the product, but also a certain brand image of the brand (Dennis, Murphy, Marsland, Cockett, & Patel, 2002).

According to Keller (1993), brand image consists of three different types of brand associations. The different *types* of brand associations are:

1. Attributes (product and non-product related)
2. Benefits (functional, experiential or symbolic)
3. Overall brand attitudes

These different types of associations can vary:

Favourability of brand associations: One has favourable associations with a brand if he/she thinks that the brand has attributes and benefits that satisfy the needs and wants.

Strength of brand associations: The strength of an association is determined by how the information enters the consumer's memory and to what extent it is considered as a part of the brand image.

Uniqueness of brand associations: Associations that imply superiority over the other brands (Keller, 1993).

For this research, not all brand image dimensions will be used. As the functional aspects are already covered by the component 'product attributes', these will be excluded from the brand image dimensions. For this paper the more symbolic and non-product related dimensions are used.

4.2.5 Effect of brand image on consumer choice

Brand image has a positive effect on the consumer choice

A study conducted by Birdwell (1968) researched the influence of image congruence on consumer choice. Cars were used as the product category for this research. This research concluded that there is a highly significant degree of congruity in the way consumers perceive themselves and the cars they buy. There was also a difference between the sort of groups. Respondents from a 'higher class' had a higher congruity between themselves and the cars compared to respondents from the economy class. Cars are frequently bought because the owners can portray the image of themselves. An attitude towards a brand has an effect on the consumer choice (Wu & Lo, 2009). Brand image has a strong clue for consumer choice (Hammer, 2011). By using a branded product, consumers develop emotional benefits with that brand (Pope and Voges, 2000). There is a positive relationship between brand image and purchase intention (Shah et al., 2012). The soft drinks of the brands Pepsi and Coca Cola seem to be nearly identical in chemical composition, but people still prefer the one above the other. In a paper of McClure (2004) a blind-test and brand cued test was done. In the blind test, the neural response in the ventromedial prefrontal cortex was consistent, but in the brand cued test, the response did not seem to be consistent.

In the brand cued test the brand knowledge influenced behavioural preferences and the measured brain responses (McClure et al., 2004). So this means that brand knowledge of certain brands have an effect on the preferences of consumers. And a lot of studies conclude that the increase of brand image is a key determinant toward the core brand attitude (Sumarjan et al., 2013). This means that brand image has an effect on the consumer choice (Carpenter & Nakamoto, 1989). So it is assumed that brand image can affect the core-brand attitude and so can the choice of the consumer.

4.3 Product attributes

This part of the paper will explain what product attributes are and what the relation is between product attributes and consumer choice. Product attributes will be examined from the utilitarian perspective in this study.

While branding research has focused on the role on product choice, other researches have focused on the effect of individual product attributes on consumer choice.

Fader & Hardie (1996) use SKU level data to examine the effect of attributes on product choice. They describe SKU in terms of *'a set categorical attributes, which have physical characteristics that uniquely identify every one of the items available on the store shelf'*.

It is also important to know how one can determine whether something is a SKU attribute. There are three criteria:

1. Consumer recognizable
2. Objective: An attribute should not have a double meaning and should be clear
3. Collectively exhaustive: Each SKU should consist of all the SKU attributes (presence or absence) (Fader & Hardie 1996)

According to Fader & Hardie (1996) the best unit of analysis for a choice model is the SKU and the effect of the individual product attributes on the consumer choice.

For the development and branding of a new product, a crucial part is the estimation of product features. Adding a new attribute to a product, will obviously bring a change to the strategic decision about the costs and the revenues, but also to the competitiveness. By using a conjoint analysis, the interest for certain attributes can be found out.

However, for knowing the consumer preferences, WTP (willingness to pay) calculations can also provide the value for certain product attributes. (Allenby et al., 2014).

Hauser and Simmie (1981) show in their study the process of how physical features of a product have an effect on the consumer choice: 'model of consumer decision'.

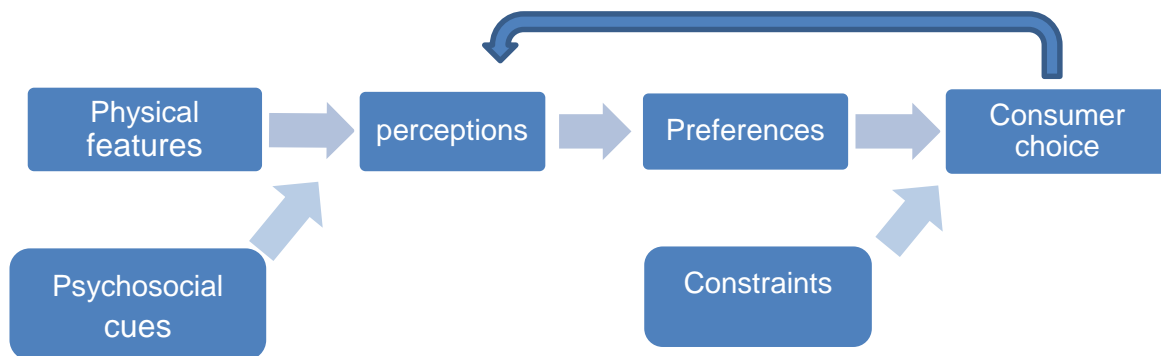


Figure 4.3

Figure 4.3 shows this process of consumer decision. The physical features of a product and also the psychosocial cues (such as advertising) help one to create certain perceptions. Building on these perceptions, the consumer forms preferences and makes the choice. After a product is used, this will help one to create new perceptions.

Lancaster (1966) assumes that characteristics of a product provide utility and not the product itself. Roberts and Urban (1988) present the Multi attribute Utility as follow:

$$X_j = X_j(y_{j1}, y_{j2}, \dots, y_{jK}) = \sum_{k=1}^K w_k y_{jK}$$

X= overall utility

Y= the attributes

W= importance of the attributes

In this study conducted by Robert and Urban (1988) the overall utility is the amount of the attributes in the product and the relative importance of the attributes.

