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Navigation User Interface design in e-commerce and its impact on customers' satisfaction

A mixed-methods study analysing the impact of different menu styles
and user interface elements

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Abstract

This research paper investigates the impact of user interface design, particularly the navigation, on customers' satisfaction when interacting with e-commerce websites. The main focus of our study was examining different navigation menu styles such as a mega menu, a horizontal menu and a hamburger menu. Navigational user interface elements such as a local navigation menu, breadcrumb trails, pagination, tags, linked logo and icons, were also analysed with relation to their ability to help users find desired products on a website.

The data was gathered by using a mixed-method research, where we carried out a survey, together with observations and semi-structured interviews. During the observations, participants were interacting with three different high fidelity prototypes of a beauty e-commerce website. They were given a task to navigate the website from the landing page, search for a specific make-up product (an eyeliner from L'Oréal) and add it to a shopping card. The semi-structured interview followed each part of the observation and participants were able to reflect on their experience. Our target group consisted of young adults, between the age of 18 and 25 years old.

Our key findings showed that different navigation menu styles could affect websites' trust, quality, understandability, usability, hierarchy, efficiency and approachability. The data analysis uncovered a strong correlation between the mega menu and an improvement of users' satisfaction with the e-commerce website. The inclusion of the hamburger menu had a negative effect on users' satisfaction, while the horizontal menu ranked in the middle, suggesting no significant impact on enhancing the navigation experience of users. Out of all six navigational user interface elements, the local navigation was considered to be the most helpful element when searching for products on the beauty e-commerce website. It was followed by icons and pagination, which were both rated to be beneficial elements of navigation in e-commerce websites.

We conclude that the utilisation of different navigation menu styles can have various effects on customers' satisfaction when interacting with e-commerce websites. Moreover, the importance of different navigational user interface elements with relation to their ability to help users find desired products can vary. The novel conclusions can be drawn when conducting the research on a larger sample size and different age group. Our suggestion for future research includes investigating other user interface elements, such as input controls and information components. A comparison study of different types of the horizontal menu could bring a deeper understanding of our results and conclusions.

Keywords

Navigation User interface design, e-commerce, e-satisfaction, mega menu, horizontal menu, hamburger menu

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1. Introduction

In this chapter we offer a clear description regarding the background of our study and the problem area that our study is addressing. The purpose of our thesis and the research questions are presented here as well, along with the delimitations of our study and the disposition of our thesis.

1.1 Problem Statement

Due to the massive growth of the e-commerce market during the past decade (Shahriari & Mohammadreza, 2015), e-commerce websites have become the most important tool for businesses that want to sell their products online. User interface design (UI), along with user experience design (UX), are some of the most important factors which determine the success of e-commerce websites. In order for e-commerce websites to succeed in this highly competitive market, they need to provide the customers with a positive user experience (Bonastre & Granollers, 2014).

However, Bonastre & Granollers (2014) explain that UX is not implemented properly in e-commerce websites – 18 different studies made by Baymard Institute have pointed out that the average shopping cart abandonment rate reaches 67%. Therefore, enhancing the user experience design is necessary in B2C (business-to-consumer) websites in order to maximise the chance of customers staying on the website and purchasing products. As Egger (2001) says, customers must feel that they have significantly more to gain than to lose when doing online transactions. Loses can lead to frustration, dissemination of personal information, deception and wasted time and money.

It has been proven that in the context of e-commerce, different navigation designs can have an influence on the customer's behavioural intentions and attitudes (Broeder & Gkogka, 2020). Broeder's and Gkogka's (2020) study was made on two sample groups that differed from a cultural standpoint; the first group was composed of Dutch people and the second group was composed of Greek people. The participants had to judge the online search page of a hotel booking website. The conclusion that the study reached is that dynamic navigation design is more preferred by users than static navigation design, especially in the case of Dutch people. Websites with dynamic navigation design attracted more bookings and recommendation intentions compared to websites with static navigation.

However, there is still more research to be made in this area, such as the impact that different navigation menu styles might have on overall satisfaction of users belonging to a certain age

group. The categorisation of menu styles can be also made in a different manner apart from the one presented by Broeder & Gkogka (2020), who split navigation menu styles into dynamic and static. Menu types such as the hamburger menu, the mega menu or the standard horizontal menu can be further investigated in the context of e-commerce websites in order to discover which one contributes the most to customers' satisfaction when navigating through a website.

Navigation is one of the four most important factors that affect website effectiveness, along with time, graphic usage and interactivity (Udo and Marquis, 2002). Web navigation shows the location within a website, provides access to information and ultimately affects the website's credibility (Kalbach, 2007). Pilgrim (2012) provided a solid base for researching specific website navigation tools. His research shows that there has been an increase in implementing a search field in commercial websites. Since the search field represents a significant part of navigation user interface design, we find it relevant for our study to investigate the importance of other navigational elements such as a local navigation menu, breadcrumb trails, pagination, tags, linked logo and icons. Considering all of these arguments which imply the importance that navigation has within a website, we have chosen to focus our study on investigating navigational elements in a greater depth, in order to find out how they affect users' satisfaction.

There have been efforts to explain e-satisfaction by several researchers but the existing literature still contains gaps when it comes to providing a clear definition of e-satisfaction. Anderson and Srinivasan (2003) define e-satisfaction as "the contentment of the customer with respect to his or her prior purchasing experience with a given electronic commerce firm". According to McKinney et al. (2002), "Satisfaction is the consequence of the customer's experiences during various purchasing stages: (a) need arousal, (b) information search, (c) alternatives evaluation, (d) purchase decision, and (e) post-purchase behavior." Our study aims to further examine the second stage such as the information search. Customers can deal with either passive or active information search. The active information search is portrayed by visiting more than one e-commerce in order to make a comparison (of prices or products). Customers are actively seeking information and the purpose of their visit has been clearly defined. The passive information search does not include a specific intention for visiting e-commerce (Rossanty et al., 2018).

The study by Gao et al. (2007) examined different navigation menu designs in relation to the overall ability of users to complete tasks. Participants between the ages of 44 and 75 years old were given different tasks to perform on an e-commerce website with different navigation menu designs such as an index menu, a tab menu (horizontal menu), a vertical cascading menu and a horizontal cascading menu. After conducting an experiment, they concluded that the tab menu and the vertical cascading menu help older users diminish disorientations when navigating through a website. The study proves that different navigation menus styles can have various impacts on users and play a crucial role in user interface design. Different menu designs can be examined further in relation to customers' satisfaction when interacting with them, and novel

conclusions can be drawn when conducting the research on a different age group. Furthermore, they suggest that more specific design features should be tested in future studies.

1.2 Purpose and Research Questions

The purpose of this study is to investigate how user interface design, specifically the navigation, of beauty e-commerce websites can affect the satisfaction of customers with e-commerce. We focus on observing and investigating how users interact with different navigation menu styles while navigating e-commerce websites, as well as how the specific navigation menu styles influence their overall satisfaction with the e-commerce website. Moreover, we aim to identify navigational elements of user interface design which customers find to be the most crucial and helpful when looking for desired products online. The main focus is to analyse the human-computer interaction and the relationship between the user interface and customers' satisfaction when navigating through a website.

The research questions are:

RQ1:

What can be the impact of different navigation menu styles used in beauty e-commerce on customers' satisfaction?

RQ2:

What are the main navigational user interface elements that help users find desired products on beauty e-commerce websites?

1.3 Scope and Limitations

In order to achieve the most accurate results within our resources, we limit our research to desktop user interface only. This way we can cover a wider range of menu styles, as well as functions like hover that are not available for mobile screens. Bigger size of the screen allows more possibilities and structure for navigational elements, since the relatively small screen size of a smartphone limits the amount of information that can be displayed on the screen (Lugtig & Toepoel, 2016). During the research we used highly fidelity interactive prototypes in order to avoid the influence of pre-existing brand association that participants might have towards already existing websites. The study solely deals with the subject of beauty e-commerce and therefore the results cannot be applied to any other type of a website. According to Chen et al. (2020), visual appeal and website layout are crucial factors affecting consumers' online impulse buying. We focus on investigating the impact of navigation user interface design on customers'

satisfaction when they interact with different navigation menu styles of e-commerce and make impulse decisions like adding products to a shopping cart and abandoning the website.

The target group of this research is clearly defined as young adults between the ages of 18 and 25 years old who have experience with making online purchases. This specific age group engages with the Internet on a daily basis and does most of their shopping online. They expect e-commerce websites to deliver high quality, functionality and trustworthiness in order for them to obtain e-satisfaction and e-loyalty (Ayuni, 2019). We will not consider any other target groups for this research.

The thesis strictly focuses on human-computer interaction and does not take account of other possible factors such as educational background, cultural differences and social status.

1.4 Disposition

The “Introduction” presents a reader with the background information and the problem statement of this study, along with the research questions that this study aims to answer. The following chapter “Method and implementation” focuses on the explanation of the methods used in our research and provides a detailed description of how the data was collected and analysed. “Theoretical framework” states important theories that we based our study on. The next chapter “Results” illustrates our key empirical findings. “Discussion” informs the reader about how the results relate to the previous studies and connects the results with our research questions. The final chapter “Conclusions and further research” provides conclusions, it also covers the relevance of our study and makes suggestions for further research.

2. Method and implementation

In this chapter we describe the methods that were used for our study, together with the research approach. Screenshots of different prototypes that were used in our mixed-method research are also included. We discuss the data collection and the data analysis. Lastly, we focus on defining the generalisability, the research validity and reliability and the considerations of this study.

2.1 Suitable research method

In order to achieve the most accurate results we decided to conduct a mixed-methods research. Therefore we used both qualitative and quantitative methods for our study, in the form of observations, semi-structured interviews and surveys. Observation is an ethnographic research method which allows researchers to study people in their natural environment with intent to understand their point of view (Baker, 2006). We had to take into account that this qualitative data collection method has been criticised for not being objective enough. As claimed by Caldwell and Atwal (2005), observers tend to be constrained by their own cultural and social backgrounds. Our aim was to target these issues straight from the beginning and define the right type of observation method for our study.

Our objective was to observe young adults, between the age of 18 and 25, while they navigate through a beauty e-commerce website. The participants were given clear instructions prior to the start of the observation. We emphasised their free choice to leave the website whenever they wanted. The established task was to navigate the e-commerce website (starting from the home page) in order to find a specific make-up product (an eyeliner from L'Oréal) and add it to cart. For our study we developed three highly interactive prototypes with different navigation menu styles, following the list of recommendations of a successful navigation design, which are specified in the Navigation efficiency theory by Gehrke and Turban (1999). The main focus was on the navigation user interface design. We chose not to use already existing websites, because we did not want the participants to be affected by brand attachment. Any kind of brand-self linkage could involve complex feelings about the brand, such as sadness and anxiety or happiness and comfort. This sort of emotional brand connection could have a negative effect on the credibility of our research (Park et al., 2010).

Each observation consisted of three parts. The first part included observing the participants while they interacted with a prototype of a beauty e-commerce website containing the mega menu. It was followed by a semi-structured interview where we asked the participants questions regarding the task that they were given beforehand. The participants were encouraged to elaborate on their answers as much as possible and include as many details as they could, in order for us to accurately understand their decision making process. The second part focused on interacting with a horizontal menu. It was again followed by a semi-structured interview. During the last part,

participants navigated through a website containing a hamburger menu and were interviewed afterwards. The subjects were also asked to list the advantages and disadvantages of each of the three menu styles, as well as compare the different menu styles and explain which one they preferred the most. The reason why we chose to specifically conduct semi-structured interviews was because this method allowed us to also ask the participants questions that were not included in our standard set of questions. Since the experience of every participant was unique, our questions also had to adapt to each specific situation.

Along with observations and semi-structured interviews, we have also conducted surveys (created and distributed through the use of Google Forms). Surveys represented a very efficient method of collecting more structured data from our respondents, since the surveys exclusively contained close-ended questions. We used the survey in order to obtain data that can be generalised to a larger population, this is why we decided to use a bigger number of respondents for the survey (66 respondents) in comparison to the observations (10 participants).

