

# **How Emotional User Interface Design Can Increase Online Shop Sales**

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Geting Zhu: How Emotional User Interface Design Can Increase Online Shop Sales

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E-Commerce is growing rapidly, as is the competition among online market. This thesis focuses on improving online sales with emotional user interface design of online shops. A survey conducted in this study explored the features that are important for users (e.g. search, filter, sort), and it also found some possible reasons that make users abandon and leave the online shop. The design presented in this thesis was made based on the results summarized from a design review of 27 popular online shops across the world. Finally, the thesis suggests design guidelines for online shops, and reports a user test to validate the guidelines.

Keywords:

Emotional Design, User Interface, User Experience, E-Commerce, Online Shopping

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## **1. Introduction**

With the development of the internet in the past decade, the popularization of smart devices, and the mega-trend of retailing, E-Commerce has grown rapidly, and online shopping has become an important part of today's life. By 2017, there were 324.1 million E-Commerce users in Europe, and the number is expected to increase to 383.9 million in 2022 (Statista, 2018). In 2017, the B2C E-Commerce revenue in Europe was 534 billion euros, and it is forecasted to grow to 602 billion euros in 2018 (Ecommerce Europe, 2018).

Selling online can bring numerous benefits to brands and retailers; it helps brands and retailers in obtaining a larger customer pool, broadening the sales channel, and collecting data for analyzing to optimize the business (Willis, 2014). Therefore, we see an increasing number of brands and retailers with online shops. This trend is also bringing more competition into the online market.

Unlike shopping in physical stores, customers cannot easily compare different stores at the same time, but they can open multiple online shops in the browser, compare them, and choose the one they would like to shop at. In addition, compared to opening a physical shop, setting up an online shop is much easier and cheaper. This is one reason why there is such intensive competition among online shops. Therefore, it is increasingly crucial for brands and retailers to find an efficient approach for keeping a steady rise in the number of customers and sales to compete in this today's online market. To grow the online sales, brands and retailers are trying to attract more customers by providing better prices, a wider range of collections, and reliable shipping services.

On the other hand, more service providers are realizing the importance of user experience in E-Commerce. User experience is the overall feeling of a user during

his/her interaction with the service or product, all the aspects of the service or product will have an influence on the user experience to an extent. A positive user experience will leave users with a delightful impression, and it will increase user loyalty and brand image. Hence, users are more likely to think of a certain service or product again when they have the demand for it (Garrett, 2010). Therefore, good user experience is not only making the users more satisfied, but also brings benefits to the service providers in return.

For the digital services such as online shops, user interface is the main thing that the user is interacting with, and in the Human-computer interaction field, computer scientists have discovered that user interface is essential to the users' responses and experience (Nielsen & Loranger, 2006). The emotional design model from Don Norman (2003) also provides an insight on how user interface can affect user experience. It explains how people's emotion and cognition are affected by the product or user interface at three levels — visceral (visual), behavioral (usability) and reflective (cognition). Norman's theory is suitable for this study because it provides theoretical guidance whilst reviewing the existing online shops and creating a new design.

According to Don Norman's another theory written in his book *Emotional Design* (2002), users will subconsciously decide whether they like an item or not as soon as they see it. This means that when customers arrive at an online shop, their perception on what they see will make them to continue or leave the shop in a very short time (Don Norman, 2002; Li and Zhang, 2005). Thus, the user interface of the online shop should work well both functionally to present the information and products clearly, and aesthetically to make a pleasing user experience (Porat and Tractinsky, 2012). As a result, the UI components of an online shop are important to the E-Commerce sales, including UI style, layout, fonts, animation effects, etc.

The first objective of this study is to find out what are the main user interface elements of online shops that affect user experience and sales. Like all the other human

behaviors, people shopping online are affected by numerous factors, and this study will focus on the factors that are related to user interface.

The second and primary objective of this study is to propose efficient design solutions to tackle the existing problems and increase sales. There are previous studies of marketing and sales strategies on how to improve the online shop sales, such as creating more value for the business, increasing the perceived trustworthiness, and applying recommender systems to help customers find products to purchase. However, only a few published papers are studying this specific topic of how to improve sales with user interface design.

The thesis is consisted of eight chapters. This is the first chapter and it introduces the overall background and objectives of the study.

Chapter 2 gives information about the theories which this theory is based on. It also explains why these theories are important to online shop sales. In short, the user interface of the online shop will affect users' perceived aesthetics (Parush et al., 2005; Lin, Yeh and Wei, 2012) and trust (Schlosser, White and Lloyd, 2006; Pengnate and Antonenko, 2013; Pengnate and Sarathy, 2017) of the online shops, and they are the main factor that affect users' desire of purchasing at a certain online shop

Chapter 3 reports a survey where some factors that matter users' experience were identified. It found that users have a major requirement to precisely find the product they need, so the design in this study focuses on several aspects which include search, sorting and filtering functions.

Chapter 4 gives a review of 27 online shops across the world. The analysis from design review and the data obtained from SimilarWeb together provide more insights for the design work in the next chapter.

The design described in Chapter 5 is based on the findings from the literature review and the survey, as well as the insights from design review. It attempts to provide some guidelines for designing online shops to meet users' functional and visual requirements, in order to achieve an excellent user experience, and therefore to increase the sales of the online shops.

Chapter 6 presents a user test of the design which proved credibility of the findings used for the design.

In chapter 7, this thesis summarizes the results from chapter 6 and proposes a number of guidelines for online shop design.

Chapter 8 explains the limitations of this study lie in the lack of implementation of a real case, and the design review mainly focused on fashion industry, whose global revenue accounts for 28% of the total E-Commerce market (Statista, 2016).

## 2. Background and Literature Review

### 2.1 Emotional Design, Emotional User Interface (EUI) Design, and Affordance

#### 2.1.1 Emotional Design and Emotional User Interface (EUI) Design

Emotional design aims to create products that elicit appropriate emotions from the users to create a positive user experience (Interaction Design Foundation, accessed in October 2018). In the past, people spent plenty of time learning how to use machines and devices. With the development in various fields, researchers realized the human-machine relationship should not be human following the rules of machines, instead, the human-machines interaction should be easy to understand, easy to use and friendly, and make human's life more efficient (Hoc, 2000).

Don Norman is a computer scientist and psychologist, and many of his theories were widely adopted in today's computer science research, user interface design and product design. In early 1980s, while Norman was looking for the better human-computer relationship, he noticed human will elicit certain emotions while they are interacting with computers. He believed that design could affect users' emotion and his finding started a branch of research in human-computer interaction afterwards.

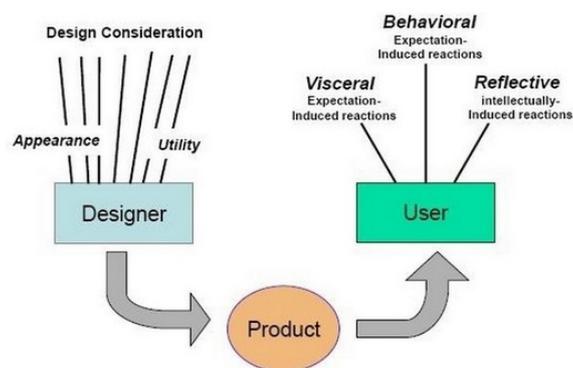


Figure 1: Norman's three levels of design.

Image from Interaction Design Foundation

In Norman's emotional design model, he indicates that human's emotions and behavior result from three different levels of information processing when interacting with an object—the visceral level, behavioral level, and reflective level, and these levels could refer to visual level, usability level and cognition level respectively. A good design should elicit proper emotions from users to provide a positive experience, and the three levels of emotional design tell designers what kind of emotions can be triggered by each aspect (visual, usability, cognition)

A designer should address the human cognitive ability at each level to elicit appropriate emotions and eventually provide a positive experience. A positive experience may include positive emotions (e.g., pleasure, trust) or negative ones (e.g., fear, anxiety), depending on the context (e.g., a horror-themed computer game).

As indicated by Norman's model, visceral level appeals to our first reactions when we encounter an item. It mainly deals with visual perceptions only from look and feel such as aesthetics and the quality. At this level, visual design features of a system (e.g., graphics, cleanliness, perceived attractiveness) dominate human perception, and, in the website design context, this is when the user makes rapid (millisecond) judgments of the website based on the initial emotional responses to the color scheme and overall layout.

Behavioral level is related to the usability of the product, while users are interacting with the product, they will assess how useful and how efficient the product is, and they will form the assessments whether it is easy to use and whether the functions can be performed well. The user will get a more concrete opinion of the product.

Finally, reflective level is at the top of Norman's emotional design model, and it is associated with metacognitive processing. A user will have, to an extent, an emotional bond to a product, either pleasing or unpleasing. For example, a user may become loyal to a product or brand. This is caused by the overall experience at this level, which

is from users' interaction with the product, and the emotions formed during the engagement.

In terms of EUI, it is the implementation of emotional design methodology in the user interface design which enables EUI design to create more emotional engagement between users and the interface. The development of technology and hardware has allowed more possibilities in user interface design, such as interactive animations, more vivid colors and shades, and the skeuomorph design which mimics real life materials. Mobile devices and computers are not merely machines to humans nowadays; they are playing an increasingly more important role in today's human life. The EUI design is evoking more emotions from users, which will also build an emotional bond between users and the devices.

### **2.1.2 Affordance**

The term "affordance" was created by the perceptual psychologist James Gibson in 1977, and Don Norman introduced this term to human-computer interaction field with his book *The Design of Everyday Things*. Norman's definition of "affordance" is opposite to Gibson's; the reason was explained by Norman in his later publication *Affordances and Design* (2008). This thesis will adopt Norman's definition.

According to Don Norman (1988), an affordance is the design aspect of an object which suggests how the object should be used. It refers to the perceived and actual properties of the object, and the affordance provides users the visual clues of how to interact with the object. For instance, the affordance of a door is 'openability', and the handle on it affords to both 'pushability' and 'pullability', while if the door does not have a handle but a plate, it will only afford to 'pushability', and users could understand to push the door even without "push" texts as hint.



Figure 2: In & Out Door designed by Jeon Hwan Soo (2010)

Naoto Fukasawa is a product designer whose design is known for the minimalistic form but triggers an instinctive or unconscious response in its user. In Naoto Fukasawa's designs, he strives to use the shape and material that people tacitly wish for, to let people easily recognize how to use them without thought.

### **Affordance in product design**

This wall-mounted CD-player exemplifies Naoto Fukasawa's approach to product design. It visually resembles the form of an extractor fan which users could find in a home, with a power cord swing below it. This form arises users' familiar experience to pull the cord to switch it on and off.



Figure 3: CD Player designed by Naoto Fukasawa (1999).

Photo courtesy of Muji.

Another example worth mentioning is the floor groove for umbrella. Naoto Fukasawa noticed people will unconsciously lean the umbrella to the wall and place the tip of the

umbrella in the tile groove, and he sketched a design concept that creates a shallow groove on the floor at the entrance. When people come home on a rainy day, this groove next to the wall can evoke the instinctive reaction from user to lean the umbrella against the wall and put the dripping tip in the groove.

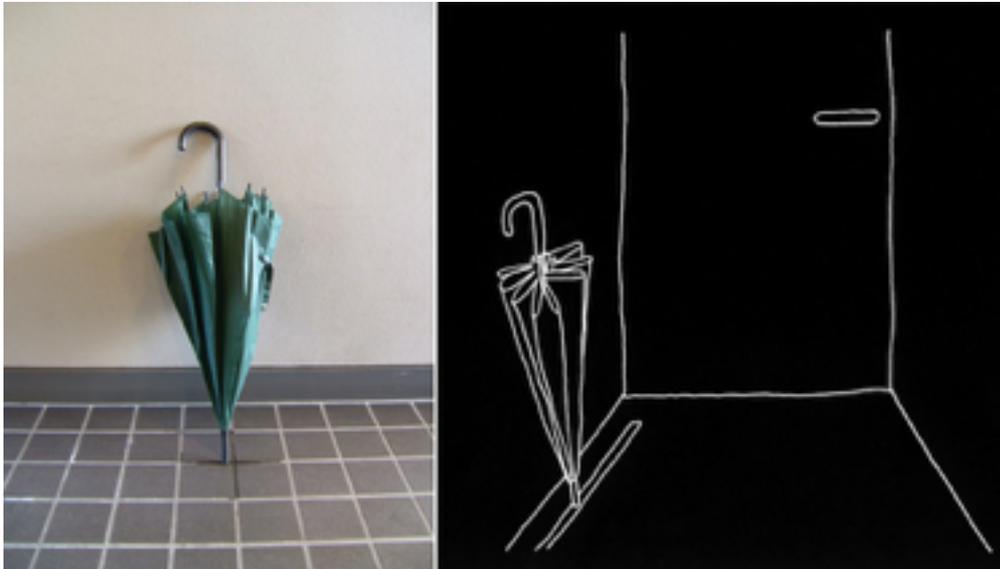


Figure 4: Floor groove for umbrella by Naoto Fukasawa

Photo courtesy of Muji

Naoto Fukasawa's designs are good examples of showing how affordance makes design easier to use, such as the cord affords 'pullability', and the floor groove affords 'supportability' and 'ability of holding water'.

### **Affordance in EUI design**

In human-computer interaction field, Jakob Nielsen (1995) used 10 usability heuristics to describe the principles of good user interface design. One of the principles is "Recognition rather than recall". In this principle, Nielsen suggests designers to minimize the user's memory load by making objects, actions, and options visible (J. Nielsen, 1995). This is consistent with Norman's ideas of affordance.

However, in Don Norman's publication *Affordances and Design* (2004) he claimed "In product design, where one deals with real, physical objects, there can be both real and perceived affordances, and the two need not be the same. In graphical, screen-based interfaces, all that the designer has available is control over perceived affordances." This implies that designers should emphasize the visual cues of user interface design, considering both graphics and texts in the interaction model with design style, color scheme, button shapes, animation, layout and so on.