4.3.1 Effect of product attributes on consumer choice

Product attributes will influence the consumer choice

Beside that the common features of the alternatives have an effect on the consumer choice, unique features also have an effect on the time one takes to make a choice (Houston, Sherman, & Baker, 1991). According to Dhar & Sherman (1996) product features have an effect on consumer choice, but they looked into the difference between the effect of common and unique features in consumer choice. The research found that the preference for a no-choice option would be greater for unique bad pairs (unique bad features and shared good features) compared to unique good pairs (shared bad features and unique good features).

According to a research conducted by Miljkovic, Gong and Lehrke (2009), products with different attributes have an effect on the consumer choice. Where people normally would think that one does not take trivial attributes into account, this research shows that trivial attributes help consumer to separate different brands. But when consumers are not able to make a choice comparing the substantial attributes they look at the trivial attributes.

The conclusion can be drawn that a higher level or quality of product attributes leads to a higher consumer choice.

4.4. Comparison between the effect of brand image and product attributes on the consumer choice

Before getting into the relative effect of brand image and product attributes on consumer choice, one prior related studies will be discussed, which integrated both components. This paper examines the effect of brand image on the perception of product attributes. This paper also shows that , the method which will be used (conjoint analysis) allows for the product attributes to be uncorrelated with the brand image dimensions since this research shows that consumers evaluate the product attributes higher for branded products.

4.4.1 Prior related research

Beer research

A research done by Allison and Uhle (1964), aimed to show the influence of beer identification on the ranking score. The first result was that the ranking score was higher during the test with the labelled products than the ranking score during the blind test.

Besides that, another conclusion was that some product characteristics seem to score higher during the labelled product test than when people had to rank the characteristics during the blind test.

So this research says that, labelled products and their brand associations did influence the evaluation.

4.4.2 Relative effect brand image and product attributes on consumer choice

Brand image has more effect on consumer choice than product attributes

Before the third and last assumption can be formulated, it is important to know that in this paper for the brand image the hedonic perspective and for the product attributes the utilitarian perspective will be used. Because these terms distinguish the more symbolic and rational meaning behind a brand/product.

Hedonic and utilitarian goods explanation in brief again:

Hirschman and Holbrook (1982) define Hedonic goods as ones whose consumption is primarily characterized by an affective and sensory experience of aesthetic or sensual pleasure, fantasy and fun.

Strahilevits and Myers (1998) define utilitarian goods as more cognitively driven, instrumental, and goal oriented and accomplishes a functional or practical task.

A lot of research has been conducted on the difference between hedonic and utilitarian goods. Consumer choices are also driven between these utilitarian and hedonic considerations. If one thinks about buying a car, one can think of the hedonic attributes. These hedonic attributes are design and luxury for example, but if one cares about utilitarian attributes, one thinks about gas mileage. A research conducted by Dhar and Wertenbroch (2000) has found that owners of relatively hedonic goods (cars in this case) value their goods more than owners of relative utilitarian goods (cars). A recent research concluded that it is not sufficient to produce only quality products in terms of good product attributes. To create a strong brand you need to create the right brand image and positioning in the consumers mind.

In this research the taste preferences for Coca Cola were much higher when the name was showed, compared to Pepsi (Ramanjaneyula, Asangi, Kadabi, 2013). As mentioned before, the brand image is higher for a certain brand if the brand equity is also high (compared to another brand). In this research about hospitality they found that brands that are objectively similar (based on consumer reports rating), but have a higher advertising budget, also have a higher brand equity.

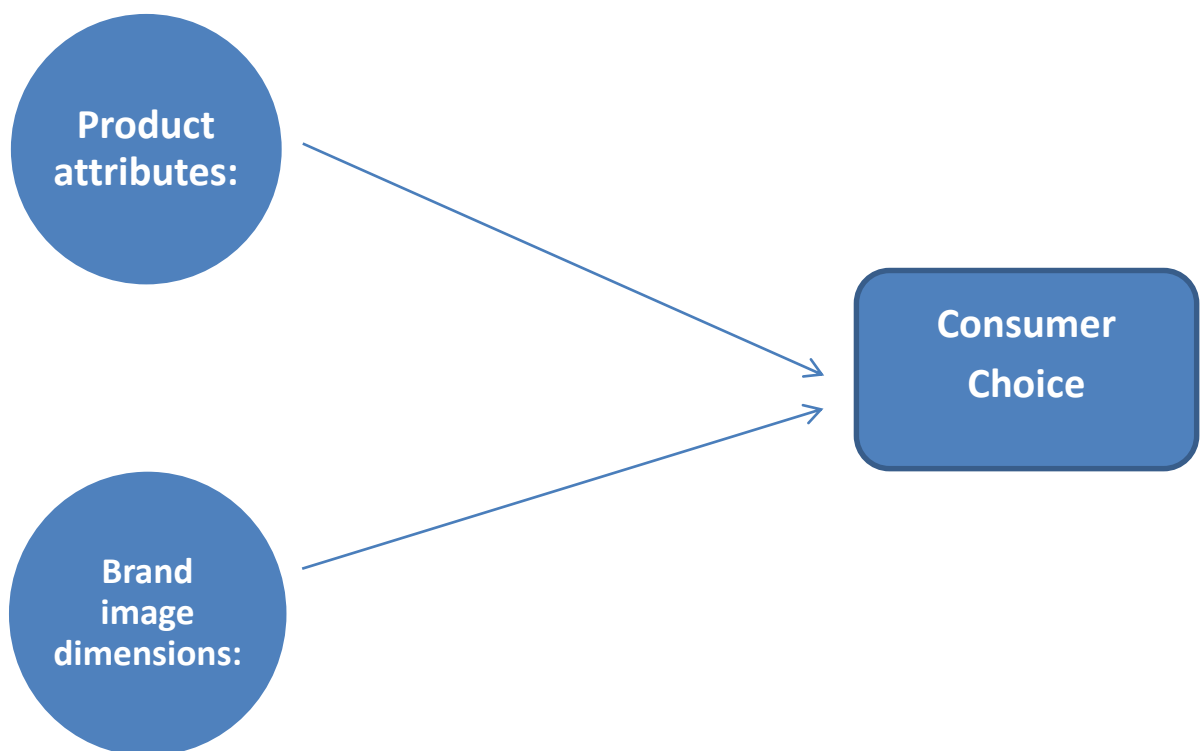
So this means that advertising has an effect on the brand equity, even if the products are almost similar.