2.2 Research approach

We used an inductive approach in order to investigate the two research questions addressed in our thesis. The inductive analysis consists in studying documents and interpreting raw data with the purpose of developing theories, deriving concepts and identifying themes (Thomas, 2006). Strauss and Corbin (1998) describe inductive analysis in the following way: “The researcher begins with an area of study and allows the theory to emerge from the data”. This approach allowed us to generate meaning and identify patterns after gathering data from the observations and the surveys.

2.3.1 Implementation of observations and interviews

The role of the researcher is an important factor when performing an observation (Mulhall, 2003). Our intention was to undertake an intermittent observation. Therefore, we adopted the position of the observer as a participant in an informal observation. During the observation we did not want to interfere, neither interact with the participants. However, when each part of the observation was over, we followed up with interviewing and reflecting on participants' behaviour and decisions that were made. A semi-structured interview provided us with a better clarification of findings from observations.

The order in which we conducted the observations and semi-structured interviews was the following: we began by presenting to the participant the prototype which employed the mega menu, we gave the participant the task and then allowed them time to complete it at their own pace. After the task was finished, we continued by asking them questions related to their task and

their experience with using the mega menu. This process was repeated for the remaining two menu styles: the horizontal menu and the mega menu. The order of the questions asked during the semi-structured interviews remained the same for all participants and all menu styles, with the specification that during some parts we followed up with additional questions if further clarification was needed.

The questions that we used as a starting point for the interviews can be seen in Figure 1.1. Since we decided to conduct semi-structured interviews, we have also asked additional questions in addition to the pre-established set of questions, adapting to the experience and answers of each participant.

<p>Demographics:</p> <ol style="list-style-type: none">1. Age:2. Gender:3. Nationality: <p>Single menu:</p> <ol style="list-style-type: none">1. Was it easy to understand how the menu functions?2. Was it challenging to find the desired product?3. Did you encounter any obstacles while navigating the website?/Did you have a moment of hesitation while performing the task?4. (If -> What made you abandon the website?)5. Do you think this menu enhances the quality of the website?6. Do you think the use of this menu makes the website more trustworthy? <p>Overall:</p> <ol style="list-style-type: none">1. Which one of the 3 menu styles do you prefer the most and why?2. What is the biggest advantage regarding the menu style that you chose?3. What are the disadvantages of the menu style that you liked the least?4. In which of the 3 cases did you feel the most satisfied when it comes to finding a specific product on the website?5. Name or point at the navigational user interface element/s that helped you to find the desired product.6. Was there anything surprising or did not perform as expected?7. Was the task easy or difficult to accomplish?
--

Figure 1.1 An interview guide with questions used after the observations.

Regarding the place where the observations and interviews were conducted, we opted for a university and a café with a rather low amount of traffic. The environment should feel natural with a relaxed atmosphere, otherwise the results could be jeopardised. It is essential to recognise any noticeable changes of behaviour in the participants.

According to Mulhall (2003), “It is important to record field notes as closely as possible in time to when events were observed”. To get the most accurate notes, we decided to record the desktop screen of the participants while they navigated through different prototypes of beauty e-commerce websites. We confronted any ethical issues by informing the participants about the screen recording taking place. We find this method to be the most effective one, because the actual filming of participants would interfere with our aim to attain a natural environment. Moreover, written notes were taken while observing the participants' behaviour and the human-computer interaction. To record participants' answers during the semi-structured interviews, we used a sound recorder app on our mobile phones.

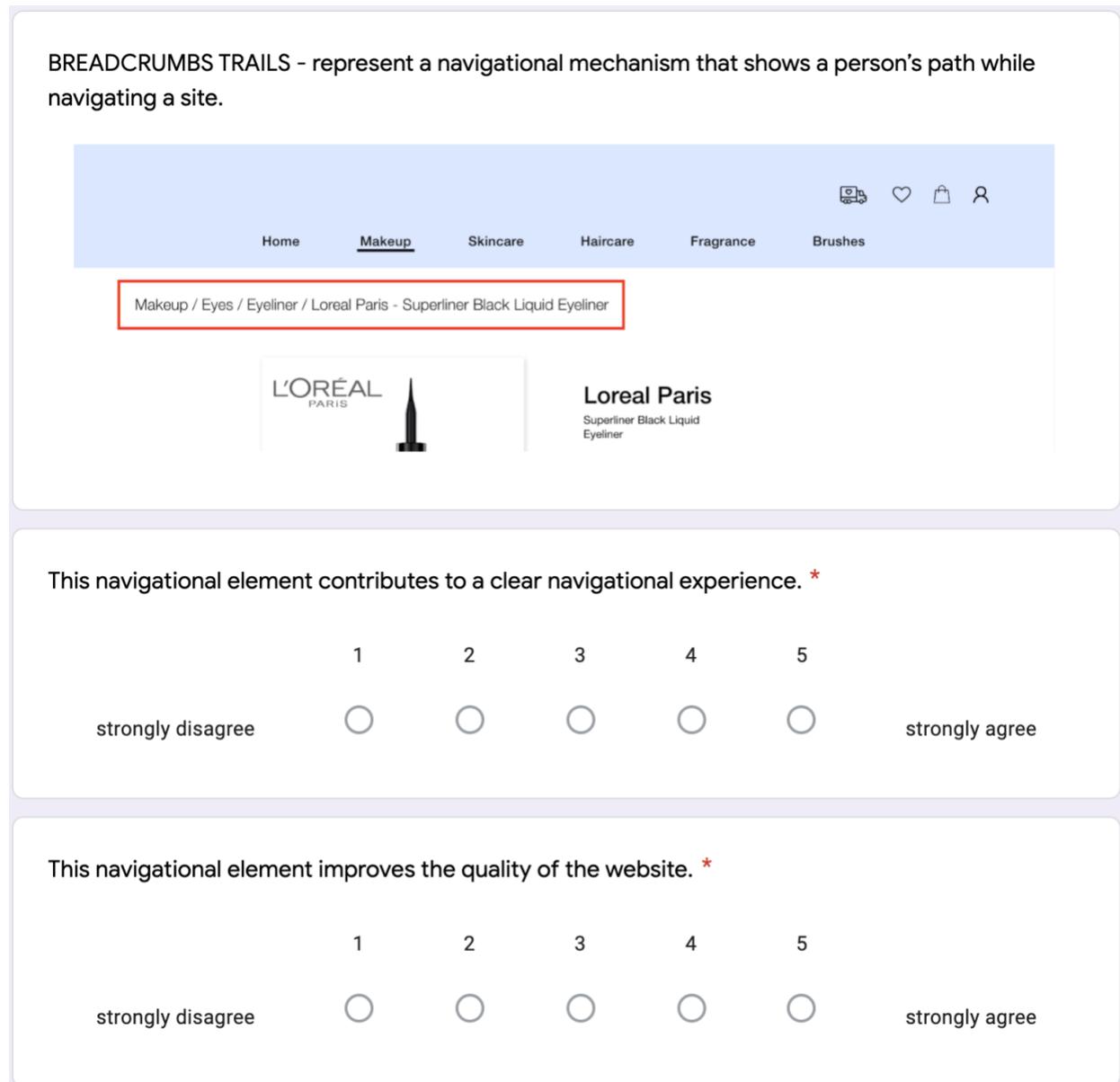
We had to take into consideration that qualitative research often produces large amounts of textual data (Pope et al., 2000). These can be time-consuming to analyse and interpret, however, when done correctly, they can provide researchers with deeply analytical results. We settled on conducting 10 observations of people from our target group.

2.3.2 Implementation of surveys

Together with observations and interviews, we used surveys in the form of questionnaires with close-ended questions. Since respondents were given a lot of freedom and spontaneity with their choices and actions during the qualitative research, we wanted to use this part of our study in order to perform quantitative research and see how they respond to a more structured approach. Our aim was to find out a group of people with particular characteristics or similar behavioural patterns and to enquire generalised data. Conducting a quantitative survey is an ideal research method for reaching larger samples of audience with less resources. Furthermore, it is less labor intensive to collect and analyse data. On the other hand, close-ended questions can provide us with less accurate data (Nardi, 2018). We also had to consider the possible risk of a low return rate.

Our approach consisted in presenting to the users questions with limited answer alternatives, revolving around the topic of customers' satisfaction in relation to beauty e-commerce websites. In order to avoid the bias that may come from suggesting response alternatives to the users (Reja, Manfreda, Hlebec & Vehovar, 2003), we have structured our survey questions and answers by also keeping in mind the information that we have already gathered about the users' behaviour and choices during the observation stage.

Our survey consisted of well-structured questions which were split into two main sub-topics: the influence that the different menu styles have on the satisfaction of customers with e-commerce and the specific user interface elements that help customers find the desired products on the website. The survey questions were also accompanied by various images of navigational user interface elements used in e-commerce, as well as screenshots of the high fidelity prototypes we used during the observation. Each menu style and navigational element was thoroughly investigated with a set of questions using a Likert scale, where respondents could show their agreement or disagreement with the statement (Figure 2.1). At the end of the survey, we included two questions where our respondents could choose which navigational user interface elements they find to be the most important and which ones to be the least important. The findings from these questions are included in Figure 5.2 and Figure 5.3.



This navigational element positively affects my trust in the website. *

1 2 3 4 5

strongly disagree strongly agree

⋮

it is relevant to include this navigational element in the website. *

1 2 3 4 5

strongly disagree strongly agree

The absence of this navigational element could negatively affect me in staying on the website. *

1 2 3 4 5

strongly disagree strongly agree

Figure 2.1 An example survey section investigating the single navigational UI element.

The collected data was from the same target group, however for the survey we aimed to reach a higher number of respondents. Fogelman and Comber (2002) suggest that the minimum acceptable sample size of any survey conducted on a small scale is 30. To get more accurate findings, we decided to draw a larger number of samples such as 50-70. When deciding on the size of our sample, we had to take into account the confidence interval and the level of confidence. The confidence interval can be described as a range of values, obtained from sample observations, in which the estimate can contain a degree of uncertainty. The level of confidence of 95% is commonly used in research and it can be explained as a 5% chance that the actual percentage will not lie between the confidence interval that we selected (Hazra, 2017). After using an online calculator (Creative Research Systems, 2012), we established the confidence interval to be 10%.

2.4 Prototypes

During our observation we used three high fidelity interactive prototypes of beauty e-commerce websites. Gehrke's and Turban's (1999) Navigation efficiency theory, where they suggested a list of things that should be considered when designing a website's navigation, helped us create the user-friendly designs. These prototypes were created in Adobe XD and the width of the page was set to 1920 px. The main difference between the prototypes was the incorporated navigation user interface design. Prototype 1 (Figure 2.2) used a mega menu, Prototype 2 (Figure 2.3) a horizontal menu and Prototype 3 (Figure 2.4) a hamburger menu. The specific product (an eyeliner from L'Oréal) that our participants were asked to find during the observations is shown in Figure 2.4. For the creation of these prototypes we drew inspiration from existing beauty e-commerce websites. We also included the screenshots of our developed navigation menu styles in the survey, together with other navigational user interface elements that were investigated in our study.