The pinch gesture (figure 5) is a good example of affordance applied to user interface, and it has been adopted by users in a very short time, because its natural mapping to users' mental model. Pinch gesture affords to the movement of the two points of the content where user's fingers are at, therefore, zooming in and out.

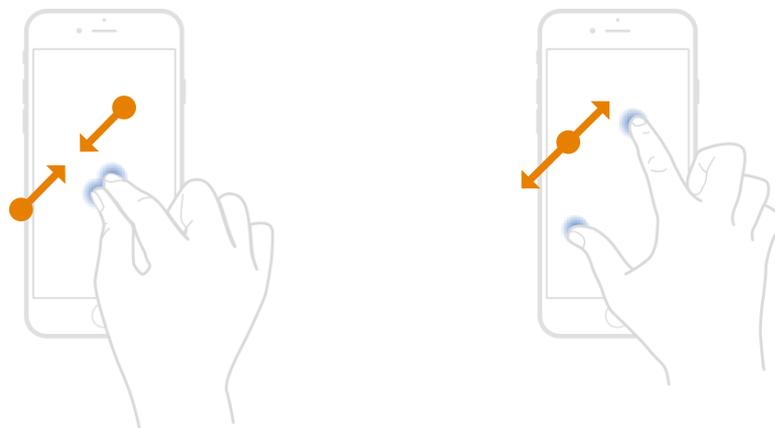


Figure 5: Illustration of pinch gesture.

Photo courtesy of Apple

Another gesture from Apple iOS is the slide to unlock (figure 6). The slider with arrow implies the direction it moves to, the empty rectangle space hints that there is a track for the slider, and the text "slider to unlock" works as signifier (D. Norman 2008) to inform user the consequence of this action.

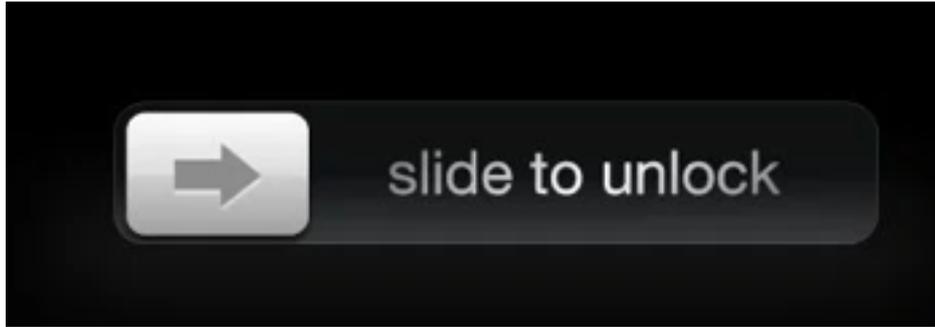


Figure 6: Slide to unlock feature in iOS

There are several more designs from Apple from time when skeuomorphism was still the mainstream design style before flat design. The iBook App has some highlights of the implementation of affordance in user interface. When a user opens the iBook App, the available books are displayed on a bookshelf (figure 7). While reading a book, the user swipes the screen to turn the page and as the user swipes the screen, there is a page turning animation and sound occurring at the same time (figure 8). It reflects user's behavior and perception of reading a book in real life.

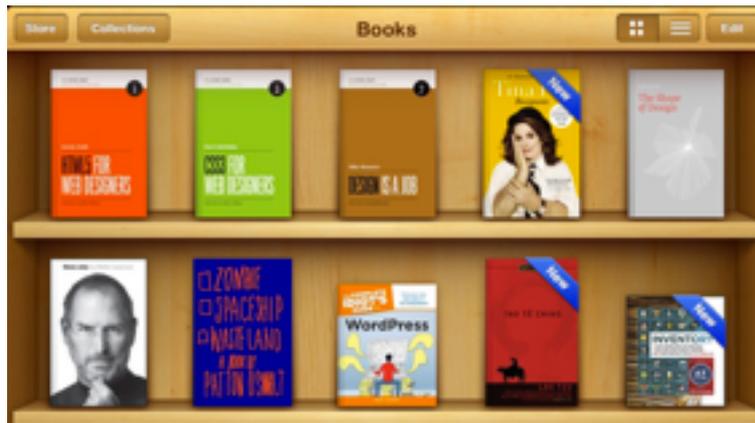


Figure 7: User's books are displayed on his bookshelf in iBook App



Figure 8: Animation when a user swipes the page in iBook App

The affordance in user interface design can be applied not only to guide users how to use the system, but also to avoid users' mistakes in a more friendly way. An example is a design from Basecamp; when a user make a mistake in a form, a cartoon character will show a surprised facial expression, and point to the mistake with a finger (figure 9).

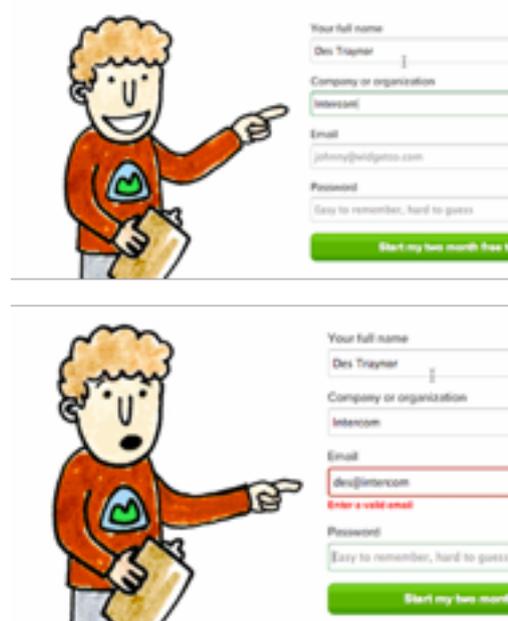


Figure 9: Registration page of Basecamp

In the flight seat selection page of Virgin America (figure 10), when passengers chose their seats, they could select an avatar for themselves. The unavailable seats are shown in grey, and the selected seats with avatars.



2013; Pengnate and Sarathy, 2017). Additionally, the aesthetics of website design can make the shopping experience better (Porat and Tractinsky, 2012; Wang, Minor and Wei, 2011; Pengnate and Antonenko, 2013;).

### **2.3 Influences of User Interface on E-Commerce Sales**

Website design features have been found to be key factors in influencing users' responses and experience (Nielsen and Loranger, 2006), the visual designs of the online shop, both aesthetics and usability properties will influence the emotions of visitors (Cyr et al., 2010; Deng and Poole, 2010; Éthier, Hadaya, Talbot, and Cadieux, 2006; Flavián, Guinalú, and Gurrea, 2006; Li et al., 2011; van der Heijden, 2004), and users' emotion and feeling will affect their attitudes toward the online shop, and the overall user experience (Porat and Tractinsky, 2012).

Additionally, users' perception of trust also relies heavily on the user interface of online shops (Fogg et al., 2002; Schlosser, White and Lloyd, 2006; Pengnate and Antonenko, 2013; Pengnate and Sarathy, 2017), a failure in the user interface design or unappealing design can be perceived as distrust by the users, and result in customer loss (Pengnate and Antonenko, 2013). To attract and sustain more customers, and improve the sales, the online shops should not only guarantee the usability, but also strive to build favorable experience for customers (Li and Zhang, 2005). The visible elements such as visual design may be more attributable to user experience than usability (Fogg et al., 2002).

Therefore, the website design has a significant impact on the sales. In order to improve the sales, the user interface of online shops needs to work well functionally, and it should be visually pleasing to enhance users' trust, favorable emotion, feeling and experience.

### **3. Online Survey of Users' Preference of Online Shops**

The website design can have an impact on users' trust, while the user interface of the website contains numerous elements, including the design style, color scheme, fonts, button shapes, size, animation, layout and so on, and each aspect will affect users' emotional responses to an extent. Generally, it is believed that minimal appearance (Parush et al., 2005) and the use of graphics can enhance the aesthetics of the website (Noiwan and Norcio, 2006; Lin, Yeh and Wei, 2012). Hence, in essence, a good online shop design should make users feel trustful, aesthetically pleased, and get favorable emotion and experience. However, people's opinions towards how online shops are affecting their experience can vary a lot, and an online survey can collect the opinions from a wide range of people, as a result, this survey was conducted online, and it asked 7 questions from the participants, to discover which problems should be urgently solved, and which functions should be given priority.

#### **3.1 Participants**

The survey was spread among some buy & sell groups with members from across the world on Facebook. The participants are considered experienced in online shopping. The survey was made with Survey Monkey and it received 263 responses. However, only the first 100 responses were analyzed for this thesis since they were accessible with the basic plan account on Survey Monkey.

#### **3.2 The Survey Questions**

Q1 was asking for respondents' contact information for later contact in case necessary.

*Q2: How often do you visit online shops?*

The survey was conducted among Facebook buy & sell groups, and 72% of them visited online shops almost every day. 25% of them visit online shops not more than 5 times a week, only 3% of them under 10 times a month (in other words, it takes more

than 3 days for them to visit online shops again). None of them shopped less frequently than any of these options.

The result of the survey is very likely to be capable of representing frequent online shoppers.

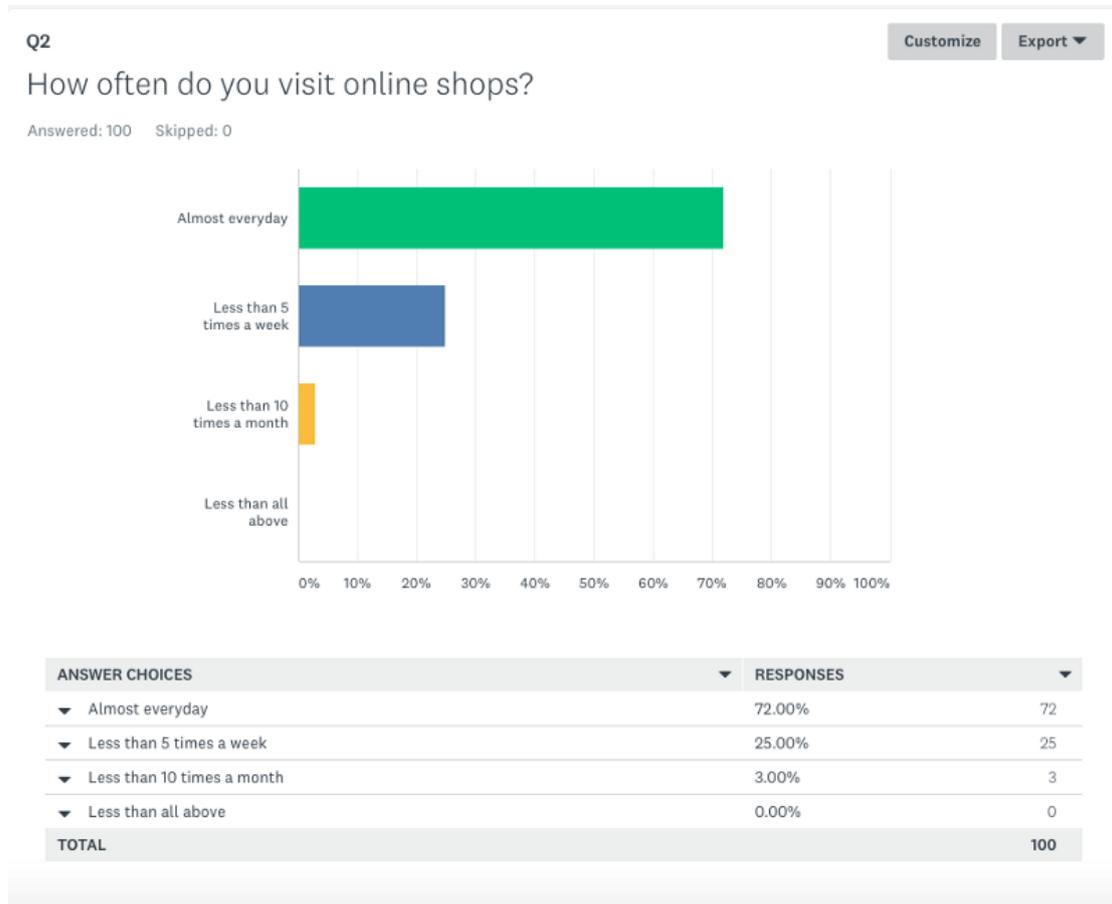


Figure 11: Result of the Question 2

*Q3: When you are shopping online, how often are you shopping without a plan, but just randomly browsing?*

68% of the time, these frequent online shoppers will check the online shops without a specific shopping plan.

Retailers should take this fact into account, considering about featuring the latest, most valuable, recommended items on the landing page.

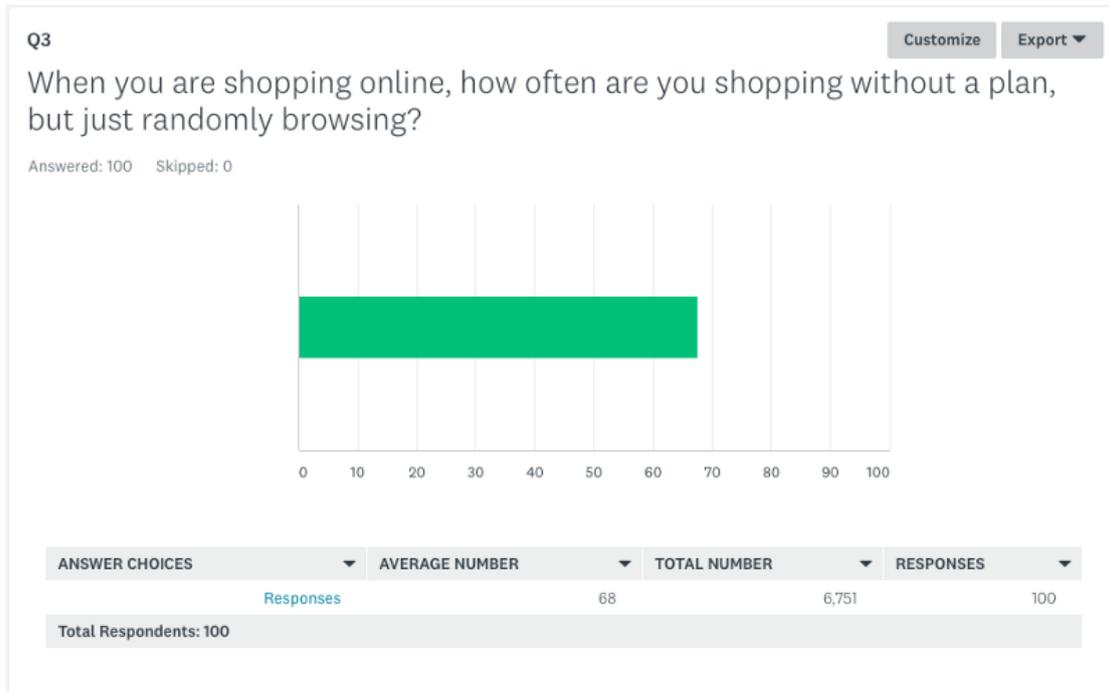


Figure 12: Result of the Question 3

*Q4: Will you try to view every single product in order to not miss a suitable item?*

51% of the respondents tend to view all the available products in the shop, because they don't want to miss a good deal.