In this research it was concluded that the brand with higher equity generated greater consumer choice preferences and purchase intentions (Cobb-Walgren, Ruble, & Donthu, 1995).

In a study in the Consumer research journal it was concluded that consumers choose products with the same symbolic meanings with their self-concept (Allen, Gupta, & Monnier, 2008). When a customer meets both functional and hedonic cut-offs in a choice set, the consumer attaches a greater importance to the hedonic attribute and also while looking at the willingness-to-pay, the hedonic scores higher (Chitturi, Raghunathan, & Mahajan, 2007).

It is therefore expected that brand image has a higher effect on consumer choice than product attributes.

4.5 Conceptual framework summarized



5 Methodology

This chapter will show everything that has to do with the research method that is used to answer the main question, the pre-test which is done, how the questionnaire is designed and how the data is collected and prepared for the analysis.

5.1 Research Method

The method that was used to answer the main research question was that of a conjoint analysis. With a conjoint analysis a company/brand can find out how important a certain product attribute (level) is, without asking this directly. By asking the importance of the attribute directly, the respondent might say that each attribute is equally important. With a conjoint analysis the respondents see a combination of all the attributes, so that the respondents can evaluate all the attributes at once (this is more realistic) and so can one see which attribute is more important for them.

(Janssens, Wijnen, De Pelsmacker & Van Kenhove, 2008).

There are three different types of conjoint analysis that can be used. For this study a Choice based conjoint analysis (CBC) is used. The CBC is the most realistic type of conjoint analysis, because it shows the trade/off between different combinations of products and services that consumers have to face in real life (Adrian, 2014).

With the choice-based conjoint analysis (CBC), the respondents have to choose for the product they are most likely to purchase, based on the options they are given (the different product attribute combinations). With the results of a CBC, the importance for the product attributes can be determined (Janssens et al., 2008)

With these results (given utilities) companies can optimize the current product to the ideal product that respondents prefer (Wittink & Cattin, 1989).

The CBC is chosen in this study, to determine which variables are more important. The brand image dimensions for the products attributes while making a (smartphone) consumer choice. The CBC can determine the importance of each variable used. And on that basis a conclusion can be drawn about the importance of brand image dimensions and product attributes (Janssens et al., 2008).

5.2 Pre-test results and used attributes

Before designing the survey with the different product combinations, a pre-test was done. The aim of the pre-test was to determine the top three product attributes and brand image dimensions. For the product attributes, respondents were asked which product attributes they consider while buying a smartphone. For the brand image dimensions the respondents are asked to tell about what other things they consider while buying a smartphone except for the product attributes. The results led to the following top three brand image dimensions for this research:

1. Attractiveness of the look and feel design of the smartphone
2. Popularity of the brand in the market
3. Fit of the personality of the brand and the personality of the respondent.

See the variables used in table 5.2.

Variables
Product attributes
1. Battery life in hours
2. Megapixels camera
3. Price
Brand image dimensions
4. Design of the smartphone
5. Popularity of the smartphone
6. Match of the brand personality and the users personality

Table 5.2

5.3 Design

For creating the different product combinations, conjoint analysis in SPSS was used. To ensure the most realistic representation for the survey, the latest smartphones of the brands Samsung and Apple are used for the levels of the attributes (Phonearea,2015). Each variable from table 5.2 has two levels, see table 5.3 for the levels. SPSS gave 16 different product combinations, this means that the respondents get 8 choice sets (when the respondents have to choose between two options in each choice set).

The 16 different product profiles can be found in appendix 2.

Variables	Levels	
Product attributes		
1. Battery life	13 hours	16 hours
2. Megapixels camera	8 megapixels	16 megapixels
3. Price	\$420	\$670
Brand image dimensions		
4. Design of the smartphone	Attractive look and feel design	Less attractive look and feel design
5. Popularity of the smartphone	Well-known brand in the market	Not so well-known brand in the market
6. Match of the brand personality and the users personality	Brand matches the personality	Brand does not match my personality

Table 5.3

To ensure that the quality of the data will not negatively be influenced by boredom of the respondent, it is best to not give more than 20 choice sets (Johnson and Orme, 1996). The choice sets do not include a 'no option' option, because this stimulates the respondent to make a choice instead of avoiding it.

5.4 Survey and respondents

There were no requirements for the respondents to participate in the survey.

Everyone could participate in the survey. The final survey had 11 questions, with 8 choice set questions, 2 demographic questions and one rank order question (the survey questions can be found in appendix 3). The following (rank order) question was included:

'Please rank the following in order of importance when purchasing a smartphone, from 1 to 6, where 1 is most important to you and 6 is least important'.

The six brand image and product attributes were added into this rank order question. The reason to include this question was, to determine whether people really choose the variables they find important, when they really have to make the choice. It is interesting to compare the actual importance and perceived importance of the different variables (product attributes and brand image dimensions).

A 'manipulation check' was also added in the survey. One choice set had the same levels of the variables except the price variable (\$420 vs. \$670). Through this question it could be identified which respondents really read the questions and which randomly choose the options. The one who chose the smartphone with the price of \$670, were excluded from the analysis. To frame and spread the survey the website www.qualtrics.com is used.