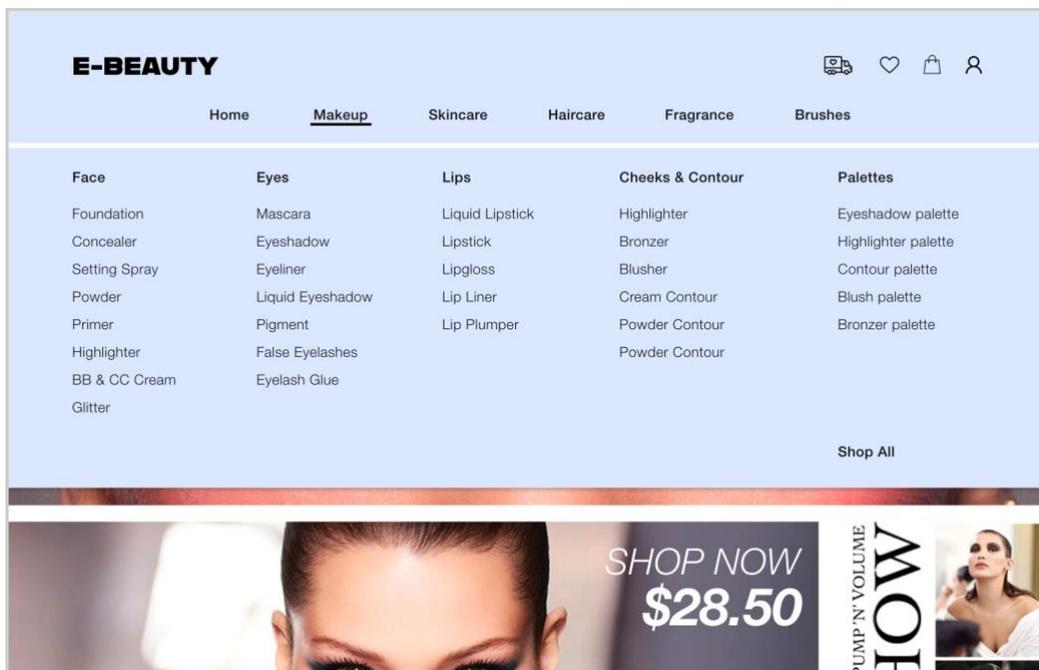


Figure 2.2 Prototype 1 - Mega menu.

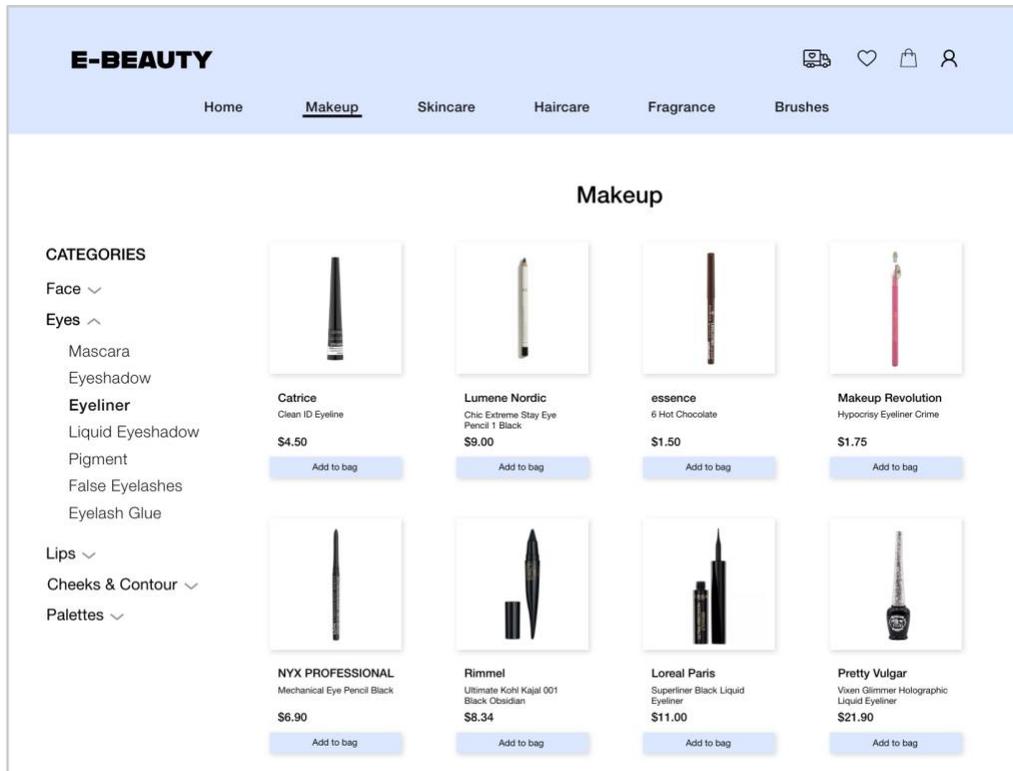


Figure 2.3 Prototype 2 - Horizontal menu.

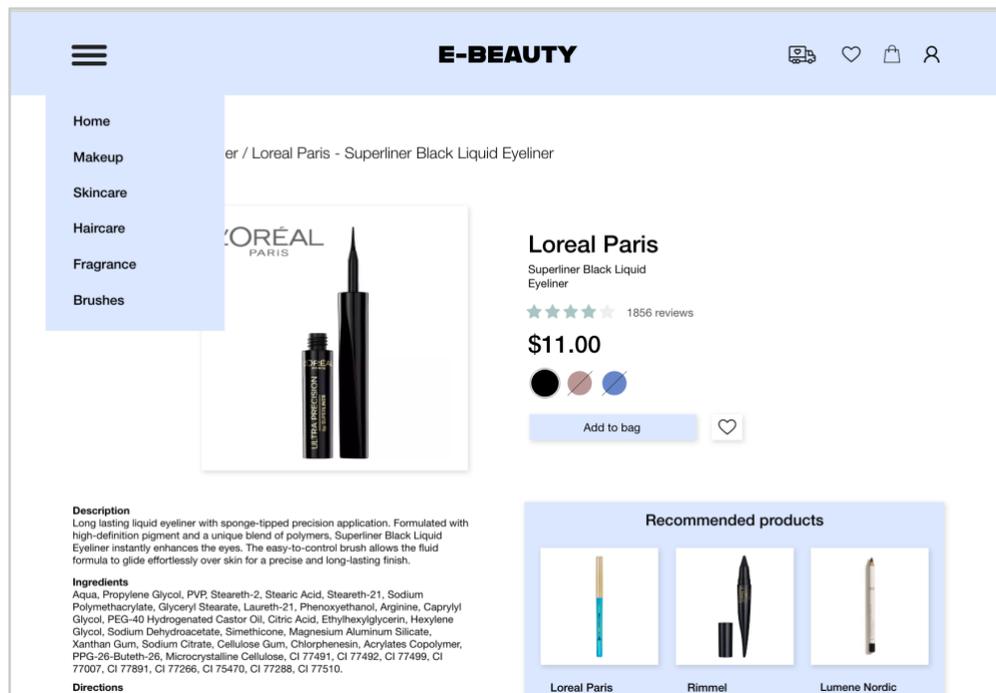


Figure 2.4 Prototype 3 - Hamburger menu, together with the eyeliner from L'Oréal .

2.5 Data collection

To collect data from participants, we produced interview and survey questions which were carefully constructed with the guidance of the IS Success Model developed by DeLone and McLean (2014). This model can be used as a guideline for measuring success of e-commerce by describing major elements of quality in information systems such as information quality, systems quality, service quality, usage, user satisfaction and net benefits. Moreover, we adapted a theory by Alawneh et al. (2013), which defines five determinants of e-Satisfaction. These determinants were specified as security and privacy, trust, accessibility, quality of public services and awareness of public services. Since security and privacy were not relevant determinants when it comes to navigation, we decided not to consider them in our research. Instead, we used the remaining four determinants. Both of these models served us as measurements of participants' satisfaction when interacting with different navigation menu styles and navigational user interface elements.

2.6.1 Qualitative data analysis

In order to analyse the qualitative data that we collected from observations and semi-structured interviews we used conventional content analysis, since this method is usually used with a study design whose purpose is to describe a phenomenon, and the existing theory or research literature about the specific phenomenon is limited (Hsieh & Shannon, 2005). In our case, the phenomenon is represented by the satisfaction of users in relation to three different menu styles used in e-commerce websites. Since information about this topic is limited, we followed the advice of Kondracki & Wellman (2002) and avoided using preconceived categories – instead we allowed the categories to naturally flow from the data.

An advantage of the conventional approach to content analysis is the fact that direct information from the participants is gained without imposing preconceived theoretical perspectives or categories. We began the data analysis by transcribing the audio recordings from the interviews, in order to have easier access to the data. We then read the data multiple times, so that we could achieve a better sense of the whole (Tesch, 1990). In order to derive codes from the text, we focused on identifying the key words, thoughts and concepts and then highlighted them (Miles & Huberman, 1994; Morgan, 1993; Morse & Field, 1995).

The next thing that we proceeded to do was to make notes of our first impressions, thoughts and initial analysis. During this process we identified the initial coding scheme by looking for ideas and concepts within the text and letting the text speak for itself. According to Auerbach & Silverstein (2003), coding represents a way of categorising the data and it is the most important step in the qualitative data analysis process. Coding consists in organising and labelling the raw information or data in order to identify common themes and topics.

Codes were then sorted into categories depending on how they related and linked. Categories are themes or patterns which are derived from analysis or directly expressed in the text, and they are used in order to organise and group the codes into meaningful clusters/subcategories (Coffey & Atkinson, 1996; Patton, 2002). Identified categories served us as a tool to measure the impact of different navigation menu styles on users' satisfaction with e-commerce websites.

2.6.2 Quantitative data analysis

We used descriptive statistics to summarise our data with the purpose of describing what occurred in the sample. Our goal was to detect any type of patterns, relationships and connections. Descriptive statistics are often used to discover sample characteristics that may influence researchers' conclusions (Thompson, 2009). It involves collecting and summarising vast amounts of data in an organised manner (Kaushik and Mathur, 2014). The data can be easily translated into simple quantitative measures such as percentages or visual summaries presented by histograms and box plots (Kaliyadan and Kulkarni, 2019). Descriptive analysis can serve as a good base for more complex statistical analysis.

To analyse our data obtained from the survey, we first carried out a frequency distribution. In the beginning of our survey we asked respondents to specify their demographics. It helped us categorise the results according to distribution of categorical variables such as gender, age and nationality. The frequency of occurring groups of respondents was analysed and our findings were presented by using a frequency table.

The majority of our survey questions were using a Likert scale, a common ratings format where respondents rank quality from high to low or least to most, by using a five-level scale. Ordinal variables are appropriately analysed with nonparametric procedures based on the rank, median or range. We therefore settled for using distribution free methods which can include tabulations, frequencies, contingency tables and chi-squared statistics (Allen and Seaman, 2007).

Our survey also contained two questions aiming to collect data in a form of quantitative variables, also called numeric, scaled or metric variables. When describing quantitative data it is crucial to mention two statistics such as measure of location and measure of spread. The most commonly used measure of location is called mean. It presents the arithmetic average. Mean is often used for comparisons, however it can be sensitive to extreme values. Median refers to the middle-most value in a set of ranked data. It is preferably used when there are extreme values taking place in the data. Range is considered to be the simplest measure of spread. It describes the difference between the minimum and the maximum (Nick, 2007). To present the distribution

of quantitative variables, we displayed the obtained data by using a histogram, which shows the frequency of certain values of a variable.

2.6.3 Methodological triangulation

Methodological triangulation uses more than one type of a method to study a phenomenon. In our study we used both a qualitative and a quantitative method. We refer to this technique as an across-method (Bekhet and Zauszniewski, 2012). According to Thurmond (2001), “Both qualitative and quantitative studies are designed to understand and explain behaviour and events, their components, antecedents, corollaries, and consequences.” Methodological triangulation has many benefits. It can help us to come up with more comprehensive and authentic data. Furthermore, it allows us to bring more validity to our conclusions and to provide a thorough explanation of the research problem (Casey and Murphy, 2009). We had to take into consideration that methodological triangulation can cause difficulties in combining the numerical and narrative data in order to understand the studied phenomenon (Thurmond, 2001). The final step of our data analysis was to compare the findings acquired from both methods used in our study. We distinguished three main types of triangulation such as convergence, complementarity and divergence (Nightingale, 2020) and drew similarities and differences from our data.

2.7.1 Generalisability

Generalisability measures how efficiently the results of a study can be applied to a broader group of people or situations (Onwuegbuzie, 2010). Gibson (2017) came to the conclusion that the combination of qualitative and quantitative research within a study can lead to an increase in generalisability across contexts and cases. Since we used both qualitative and quantitative research methods in our study, in the form of observations, semi-structured interviews and a survey, we believe that the final results of our research can be generalised to a higher number of people who belong to our target group (young people aged between 18 and 25 years old). The generalisability of our study can also be confirmed by the fact that we respected the minimum number of participants suggested for small-scale surveys and interviews. In total, we had a number of 76 participants: 10 participants for the observations and semi-structured interviews and 66 respondents for the survey. On the other hand, a factor which might affect the generalisability of our study in a negative way is the gender imbalance of our participants. The majority of the study’s participants were women: 66.7% of our survey participants were women, respectively 80% in the case of observations and semi-structured interviews.