Considering half of the customers would like to see all the available products, while there might be over tens of thousands of items, retailers should find a solution to display and categorize the products systematically, as well as useful filtering and sorting tools for the customers who want to see all the products.

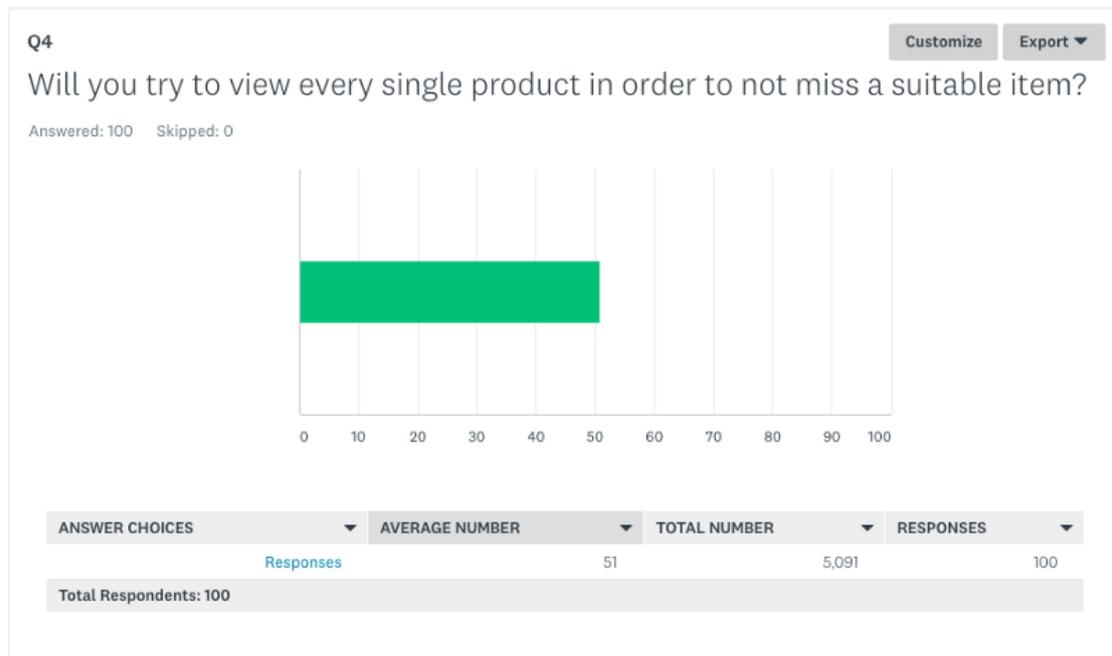


Figure 13: Result of the Question 4

*Q5: If you recommended an online shop to a friend, it was because:*

*The visual design of the online shop*

No: 6% | Not very possible: 31% | Possible: 44% | Very possible: 16% | Yes: 3%

Negative 37%, Neutral 44%, Positive 19%

The visual design is important for user experience, but not a primary reason for people to recommend a shop to their friends.

*The collection of products is suitable to you*

No: 1% | Not very possible: 0% | Possible: 8% | Very possible: 38% | Yes: 53%

Negative 1%, Neutral 8%, Positive 91%

The result is significantly leaning to positive, and it reminds online retailers to present their online shops more tailored to their target customers.

*The price is cheaper*

No: 1% | Not very possible: 4% | Possible: 19% | Very possible: 40% | Yes: 36%

Negative 5%, Neutral 19%, Positive 76%

Looking for cheaper price is almost a habit for people shopping online. If the shop has some products with competitive prices, they should be given a highlight and let the visitors be aware of that.

*The payment is easy to be done*

No: 8% | Not very possible: 28% | Possible: 31% | Very possible: 21% | Yes: 12%

Negative 36%, Neutral 31%, Positive 33%

The result is rather average on the three alternatives, while Negative is slightly higher.

Therefore, it is not such an important reason for people to recommend a shop to others.

*The customer service is satisfying*

No: 3% | Not very possible: 20% | Possible: 32% | Very possible: 25% | Yes: 20%

Negative 23%, Neutral 32%, Positive 45%

The online shops should maintain satisfying customer service, as it will increase the chance of getting recommended.

*Other reasons:*

The comments provided to the open question asking for other reasons why people may recommend an online shop include the following: "Easy user experience"; "What the shop got in stock etc."; and "Heat stuff, best price for the certain products I'm looking for".

These other reasons can be concluded as providing overall better experience, competitive inventory and prices.

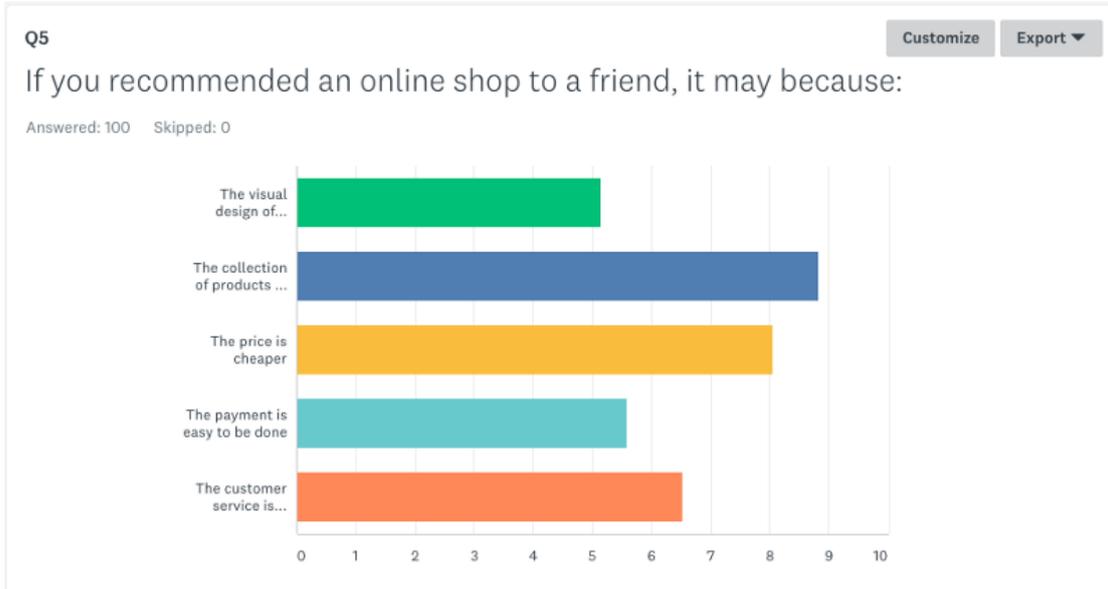


Figure 14-1. Result of the Question 5

|  | NO         | NOT VERY POSSIBLE | POSSIBLE     | VERY POSSIBLE | YES          | TOTAL | WEIGHTED AVERAGE |
|--|------------|-------------------|--------------|---------------|--------------|-------|------------------|
| The visual design of online shop                         | 6.00%<br>6 | 31.00%<br>31      | 44.00%<br>44 | 16.00%<br>16  | 3.00%<br>3   | 100   | 5.15             |
| The collection of products and brands is suitable to you | 1.00%<br>1 | 0.00%<br>0        | 8.00%<br>8   | 38.00%<br>38  | 53.00%<br>53 | 100   | 8.82             |
| The price is cheaper                                     | 1.00%<br>1 | 4.00%<br>4        | 19.00%<br>19 | 40.00%<br>40  | 36.00%<br>36 | 100   | 8.06             |
| The payment is easy to be done                           | 8.00%<br>8 | 28.00%<br>28      | 31.00%<br>31 | 21.00%<br>21  | 12.00%<br>12 | 100   | 5.58             |
| The customer service is satisfying                       | 3.00%<br>3 | 20.00%<br>20      | 32.00%<br>32 | 25.00%<br>25  | 20.00%<br>20 | 100   | 6.52             |

Figure 14-2. Result of the Question 5

|  |   |
|--|---|
| <b>Easy user experience</b><br>8/15/2018 5:47 PM   | <a href="#">View respondent's answers</a> |
| <b>What the shop got instock etc..</b><br>8/15/2018 2:31 PM                                | <a href="#">View respondent's answers</a> |
| <b>Heat stuff, best price for certain products I am searching for</b><br>8/14/2018 8:05 PM | <a href="#">View respondent's answers</a> |

Figure 14-3. Result of the Question 5

*Q6: If you like the online shop, it may be because:*

*High quality photos that show the details of products*

No: 1% | Not very possible: 7% | Possible: 29% | Very possible: 31% | Yes: 32%

Negative 8%, Neutral 29%, Positive 63%

A majority of respondents will like an online shop because of its high-quality photos. Thus, online shops are recommended to recruit professional photographers and models to make the photos for their products.

*The search function is easy to use*

No: 1% | Not very possible: 7% | Possible: 21% | Very possible: 28% | Yes: 43%

Negative 8%, Neutral 21%, Positive 71%

Only 8% of the respondents did not find the search function very important for them, while most of the respondents will have a good impression on the online shop if the search function is easy to use.

*Users can sort the products according to their needs (price, latest, discount)*

No: 0% | Not very possible: 4% | Possible: 14% | Very possible: 28% | Yes: 54%

Negative 4%, Neutral 14%, Positive 82%

Only 4%, very small proportion of the respondents don't think the sorting function is affecting them to like or not like the online shop, while the rest 96% of them think it's possible, very possible or definitely to affect their opinions towards the online shop.

*Users can filter the products according to their needs (size, color, price)*

No: 0% | Not very possible: 2% | Possible: 17% | Very possible: 26% | Yes: 55%

Negative 2%, Neutral 17%, Positive 81%

Very similar to the result of sort function, most people find the filter function an important factor for them.

*Detailed text description of the product*

No: 7% | Not very possible: 15% | Possible: 26% | Very possible: 28% | Yes: 24%

Negative 22%, Neutral 26%, Positive 52%

More than half of the respondents are positive that detailed text descriptions of products will make them like the online shop.

*There is online chat service to provide help immediately*

No: 13% | Not very possible: 23% | Possible: 25% | Very possible: 22% | Yes: 17%

Negative 36%, Neutral 25%, Positive 39%

The responses of negative and positive had very similar results, while online chat services help the users to have an easier shopping experience, it is not a critical reason for them to like or dislike the online shop.

*Easy to complete the payment*

No: 4% | Not very possible: 8% | Possible: 33% | Very possible: 26% | Yes: 29%

Negative 12%, Neutral 33%, Positive 55%

While the ease of completing payment is not a main reason in terms of recommending an online shop to others, more than half of the respondents are positive that the ease of completing payment will make them like an online shop, 33% are neutral about it, while 12% are negative. Therefore, the online shop should provide efficient payment procedures. Implementing third party payment methods which are commonly used might be a good idea.

Other reasons:

Responses to the questions asking for other reasons why one might like on on-line shop included: "Be able to use a lot of different keywords (while searching)"; "Size guides and models, such as this person is 183cm tall and wear size M."

Supporting blurry searching and providing size guides that are easy for customers to understand are beneficial for the online shops.



Figure 15-1: Result of the Question 6

|  | NO           | NOT VERY POSSIBLE | POSSIBLE     | VERY POSSIBLE | YES          | TOTAL | WEIGHTED AVERAGE |
|--|--------------|-------------------|--------------|---------------|--------------|-------|------------------|
| High quality photos that show the details of products                          | 1.00%<br>1   | 7.00%<br>7        | 29.00%<br>29 | 31.00%<br>31  | 32.00%<br>32 | 100   | 7.63             |
| The search function is easy to use   | 1.00%<br>1   | 7.00%<br>7        | 21.00%<br>21 | 28.00%<br>28  | 43.00%<br>43 | 100   | 8.01             |
| Users can sort the products according to their needs (price, latest, discount) | 0.00%<br>0   | 4.00%<br>4        | 14.00%<br>14 | 28.00%<br>28  | 54.00%<br>54 | 100   | 8.60             |
| Users can filter the products according to their needs (size, color, price)    | 0.00%<br>0   | 2.00%<br>2        | 17.00%<br>17 | 26.00%<br>26  | 55.00%<br>55 | 100   | 8.66             |
| Detailed text description of the product                                       | 7.00%<br>7   | 15.00%<br>15      | 26.00%<br>26 | 28.00%<br>28  | 24.00%<br>24 | 100   | 6.65             |
| There is online chat service to provide help immediately                       | 13.00%<br>13 | 23.00%<br>23      | 25.00%<br>25 | 22.00%<br>22  | 17.00%<br>17 | 100   | 5.65             |
| Easy to complete the payment   | 4.00%<br>4   | 8.00%<br>8        | 33.00%<br>33 | 26.00%<br>26  | 29.00%<br>29 | 100   | 7.20             |

Figure 15-2: Result of the Question 6

|   |   |
|---|---|
| Be able to use a lot of different keywords!                               | <a href="#">View respondent's answers</a> |
| 8/15/2018 2:31 PM   |   |
| Sizeguides and models, such as this person is 183 cm tall and wear size M | <a href="#">View respondent's answers</a> |
| 8/14/2018 7:02 PM   |   |

Figure 15–3: Result of the Question 6

*Q7: If you stop browsing, and decide to leave the online shop, it may be because:*

*The photos of products are not visually pleasing enough*

No: 14% | Not very possible: 28% | Possible: 21% | Very possible: 26% | Yes: 11%

Negative 42%, Neutral 21%, Positive 37%

Among the frequent online shopping customers, the fact might be that they have seen various online shops, and some of them have cultivated a tolerance to the displeasing visuals. However, online shops ought to minimize the chance of customers leaving the shop. Under this question, there are 11% respondents stated that they will leave the shop if the visual are displeasing, and 26% are very possible to leave.