5.5 Data gathering

The survey was online for about two weeks, which gained a response of about 220, which was not the final sample. From this number, 38 cases were deleted (11 cases with missing values and 27 cases were deleted because they failed to pass the manipulation check) and this leads to a final sample of 182 respondents which are used for analysis.

The aim was to have 25-30 respondents for each variable, in this case it would be (25-30 (respondents) * 6 (variables)) about 150-180 respondents. This goal has been achieved.

Through social networks such as Facebook, and my personal network (family, work and friends) people were asked to fill in the survey and to invite others to fill in the survey.

5.6 Data preparation

To make the data 'ready for analysis', Excel was used. For each respondents the first 8 choices were put under each other and this is done 1456 times ($8 * 182$ respondents). After that, the demographic variables were organised, because it was necessary that SPSS could see that the first '8 cases' are one person, and that the same gender and same age is given to those 8 cases.

5.7 Model used

To analyse the data, a binary logistic regression is used in SPSS. This binary logistic regression is used, because the dependent variables has only two categorical outcomes and the independent variables are categorical or continuous (Field,2009).

5.8 Empirical Design

Dependent variable: consumer choice

Independent variables: camera megapixels, battery hours, price, attractiveness look and feel design, popularity brand and personality match with brand.

Utility :

General formula Utility

$$\mu = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon$$

Utility formula with independent variables

$$\mu = \beta_0 + \beta_1 \text{Cam}_1 + \beta_2 \text{Bat}_2 + \beta_3 \text{Price}_3 + \beta_4 \text{Pop}_4 + \beta_5 \text{Des}_5 + \beta_6 \text{Pers}_6$$

$$\mu = 0,862 + 0.089\text{Cam}_1 + 0.259\text{Bat}_2 + -0.007\text{Price}_3 + 0.309\text{Pop}_4 + 1,044\text{Des}_5 + 0.611\text{Pers}_6$$

Utility formula with independent variables + demographic variables

$$\mu = \beta_0 + \beta_1 \text{Cam}_1 + \beta_2 \text{Bat}_2 + \beta_3 \text{Price}_3 + \beta_4 \text{Pop}_4 + \beta_5 \text{Des}_5 + \beta_6 \text{Pers}_6 + \beta_7 \text{Age}_7 + \beta_8 \text{Gender}_8$$

The formula of a logit model is:

$$\text{Probability} = \frac{e^Z}{e^Z + 1}$$

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

$e = 2.718$

Demographic information:

Gender		Age	
Male	51,6%	<20	10,4%
		20-30	72,5%
Female	48,4%	31-40	13,2%
		>40	3,8%

Table 5.8

The final sample size was 182 respondents. The demographic information of the respondents can be seen in Table 5.8. The data shows that the gender distribution is almost equal. Most of the respondents have an age between the 20 and 30, followed up between 31 and 40 years old.

6. Results

This Chapter will show and describe the results which are collected through the survey. The first part of the chapter will show the results of the model which this research is mainly about: the effects of the brand image dimensions and product attributes on the consumer choice. Later on a model is created in which demographic variables such as age and gender are added to see if they have an effect on the consumer choice. To do the analysis a binary logistic regression is used in SPSS.

6.1 Model 1

Log likelihood

Forward stepwise method: using only the constant in the regression equation. By only putting the constant in the model the '*Iteration History*' shows (see appendix 4) the fit of the most basic model to the data. This table tells that the *log-likelihood* is -2016,290. The table 'Variables not in the equation' (see appendix 5), shows that the residual chi-square statistic is 373,999 which is significant at $P < 0,05$ (0,000). So adding one of the variables to the model will significantly affect its predictive power. In the 'new model', in which the other variables are included, the fit of the model can be determined by using the log likelihood. To see whether the data has a better fit in the model with the other variables, the new log likelihood has to be lower (because that will mean that the model will predict the outcome variable more accurately). The new likelihood is -1569,013 (the 'original' one was: -2016,290). The difference is 447.227 and it is significant ($p = <0.05$) (appendix 6). So the model is predicting the outcomes better, than when only the constant was added.

Classification table

Looking at the classification table (appendix 7), when only using the intercept, the model predicted 51,9% of the outcome correct. By including the independent variables, this percentage increased to a percentage of 69,5% (1012/1456).

Nagelkerke R Square

The 'model summary' table (Appendix 8) shows the Cox & Snell R Square and Nagelkerke R Square. This tells to what extent the independent variables in the model explain the variance in the dependent variable. A higher R Square for Cox & Snell and Nagelkerke corresponds to a better fit of the model.

A difference between these two is that the first one does not accept the maximum value of 1 and Nagelkerke does meet this condition.

Nagelkerke R Square shows that this is 0,353 which means a medio fit.

Significances and Coefficients

When a binary logistic regression is run, SPSS gives unstandardized Beta coefficients. Standardized Betas are used to compare the level of prediction across the variables. In a linear regression, SPSS calculates these standardized Beta's by placing them on the same scale so that each variable has the same mean and standard deviation. Since SPSS does not require standardized Beta coefficients for a logistic regression, they can be calculated through another formula, developed by Kaufman (1996):

$$SS^{\Delta P} = \left[\frac{1}{1 + \exp\left(-\left(\ln\frac{P_{Ref}}{1-P_{Ref}}\right) + \frac{1}{2}\hat{b}s\right)} - \frac{1}{1 + \exp\left(-\left(\ln\frac{P_{Ref}}{1-P_{Ref}}\right) - \frac{1}{2}\hat{b}s\right)} \right]$$

P_{Ref} = a probability value used as a reference point

\hat{b} = the unstandardized logistic regression coefficient

s = the sample standard deviation.

In a linear regression model, the Beta's can be compared directly because the Beta is calculated by showing the difference in the outcome in one unit change in the X.

The reason why the Beta's in a logistic regression cannot be compared directly, is because of the randomness. In this formula by Kaufman, this is replaced by the standard deviation. The interval in this case is between -1 and 1 (King, 2007)

To calculate the standardized beta coefficients, the formula is converted in excel.