2.7.2 Research validity

Blumberg et al. (2005) define validity as the extent to which an instrument measures what it is intended to measure. Validity represents the degree to which the results of a study are truthful and it establishes whether the results meet all the requirements of the research method (Pallant 2011). In the case of qualitative research, validity is a matter of dependability, trustworthiness and utility, as well as an extent at which the requirements of the chosen scientific method have been followed during the research process (Zohrabi, 2013). On the other hand, in quantitative research, validity represents the extent to which a measuring instrument measures what it is intended to measure (Thatcher, 2010).

According to Baker (2006), personal reactivity in the context of observations occurs when subjects behave differently because of the observer's personal characteristics or behaviour. Procedural reactivity happens when the subjects are aware of the fact that they are being studied or observed and as a consequence begin behaving in a more unnatural way. In order to prevent personal and procedural reactivity, we have decided to screen record the process of the participants completing their tasks and take notes while maintaining a distance, instead of actively taking notes next to the participants and studying their actions and choices in a way that might feel intrusive for them.

In order to assure the validity of the semi-structured interviews, we have pre-tested our standard set of questions with potential interviewees, by asking them if the formulation of the questions is clear enough, if they find the questions to be relevant and if they have any suggestions. The list of questions contained only open-ended questions, so that we could allow the participants to have as much freedom as possible in elaborating their answers. In addition to the standard set of questions that we used for every participant, we followed-up our interviews with pertinent personalised questions by taking into account each subject's journey and experience when navigating the prototypes. This allowed us to gain a deeper knowledge of the thought process and judgement making of each participant.

The tone and demeanour that was used when interacting with the subjects was objective and non-judgemental. The duration of the observations and semi-structured interviews was approximately 6 minutes for each participant, therefore the chances of the participant becoming tired or losing their focus while performing the tasks or answering the questions was very low. We also do not consider that the order in which participants were asked the questions during the semi-structured interviews affected the results of the study in any way, since we used stand-alone questions which did not depend on one another.

In order to make sure that the questions that we included in our survey were relevant for our study, we used a theory made by Alawneh et al. (2013), which defines five e-satisfaction

determinants: security and privacy, trust, accessibility, quality of public services and awareness of public services. We used four of these determinants (trust, accessibility, quality of public services and awareness of public services) in order to measure the satisfaction level of e-beauty commerce users as efficiently as possible. We also used a theory written by DeLone & McLean (2014), which acts as a guideline for measuring success in information systems, including e-commerce. The major elements of quality that DeLone & McLean describe are: information quality, systems quality, service quality, usage, user satisfaction and net benefits.

2.7.3 Research reliability

As mentioned by Chakrabarty (2013), reliability is a concept used to measure the precision, consistency and trustworthiness of a research, indicating the extent to which the research is error free (without bias), therefore ensuring stable and consistent results. In qualitative research, reliability is determined by the consistency of the researcher's approach (Twycross and Shields, 2004), as well as the researcher's capacity to prevent their subjectivity from affecting the results of the study (Wilson, 2010).

During the observations that we conducted, we made sure not to interfere or interact with the participants in order to not compromise or affect the integrity of the results. For consistency reasons, all the observations and semi-structured interviews were conducted in the exact same manner. The observations were held in places with low amounts of traffic and with a relaxed atmosphere, so that the participants could concentrate exclusively on their tasks. All the participants of the study received the same task and then they were given space to perform the specific tasks without being interrupted or disturbed in any way by the observer. The questions for the semi-structured interviews were asked by the same interviewer every time and the conversations with the participants were audio recorded in order to have access to the participants' responses at any time.

Twycross and Shields (2004) affirm that in quantitative research, the results of a research are considered reliable if consistent results have been obtained in identical situations but different circumstances. In order to assure the stability and consistency of our survey results, we have created a well-structured survey by using clearly formulated close-ended questions and accessible words. This way, we prevented the risk of each question being interpreted differently by the participants. The images that accompany some of the survey questions were chosen to be easily understandable and to leave no place for confusion or misinterpretation to the participants of the study. The surveys were sent out to a clearly pre-defined target group, which consisted of people between the ages of 18 and 25 who had previous experience with beauty e-commerce websites.

2.8 Considerations

We selected the participants for our study according to our specific target group, which is comprised of young people between the ages of 18 and 25 who are familiar with e-commerce shopping. Our participants consisted of people from our circle of friends, as well as people whom we have never met before. We used the convenience sampling method since it allowed us to get participants in an easy, quick and cost effective way. The convenience method consists in taking samples from a group of people who are easy to reach or to contact (Etikan, Musa & Alkassim, 2016). We chose to contact our friends, since they perfectly fit the targeted age group of our study. Another advantage of choosing our friends as participants was the fact that they had a more relaxed attitude during the observations and interviews, and that they felt comfortable answering our questions in an honest way. Most of the people in our friends circle are university students and therefore the collected results may not represent the whole population.

The manner in which we managed to get in touch with people from outside our group of friends was by sharing announcements about our study on Facebook group chats. This way, we found university students from different countries around the world (17 countries in total) which were willing to help us with our research. In terms of gender distribution, the majority of our participants were women: 66.7% of our survey participants were women, respectively 80% in the case of observations and semi-structured interviews. The imbalance between the female to male ratio is a factor that might affect the generalisation of our results in the long term.

In what concerns the ethical implications of our study, we made sure to take the confidentiality of our participants very seriously and we assured them from the beginning that their personal information will be kept private. All the participants gave their consent for taking part in our research and they were informed that they are free to withdraw if they felt uncomfortable anytime during the research. It is also important to mention that none of the answers from our participants were judged in a subjective way; their answers served purely for research purposes and they haven't been disclosed to anyone except us, the researchers.

3. Theoretical framework

This chapter presents the theories that were implemented in our research. The following paragraphs provide a definition of the IS Success Model, together with Determinants of e-satisfaction, which were both relevant and crucial to our study. Additionally, we describe different navigation menu styles along with different navigational user interface elements.

3.1 E-commerce

According to Niranjnamurthy et al. (2013),” Electronic commerce, or e-commerce refers to economic activity that occurs online. E-commerce includes all types of business activity, such as retail shopping, banking, investing and rentals.”

Different types of e-commerce has been defined by Nemat (2011) as follows:

- Business-to-business (B2B)
- Business-to-consumer (B2C)
- Business-to-employee (B2E)
- Business-to-government (B2G)
- Business-to-manager (B2M)
- Consumer-to-business (C2B)
- Consumer-to-consumer (C2C)
- Government-to-business (G2B)
- government-to-citizen (G2C)
- Government-to-employee (G2E)
- Government-to-government (G2G)
- Peer-to-peer (P2P)

In our thesis we focus entirely on business-to-consumer (B2C) e-commerce, which describes activities between the business and consumer, more specifically a purchase of goods or services.

3.2 Navigation efficiency

Gehrke and Turban (1999) describes navigation efficiency as an important part of an effective website. Their study specifies recommendations for improving the navigation experience of users. The following are their suggestions:

- Use well labeled, accurate links
- Avoid the use of frames
- Keep navigation consistent
- Provide an effective search engine in the site

- Use distinctive hot buttons
- Use long pages with links rather than subsequent pages
- Use site maps/guides if the site has many underlying pages
- Avoid links that open up new browsers or pop-up ads

If the website's navigation is not user-friendly, users can easily get confused and frustrated, which can eventually lead to users leaving the website. Therefore, when creating the navigation design, designers and web developers should follow the list of Gehrke's and Turban's (1999) suggestions.

3.3 Information Systems (IS) Success Model

Developed by The DeLone and McLean in 2004 and updated in 2014, IS Success Model (DeLone and McLean, 2014) serves as a guideline for measuring success in information systems. In their research DeLone and McLean described three major elements of quality as:

- information quality - referring to completeness, ease of understanding, personalisation, relevance, security
- systems quality - referring to adaptability, availability, reliability, response time, usability
- service quality - referring to assurance, empathy, responsiveness

The adaptation of IS Success Model to e-commerce meant enhancing the major three elements with other relevant elements such as:

- usage - referring to nature of use, navigation patterns, number of site visits, number of transactions executed
- user satisfaction - referring to repeat purchases, repeat visits, user surveys
- net benefits - referring to cost savings, expanded markets, incremental additional sales, reduced search costs, time savings

This led to creating the ultimate list of e-commerce success metrics (Figure 3.1). The above elements that are relevant to our study can be implemented and serve as an indicator of measuring customers' satisfaction.

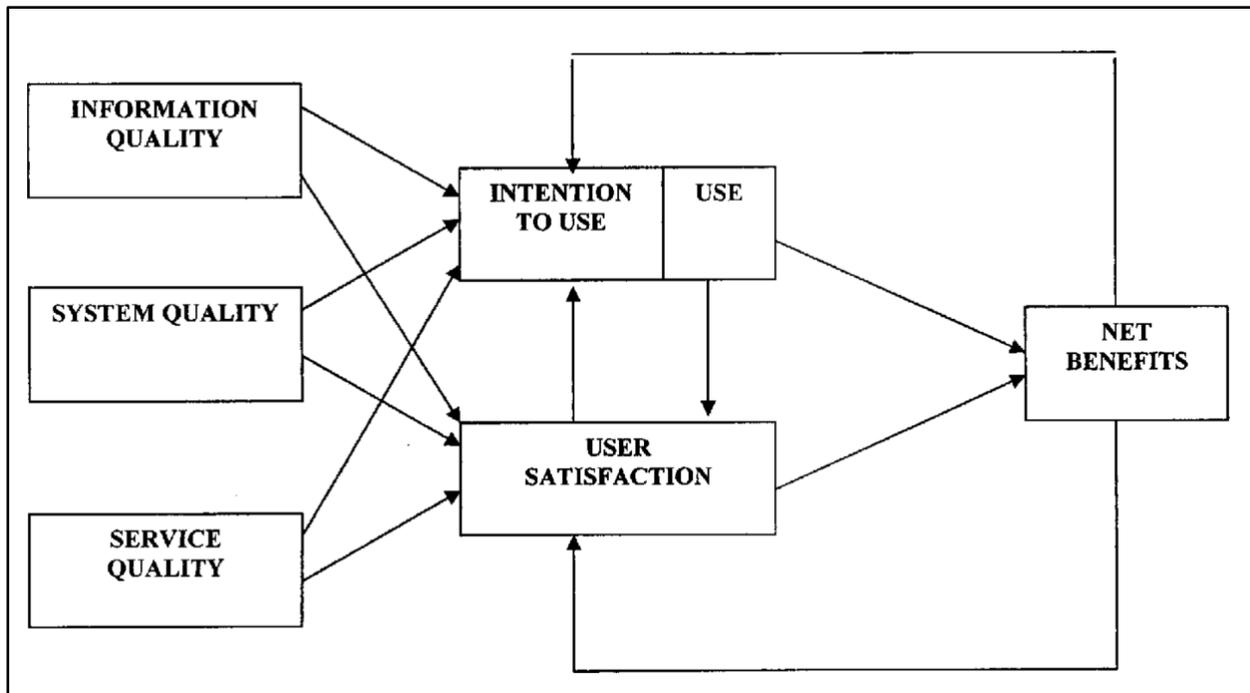


Figure 3.1 Information Systems (IS) Success Model (DeLone and McLean, 2014).

3.4 Determinants of e-Satisfaction

Satisfaction relates to the quality of service and it consists of both behavioural and mental dimensions. Users are influenced by their experience and by attitudes they have developed prior to interacting with the service. Dissatisfaction might arise when there is a technological issue, a design problem or a service problem (Alawneh et al., 2013).