*The photo quality is not good enough to show details and materials of the product*

No: 9% | Not very possible: 16% | Possible: 32% | Very possible: 26% | Yes: 17%

Negative 25%, Neutral 32%, Positive 43%

Only 25% of the responses feel they are not very likely influenced by the quality of photos when they are shopping online. 75% think it is at least possible for them to leave the online shop if they cannot understand materials of product from the photos.

*The search function is not easy to use*

No: 5% | Not very possible: 17% | Possible: 24% | Very possible: 33% | Yes: 21%

Negative 22%, Neutral 24%, Positive 54%

More than half of the respondents think the search function is an important tool for them, and they may stop shopping on the shop in case the search function is not easy to use.

*There are too many products to view*

No: 17% | Not very possible: 39% | Possible: 20% | Very possible: 16% | Yes: 8%

Negative 56%, Neutral 20%, Positive 24%

While 24% of the respondents feel too much products to view will cause an unpleasant shopping experience, more than half of the total respondents suppose it not very possible to make them leave the shop for this reason.

*There are no suitable sorting options*

No: 3% | Not very possible: 14% | Possible: 34% | Very possible: 27% | Yes: 22%

Negative 17%, Neutral 34%, Positive 49%

Only 17% respondents are not very much affected by this reason, while 49% respondents are very likely to leave the online shop due to the unhelpful sorting function. Online shops should pay some effort to optimizing this function, for users to find the products they need more easily.

*Cannot filter the products according to needs (size, color, price)*

No: 4% | Not very possible: 13% | Possible: 29% | Very possible: 32% | Yes: 22%

Negative 17%, Neutral 29%, Positive 54%

Very similar to the sorting function, most respondents showed their demands on an efficient filtering function. On top of that, an earlier result showed most customers would continue shopping even though there are too much to choose from. With suitable sorting and filtering functions, it is useful for them to find the items they are looking for more easily.

*The text description of product is not detailed enough*

No: 12% | Not very possible: 32% | Possible: 31% | Very possible: 16% | Yes: 9%

Negative 44%, Neutral 31%, Positive 25%

The text descriptions are not very critical in losing the customers, but from the result of Q6, it makes more customers to like the shop. Besides, it is a feature that can be

done with a comparatively low effort, thus it is highly advised to include good text descriptions.

*There is no online chat service*

No: 41% | Not very possible: 36% | Possible: 13% | Very possible: 7% | Yes: 3%

Negative 77%, Neutral 13%, Positive 10%

Although online chat service is the most preferred way of contacting the customer service ([Zhang, 2016](#)), very few of the customers will leave the shop because of the lack of online chat service. Considering the online chat service costs both time and human resource, it is understandable why a lot of online shops do not have online chat service.

*Payment procedure is safe, but complicated*

No: 10% | Not very possible: 36% | Possible: 27% | Very possible: 19% | Yes: 8%

Negative 46%, Neutral 27%, Positive 27%

Most people can bear with a complicated payment procedure, however 27% respondents still find it annoying. There are a number of third-party payment methods available for online shops to integrate with, and most of them are widely used because of their safety and efficiency. It is highly recommended that online shops utilize these payment methods along with the traditional credit card payment.

*Other reasons:*

Answer to the open question asking for other reasons to stop browsing an on-line shop were: "If they make you overpay by a lot, or they don't tell you about how much extra the total will be immediately! Like StockX.com and similar."

Transparency is important, the online shop should give it best to estimate the final price including shipping costs to the customer's location. It can make a customer very frustrated when one is ready to pay but notices an unexpected added up amount on the price.

Q7

Customize Export

If you stop browsing, and decide to leave the online shop, it may be because:

Answered: 100 Skipped: 0

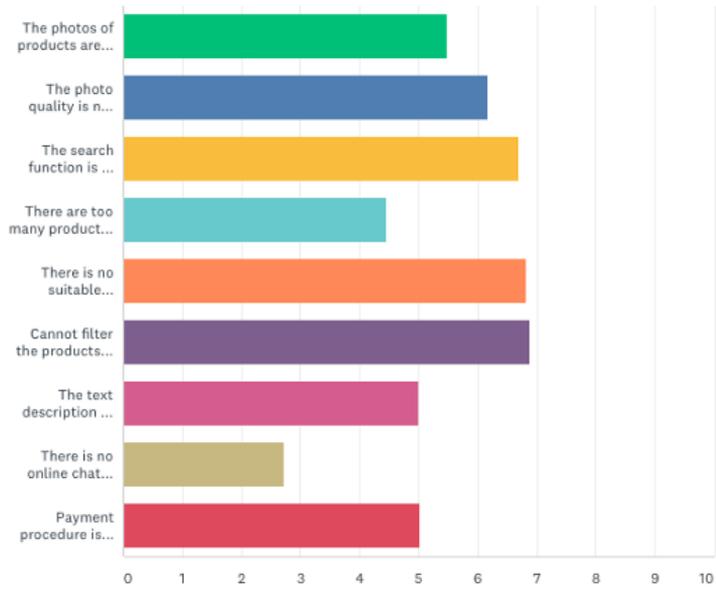


Figure 16-1: Result of the Question 7

|   | NO           | NOT VERY POSSIBLE | POSSIBLE     | VERY POSSIBLE | YES          | TOTAL | WEIGHTED AVERAGE |
|---|--------------|-------------------|--------------|---------------|--------------|-------|------------------|
| ▼ The photos of products are not visually pleasing enough                           | 14.00%<br>14 | 21.00%<br>21      | 28.00%<br>28 | 26.00%<br>26  | 11.00%<br>11 | 100   | 5.49             |
| ▼ The photo quality is not good enough to show details and materials of the product | 9.00%<br>9   | 16.00%<br>16      | 32.00%<br>32 | 26.00%<br>26  | 17.00%<br>17 | 100   | 6.18             |
| ▼ The search function is not easy to use  | 5.00%<br>5   | 17.00%<br>17      | 24.00%<br>24 | 33.00%<br>33  | 21.00%<br>21 | 100   | 6.69             |
| ▼ There are too many products to view   | 17.00%<br>17 | 39.00%<br>39      | 20.00%<br>20 | 16.00%<br>16  | 8.00%<br>8   | 100   | 4.45             |
| ▼ There is no suitable sorting options  | 3.00%<br>3   | 14.00%<br>14      | 34.00%<br>34 | 27.00%<br>27  | 22.00%<br>22 | 100   | 6.82             |
| ▼ Cannot filter the products according to needs (size, color, price)                | 4.00%<br>4   | 13.00%<br>13      | 29.00%<br>29 | 32.00%<br>32  | 22.00%<br>22 | 100   | 6.89             |
| ▼ The text description of product is not detailed enough                            | 12.00%<br>12 | 32.00%<br>32      | 31.00%<br>31 | 16.00%<br>16  | 9.00%<br>9   | 100   | 5.00             |
| ▼ There is no online chat service   | 41.00%<br>41 | 36.00%<br>36      | 13.00%<br>13 | 7.00%<br>7    | 3.00%<br>3   | 100   | 2.72             |
| ▼ Payment procedure is safe, but complicated  | 10.00%<br>10 | 36.00%<br>36      | 27.00%<br>27 | 19.00%<br>19  | 8.00%<br>8   | 100   | 5.02             |

Figure 16–2: Result of the Question 7

If they make you overpay by a lot, or they dont tell you about how much extra the total will be emdiatally! Like stockX and simular

8/15/2018 2:31 PM [View respondent's answers](#)

Figure 16–3: Result of the Question 7

### 3.3 Conclusion of the survey

A majority of customers will visit online shops even though they do not have a specific shopping plan, and about half of the respondents will try to view all the available products in the online shop. Therefore, it is important to clearly present the valuable deals to customers, and the products should be displayed in an easy-to-view layout.

Word of mouth is seen as an important way of increasing the number of customers (Alanah, and Khazanchi, 2008; Javadi, Dolatabadi, Nourbakhsh, Poursaedi & Asadollahi, 2012). Suitable collection, competitive price, and satisfying customer service are the three main contributions for people to recommend an online shop to their friends.

When being asked the reasons for liking an online shop, more than half of the respondents selected the following 6 reasons: 1. the high-quality photos; 2. the easy to use search function; 3. sort function; 4. filter function; 5. detailed text description; 6. easy payment. Among them search, sort and filtering functions are the three most likely reasons. It is worth mentioning that search, sort and filtering are all related to finding products.

In terms of a bad experience, which may lead to customers leaving the online shop, we can see result very similar to the previous part. The three most voted reasons are: 1. the search function is not easy to use; 2. users cannot filter the products according to their needs; 3. there are no suitable sorting options. Nearly 50% respondents agree to these three reasons, and the next most voted reason is “The photo quality is not good enough to show details and materials of the product”. In addition, one respondent mentioned that the online shop should let customers be aware of the final price of their purchase, this aligns with the “visibility of system status” of the heuristic evaluation.

To sum up into points, to attract and sustain the customers, an online shop is recommended to:

- Present the valuable deals and some competitive prices to customers who don't have a specific shopping plan;
- Display the products in an easy-to-view layout, as in some circumstances the customers need to choose from a great number of products;
- Implement and improve the search, sort, filter functions for customers to find their products more efficiently;

- Use product photos to describe the details and materials of a product, it is more important than merely visually fancy photos;
- Ensure the visibility of customer's shopping status, by making customers aware of the total price they need to pay, including shipping, and possible import taxes.

#### **4. Review of Existing Designs**

Similar to literature review and case study, the design review can provide researchers more insights from knowing the existing work in the same field. Although this review contains some subjective opinions, based on author's own experience, the focus of the review is based on the findings from related literature, and on the results of the survey in Chapter 3. According to previous studies, users' trust towards an online shop is a critical factor influencing their decision of making the purchase or not (Monswé et al., 2004; Lim, Sia, Le and Benbasat, 2006), and appealing visuals of the website design can increase users' perception of trustworthiness of online shops (Schlosser, White and Lloyd, 2006; Pengnate and Antonenko, 2013; Pengnate and Sarathy, 2017). In addition, Li and Zhang (2005) have stressed the importance of the first glance of a website that users may produce an attitude to the website very quickly, and an uncomfortable feeling at the first glance can drive a potential customer away. The results from the survey in Chapter 3 indicate the importance of search, sorting, and filtering functions for users. As a result, the design review will focus on the design of the landing pages of online shops, the aesthetics of the website designs, and the usability of search, sorting filtering functions.

##### **Selection of Reviewed Shops**

This study reviewed 27 popular online shops in several business focus (see table 1), covering fashion retailers (i.e. End Clothing, Farfetch), sports industry (i.e. Nike, Footlocker), furniture (IKEA), and online marketplace (Amazon, eBay). All the websites were accessed in October 2018, from Finland, Europe. The operating system was OS X High Sierra (Version 10.13.16), and the used browser was Google Chrome (Version 68.0.3440.106), with a Google account logged in.

| Category | Fashion retailer | Brand            | Sports         | Furniture | Marketplace |
|----------|------------------|------------------|----------------|-----------|-------------|
| Website  | Antonia.it       | Louisvuitton.com | Footlocker.com | IKEA.com  | Amazon.de   |
|          | Nakedcph.com     | Pullandbear.com  | Nike.com       |           | Ebay.com    |
|          | Ssense.com       | Cosstores.com    | Adidas.com     |           | Zalando.fi  |
|          | Vooberlin.com    | Hm.com           | Stockx.com     |           |             |
|          | Sotostore.com    | Zara.com         | Goat.com       |           |             |
|          | Endclothing.com  | Stories.com      |                |           |             |
|          | Farfetch.com     |                  |                |           |             |
|          | Mrporter.com     |                  |                |           |             |
|          | Arket.com        |                  |                |           |             |
|          | Maycs.com        |                  |                |           |             |
|          | Harrods.com      |                  |                |           |             |
|          | Selfridges.com   |                  |                |           |             |

Table 1: The list of online shops in design review

The studied online shops were selected based on several criteria, including the revenue ranking (ecommerceDB, 2017) and the popularity and international recognition among customers (SimilarWeb, 2018). Therefore, their success could reflect the overall pleasing user experience, and the aesthetics of the websites – especially the fashion retailers and brands. According to my personal experience as a visual designer, these companies are usually willing to invest and have an emphasis on the visual design of the online shop.

### Review Procedure

The online shops should provide visitors a pleasing first impression (Basso et al., 2001; Sanchez, Franco and Roldan, 2010; Lin, Yeh and Wei, 2012), which is greatly influenced by the appearance the web page (Lindgaard et al., 2006; Tuch et al., 2010). Therefore, the design review gave focus on the aesthetics of the online shops, especially the landing page. On the other hand, the aesthetics of the web design have

a strong impact on users' perception of trustworthiness (Schlosser, White and Lloyd, 2006; Pengnate and Antonenko, 2013; Pengnate and Sarathy, 2017), their attitudes towards the online shops (Porat and Tractinsky, 2012; Lin, Yeh and Wei, 2012; Wang, Minor and Wei, 2011), and finally it will influence customers' intention of purchasing (Schlosser, White and Lloyd, 2006; Lim, Sia, Lee and Benbasat, 2006).