Table 6.1 shows the used numbers and the outcomes.

Variables	Unstandardized Beta	Standardized Beta	Significance
Camera	0.089	0,14638	0.000**
Battery	0.259	0,096746	0.002**
Prices	-0.007	-0,29956	0.000**
Popularity	0.309	0,037318	0.097*
Design	1.044	0,182206	0.000**
Personality	0.611	0,091263	0.000**
Constant	0.862		

***Significant at 5% level*

Table 6.1

**Significant at 10% level*

After that the Beta coefficients were standardized, the p-values of the Wald-statistics were tested. The Wald-statistics tests whether a variables has a significant effect or not (Janssens et al., 2008). This table shows that all the variables have a significant effect on the consumer choice. Price seems to have the most effect on the consumer choice with a coefficient of -0.29956, followed by the design of a smartphone with a coefficient of 0.182206, the camera variable with a Beta of 0.14638, the battery a coefficient of 0.0968, the popularity of a brand a coefficient of 0.37318 and the variable which has the least effect on the consumer choice is the personality match with a Beta of 0.091271.

To see whether product attributes or brand image dimensions have more effect, only four variables will be compared to each other. Because one brand image dimensions (popularity) did not have a 5% significant effect on the consumer choice and comparing this would not be correct, this would be a comparison of 3 product attributes against 2 brand image dimensions.

Comparing two product attributes (camera and battery) and two brand image dimensions (design and personality) results in the following outcomes:

Product attributes : **0,14638 (Camera) + 0,096746 (Battery) = 0.243**

Brand image dimensions: **0,182206 (Design) + 0,091263 (Personality) = 0.274**

As mentioned before, to compare the betas of a logistic regression, it is important to first standardize them. In this study, the formula of Kaufman (1996) is used. This means that this is the effect of one standard deviation increase in brand image dimensions and product attributes. Even by comparing three product attributes and three brand image dimensions to each other, the brand image would have a stronger effect on the consumer choice.

6.2 Model 2: adding demographics variables

Log likelihood

By adding the demographic variables (Gender and Age), to the model, the log likelihood decreases with 450,462 in the second model included with the variables, which is significant (appendix 9).

Classification table

In this model, the prediction percentage also increases slightly to 70.55% (appendix 10).

Nagelkerke R Square

The R square in this model increased with 0.002, compared to the model without the demographics (from 0.353 to 0.355), again a medio poor fit (appendix 11).

Coefficients and significance

Variables	Unstandardized Beta	Standardized Beta	Significance
Camera	0.089	0,14638	0.000**
Battery	0.259	0,0967	0.002**
Prices	-0.007	-0,29956	0.000**
Popularity	0.310	0,03744	0.097*
Design	1.046	0,182547	0.000**
Personality	0.613	0,09156	0.000**
Age	-0.107	-0,01645	0.287
Gender	-0.152	-0,01897	0.220
Constant	0.862		

**Significant at 5% level

Table 6.2

*Significant at 10% level

Table 6.2 shows that the variables age and gender are not significant, so they have no direct effect on the consumer choice. All the other variables stayed almost the same as in the first model.

6.3 Probability

Logistic regression is about 'chances' or 'odds' (likelihood ratios). The odds in this case is the probability of which product the respondent chooses. The scope of an odd is between 0 and 1. In this case product 2 is used as the baseline to make the observations, so if the outcome of the probability calculation is $>0,5$, it can be assumed that the respondent will choose product 2 and if its $<0,5$ it can be assumed that the respondent chooses product 1.

Example:

To give an example, the probability for the first respondent for his first option is calculated and compared to what that respondent eventually had chosen:

$$Z = 0,862 + 0.089\text{Cam}_1 + 0.259\text{Bat}_2 + -0.007\text{Price}_3 + 0.309\text{Pop}_4 + 1,044\text{Des}_5 + 0.611\text{Pers}_6 \text{ and } e = 2.718$$

Probability = 0,267176. It can be assumed that this respondents would chose for product 1, because the outcome is 0,267 (<0,5). This person also had chosen for product 1.

6.4 Willingness to pay

This part of the paper will show the calculations of how much one is willing to pay more for one unit upgrade for the product attributes and brand image dimensions.

a. Camera

$$U = \text{Cam} \times 0.089 - 0.007 \times \text{price}$$

$$0 = 8 \times 0.089 - 0.007 \times ?$$

$$0.007 \times \text{price} = 0.712$$

$$\text{Price} = 0.712 / 0.007 = 101,71$$

If a smartphone will have 1 unit megapixel increase for the camera, then one is willing to pay 101.71 euro's more.

One unit in this situation is 8 megapixels, so for one increase in the camera megapixels resolution, one is willing to pay 12.71 euro's more. ($101.71/8 = 12.71$).

b. Battery

$$U = \text{Bat} \times 0.259 - 0.007 \times \text{price}$$

$$0 = 3 \times 0.259 - 0.007 \times ?$$

$$0.007 \times \text{price} = 0.777$$

$$\text{Price} = 0.777 / 0.007 = 111$$

If a smartphone will have 1 unit battery hour increase, then one is willing to pay about 111 more euro's. In this situation one unit increase in the battery hours, is a three hours increase, so for one hour increase in the battery, one is willing to pay 37 ($111/3$) more euro's.

c. Design

$$U = \text{Des} \times 0.309 - 0.007 \times \text{price}$$

$$0 = 1 \times 0.309 - 0.007 \times ?$$

$$0.007 \times \text{price} = 0.309$$

$$\text{Price} = 0.309 / 0.007 = 44.14$$

To have a smartphone with an attractive design, one is willing to pay about 44.14 more euro's.

d. Personality

$$U = \text{Pers} \times 0.611 - 0.007 \times \text{price}$$

$$0 = 1 \times -0.611 - 0.007 \times ?$$

$$0.007 \times \text{price} = 0.611$$

$$\text{Price} = 0.611 / 0.007 = 87.29$$

If the personality unit will increase with 1 unit, one is willing to pay about 87.29 euro's more. So one is willing to pay 87.29 more euro's for a smartphone of a brand which matches his/her own personality.

e. Popularity

$$U = \text{Pop} \times 0.309 - 0.007 \times \text{price}$$

$$0 = 1 \times -0.309 - 0.007 \times ?$$

$$0.007 \times \text{price} = 0.309$$

$$\text{Price} = 0.309 / 0.007 = 44.14$$

If the popularity unit will increase with 1 unit, one is willing to pay about 44.14euro's more. So one is willing to pay 44.14 more euro's for a smartphone which is from a popular brand.