In order to measure the e-satisfaction, Alawneh et al. (2013) defined five e-Satisfaction determinants:

- Security and privacy
- Trust
- Accessibility
- Quality of public services
- Awareness of public services

Security and privacy are described as one of the most challenging things to maintain when customers are interacting with e-commerce. The role of security is to protect users from invasion of their privacy. Security can be viewed as a subjective perception of a website that users possess and their belief to keep their private information saved from misuse (Dixit, 2012). Highly

reliable security and privacy should include resilience to attacks, data authentication, access control, client privacy (Weber, 2010).

Successful e-commerce websites should affirm customers' trust and lower their risk perception through technology and marketing. The appearance, the functionality and the service quality are all a result of the technical design which is crucial in relation to trust (Corbitt et al., 2003). According to Gefen (2000), "Trust encourages long-term orientation, increases the acceptance of independence and creates commitment."

Accessibility and approachability can be enhanced by a good page layout that is user friendly, and an accessible website that can accommodate business transactions (Cox and Dale, 2001). Accessibility is the ability of customers to use, perceive, understand, navigate and interact with the e-commerce website (Alawneh et al., 2013).

Quality of public services is the customer's perception of the difference between the expected service quality and the perceived service. Quality that takes place in e-commerce is defined as users' overall evaluation of e-service offerings in the virtual marketplace. Positive factors in an online environment such as reliability, responsiveness, access, ease of use, attentiveness, credibility, flexibility, convenience, efficiency and enjoyment can increase the quality of public services. On the other hand, security concerns, risk of obsolescence, impersonalisation and lack of control can contribute to users developing a negative perception of e-services (Santos, 2003).

Awareness of public services helps users adopt and use e-services. Awareness is the ability to perceive, feel or be conscious of events, objects or sensory patterns. Consumer awareness relates to a consumer's knowledge of a product or a company. It can be enhanced by providing product or e-service information to users, informing them about safety issues and their rights (Najafi, 2012).

3.5 Online store attributes

Studies who have analysed the online shopping service attributes (Jarvenpaa and Todd, 1997; Lohse and Spiller, 1998; Szmanski and Hise, 2000; Liu and Arnett, 2000) have classified these attributes into into four categories :

- Merchandise
- Customer service and promotions
- Navigation and convenience
- Security

Merchandising refers to product-related characteristics such as variety, assortment and product information (Jarvenpaa and Todd, 1997). The probability of the consumer's needs to be fulfilled can be increased by a rich product assortment. Bakos (1997) argues that the primary role of an online store is to offer product information and price-related information in order to help the consumer reduce their search costs. Big online stores are not as effective as small stores at obtaining sales out of site traffic, because users have more difficulty finding the products that they are searching for (Lohse & Spiller, 1998). Extensive product information such as product testimonials, price comparisons or product demonstrations can be offered by online shopping stores in order to facilitate the decision making process of customers (Park & Kim, 2003).

Customer service and promotion represents the second attribute category of online stores. According to Lohse & Spiller (1998), customers want continuous, careful and useful communication. Customer service includes answers to frequently asked questions, information about payment policies, help with product selection, contact information for sales representatives and gift services. Promotions include practices or strategies that attract customers, some examples being lottery games, frequent buyer schemes or product-related tips (Park & Kim, 2003).

The third attribute is represented by navigation and convenience, which, for an online store, is related to the user interface (Szymanski & Hise, 2000). Since the experiences of customers interacting with a product or service are influenced by the user interface of an online store (Griffith, 2001), a user interface system that is properly designed can reduce the users' cost of searching and the time consumed. Consumers find online shopping a pleasurable and satisfying experience when the retailer sites are fast, easy to navigate and uncluttered. These types of websites allow users to economise shopping time by not performing extra steps in order to understand how to effectively shop online (Szymanski & Hise, 2000).

Finally, the security of online transactions is another important attribute of electronic commerce. Customers feel reserved when it comes to disclosing their private information to online shopping sites, even when websites offer private protection policies regarding the personal information of clients or guarantee transaction security. In most cases, websites omit to also offer detailed information on how they secure transaction and personal data (Elliot & Fowell, 2000).

3.6 Navigation design

Navigation design helps users find their way around in an information space. Good navigation design should provide users with means for navigating through the site. It should also communicate the relationship between the specific links used in the navigation as well as the way these links relate to the content of the page. Most sites usually use a combination of various

navigation systems to make it easy for users to navigate the website in any conditions (Garrett, 2011).

3.6.1 Global navigation

Global navigation provides access to the most important sections of the website. It is quite common that global navigation appears on every page of the site and users are then able to get from one end of the site to the other in a short period of time (Garrett, 2011).

Hamburger menu

The hamburger menu is a type of navigation which is “hidden”, meaning that the user must click the hamburger icon in order for the content of the menu to be revealed on the page. The main characteristics of the hamburger menu are the fact that it occupies a limited amount of space and that it can scale a big number of items (Pernice & Budiu, 2016). We chose to study the hamburger menu because it differs from the other menu styles by using an icon. This icon consists of three horizontal lines that are usually placed in the top corner of a website. We refer to it as a hamburger button (also known as the collapsed menu icon). During our research we aimed to study the different impact this menu style can have on users when navigating through a website.

Mega menu

The mega menu is a drop-down menu with multi-level expansions which has the ability to contain the website’s entire navigation into a single menu. A mega menu allows users to reach the deepest sections of a website by using exclusively the main menu (Kalbach, 2007). In our thesis we wanted to investigate whether this combination of global and local navigation accommodated in a single navigation menu style could have a positive or a negative impact on customers' satisfaction.

Horizontal menu

The horizontal navigation consists of a list of links at the top of each page. The horizontal navigation menu can be situated above, below, to the right or to the left of the header or the logo, but it is always placed before the main content of the page. This type of menu can support up to two levels of navigation: primary and secondary. The primary level navigation is always exposed, while the secondary level navigation can be either visible or hidden within dropdown menus (Kalbach, 2007). The reason why we chose to investigate this specific type of menu is because of its simple yet effective design, which allows users to quickly navigate throughout a website and find the desired piece of content.

3.7 Navigational user interface elements

In this chapter we describe the different navigational user interface elements that we found relevant to our study, and therefore we decided to investigate their ability to help users find desired products on beauty e-commerce websites.

3.7.1 Local navigation

Local navigation gives users access to those sections of the website that are nearby. If we considered a strictly hierarchical structure, local navigation would accommodate linking to a page's parent, siblings, and children (Garrett, 2011).

3.7.2 Paging navigation

Paging navigation (pagination) is often found on search results pages which show details about the page numbers in the results set. Results sets often have limits on the amount of items that can be displayed at once, therefore, after this limit is reached, a second section of results is displayed on a new page (Kalbach, 2007).

3.7.3 Breadcrumb trail

The breadcrumb trail is a navigational mechanism that shows a person's path while navigating a site. Breadcrumbs consist of elements, also called nodes, that are chained together. The nodes are connected to previously visited pages and they are separated with a symbol, usually a greater-than sign (>), colon (:), or pipe (|) (Kalbach, 2007).

3.7.4 Tag clouds

Tag clouds are logical arrangements of keywords within a textual context, which visually describe the subject of a website, blog or any other text. Tags represent the most popular topics and they are highlighted using bold, larger fonts or easily visible colours. Tag clouds help users search the content easily which is why they are used as navigation or visualisation tools (Kalbach, 2007).

3.7.5 Linked logo

The logos of websites are usually found at the top of each page. It is a common practice to link the logo to the home page. This practice is used because linking the logo provides a predictable way of returning to a familiar starting point. It can be seen as an “undo” option within the navigation process (Kalbach, 2007).

3.7.6 Icon

Icon is a word originating from Greek “eikon”, which can be translated as an “image”. Icon design is a crucial part of user interface design. We refer to icons as simplified images that are used as graphical symbols indicating concepts. The icon’s goal is to help users navigate and get information more quickly and effectively. Icons are often hyperlinked and clicking on them can reach different behavioural results such as opening a file or an option (Yan, 2011).

4. Results

In this chapter we present, analyse and structure the empirical findings that were obtained from the survey, observations and semi-structured interviews. We provide a comparison between the qualitative and the quantitative method by using the methodological triangulation, which concludes this chapter.

4.1 Survey

The collected empirical findings were divided into two main sections, such as navigation menu styles and user interface navigational elements, following the structure of our survey. Each of the sections was followed by analysis of collected results and data comparison. Figures 4.1 and 4.1 were used to display the demographics of our respondents by using a frequency table.

Gender	Frequency	Percentage
Male	44	66.7%
Female	22	33.3%
Total	66	100%

Figure 4.1 Frequency distribution according to the gender of the respondents.

Age	Frequency	Percentage
18	4	6.1%
19	13	19.7%
20	6	9.1%
21	7	10.6%
22	8	12.1%
23	11	16.7%
24	7	10.6%
25	10	15.2%
Total	66	100%

Figure 4.2 Frequency distribution according to the age of the respondents

4.1.2 Navigation menu styles

In our survey we asked respondents to rank their agreement (on a scale from 1 - strongly disagree to 5 - strongly agree) with statements focusing on the different determinants affecting the quality of navigation and respondents overall satisfaction with the particular menu style. We formulated the statements in order to obtain detailed data about the ability of each menu style to provide a clear navigational experience, the ease of finding a specific product, the ease of understanding how the menu functions, the ability of the menu to improve the website's quality, as well as the impact of the menu on the website's trustworthiness. Through these questions, we investigated the impact of each menu style on customer's satisfaction with the e-commerce website. All navigation menu styles were presented by using a screenshot from the wireframes used during the observations.

Mega menu

The mega menu showed positive results in providing a clear navigational experience. More than 55% of the respondents rated the mega menu with the highest point of 5, and over 30% respectively ranked with a 4, when asked about the navigational experience and the easiness of finding the desired product. According to collected data, all respondents were strongly confident or confident that it is easy to understand how the mega menu functions. The distribution of answers was more equal when asked about the impact of the mega menu on the quality of a website. 40.9% of respondents agreed with this statement, 36.4% agreed strongly, and 19.7% provided a neutral answer with no regard to a direct connection between the mega menu and the website's quality. Almost half of the respondents (45.5%) agreed that the mega menu positively affects their trust in the website. However, a third of the respondents ranked the mega menu with a 3 - nor agree or disagree with the statement. The most commonly used answer was 5, which indicates a positive effect of the mega menu on users' satisfaction.

Hamburger menu

According to our respondents, the hamburger menu provides a relatively clear navigational experience and it is easy to understand how it functions. 40.9% of the respondents rated the overall navigational experience of the hamburger menu a 5, while 33.3% of them rated it a 4. A significant percentage of the respondents (34.8%) agreed that it is easy to understand how the menu functions, while an even bigger percentage of subjects strongly agreed with this statement (43.9%). On the other hand, the downside of the hamburger menu is the fact that difficulties might arise when it comes to using this specific menu style in order to find a desired products page or category. Although 42.4% of the respondents were satisfied with the menu's ability to help them navigate through the website, 34.8% of the respondents were either neutral or not satisfied in this regard. When it comes to deciding whether the hamburger menu improves the quality of a website or increases the customers' trust, the majority of the answers indicated a slightly above the average satisfaction level. The respondents' most occurring answer was 4,

which shows the hamburger menu has the ability to improve user's satisfaction with navigating through the website, however not to that degree as the mega menu.

Horizontal menu

The respondents ranked the horizontal menu high on the satisfaction scale when it came to analysing its simplicity, its functionality and its overall efficient navigational experience. The majority of the respondents (51.5%) strongly agreed that it is very easy to understand how to use the horizontal menu, while 36.4% of the respondents simply agreed with this statement. The subjects also stated that this menu allowed them to efficiently find a specific page or category within a website, 37.9% of the respondents ranked this ability a 5, while 36.4% ranked it a 4. Even though the respondents were mostly pleased with the simplicity of the horizontal menu, they did not consider that it has the potential to significantly improve the quality of a website or increase their trust in a website. The mode or the most commonly used answer was number 5. Although the results did not show a notable difference between the numbers 4 and 5, which puts the horizontal menu slightly above the hamburger menu when analysing the users' satisfaction.