To evaluate the aesthetics of web pages, the review analyzed their visual layouts such as the amount of links, uniformity of information (Parush et al., 2005) and the usage of graphics (Noiwan and Norcio, 2006; Lin, Yeh and Wei, 2012).

In terms of usability, search function is an important feature for users to do online shopping. In the survey presented in Chapter 3, when participants were asked would the search function is easy to use be a reason for them to like an online shop, a total of 71% participants responded yes or very possible (Possible: 21%; very possible: 28%; yes: 43%), similar results were seen for filtering and sorting functions as well, with percentages of 82% and 81% respectively.

As a result, the review was done by using the following procedure. First, an online shop was opened and then it was checked whether there are too many links, or if the information is not well grouped. Then the location and design of the search function was observed and "white tee" was used as a keyword to find make a search. An exception was that "white chair" was used as the keyword for IKEA.

Secondly, the search result page was analyzed. The analysis included checking what information was provided at the search result page, such as the number of retrieved results, and how the products were displayed. In addition, it was analyzed, whether the layout was easy for users to browse quickly, and to obtain the essential information of the products, such as price and availability.

Finally, it was studied how the filtering and sorting options were located and designed in the page. Since some of selected online shops were very similar, the final review is

based on 18 online shops. The landing page and search result page of the 18 sites were drawn as wireframes (figure 17), and options of filtering and sorting were noted down for later comparisons and study. To sum up, the design review is focused on the user interface design related aspects which include:

- Design of the landing page
- Design and placement of the search button
- Products display on the search result page
- Options, design and placement of filtering function
- Options, design and placement of sorting function



Figure 17: Reviewing popular online shops

SimilarWeb is an online tool that provides a variety of data of websites, such as website rank, number of visitors, visitor source, etc. Companies including Walmart, eBay, Booking.com are using SimilarWeb for data analysis, which provides reliability for the data on SimilarWeb, and on 16<sup>th</sup> of October 2018, this research accessed the data from SimilarWeb including the monthly visits to websites, average visit duration, pages per visit, and bounce rate. The bounce rate, according to Wikipedia, refers to the percentage of visitors who enter the site and then leave it directly and do not stay to

view the pages. Although these numbers are a result of multiple factors and cannot be used to make judgements, they could indicate an overall performance of the online shops and contribute to the analysis in this research.

In this research, such metrics (Table 2) were used as insights to help the design review, assuming longer visit duration, more pages viewed per visit, and lower bounce rate potentially mean more sales could happen in an online shop. These indexes also represent the extent to which the users are engaging with websites, reflecting the performance of user interface design of the sites. However, this data is limited in how much it can indicate the actual performance of the website design, as longer visit duration could also imply the users have spent longer time to find the specific products, and this may be attributed to the inefficient website design. Therefore, the data was merely used for extra insights, but not for making conclusions.

| Category    | Website          | Monthly Visits | Avg. Visit Duration | Pages/Visit | Bounce Rate |
|-------------|------------------|----------------|---------------------|-------------|-------------|
| Fashion     | Antonia.it       | 0.072M         | 00:02:06            | 3.22        | 44.37%      |
|             | Nakedcph.com     | 0.422M         | 00:02:37            | 4.54        | 45.71%      |
|             | Ssense.com       | 6.12M          | 00:03:55            | 6.59        | 44.72%      |
|             | Vooberlin.com    | 0.178M         | 00:03:24            | 12.11       | 36.82%      |
|             | Endclothing.com  | 6.687M         | 00:04:40            | 5.94        | 41.38%      |
|             | Arket.com        | 0.58M          | 00:04:05            | 7.29        | 22.75%      |
|             | Farfetch.com     | 14.91M         | 00:04:07            | 5.26        | 47.88%      |
|             | Mrporter.com     | 3.787M         | 00:04:24            | 5.88        | 41.72%      |
| Brands      | Louisvuitton.com | 7.774M         | 00:04:35            | 8.97        | 34.04%      |
|             | Pullandbear.com  | 10.41M         | 00:05:34            | 6.84        | 26.17%      |
|             | Cosstores.com    | 2.64M          | 00:04:35            | 6.97        | 22.75%      |
|             | Hm.com           | 78.68M         | 00:07:14            | 15.91       | 25.61%      |
|             | Zara.com         | 48.72M         | 00:07:08            | 14.73       | 23.69%      |
|             | Stories.com      | 2.613M         | 00:05:05            | 7.47        | 24.18%      |
| Sports      | Nike.com         | 66.15M         | 00:04:32            | 7.41        | 32.16%      |
|             | Stockx.com       | 10.48M         | 00:04:00            | 4.87        | 42.29%      |
| Furniture   | Ikea.com         | 162.5M         | 00:06:45            | 10.42       | 32.14%      |
| Marketplace | Amazon.de        | 499.2M         | 00:07:08            | 10.68       | 30.54%      |
| Average     | /                | 54.2M          | 00:04:46            | 8.06        | 34.38%      |

Table 2. Data of the online shops (SimilarWeb, October 2018)

The best scores are marked in green, while the worst scores are marked in red.

## Findings

### Landing page

Every fashion retailer in this review case features high quality photos in large size in their landing page. The photos take up a great proportion of the landing page, and this may significantly enhance users' first impression of the online shop, as some previous

studies suggested graphics are rather important to the aesthetics of the web pages, as well as to users' feelings (Noiwan and Norcio, 2006; Lin, Yeh and Wei, 2012).

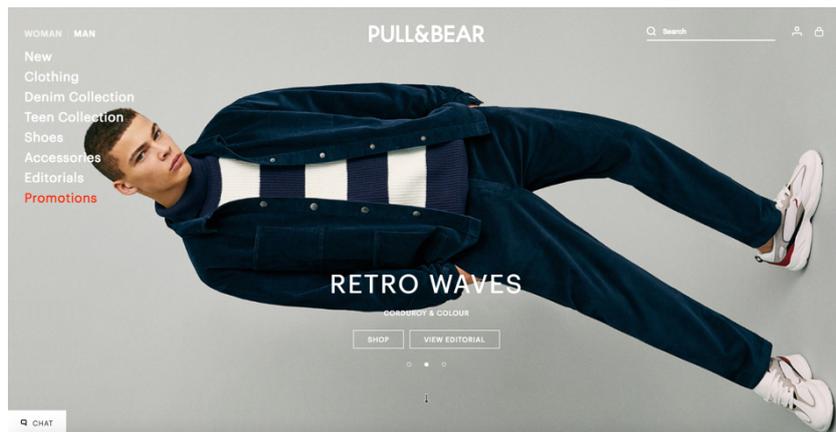


Figure 18: The landing page of Pull & Bear (pullandbear.com)

Some other online shops such as Amazon and IKEA tend to display more featured items and promotions on the landing page, which results in too much information to see at one time. According to Nielsen's (1995) 10 Usability Heuristics for user interface design, the design should be minimal and only keep the necessary information. Pengnate and Antonenko's (2013) study revealed the aesthetics and usability of websites can override the information quality. Thus, the landing page should be designed to provide a pleasing first impression and increase the trustworthiness of the website, rather than presenting too much information.

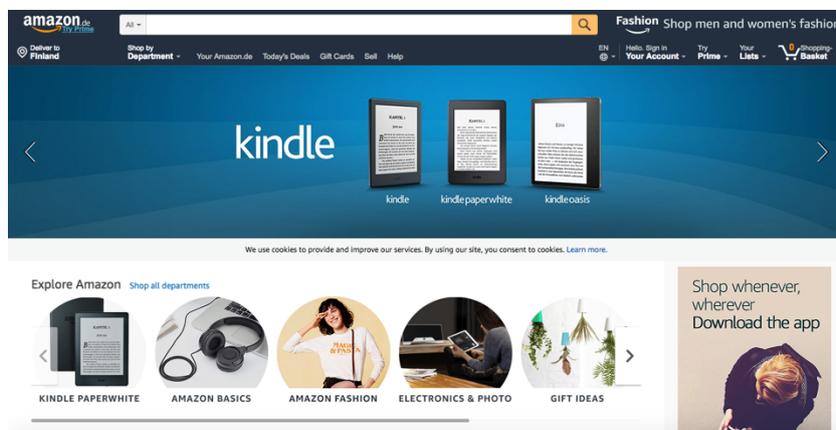


Figure 19: There is more information on the landing page of Amazon (amazon.de)

## Design and placement of the search button

From the 18 online shops, only two did not use an icon for the search. Most fashion retailers had a minimalistic appearance by shrinking the size of buttons and texts, including the search button. According to Fitts' law, when the size of the button is smaller, it requires more time from the user for the action. On top of the small size of search button, some sites did not implement a search box, which caused more inconvenience when users have to click on the button to open a text box and then input the keywords. Nielsen et al. (2000) argue that the search function should always be visible on the page and be able to precisely find the products for users, and the sites should include a text box for the search function to meet users' expectations. A visible search box can increase users' success rate of finding their desired items, and hence, increase the sales of the online shop.

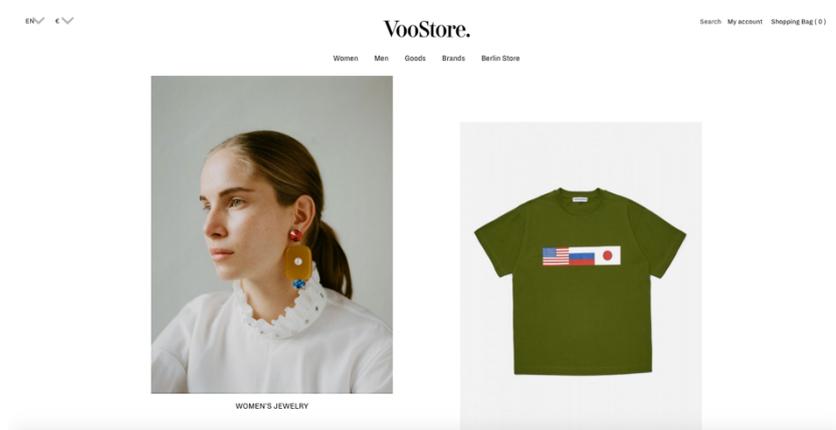


Figure 20: The search button lacks visibility on Voo Store (voostore.com)

Based on the observations in the design review, Zara, Arket and Pull & Bear had comparatively the most easy-to-notice and easy-to-use search function, with both usability and appealing visuals. Also, these sites all used graphics in high-quality and large-size. Correspondingly, these three websites had the lowest bounce rate among the 18 online shops (Zara 23.69%; Arket 26.17%; Pull & Bear 22.75%).

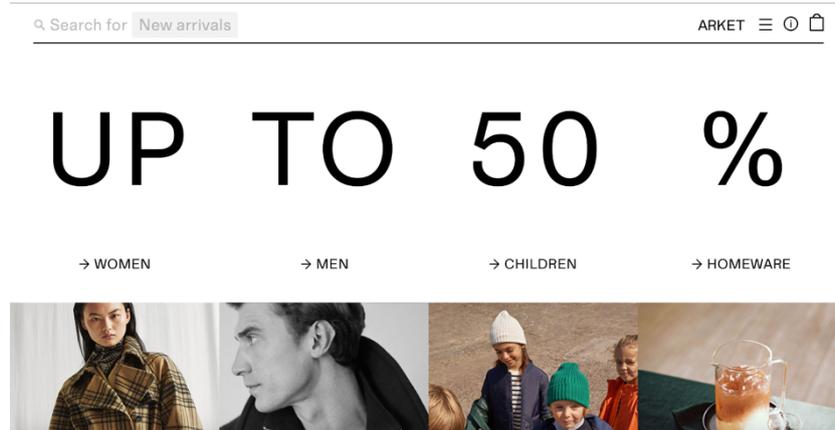


Figure 21: Arket gives users suggestions to search (arket.com)

### **Products display on the search result page**

Most of the selected sites display the products in a row of three, and End Clothing provided the user with an option to show three or four images. According to a previous research by Nelson Cowan (2001), there is a magical number four in visual attention, which refers to the fact that humans have a limited short-term working memory of storing up to four objects. While users are scrolling the page, the images are ebulliently moving objects; some previous studies have also found that people are capable of tracking approximately four objects (Intriligator and Cavanagh, 2001; Pylyshyn and Storm, 1988; Yantis, 1992). Therefore, three or four images in a row is an optimal amount for browsing in quickly while users are scrolling down the page. On top of the suitable products displayed, majority of the sites included the keyword used for search, and the number of results, which provided useful additional information for the users (Nielsen et al., 2000).

### **Options, design and placement of filters**

15 out of 18 online shops implemented filtering in their sites. Among the online shops which support filtering, 13 of them provided more than three filters, and H&M has most in number – eleven filters. Under each filter, it usually has multiple criteria, for instance, the color filter contains a number of color options; the size filter contains different sizes, and it can be up to dozens when it comes to shoe size. Most sites solve this by placing

filtering function vertically at the side of the page, and some filters with too many options are collapsed to save the space.