6.5 Do people really buy what they find important?

After the eight questions in which people had to choose between two products and the two demographic questions, the last question of the survey was included to rank order the importance of the variables (the three product attributes and the three brand image dimensions). The reason why this question was asked was to determine if people really chose something they find important. Figure 6.5 shows these results. Surprisingly, they don't. As shown in the circle diagram, the most important variables are the product attributes.

But the choice based model says that the brand image dimensions are more important than the product attributes. This means that the brand image dimensions are more important than the product attributes in the situation the respondents actually have to make the choice.

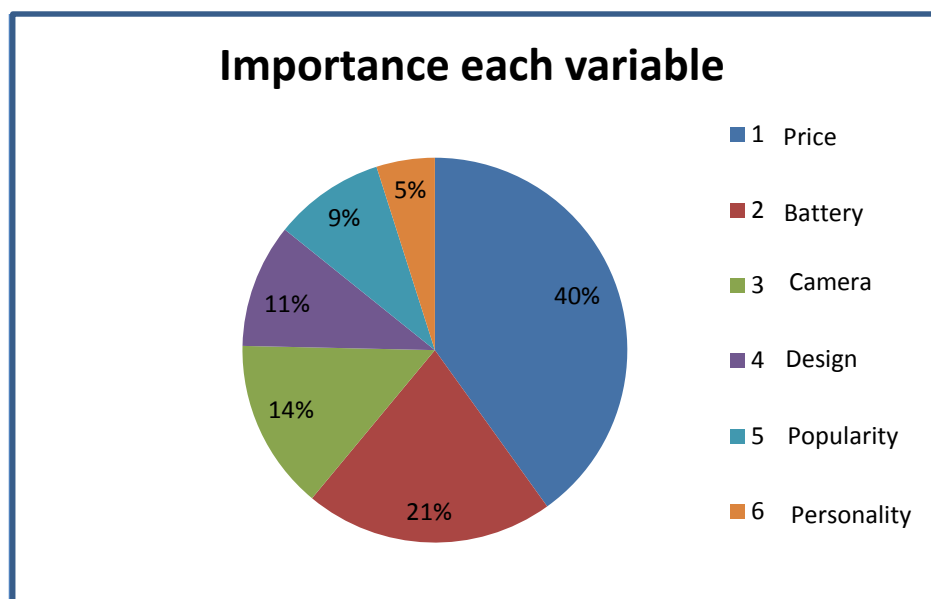


Figure 6.5

7. Conclusion

In this chapter the conclusion of the research will be given. This study was conducted to see what the relationship is between the product attributes and the consumer choice and the relationship between brand image dimensions and consumer choice. Besides that the most important question was, which of these two subjects has the highest effect on the consumer choice. Six independent variables were used to test this effect. Three product attributes were used; camera, battery and price. Three brand image dimensions were used; design, popularity and personality match.

Do people really buy what they find important?

Before answering the main question, it is also interesting to know if people chose the things they tend to say, they find important. Results show that if people are put in the situation where they have to give their opinion about the importance, they say that than the product attributes are more important, but when they finally have to make the choice, result show that brand image dimensions are more important.

Product attributes have an effect on the consumer choice

The first assumption that was made in the literature chapter, was that the product attributes would lead to an effect on the consumer choice. All the three product attributes used for this research had a significant effect on the consumer choice. As expected, price had the highest (negative) effect on the consumer choice, followed by the battery of the smartphome and the camera of the smartphome. So the first assumption is correct.

Brand image dimensions effect the consumer choice

The second assumption which was made in the literature chapter, was that brand image has a positive effect on the consumer choice. This assumption is also correct, because all three brand image dimensions which were used in this research, have a positive significant effect on the consumer choice. Design had the most effect, followed by the personality match of the brand with the personality of the (potential) user and as last the popularity of the brand.

Which one has a stronger effect on the consumer choice

Coming at the main and last question, which of the two dimensions has a stronger effect on the consumer choice? As mentioned before, the brand image dimension 'popularity' did not have a 5% significant effect on the consumer choice.

To make an equally comparison between the used dependent variables, one product attribute variable 'price' was also excluded. By comparing the remained four independent variables, it can be concluded that *the brand image dimensions have a stronger effect on the consumer choice.*

8. Managerial implications

Marketing managers could take the following recommendations in to account when they take branding and research development decisions.

First thing, which can be noticed is that the findings (brand image dimensions have a stronger effect on the consumer choice than product attributes) of this study may explain why pharmacy companies spend so much money on branding instead of research and development. Probably people care more about the brand image of the product, rather than the product attributes they offer.

Besides that, Companies should emphasize their innovation through appropriate brand development activities, since consumers' purchase choice is more influenced by brand image.

A lot of companies, especially smartphones, focus in their ads on the product attributes they offer. But the findings of this study show, that brand image dimensions have a greater effect than the product attributes. Instead of focusing on the rational messages in their ads, advertising managers could focus on the emotional value a company can offer.

The results of this study also show that the strongest effect between the brand image dimensions is 'design'. Apparently people really care about how attractive the look and feel design is. This means companies should pay more attentions on the design of the products, instead of the functionality.