4.1.3 Analysis and comparison of navigation menu styles

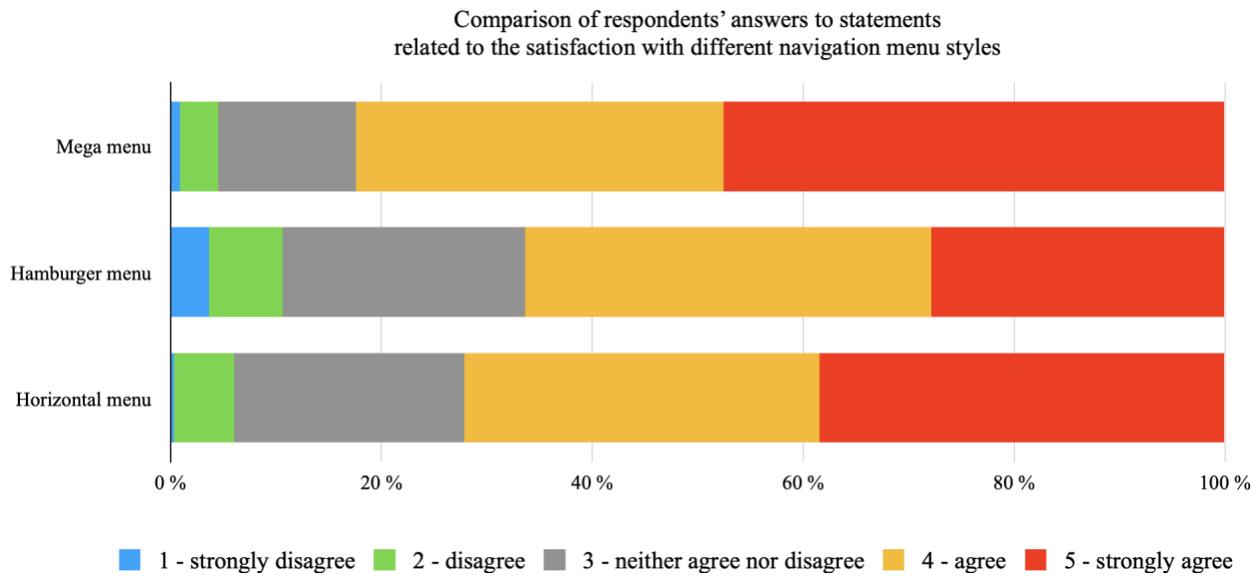


Figure 5.1 Comparison of respondents' answers to statements related to the satisfaction with different navigation menu styles.

In order to gain a better understanding of the differences between the individual menu styles, we displayed the collected data by using a stacked bar chart (Figure 5.1). This chart shows the

percentage of respondents' answers (1 to 5) when asked about the three different navigation menu styles. We were able to use the 1 to 5 answers as a tool of comparison, because the values always carried the same meaning for each of the statements. Moreover, all statements about the menus that we included in the survey were constructed to have a positive meaning or a positive quality. Respondents used number 1 on the Likert scale to express a strong disagreement and number 5 to express a strong agreement with the statement. Therefore, we can perceive number 1 as a strongly negative response and number 5 as a strongly positive response to the particular menu. The questions were carefully constructed to detect the respondents' satisfaction with each of the menus.

The mega menu was the most preferred menu style by our respondents. Almost 85% of them showed a strong agreement or an agreement with the statements, proving that the mega menu has the biggest impact on improving the users' satisfaction with an e-commerce website. With a lower percentage of respondents' agreement with the survey statements, the horizontal menu ranked the second. The results show that the number of people who strongly agreed with the statements (38,48%) moved closer to the number of those who only agreed (33,64%). We also had to take into account a growing percentage of those who neither agreed, nor disagreed with the statements, since this number is larger than a fifth of the respondents. The hamburger menu received a smaller percentage of respondents who strongly agreed (27,88%) than those who agreed (38,48%) with the statements. There was also the highest percentage of disagreement and people who did not see any particular effects of the hamburger menu on users' satisfaction. We can conclude that all menu styles proved to have a positive impact on the satisfaction of users, however the mega menu clearly differed with outstanding results.

4.1.4 Navigational user interface elements

The survey also accommodated sections about six different navigational user interface elements. The respondents were asked to rank their agreement (on a scale from 1- strongly disagree to 5 - strongly agree) with statements (see Figure 2.1). Each statement was focusing on different factors such as the ability of the element to contribute to a clearer navigational experience, to improve the quality of the website, to affect the trustworthiness of users, as well as the relevance of including the specific element in the ecommerce website. Through these questions, we examined each navigational user interface element with relation to its ability to help users find specific products. All navigational user interface elements were presented by using screenshots from the wireframes used during the observations, together with a short written definition. Additionally, we included two different questions, where respondents chose the most important and the least important navigational user interface elements when it comes to their ability to help users find a desired product on a beauty e-commerce website.

Local navigation

The respondents found the local navigation to be very essential for the overall navigation on the website. Over 75% of the respondents strongly agreed or agreed that local navigation should be included in the website and more than a half of the respondents agreed that the absence of the local navigation could result in users abandoning e-commerce websites. The survey showed that over 75% of the respondents agreed or strongly agreed that the quality of the website is improved when local navigation is incorporated. The mode or the most repeated answer was number 5, which proves the importance of this element.

Breadcrumb trails

When investigating this particular navigational user interface element, we received almost equally divided answers among the five-point scale. Even though 39.4% of the respondents strongly agreed that breadcrumb trails contribute to a clear navigation experience, almost 20% neither agreed nor disagreed with this statement. The results showed that 37.9% of the respondents did not find it relevant to incorporate the breadcrumb trails in order to improve the website's trustworthiness. The split opinions of the respondents were present when asked whether they find it important to include this element in the website at all. Most of the respondents (28.8%) did not consider the absence of the breadcrumb trails to be directly connected to users leaving the e-commerce website.

Pagination

42.4% of the respondents gave the pagination a ranking number 5 and 30.3% a ranking number 4, when asked about the effect of this navigational user interface element on a clear navigational experience. Over a half of the respondents strongly agreed or agreed that the pagination makes it easier to find the desired product. They also stated that the pagination improved the website's quality and is important to be included in the website. The respondents did not find a direct relation between the pagination and its possible effect on users' trust in the website. 27.3% of the total number of respondents agreed that the absence of the pagination could result in an abundance of the e-commerce website, however, 24.2% disagreed with this statement, resulting in a clash of opinions between the respondents. The most commonly used answer was number 4 (agree), suggesting that the pagination betters users' satisfaction with the e-commerce website.

Tags

The answers were almost equally divided when respondents were asked to rate the influence of tags on the navigational experience. 31.8% of the respondents rated the contribution of tags on an overall clear navigational experience a 3, while 24.2% of them rated it a 2 and 24.2% of them rated it a 4. The satisfaction level of the respondents remained neutral when assessing impact of tags in the process of finding a certain product or category within a website, as well as when deciding whether tags have a relevant impact on the quality of a website. The absence of tags within a website would not affect the majority of the respondents: 28.8% of the respondents

voted 2 when asked whether the absence of tags would affect their decision of staying on a website. 27.3% of the subjects voted 1 for the same question, while 25.8% of them voted 3.

Linked logo

Linked logos had a strong positive impact on the majority of our respondents, 54.5% of them ranked the contribution that linked logos bring to a clear navigational experience a 5. A high percentage of the respondents (60.6%) also considered that linked logos play a significant role in improving the quality of a website, while 53% of respondents considered that it is very relevant to include this navigational element inside a website.

Icons

Icons were another highly appreciated navigational element, which 65.2% of respondents viewed as very necessary for an efficient navigational experience, rating it a 5. When asked if icons help the user find a desired products page or category within a website, 54.5% of the respondents strongly agreed with this statement and ranked icons a 5. 54.5% of the respondents considered that it is highly relevant to include icons inside an e-commerce website, while 59.1% of the respondents voted for the ability of icons to improve the quality of a website a 5.

4.1.5 Analysis and comparison of navigational user interface elements

Which navigational element/elements do you find to be the most important? (Select 1 or more)

66 responses

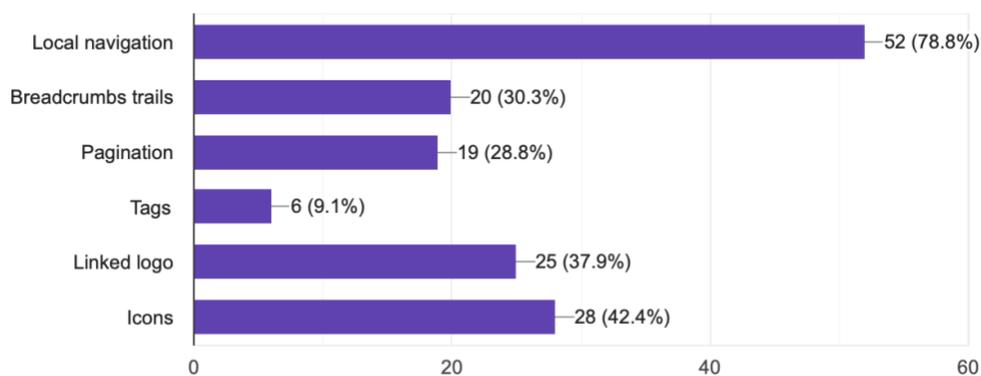


Figure 5.2 A histogram showing the most important navigational elements.

Which navigational element/elements do you find to be the least important? (Select 1 or more)

66 responses

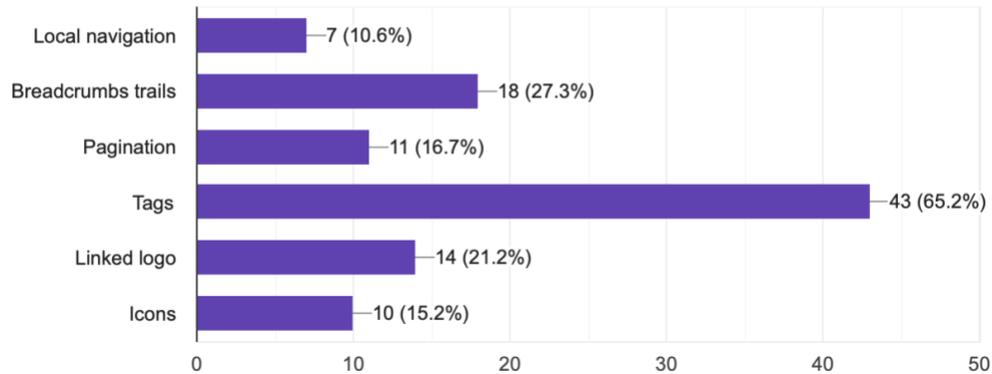


Figure 5.3 A histogram showing the least important navigational elements.

In order to determine which navigational user interface elements are the most important when it comes to users' satisfaction, we added two additional questions to our survey. Inside these questions we listed the six navigational elements that we were investigating and we asked the respondents to choose which elements they found to be the most important, respectively which ones they found to be the least important. The respondents' answers were displayed inside two graphs which were automatically created by Google Forms. After analysing the two graphs, we noticed that the participants' answers were overall consistent in what concerns the placements of the navigational elements within a hierarchy. Both graphs show that the "Local navigation" is considered by far the most important navigational element, followed by "Icons" as the second most important element. The following elements in the hierarchy are "Linked logo", "Breadcrumbs" and "Pagination", but their order varies between the two graphs. On the other hand, both graphs clearly confirm that "Tags" were voted as the least relevant navigational element by the respondents.

4.2 Observations and semi-structured interviews

The collected data from the observations and semi-structured interviews was displayed into tables containing the impressions of each participant concerning the three menu styles. An individual table was created for each menu style, displaying the extracts and codes from the observations and interviews.

The codes that derived from analysing the qualitative data were placed into seven categories: trust, quality, understandability, usability, hierarchy, efficiency and approachability. These categories were then used in order to count the number of negative and positive impressions of the participants about each menu style, and then determine the satisfaction level of each menu style.