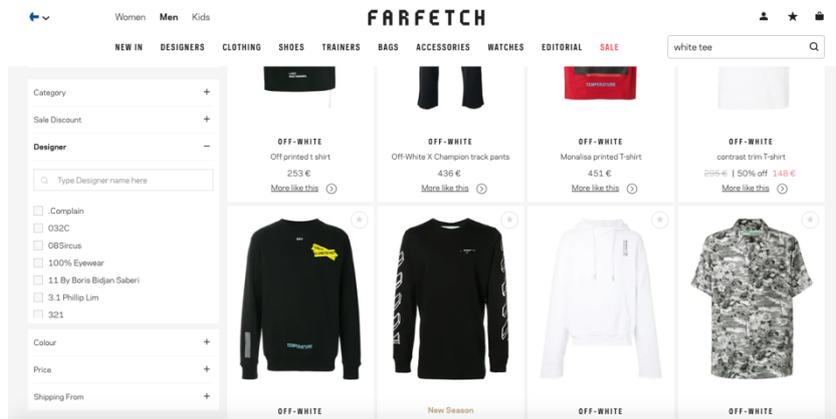
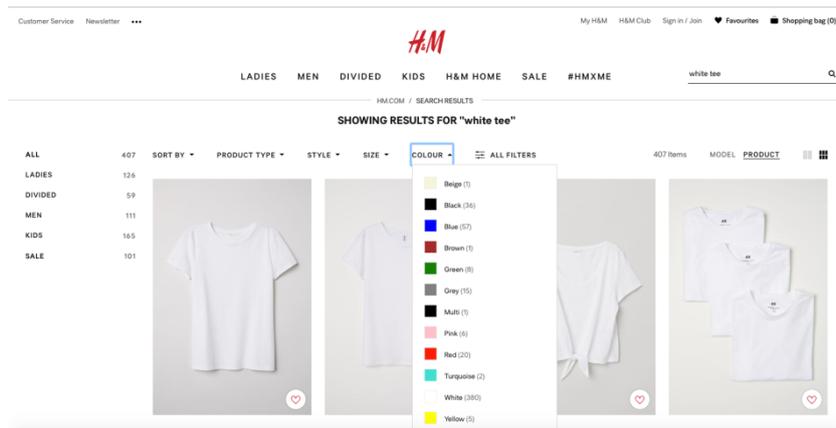


Figure 22: The filters in Farfetch have the most criteria (farfetch.com)

There are a few sites presenting with a different solution, such as COS, H&M, and Louis Vuitton where the filter is under the search box, and above the result list. This solution allows a larger space for texts, and the information is likely easier for users to read.



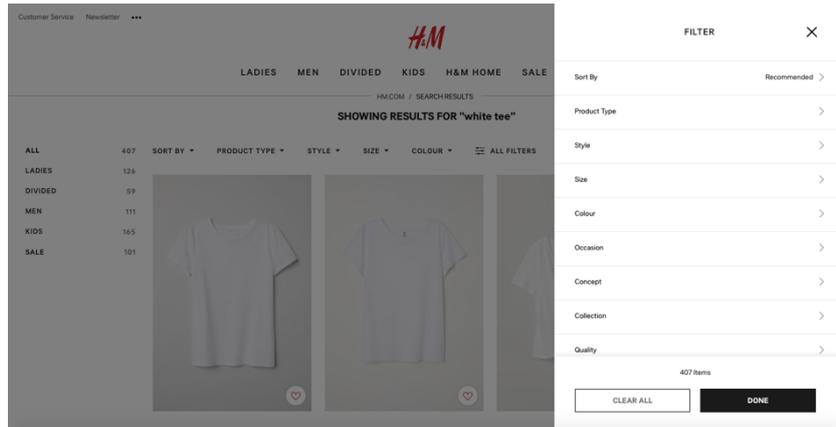


Figure 23: The design of filters in H&M (hm.com)

### Options, design and placement of sorting

Seven of the studied online shops did not implement sorting function, while “newest”, “price low to high”, “price high to low” are the most popular criteria for the sites which included sorting. Majority of the shops showed “sort by” as the default name of the function. Only a few of them could indicate to the user which criteria is used by default to display the products in the search result, including Amazon, End Clothing, Farfetch.

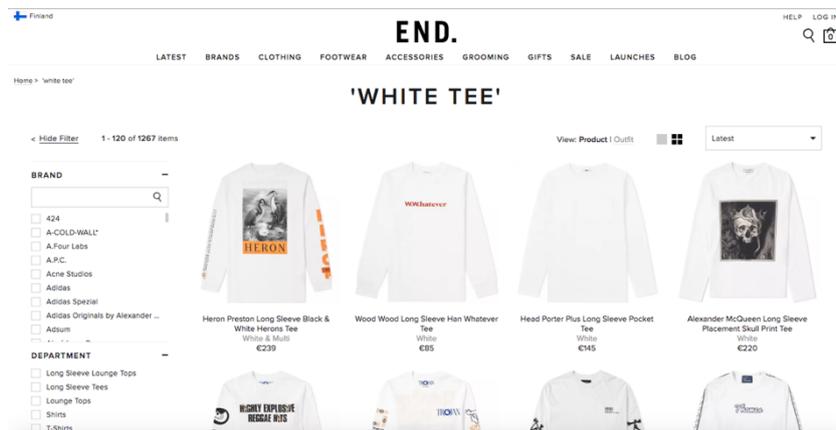


Figure 24: End Clothing indicated the default sorting criteria (endclothing.com)

The design review has provided more insights of the current design solutions of the online shops, and also more ideas for the design phase of this research. Although the review contains some subjective opinions, and there are lots more online shops in the internet, the conclusions of design review have covered the important aspects of the

research questions in this paper, and they could provide some guidelines for the user interface design of online shops.

Nowadays, the landing page of a website usually looks better in a minimal design, although it sacrifices the space for more promotions, and an unfavorable web design may make the visitors distrust the site and abandon the page (Li, Zhang, 2005; Pengnate and Antonenko, 2013). Hence, the landing page should have a stress on the aesthetics rather than the amount of information. Regarding the aesthetics, Parush et al. (2005) have found that fewer links, more uniformity of information, and using graphics (Noiwan and Norcio, 2006; Lin, Yeh and Wei, 2012) can increase users' perception of aesthetics.

Search function should be very visible and include a text box ready for users' input, and Nielsen (2000) highly recommended to online shops to implement the search function in all the pages, except from the pages where users would risk losing their work, for instance, the checking out page.

In the search result page, the search criteria should be ready for users to edit quickly in case there was a mistake in it. The optimal number of products in a row is three, and some websites provided users an option of choosing the number of products in a row.

From the design review, most online shops contained more than three subsets in the filtering function, and some of them may enclose up to dozens of options, such as the shoe size subset. Thus, designers should make better use of the space on the page and use some graphic elements to lessen users' cognitive load. At the same time, the online shops should learn their customers and only keep the most useful filters, to reduce the complexity of this function.

Most online shops have a default sorting criterion for the products, yet only a few of them could indicate it to the users. In order to create a better user experience, the online shop should make the user aware of the state at the first point.

## **5. Design**

The design in this study follows the conclusions of literature review, survey and design review, plus author's own judgements. The design contains five screens: landing page, search function, search result, filtering function and sorting function. During the progress of designing these screens, some contrary opinions were found, for example, Parush et al. (2005) found that using fewer links can improve the aesthetics of the website and the online shop sales, while other research indicated promotional information is helpful to increase the E-Commerce sales (Song and Zahedi, 2005). To find the balance between these findings, the author designed two versions for each screen – minimal (version A) and informational (version B), and they were used for comparison in the user test.

### **Landing page**

The landing page should provide a positive impression for users' first glance (Basso et al., 2001; Sanchez, Franco and Roldan, 2010; Lin, Yeh and Wei, 2012), a pleasing visual to enhance users' perceived aesthetics (Parush et al., 2005; Lin, Yeh and Wei, 2012) and trustworthiness (Schlosser, White and Lloyd, 2006; Pengnate and Antonenko, 2013; Pengnate and Sarathy, 2017). Therefore, the landing page is designed with a stress on aesthetics with fewer links (Parush et al., 2005) and large-size graphics (Noiwan and Norcio, 2006; Lin, Yeh and Wei, 2012). The landing page design is shown as figure 25.



Figure 25: Landing page (Design A)

However, the survey presented in Chapter 3 indicates that 68% of the time the respondents will visit the online shops without a plan, the landing page without promotional information may bear with less attraction for the random visitors, a research from Song and Zahedi (2005) revealed the impact that information about price and service can have on the online shop sales. Thus, a different landing page was designed (figure 26), which shows a link of sales and information of the provided service.



Figure 26: Landing page (Design B)

### Search function

A prior study from Kim and Lee (2002) found that the information phase is the most important among the four phases of E-Commerce transaction (information phase, agreement phase, settlement phase, environment phase), and the most critical design factors of information phase include searching for a specific item and browsing for an interesting item. The survey in Chapter 3 also shows that search function is an important feature for 71% users of online shops. Accordingly, in this case, the search function is designed with a central placement to be noticed easily, and a big search box to be clicked on accessibly. The difference between the two versions of design is the “enter” icon on the version B (figure 27 & 28).



Figure 27: Search function (Design A)



Figure 28: Search function (Design B)

### Search result

The display of products in search result is also affiliated to the information phase that it should be easy for users to browse and find the wanted item. Previous studies of human's short-term memory load have explained that human can only store about five

objects the short-term memory (Miller, 1956; Cowan, 2001). The same result is seen in majority of the online shops in the design review presented in Chapter 4 that most of them display three or four products in a row. In terms of the product information, Nielsen et al. (2000) and Kim et al. (2002) suggested users usually expect to see the product name, brand name, price and stock status. In this design, the search box is placed at the same position as it is on landing page, providing easy access for users who need to re-search with different key words. The font size of the key words for searching are enlarged, for users to check there are no typing errors. The two versions of design show the difference in number of products in a row, and there is some extra information on the version B, such as the provided service on the top of page, and an online chat button at the bottom right.

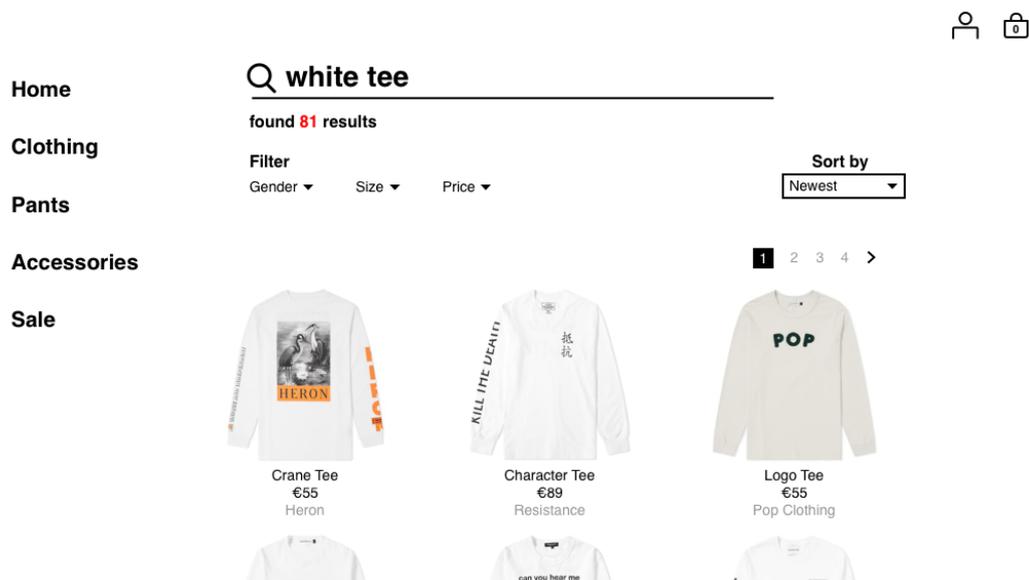


Figure 29: Search result (Design A)

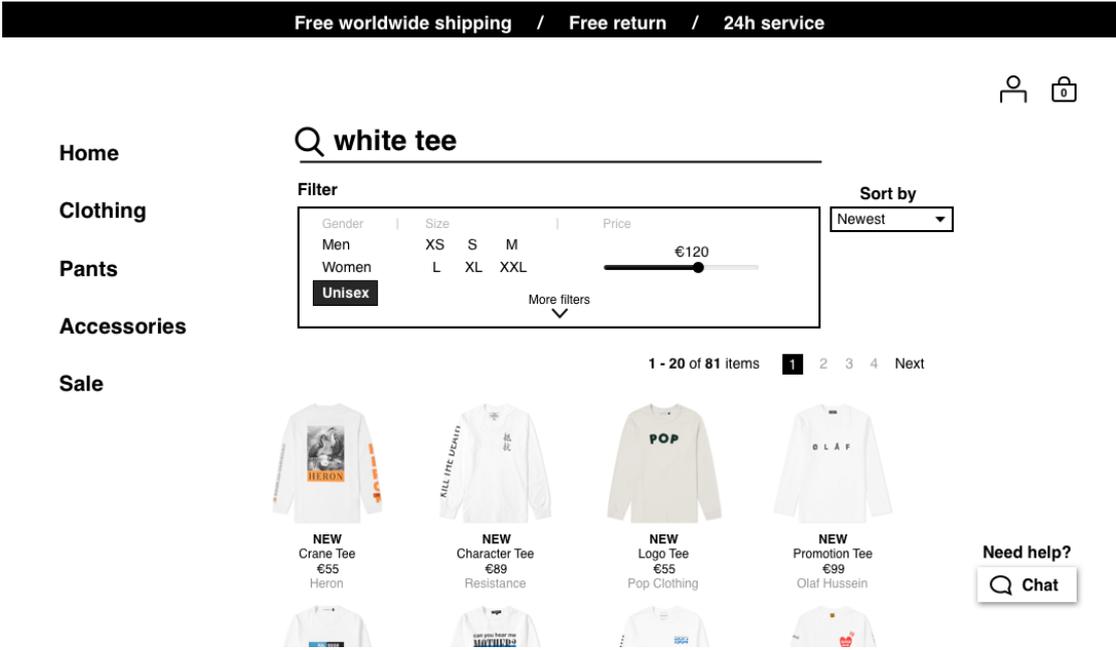


Figure 30: Search result (Design B)

**Filtering function**

Allowing user to find the specific items accurately is an important factor of the sales (Nielsen et al., 2000; Kim and Lee, 2002), and hence the filters for narrowing down search result is an essential feature of online shops. The survey in Chapter 3 shows that 81% respondents believed filtering function is a reason for them to like an online shop, and more than half respondents might leave the online shop if the filtering function is not easy to use. Most online shops in the design review shown in Chapter 4 provided filtering function, but the number of filters ranged from three to eleven, and it is common to see the filtering function is placed vertically at the left side of the page, with sorting function at the right side of the page. This design suggested placing the filtering and sorting function closer, under the search box, to provide a uniformity of similar information, as they are all meant to help users to find specific products. To find out whether aesthetics or function of the filtering function is more important users, the two versions of design presented a significant difference in the filtering function.