The brand image dimension 'personality' also seem to have a great effect on the consumer choice. Companies could do research about, what kind of 'personalities' attract to their brand. By knowing their customers, brands can work on that while promoting the products.

By focusing on the brand image, companies will not only gain higher preferences for their products, but this can also bring advantages for the employees of the company and trust of the customers. A good brand image will stimulate employees. A good brand image inspires also employees to work harder for the company to achieve the missions of the company. If companies have a good and professional brand image, this can help to create trust for the (potential) customers. People are more willing to buy from a company with a good brand image. Finally, if companies want to know the importance of different product attributes, it is maybe better to do a choice based conjoint survey, instead of asking directly what the importance is of the different product attributes. Because the results were different during the choice based survey and when people were asked directly what the importance is of the different variables.

9. Limitations and future research

More brands and levels

For this research only two levels were used for the attributes. In another research more levels can be used for the conjoint analysis, to see whether this makes a difference.

Other variables

The R Square of the model can be improved by adding more independent variables. For example other product attributes such as the size of the smartphone or the weight of the smartphone.

Differences in groups

In a more comprehensive research it can be tested whether there are differences between two different groups. For example early adopters vs. late adopters or young people vs. older people.

Product vs. service

The same research can be done again, but by using another kind of situation. Because a smartphone is a product. The same research can be done where people have to give their opinions about service choice tasks and see if the results are the same.

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11. Appendix

Appendix 1 Pre-test list

Brand image dimensions

What Comes to your mind when you think of Samsung/Apple?

1. Samsung:

android, cheap. Good price, innovation, ahead of the world, Korea

Apple:

branding pricey, innovation, creative, laptop, iPad, world popular, taking over the world

2. Samsung:

copycats, android, big phones

Apple:

Steve Jobs, Apple logo, IOS, pretty designs, suits my personality

3. Samsung:

Cheap, less popular, functionality

Apple:

marketing, popular, trendy, pretty

4. Samsung:

'open system', sensitive for viruses, more possibilities for downloading stuff and programs, more options for memory size, low quality, less popular

Apple:

closed system, safe, no viruses, quality hardware and software, expensive 'toy'

5. Samsung:

Innovative, easy in use, good price quality , expensive

Apple:

innovative, not easy in use , Apple is more my thing, expensive, good price quality

6. Samsung:

big competitor of Apple, active on more markets because of diverse product specifications, the phone is too big, innovative

Apple:

'stubborn', elaborate, expensive, for people who care about showing the brand, not so innovative, works perfect if you own all the apple products,

7. Samsung:

android, bad picture, less popular, low quality

Apple:

simple, ios, trendy, nice design

8. Samsung:

too complicated, 'strong product', less popular

Apple:

easy, luxury, quality, quick damaged

9. Samsung:

all-round users, more freedom in software, more options for customizing, technical users

Apple:

people who want luxury products, simple/easy in use

10. Samsung:

match with working lifestyle, variation, cheap

Apple:

status, design, luxury

11. Samsung:

monotonous design, 'tries to be luxurious', 'so-called' good camera, but not, dredging software

Apple:

design, luxe, high segment products, easy and simple software, easy in use, smart technology

12. Samsung:

Cheap, Tech personality, android

Apple:

Luxe, expensive, nice design, popularity

Which product attributes you consider while buying a smartphone?

Product attributes

Price

Battery

Camera

Memory Size

Display resolution

Sound

Appendix 2 Profile cards smartphones

Profile Number 1

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
1	16 Megapixels	13 Hours	\$420,-	Less attractive look & feel design	Less popular in the market	Does not match my personality

Profile Number 2

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
2	8 Megapixels	13 Hours	\$670,-	Attractive look & feel design	Less popular in the market	Does not match my personality

Profile Number 3

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
3	8 Megapixels	13 Hours	\$420,-	Attractive look & feel design	One of the most popular brands in market	Matches my personality

Profile Number 4

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
4	16 Megapixels	13 Hours	\$420,-	Less attractive look & feel design	One of the most popular brands in market	Does not match my personality

Profile Number 5

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
5	8 Megapixels	16 Hours	\$670,-	Less attractive look & feel design	Less popular in the market	Matches my personality

Profile Number 6

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
6	8 Megapixels	16 Hours	\$420,-	Less attractive look & feel design	Less popular in the market	Matches my personality

Profile Number 7

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
7	16 Megapixels	16 Hours	\$420,-	Attractive look & feel design	One of the most popular brands in market	Does not match my personality

Profile Number 8

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
8	16 Megapixels	16 Hours	\$420,-	Attractive look & feel design	Less popular in the market	Does not match my personality

Profile Number 9

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
9	8 Megapixels	16 Hours	\$420,-	Less attractive look & feel design	One of the most popular brands in market	Matches my personality

Profile Number 10

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
10	16 Megapixels	13 Hours	\$420,-	Less attractive look & feel design	One of the most popular brands in market	Matches my personality

Profile Number 11

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
11	8 Megapixels	13 Hours	\$670,-	Less attractive look & feel design	One of the most popular brands in market	Does not match my personality

Profile Number 12

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
12	8 Megapixels	16 Hours	\$420,-	Attractive look & feel design	One of the most popular brands in market	Does not match my personality

Profile Number 13

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
13	8 Megapixels	13 Hours	\$420,-	Attractive look & feel design	Less popular in the market	Does not match my personality

Profile Number 14

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
14	16 Megapixels	13 Hours	\$670,-	Attractive look & feel design	Less popular in the market	Matches my personality

Profile Number 15

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
15	16 Megapixels	16 Hours	\$670,-	Attractive look & feel design	One of the most popular brands in market	Matches my personality

Profile Number 16

Card ID	FirstAttribute	SecAttribute	ThirdAttribute	FourtAttribute	FifthAttribute	SixthAttribute
16	16 Megapixels	16 Hours	\$670,-	Less attractive look & feel design	One of the most popular brands in market	Does not match my personality