4.2.1 Transcription of extracted data into codes

We extracted the most relevant information that our participants provided to us about each menu style and we created three tables (one for each menu style). Inside of these tables, we displayed the extracts (the most important thoughts and impressions) from each participant, along with the corresponding codes. The codes were created by identifying keywords and main concepts from the extracts, in order to create general themes and topics.

Participant no.	Extracts	Code
Participant 1	<ul style="list-style-type: none"> - nice that it shows all options at once - does not include a lot of clicks - is easy to use - improves the website's quality - makes the website more trustworthy 	<ul style="list-style-type: none"> - nice to see all available options - time efficient - easy to understand - easy to use - improves quality - positively affects trust
Participant 2	<ul style="list-style-type: none"> - it is the easiest to navigate - good hierarchy and clear subcategories - a moment of hesitation - I was not sure whether to click on "Eyeliners" or "Liquid eyeshadows" - makes the website more trustworthy 	<ul style="list-style-type: none"> - easy to understand - easy to use - clear hierarchy - confused by similar menu subcategories - positively affects trust
Participant 3	<ul style="list-style-type: none"> - easy to understand and navigate - the menu is understandable to everyone - enhances the quality of the website - encompasses all the pages/categories - seems to have been put a lot of effort into creating - offers me a sense of trustworthiness 	<ul style="list-style-type: none"> - easy to understand - easy to use - enhances quality of the website - complex with a clear hierarchy - good thought-out design - positively affects trust
Participant 4	<ul style="list-style-type: none"> - easy to understand how it functions - easy to find the desired product - didn't encounter any obstacles - didn't experience hesitation - it makes the website more trustworthy 	<ul style="list-style-type: none"> - easy to understand - easy to navigate - easy to use - positively affects trust
Participant 5	<ul style="list-style-type: none"> - easy to navigate and find information, effective 	<ul style="list-style-type: none"> - easy to understand

	<ul style="list-style-type: none"> - improves the website's quality - makes the website trustworthy 	<ul style="list-style-type: none"> - easy to use - effective design - easy access to information - improves quality - positively affects trust
Participant 6	<ul style="list-style-type: none"> - the easiest to understand - it is well divided and all encompassing - is simple to use - looks professional - used a minimum amount of clicks in order to find the desired product - enhances the quality and trustworthiness of the website 	<ul style="list-style-type: none"> - easy to understand - easy to use - complex with a clear hierarchy - time efficient - professional look - improves quality - positively affects trust
Participant 7	<ul style="list-style-type: none"> - the easiest to use - the fastest one to use - is familiar with this type of menu - can easily see all the categories - can easily find the desired product - didn't encounter obstacles - it enhances the quality of the website 	<ul style="list-style-type: none"> - easy to understand - easy to use - fast to use - easy to find the desired product - clear hierarchy - easy access to information - positively affects the quality
Participant 8	<ul style="list-style-type: none"> - the easiest to understand - easy to find the desired product - no obstacles were encountered - makes the website more trustworthy and positively affects its quality 	<ul style="list-style-type: none"> - easy to understand - easy access to information - easy to use - positively affects trust - improves quality
Participant 9	<ul style="list-style-type: none"> - fast, easy to understand, good organisation, clear hierarchy and subcategories, less clicks - fills up the whole screen - I am not being able to see anything else, e.g. other products - improves the website's quality - makes the website trustworthy 	<ul style="list-style-type: none"> - easy to understand - easy to use - clear hierarchy - time efficient - unappealing design - improves quality - positively affects trust
Participant 10	<ul style="list-style-type: none"> - the easiest to use, the fastest to find the product - good hierarchy - appealing to the eye - improves the website's quality - makes the website trustworthy 	<ul style="list-style-type: none"> - easy to understand - easy to use - time efficient - clear hierarchy - appealing design - improves quality - positively affects trust

Figure 6.1 A table displaying the observations and interviews' extracts, where participants were asked to use **the mega menu**

Participant no.	Extracts	Code
Participant 1	<ul style="list-style-type: none"> - having to click multiple times and not being able to see the overview of all categories in the menu - enhances the website's quality - makes the website trustworthy - no other significant difference compared to other menus 	<ul style="list-style-type: none"> - no overview of all available options - time consuming - improves quality - positively affects trust
Participant 2	<ul style="list-style-type: none"> - challenging and confusing to find the product - does not enhance the website's quality - does not make the website trustworthy 	<ul style="list-style-type: none"> - hard to understand - hard to access information - does not improve quality - negatively affects trust
Participant 3	<ul style="list-style-type: none"> - the categories weren't visible from the start - not noticing the side menu (local navigation) at first, caused a few extra seconds of thinking - the menu doesn't necessarily improve the quality or trustworthiness of the website 	<ul style="list-style-type: none"> - time consuming - unclear hierarchy - hard to use - has no impact on the quality or trustworthiness of the website
Participant 4	<ul style="list-style-type: none"> - the easiest one to understand - easy to find the desired product - didn't encounter any obstacles - I liked that the categories were presented on the side - it makes the website more trustworthy 	<ul style="list-style-type: none"> - easy to understand - easy to navigate and use - appealing design - positively affects trust
Participant 5	<ul style="list-style-type: none"> - more difficult to understand, but still manageable - a moment of hesitation - I am not able to see the Eyes subcategories when clicking on it - includes more steps and clicks - does not enhance the website's quality - does not make the website trustworthy 	<ul style="list-style-type: none"> - hard to understand - hard to use - unclear hierarchy - time consuming - does not improve quality - negatively affects trust
Participant 6	<ul style="list-style-type: none"> - more challenging to find the desired product (compared to the mega menu) - got distracted by the pictures on the right side of the local navigation - not too sure if this menu style enhances the quality + trustworthiness 	<ul style="list-style-type: none"> - hard access to information - distracting design - has no impact on the quality or the trustworthiness of the website
Participant 7	<ul style="list-style-type: none"> - easy to understand - more steps were required in order to find the desired product - the menu doesn't necessarily make a difference in the quality of the website 	<ul style="list-style-type: none"> - easy to understand - time consuming - has no impact on the quality or the trustworthiness of the website
Participant 8	<ul style="list-style-type: none"> - easy to understand - it took more time to find the product - no obstacles were encountered 	<ul style="list-style-type: none"> - easy to understand - time consuming - has no impact on the quality or the

	- it doesn't necessarily impact the quality and trustworthiness of the website	trustworthiness of the website
Participant 9	- does not fill up the whole screen - is still able to see the products on the left - I have to realise the local navigation is as a part of the interface - makes the website trustworthy - improves the website's quality	- clear hierarchy - appealing design - hard to understand - positively affects trust - improves quality
Participant 10	- more difficult to understand - I have to realise I am redirected to a new page with local navigation - makes the website trustworthy - improves the website's quality	- hard to understand - hard to use - positively affects trust - improves quality

Figure 6.2 A table displaying the observations and interviews' extracts, where participants were asked to use **the horizontal menu**

Participant no.	Extracts	Code
Participant 1	- having to click multiple times - easy to use - enhances the website's quality - makes the website trustworthy - no other significant difference compared to other menus	- time consuming - easy to use - improves quality - positively affects trust
Participant 2	- easy to use and navigate - enhances the website's quality - makes the website trustworthy	- easy to understand - easy to use - improves quality - positively affects trust
Participant 3	- is confusing to use - made it challenging to find the desired product - think that not all people can manage to understand how it works - experienced hesitation when browsing through the categories inside the menu - it doesn't enhance the quality of the website	- hard to use - hard access to information - not equally accessible for all types of users - unclear hierarchy - does not improve quality
Participant 4	- easy to understand - easy to find the desired product - didn't encounter any obstacles	- easy to understand - easy access to information

Participant 5	<ul style="list-style-type: none"> - easy to understand, but more challenging than the mega menu - a moment of hesitation - I am not able to see the Eyes subcategories when clicking on it - included more steps and clicks - makes the website trustworthy - does not improve the website's quality 	<ul style="list-style-type: none"> - challenging to understand - hard to use - unclear hierarchy - time consuming - positively affects trust - does not improve quality
Participant 6	<ul style="list-style-type: none"> - easy to understand - manageable to navigate (not too easy, not too difficult) - it doesn't enhance the quality of the website 	<ul style="list-style-type: none"> - easy to understand - mediocre navigational experience - does not improve quality
Participant 7	<ul style="list-style-type: none"> - I hesitated in the beginning until I figured out on which icon to click in order for the menu to appear - nice minimalistic and clean design - the menu doesn't make the website more trustworthy - liked this menu style the least 	<ul style="list-style-type: none"> - causes hesitation - hard to understand - minimalistic and clean design - negatively affects trust
Participant 8	<ul style="list-style-type: none"> - easy to understand and use - no obstacles were encountered - it doesn't necessarily impact the quality and trustworthiness of the website 	<ul style="list-style-type: none"> - easy to understand - easy to use - no impact on the quality or trust of the website
Participant 9	<ul style="list-style-type: none"> - easy to understand, but some people might find it difficult - they need to know the hamburger icon - does not enhance the website's quality - does not make the website trustworthy 	<ul style="list-style-type: none"> - easy to understand - possible negative effect of using a hamburger button - does not improve quality - negatively affects trust
Participant 10	<ul style="list-style-type: none"> - complicated, unclear, takes a lot of time to find something - very difficult to understand, challenging to find the desired product - does not enhance the website's quality - does not make the website trustworthy 	<ul style="list-style-type: none"> - hard to understand - hard to use - unclear hierarchy - time consuming - hard access to information - does not improve quality - negatively affects trust

Figure 6.3 A table displaying the observations and interviews' extracts, where participants were asked to use **the hamburger menu**

4.2.2 Categorisation of codes

Our approach to creating the categories from codes consisted of implementing a flat coding frame, which treats each code with the same level of importance. We first organised the codes,

grouped them into meaningful clusters and then we proceeded with labelling the data. Because of our semi-structured interviews which followed the observations, we were able to detect a lot of similarities in the codes derived from transcripts of participants' answers. We paid a lot of attention to the categories and we made sure they are not overlapping. Eventually, we were able to identify 7 different categories (Figure 7.1), which were derived from the codes. These categories represent important qualities of information systems and can be used to answer our research questions.

Code	Category
<ul style="list-style-type: none"> - positively affects trust - no impact on trust - negatively affects trust 	<p>Trust - The ability to assure users that the website is a safe platform for conducting online transactions.</p>
<ul style="list-style-type: none"> - improves quality - no impact on the quality - does not improve quality 	<p>Quality - Users' overall perception of quality of the products and services that the website provides.</p>
<ul style="list-style-type: none"> - easy to understand - hard to understand - challenging to understand - hard access to information - easy access to information - not equally accessible for all users 	<p>Understandability - The ability to make users understand the way that the navigation works.</p>
<ul style="list-style-type: none"> - easy to use - easy to navigate - hard to use - possible negative effect of using a hamburger button - causes hesitation - effective design 	<p>Usability - The degree of difficulty to use the navigation.</p>
<ul style="list-style-type: none"> - clear hierarchy - unclear hierarchy - nice to see all available options - no overview of all available options - confused by similar menu subcategories - complex with a clear hierarchy 	<p>Hierarchy - The organisation of the navigation's elements, their structure and the overall layout.</p>
<ul style="list-style-type: none"> - time efficient - time consuming - fast to use 	<p>Efficiency - Navigation's ability to perform the task successfully and with the least waste of time and effort.</p>
<ul style="list-style-type: none"> - appealing design - unappealing design - professional look 	<p>Approachability - Navigation with a good user interface design, which makes it appear to be friendly and accessible to users.</p>

<ul style="list-style-type: none"> - good thought-out design - familiar design - distracting design - minimalistic and clean design 	
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Figure 7.1 A table displaying the codes organised into categories

The table below compares the three menu styles (mega menu, horizontal menu and hamburger menu) by taking into account the number of positive and negative impressions that the participants had while interacting with our prototypes. When counting the number of positive and negative impressions, we used the categories that we had previously created after grouping the codes.