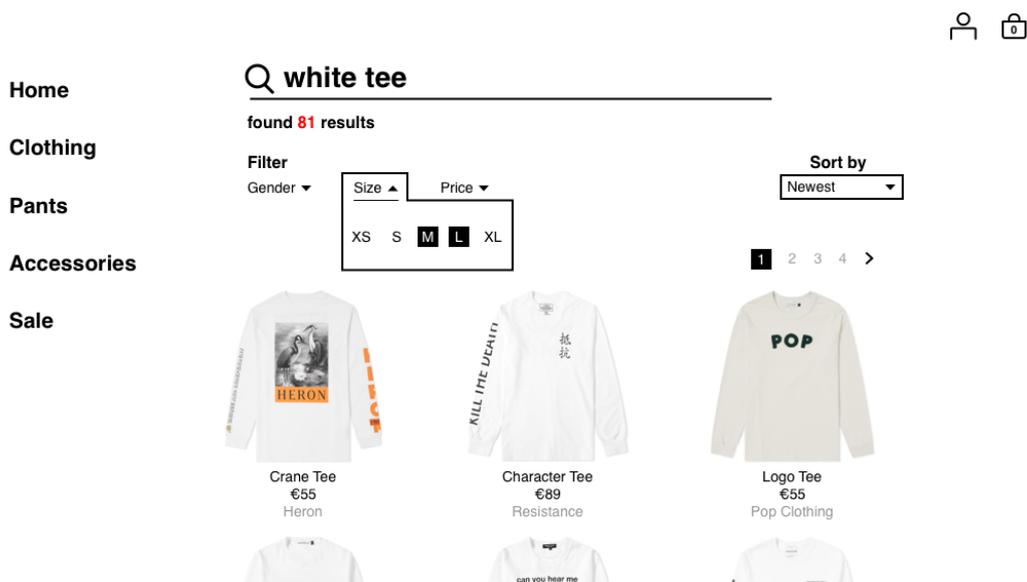


Figure 31: Filtering function (Design A)

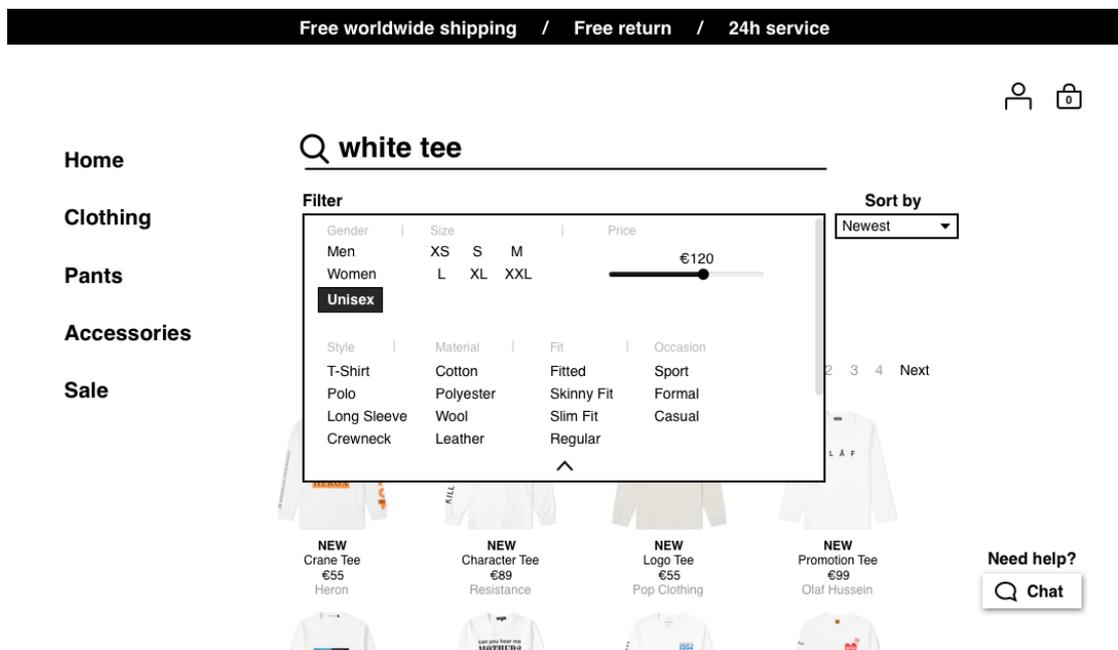


Figure 32: Filtering function (Design B)

## Sorting function

The sorting function allows users to browse the products according to their preference, although most online shops in design review of Chapter 4 provided sorting function and sorted the search result with some default criteria, very few of them could visually

inform the users which criterion it used, and a solution has been presented in this design. The version B also presented a solution of grouping the criteria (figure 34) as in most cases the criteria for sorting are paired (e.g. price low to high, and price high to low).

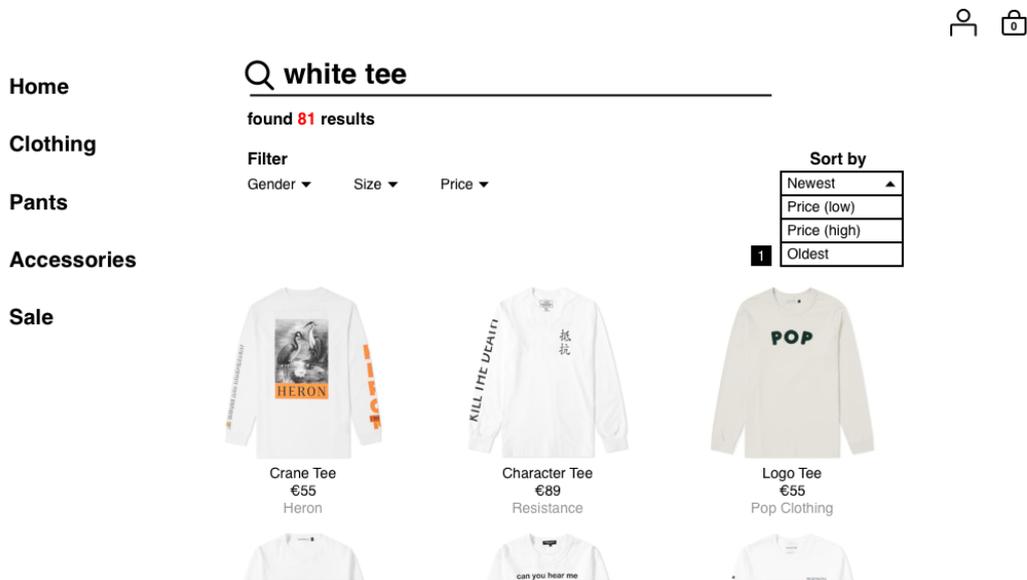


Figure 33: Sorting function (Design A)

Free worldwide shipping / Free return / 24h service

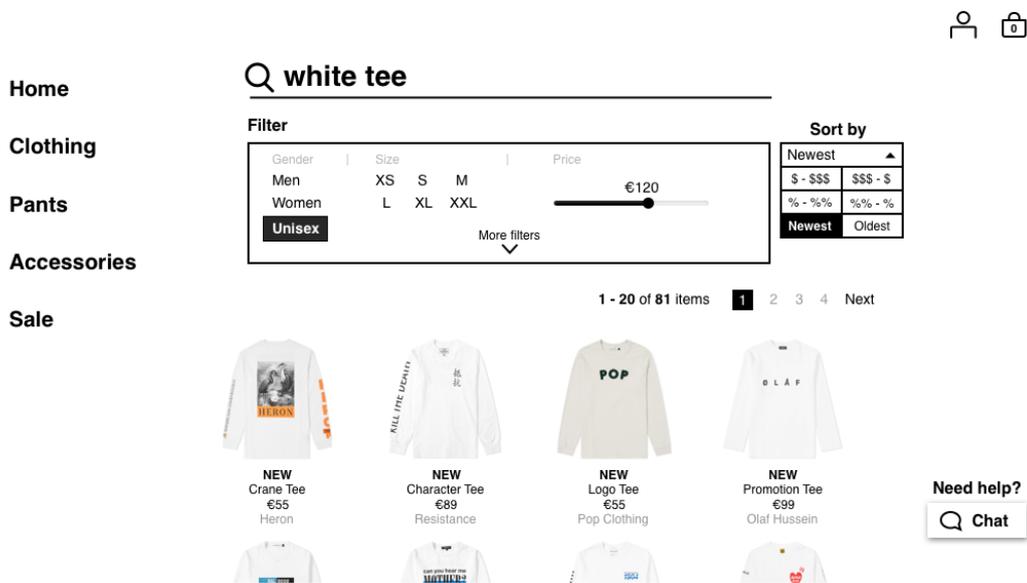


Figure 34: Sorting function (Design B)

## 6. Results

The user test was done by showing the two versions of design to participants. 21 people took part in this user test, and the participants were asked to answer a questionnaire while comparing the two different designs. The questionnaire consisted of 13 questions, and it contained questions with 7-point scale and asked respondents' opinions of aesthetics, trustworthiness, and usability. The questions, results and analysis are shown as following:

### Font

The first two questions asked users' perceived aesthetics and trustworthiness of the fonts. Both designs use the fonts that users could have frequently see in their previous experiences, to be exact, design A uses Helvetica, and design B uses Times.

The result shows people prefer fonts like Helvetica, and only 1 respondent perceived more aesthetics from Times. There were 13 – more than half respondents, who gave the same scores to aesthetics and trustworthiness of the fonts, which reveals the strong relevance of people's perceived aesthetics and trustworthiness of online shops.

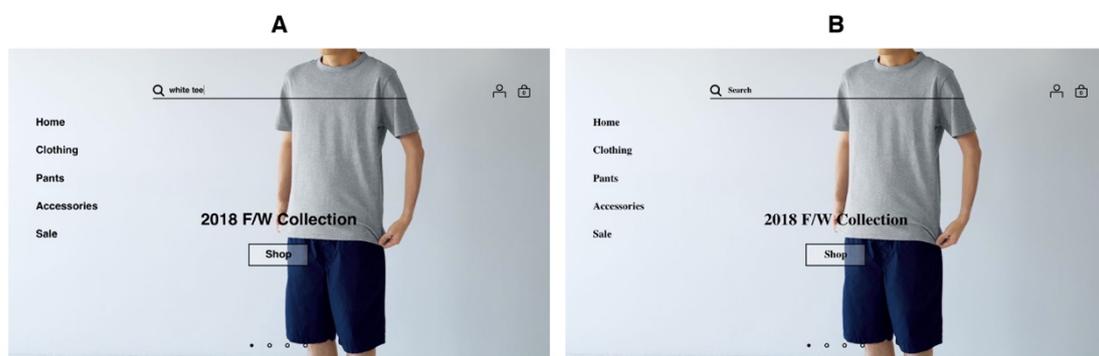


Figure 35: Comparison of fonts in design A & B

Q1: Font (1/2): how will you evaluate the aesthetics of the fonts (7-point scale, higher score means more aesthetics)?

A: 5.62

B: 2.57

Q2: Font (2/2): how trustworthy do they look like (7-point scale, higher score means more trustworthiness)?

A: 5.10

B: 3.45

## Landing page

The second question asked respondents about their perceived aesthetics of the landing page, and their motivation to keep browsing the shop. The respondents were also asked what information on the landing page is the most important for them.

The result indicates that minimal appearance and fewer links can enhance the aesthetics. Another implication from this result is that promotional information is probably not making contributions to users' motivation of browsing the online shops. 10 respondents (table 3) stated the easy navigation is the most important information for them, including the easy-to-understand names of the categories.

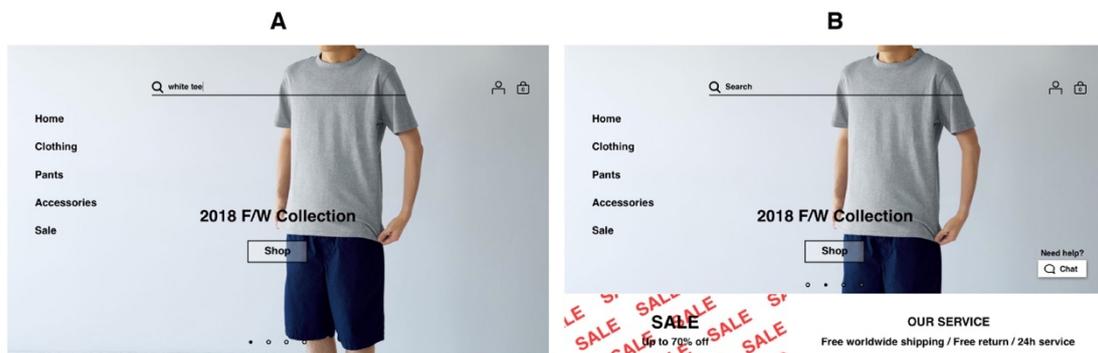


Figure 36: Comparison of landing page design A & B

Q3: Landing page (1/3): the aesthetics of the visual?

A: 5.52

B: 3.14

Q4: Landing page (2/3): how much motivation do you get to keep browsing the shop?

A: 4.43

B: 3.81

Q5: Landing page (3/3): what information on the page is the most important for you?

18 participants answered this question, and the result is shown in table 3.

| <b>Answers</b>    | <b>Responses</b> |
|-------------------|------------------|
| Menu (navigation) | 10               |
| Sales             | 3                |
| Clothing picture  | 2                |
| Search function   | 2                |
| Brand is missing  | 1                |

Table 3. Result of the Question 5

### **Search**

This comparison was to find out whether participants prefer the “enter” icon while typing in search box. And the result shows most people preferred it without the icon (table 4).