Appendix 3 Survey

Q1

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **16 megapixel camera**, a battery life duration of **13 hours** and a price of **\$420**. The brand is **not so well-known** in the market, the smartphone has a **less attractive look & feel design** and the **brand does not match your personality**

Smartphone B has a **8 megapixel camera**, a battery life duration of **13 hours** and a price of **\$670**. The brand is **not so well-known** in the market, the smartphone has an **attractive look & feel design** and the **brand does not match your personality**

----- Page Break -----

Q2

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **8 megapixel camera**, a battery life duration of **13 hours** and a price of **\$420**. The brand is **well-known** in the market, the smartphone has an **attractive look & feel design** and the **brand matches your personality**

Smartphone B has a **16 megapixel camera**, a battery life duration of **13 hours** and a price of **\$420**. The brand is **well-known** in the market, the smartphone has a **less attractive look & feel design** and the **brand does not match your personality**

----- Page Break -----

Q3

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **16 megapixel camera**, a battery life duration of **16 hours** and a price of **\$670**. The brand is **well-known** in the market, the smartphone has an **attractive look & feel design** and the **brand matches your personality**

Smartphone B has a **8 megapixel camera**, a battery life duration of **16 hours** and a price of **\$420**. The brand is **well-known** in the market, the smartphone has a **less attractive look & feel design** and the **brand matches your personality**

Q4

⚙️

⚠️

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **8 megapixel camera**, a battery life duration of **16 hours** and a price of **\$670**. The brand is **not so well-known** in the market, the smartphone has a **less attractive look & feel design** and the brand matches your personality

Smartphone B has a **8 megapixel camera**, a battery life duration of **16 hours** and a price of **\$420**. The brand is **not so well-known** in the market, the smartphone has a **less attractive look & feel design** and the brand matches your personality



Page Break

Q5

⚙️

⚠️

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **16 megapixel camera**, a battery life duration of **16 hours** and a price of **\$420**. The brand is **not so well-known** in the market, the smartphone has an **attractive look & feel design** and the brand does not match your personality

Smartphone B has a **8 megapixel camera**, a battery life duration of **16 hours** and a price of **\$420**. The brand is **well-known** in the market, the smartphone has an **attractive look & feel design** and the brand does not match your personality



Page Break

Q6

⚙️

⚠️

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **16 megapixel camera**, a battery life duration of **16 hours** and a price of **\$420**. The brand is **well-known** in the market, the smartphone has an **attractive look & feel design** and the brand does not match your personality

Smartphone B has a **8 megapixel camera**, a battery life duration of **13 hours** and a price of **\$670**. The brand is **well-known** in the market, the smartphone has a **less attractive look & feel design** and the brand does not match your personality



Q7

⚙️

⚠️

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **8 megapixel camera**, a battery life duration of **13 hours** and a price of **\$420**. The brand is **not so well-known** in the market, the smartphone has an **attractive look & feel design** and the brand does not match your personality

Smartphone B has a **16 megapixel camera**, a battery life duration of **13 hours** and a price of **\$420**. The brand is **well-known** in the market, the smartphone has a **less attractive look & feel design** and the brand matches your personality



Page Break

Q8

⚙️

⚠️

If you were considering buying a smartphone and these were the only alternatives, which one would you choose?

Smartphone A has a **16 megapixel camera**, a battery life duration of **13 hours** and a price of **\$670**. The brand is **not so well-known** in the market, the smartphone has an **attractive look & feel design** and the brand matches your personality

Smartphone B has a **16 megapixel camera**, a battery life duration of **16 hours** and a price of **\$670**. The brand is **well-known** in the market, the smartphone has a **less attractive look & feel design** and the brand does not match your personality



Page Break

Q9

⚙️

⚠️

What is your gender?

Male

Female

Q10 What is your age?

<20
 20-30
 31-40
 >40

Page Break

Q15 Please rank the following in order of importance when purchasing a smartphone, from 1 to 6, where 1 is most important to you and 6 is least important

Camera megapixels	1
Popularity of the brand in the market	2
Price	3
Look and feel design of the smartphone	4
Battery	5
Similarity of the brands personality and your own personality	6

Model 1 Appendix

Appendix 4

Iteration History^{a,b,c}

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0	1	2016,290	-,077
	2	2016,290	-,077

- a. Constant is included in the model.
- b. Initial -2 Log Likelihood: 2016,290
- c. Estimation terminated at iteration number 2 because parameter estimates changed by less than ,001.

Appendix 5

Variables not in the Equation

		Score	df	Sig.
Step 0	Variables			
	CAM	59,565	1	,000
	BAT	70,434	1	,000
	PRICE	266,328	1	,000
	POP	24,303	1	,000
	DES	,022	1	,882
	PER	36,980	1	,000
	Overall Statistics	373,999	6	,000

Appendix 6

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step		447,277	6	,000
Step 1	Block	447,277	6	,000
	Model	447,277	6	,000

Appendix 7

Classification Table^{a,b}

		Observed	Predicted		
			CHOICE		Percentage Correct
			BRAND A	BRAND B	
Step 0	CHOICE	BRAND A	756	0	100,0
		BRAND B	700	0	,0
		Overall Percentage			51,9

a. Constant is included in the model.

b. The cut value is ,500

Appendix 8

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1569,013 ^a	,264	,353

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001.

Model 2 Appendix

Appendix 9

Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step	450,462	8	,000
Step 1 Block	450,462	8	,000
Model	450,462	8	,000

Appendix 10

Classification Table^{a,b}

	Observed	Predicted		
		CHOICE		Percentage Correct
		BRAND A	BRAND B	
Step 0	CHOICE BRAND A	756	0	100,0
	CHOICE BRAND B	700	0	,0
Overall Percentage				51,9

a. Constant is included in the model.

b. The cut value is ,500

Appendix 11

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1565,828 ^a	,266	,355

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than ,001.