At the end of the table we included a row where we calculated the total number of impressions for each menu style. The mega menu turned out to have, by far, the biggest number of positive impressions (52) and only 2 negative impressions. The horizontal menu and the hamburger menu have an equal number of positive impressions (14), but the horizontal menu turned out to be slightly more preferred by our participants since it has 21 negative impressions, compared to the hamburger menu which has 23 negative impressions.

Category	Mega menu		Horizontal menu		Hamburger menu	
	No. of positive impressions	No. of negative impressions	No. of positive impressions	No. of negative impressions	No. of positive impressions	No. of negative impressions
Trust	9	0	4	2	3	3
Quality	8	0	3	2	2	5
Understandability	10	0	3	5	5	4
Usability	10	0	1	3	3	5
Hierarchy	7	1	1	3	0	3
Efficiency	5	0	0	5	0	3
Approachability	3	1	2	1	1	0
TOTAL	52	2	14	21	14	23

Figure 7.2 A table displaying the number of positive and negative impressions of the participants in all three of the navigation menu styles

4.2.3 Methodological triangulation

The survey, observation and interviews provided us with enough data to understand the impact of each menu style on customers' satisfaction as well as which navigational elements have the ability to help users find desired products. Once the acquired data from both a quantitative and a qualitative method was analysed, we carried on with conducting a methodological triangulation. Because our findings produced similar results, we were able to use this across method in order to add more validity to our study. It came clear that the incorporation of a mega menu in the navigation user interface design proved to have the biggest impact on increasing participants' satisfaction with e-commerce websites. In both methods, the horizontal menu ended up being the second most preferred navigation menu style. A strong degree of overlap when it comes to data sets concerning the hamburger menu shows that this particular navigation menu style secured the last spot out of all three and its inclusion does not necessarily enhance the navigational experience.

Six sections of our survey contained different questions related to each navigational user interface element. Respondents expressed how much they agreed or disagreed with the statements by using a Likert scale (Figure 2.1). Moreover, we included two additional questions where respondents selected the most important navigational elements and the least important ones (Figure 5.2 and Figure 5.3). After the observations, participants were asked to name or point at the specific navigational elements that helped them with their task to find the L'oreal eyeliner and add it to a shopping card. By combining the findings from observations and interviews, we found out that the majority of our participants highly valued the usage of local navigation. Participants also voted for the notably high ability of icons and a linked logo to improve the overall navigation. On the other hand, most of them considered tags to be the least important navigational user interface element, followed by breadcrumb trails and pagination. These elements do not possess the ability to help users find desired products on e-commerce websites.

Furthermore, the results from the qualitative method provided us with resources to build a bigger picture. The observations allowed participants to interact with different navigational systems and brought us an in-depth analysis of their behaviour. The results showed that different navigation menu styles can impact website's trust, quality, understandability, usability, hierarchy, efficiency and approachability. Thus, after carrying out a complementary triangulation, which allows the different methods to inform each other (Nightingale, 2020), our findings became more comprehensive and authentic. The hamburger menu reached the highest number of negative impressions when comparing the occurrence of different categories in Figure 6.2. Therefore, we can conclude that the hamburger menu can in fact have a negative impact on customers' satisfaction with e-commerce websites. The detailed data suggests that the horizontal menu does

not necessarily enhance the overall navigational experience and therefore it does not increase users' satisfaction when navigating through e-commerce websites.

While all menu styles performed well in the survey, we were able to get more critical insights from the data acquired through observations and interviews. We reached a better understanding of different aspects that each menu style can affect. Methodological triangulation helped us improve the scientific rigour and provided us with a thorough explanation of our research problem as well as helped us gain answers to our research questions.

5. Discussion

In this chapter we focus on discussing our results in relation to previous studies. We provide answers to our research questions and we analyse the methods that were used in our research. Furthermore, we acknowledge the limitations of our study.

5.1 Result discussion

This study focuses on examining the impact of navigation user interface design on customers' satisfaction when they are navigating through e-commerce websites. More specifically, it intends to analyse the different effects of navigation menu styles on users' satisfaction, together with the importance of employing various navigational user interface elements with relation to finding specific products on the e-commerce website. We aimed to provide answers to the following research questions:

RQ1: What can be the impact of different navigation menu styles used in beauty e-commerce on customers' satisfaction?

RQ2: What are the main navigational user interface elements that help users find desired products on beauty e-commerce websites?

The results build on an existing evidence of different effects of navigation menu styles, which were researched by Gao et al. (2007). Their study followed four navigation menu styles, such as an index menu, a tab menu, a vertical cascading menu and a horizontal cascading menu. It focused on investigating users' ability to complete tasks, together with the level of their performance and satisfaction. Their experiment results stated that the tab menu (horizontal menu) and the vertical cascading menu are preferable menus in navigation user interface design. These menu styles can substantially increase the satisfaction as well as diminish disorientations of older users.

While their research has focused on four previously stated navigation menu styles, we felt the importance of providing a new insight into the relationship between the users and other menu styles such as the mega menu and the hamburger menu, together with the horizontal menu, which are all frequently used in beauty e-commerce websites. Through a mixed-methods research we were able to gain a deeper understanding of different impacts of these menu styles on customers' satisfaction with e-commerce websites. Moreover, our target group consisted of a younger audience, between the age of 18 and 25 years old, who had previous experience with e-commerce websites. The level of satisfaction was examined by implementing a theory by

Alawneh et al. (2013), which describes different determinants of e-satisfaction, along with DeLone's & McLean's IS Success Model (2014).

The results showed that different navigation menu styles can affect website's trust, quality, understandability, usability, hierarchy, efficiency and approachability, which can all have different impacts on users' satisfaction with the e-commerce website. Furthermore, the obtained data demonstrates that the horizontal menu was surpassed by the mega menu, which users rated to have the most significant impact on their satisfaction. The inclusion of the mega menu in the navigation user interface design can notably increase the satisfaction of customers with an e-commerce website. In addition, our study contributes with new information regarding the hamburger menu, which performed the most poorly out of all menu styles. It showed a predominantly negative effect on the users' satisfaction and hence it can downgrade the level of navigational experience with the e-commerce website.

Our results do not fit with the theory that the horizontal menu has the ability to largely increase users' satisfaction. When comparing the three navigation menu styles, the horizontal menu ranked in the middle. The horizontal menu does not strengthen the website's navigation, nor does it increase the customers' satisfaction with the e-commerce website. However, when discussing the different impact of the horizontal menu, the placement of the second level submenu should be taken into account. While Gao et al. (2007) placed the horizontal second level submenu right below the first level, we positioned it on the left side of the screen. The different placement might have been a determining factor for the differences in our results.

According to Pilgrim (2012) there has been a rapid increase in implementing a search field in e-commerce websites. This study researched different trends of website navigational tools, including search tools, sitemap tools and index tools. It served us as a base for investigating the importance of other navigational user interface elements, such as a local navigation menu, breadcrumb trails, pagination, tags, linked logo and icons, with relation to their ability to help users find the desired products on the website. The novelty of our findings lies in an in-depth analysis of each of these elements. Our data implies that out of all six navigational user interface elements, the local navigation is considered to be the most helpful one for finding products in beauty e-commerce websites. It was followed by icons and pagination, which were both rated to be beneficial elements of navigation in e-commerce websites. The least important element capable of providing helpful navigation were tags. The users did not find any value in incorporating tags into a website's navigation.

5.2 Method discussion

By using both qualitative and quantitative methods in our study, we managed to achieve a more complex understanding on the effect of e-commerce navigational elements on the satisfaction level of users. Conducting observations and semi-structured interviews allowed us to get more in-depth data from our participants, since we had the opportunity to ask open-ended questions, which gave the participants the opportunity to elaborate on their answers as much as possible and to be very specific. We also gathered information about the behaviour of the participants in relation to the three menu styles and the navigational elements, by observing how they interacted with our prototypes. On the other hand, conducting the surveys allowed us to get data from a larger number of people and a more culturally diverse audience, which helped in increasing the generalisability of our study.

Using a mixed-methods approach also allowed us to test the consistency of the data and ensure the validity of the final results, by comparing the results from the surveys with the results from the observations and semi-structured interviews. After analysing the data provided by both methods, we obtained similar results in what concerns the impact that the three menu styles and the navigational elements have on the satisfaction level of users. The data that we obtained allowed us to answer both of our research questions and therefore to fulfil the purpose of our study.

Even though the methods that we chose for conducting our study were overall successful, we believe that there are certain aspects that might have affected or influenced our research. These aspects are primarily connected to the observations and semi-structured interviews, where most of the participants consisted of people from our own circle of friends. Choosing people from our friend group was an accessible way for us to conduct the observations and interviews, and although we do not consider that this choice affected the results of our study in a significant way, we decided to still take this aspect into consideration when it comes to generalisability.

Another thing that we regret is not asking some of the participants enough follow-up questions during the semi-structured interviews. A couple of participants did not elaborate enough on some of their answers, but the reason why we hesitated to ask them additional questions was the fact that we were aware that they were not familiar enough with User Interface design and the specific terms related to it. The unfamiliarity with this subject also caused difficulty for the participants when they were asked to give their opinion on the navigational elements. Since they could not name the specific navigational elements, they just pointed them on the screen in order to let us know which were the ones that they were referring to. Another possible weakness to take into consideration was the fact that the majority of our study participants were females, both in the case of surveys (66.7%) and observations and semi-structured interviews (80%).

6. Conclusions and further research

This chapter wraps up our research and provides a reader with the final impression of our study. We present the conclusions together with practical and scientific implications. The chapter concludes with stating our suggestions for future research.

6.1 Conclusions

This research aimed to analyse how customers' satisfaction can be affected by navigation user interface design. Based on a qualitative and a quantitative analysis of three different navigation menu styles and their impact on users' satisfaction, we concluded that various levels of satisfaction can be achieved by incorporating different menu styles in e-commerce websites. The mega menu showed to be the most promising menu style, since it possesses the capability to increase the satisfaction of users with e-commerce websites. The navigational user interface elements were also investigated and ranked by their ability to provide a helpful navigational experience. The results indicate that out of all six navigational user interface elements that were examined, the local navigation is the most helpful when it comes to finding specific products on the e-commerce website.

6.1.1 Practical implications

The data obtained from this study can be used as a valuable source for companies, designers and website developers. It brings attention to important content such as navigation, which has the power to enhance the satisfaction of customers when they are interacting with e-commerce websites. Navigation should be perceived as more than just an appealing element and it should be paid great attention to, when it is being included in the website. The proper navigation menu styles and navigational user interface elements could help the companies secure more clients and prevent the customers from leaving e-commerce websites without making a purchase.

6.1.2 Scientific implications

Our study results provide a continuation to the study made by Gao et al. (2007), who also investigated the impact that different navigation can have on users. Apart from the horizontal menu, which was one of the four menu styles that Gao et al. (2007) analysed, we investigated two additional menu styles: the mega menu and the hamburger menu. Although the horizontal menu turned out to be the most preferred menu style in the study made by Gao et al. (2007), we came to a different conclusion after comparing the horizontal menu with the mega menu and the

hamburger menu. The data that we gathered from our participants showed that the mega menu greatly exceeds the performance of the horizontal menu, therefore making it the menu style which brings the most satisfaction to users. Moreover, we came up with new data after comparing individual navigational user interface elements in relation to their ability to help users find products on the e-commerce website. Local navigation, together with linked logo and icons, performed the best out of all six elements that were investigated in our study.

6.2 Further research

This study can serve as a model for future studies which focus on investigating how the satisfaction level of e-commerce customers can be influenced by navigation design in user interface. To better understand the implications of our results, future studies could address the impact of different positions of the horizontal's second level submenu. It would be interesting to see what kind of conclusions can be drawn from the analysis of different variations of the horizontal menu in e-commerce websites.

Moreover, instead of investigating navigational user interface elements, other user interface elements can be explored, such as input controls (buttons, drop-down lists, text fields, toggles), information components (progress bars, notifications, tool tips, message boxes) and so on. Another option could be investigating navigation elements in even more depth, by analysing elements that our study has not touched upon, such as image sliders, carousels or search fields. Working with participants that belong to another age group, apart from the one that we chose to focus on (young adults), can also represent an interesting opportunity for future studies.

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