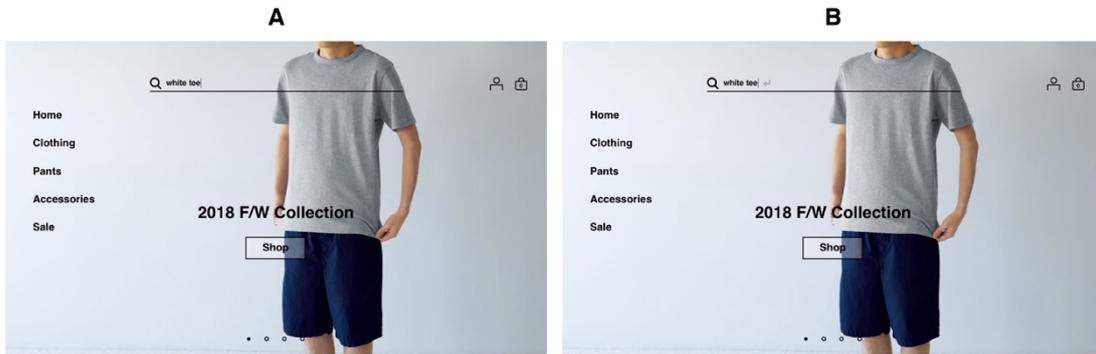


Figure 37: Comparison of search function design A & B

Q6: Search (1/1): which one do you prefer?

| Answers        | Responses |
|----------------|-----------|
| A              | 14        |
| B              | 4         |
| Doesn't matter | 3         |

Table 4. Result of the Question 6

### Search result

The two designs are differentiated in their provided amount of information, and the number of products in a row. Participants were asked to rate the aesthetics of the page and easiness of browsing the products.

The result again shows that minimal appearance and fewer links can improve the aesthetics of web pages. Although the difference in ease of browsing is not evident, the number indicates three products in a row is easier to browse than four in a row.

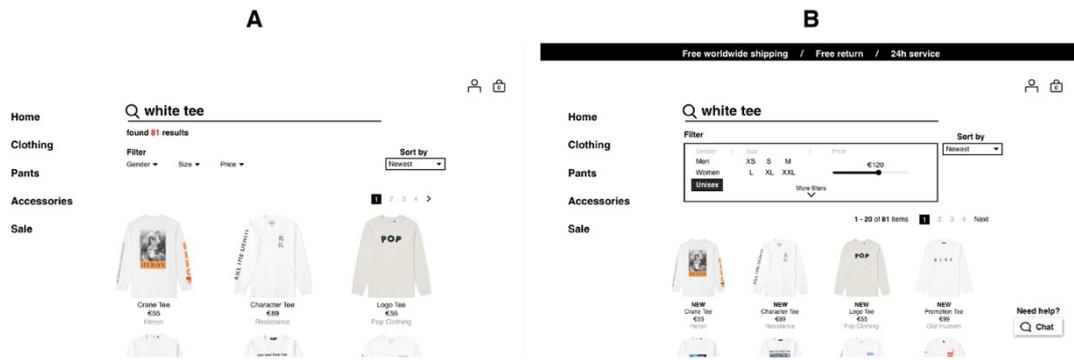


Figure 38: Comparison of search result design A & B

Q7: Search result (1/2): how much did you like the aesthetics of the design?

A: 4.95

B: 3.85

Q8: Search result (2/2): how easy is for you to browse the products?

A: 4.89

B: 4.74

### Filtering function

The result shown in Q9 confirms again that less visual elements on the web page is very likely to make the visual more appealing. Although aesthetics affects significantly users' decision at the first glance (Basso et al., 2001; Sanchez, Franco and Roldan, 2010; Lin, Yeh and Wei, 2012), it seems less influential to users' preference after users have started using the service (table 5).

It is worth mentioning, a number of responses had different rating result for design A's and design B's aesthetics and usability, for instance, one of the responses rated aesthetics [A: 6.0, B: 4.0] and usability [A: 5.0, B: 5.0]. This result points out that usability has a greater weight than aesthetics for some users in filtering function. Numerically, 4 respondents value aesthetics more than usability, while usability of filtering function is more important than aesthetics to eight of the respondents (table 6).

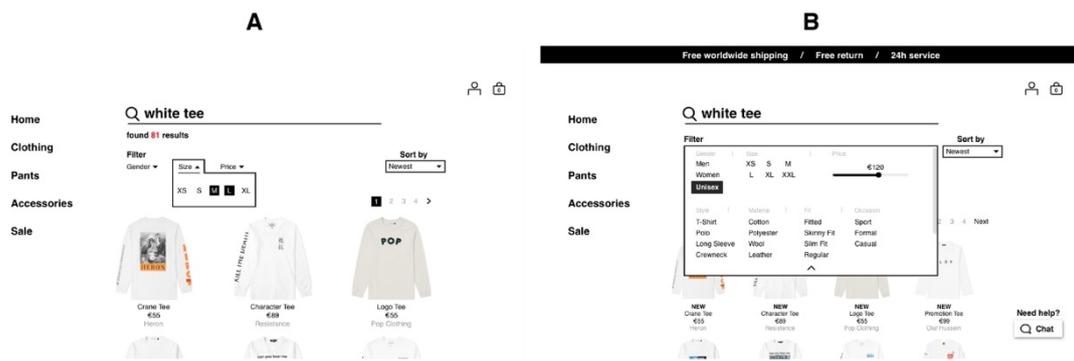


Figure 39: Comparison of filtering function design A & B

Q9: Filter (1/3): the aesthetics of the page?

A: 5.35

B: 3.35

Q10: Filter (2/3): the usability of filter?

A: 4.10

B: 4.95

Q11: Filter (3/3): which one do you prefer?

Two participants skipped this question.

| Answers        | Responses |
|----------------|-----------|
| A              | 7         |
| B              | 11        |
| Doesn't matter | 1         |

Table 5. Result of the Question 11



*Q12: Sort (1/2): the usability of the function?*

A: 5.60

B: 3.20

*Q:13 Sort (2/2): which one do you prefer?*

There were 1 participant skipped this question.

| <b>Answers</b> | <b>Responses</b> |
|----------------|------------------|
| A              | 15               |
| B              | 2                |
| Doesn't matter | 3                |

Table 7. Result of the Question 13

## **7. Design Guidelines**

This chapter suggests a number of design guidelines, the guidelines are summarized based on the result of the user test. These guidelines can be used for future studies and design cases both theoretically and practically.

### **Guarantee the aesthetics of landing page**

The landing page of online shops is essential to provide trustworthiness and a pleasing first impression for users to continue using the website. To meet this purpose, the landing page should be designed with a focus on its aesthetics to be visually pleasing.

### **Use minimalistic design to improve aesthetics**

To improve the aesthetics of the website, previous studies and the user test have implied that a minimal appearance is more efficient in making the visuals appealing to users.

### **Use large-size and high-quality photos to improve aesthetics**

The user test shows that pictures on the landing page are important to some users, therefore, online shops are suggested to use large-size and high-quality photos to demonstrate the details and materials of products.

### **Choose suitable font for the web page to improve aesthetics**

Font can influence users' perception of aesthetics. However, what kind of font is more appealing to users is not revealed in this study. In this design, a comparison between Helvetica and Times suggested users prefer Helvetica much more than Times.

### **Present the promotional information as graphics**

The promotional information such as on sale products and the provision of services are considered attractive by many users, but respondents of the user test were more motivated to use the online shop with visually appealing landing page, instead of a

more informative landing page. This can inspire online shops to display the promotional information as graphics, for instance, as a part of the slideshow on the landing page.

### **Categorize the navigation menu clearly**

When participants of the user test were asked which information of landing page is important, nearly half of them chose the navigation menu. This result suggests online shops should make the navigation menu easy to view and informative about what contents the menu contains. This helps users to understand the categories of products available in the shop.

### **Design an easy-to-use search function**

It is critical for users to find the specific products easily. The search box should be easy to find and ready for users' input. The solution presented in this design is developed based on Nielsen's (2000) study on search function of online shops and the design review. The user test also proved the presented solution in this thesis to be very easy to use.

### **Display three products in a row**

It is the most optimal to list three or four products in a row on the search result page, and the user test showed that three in a row is easier for browsing.

### **Provide advanced filtering function**

The user test showed usability is more important than aesthetics to users in tasks that are related to find specific products. The online shop should provide useful filters according to the properties of products. And the filtering function usually contains many options, and they should be grouped appropriately to reduce the complexity of the information.

**Indicate the default sorting criterion to users**

Online shops should inform the users of by which criterion the products are sorted in the search result, this will help users to be aware of the system status.

## **8. Conclusion**

This study covers a number of topics including marketing strategies, user interface design, E-Commerce design and human factors. It started with literature review and an online survey, followed with a design review, and according to the results of these procedures, two versions of an interface design of an online shop were designed with focus on the five most important factors in regard to online shop sales (landing page, search function, search result, filtering function, sorting function). The interfaces were then tested with 21 participants. The study provided a number of design guidelines, as well as theoretical findings.

This study is limited as its focus was mainly on fashion industry. The results may be different for other business areas due to the different customer traits. In addition, this study was not implemented in a real case, and it could not determine which solution is more cost-efficient in improving the online shop sales.

Therefore, the future research in this topic can study a different business field, for instance, online shops of electronic products. In addition, applying the design guidelines and suggestions of this study in a real case could provide further justifications for how accurate the presented results are. Another recommended future study is in regard to the influence of fonts on the aesthetics.

To summarize, this study has provided more theoretical foundations for the findings of some earlier studies, such as aesthetics affect trustworthiness, graphics can improve users' perception of aesthetics. The result of the user test demonstrated another finding that aesthetics and usability have different importance in different situations during online shopping.

As E-Commerce is still growing rapidly, there will be an increasing demand for the retailers to rise their online sales, which is the topic this thesis has discussed. Even

though the research of increasing online shop sales with user interface design is at the very early stage, and this thesis has its limitations, the findings presented in this thesis have provided the foundations and inspirations for further studies in this topic. In addition, the design guidelines can be used as references for online shop design, to guarantee the aesthetics and user experience.

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# Appendix

## Appendix 1 – Survey of Users' Online Shopping Preferences

### A Survey of Online Shopping Experience

\* How often do you visit online shops?

- Almost everyday
- Less than 5 times a week
- Less than 10 times a month
- Less than all above

\* When you are shopping online, how often are you shopping without a plan, but just randomly browsing?

Seldom Very often

A horizontal slider bar with a white circle in the middle, indicating a frequency between 'Seldom' and 'Very often'.

\* Will you try to view every single product in order to not miss a suitable item?

No Yes

A horizontal slider bar with a white circle in the middle, indicating a response between 'No' and 'Yes'.

\* If you recommended an online shop to a friend, it may because:

|  | NO                    | Not very possible     | Possible              | Very possible         | Yes                   |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The visual design of online shop                         | <input type="radio"/> |
| The collection of products and brands is suitable to you | <input type="radio"/> |
| The price is cheaper                                     | <input type="radio"/> |
| The payment is easy to be done                           | <input type="radio"/> |
| The customer service is satisfying                       | <input type="radio"/> |

Other (please specify)

\* If you like the online shop, it may because:

|  | No                    | Not very possible     | Possible              | Very possible         | Yes                   |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| High quality photos that show the details of products                          | <input type="radio"/> |
| The search function is easy to use   | <input type="radio"/> |
| Users can sort the products according to their needs (price, latest, discount) | <input type="radio"/> |
| Users can filter the products according to their needs (size, color, price)    | <input type="radio"/> |
| Detailed text description of the product                                       | <input type="radio"/> |
| There is online chat service to provide help immediately                       | <input type="radio"/> |
| Easy to complete the payment   | <input type="radio"/> |
| Other (please specify)   | <input type="text"/>  |                       |                       |                       |                       |

\* If you stop browsing, and decide to leave the online shop, it may because:

|   | No                    | Not very possible     | Possible              | Very possible         | Yes                   |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| The photos of products are not visually pleasing enough                           | <input type="radio"/> |
| The photo quality is not good enough to show details and materials of the product | <input type="radio"/> |
| The search function is not easy to use  | <input type="radio"/> |
| There are too many products to view   | <input type="radio"/> |
| There is no suitable sorting options  | <input type="radio"/> |
| Cannot filter the products according to needs (size, color, price)                | <input type="radio"/> |
| The text description of product is not detailed enough                            | <input type="radio"/> |
| There is no online chat service   | <input type="radio"/> |
| Payment procedure is safe, but complicated  | <input type="radio"/> |
| Other (please specify)  | <input type="text"/>  |                       |                       |                       |                       |

## Appendix 2 – User Test of The Design Result (comparison of design A & B)

While you are evaluating the design, please kindly focus on the overall structure, rather than the specific components (e.g. “the icon is too small”).)

### Font

1. Font (1/2): how will you evaluate the aesthetics of the fonts

|   | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| A | <input checked="" type="radio"/> |
| B | <input type="radio"/>            |

2. Font (2/2): how trustworthy do they look like?

|   | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| A | <input checked="" type="radio"/> |
| B | <input type="radio"/>            |

### Group 1: Landing page

3. Landing page (1/3): the aesthetics of the visual?

|   | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| A | <input checked="" type="radio"/> |
| B | <input type="radio"/>            |

4. Landing page (2/3): how much motivation do you get to keep browsing the shop?

|   | 1                                | 2                                | 3                                | 4                                | 5                                | 6                                | 7                                |
|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| A | <input checked="" type="radio"/> |
| B | <input type="radio"/>            |

5. Landing page (3/3): what information on the page is the most important for you?

### Group 2: Search

6. Search (1/1): which one do you prefer?

- A
- B
- Doesn't matter

### Group 3: Search result

7. Search result (1/2): how much aesthetics do you get from the visual?

|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| A | <input type="radio"/> |
| B | <input type="radio"/> |

8. Search result (2/2): how easy is for you to browse the products?

|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| A | <input type="radio"/> |
| B | <input type="radio"/> |

### Group 4: Filter

9. Filter (1/3): the aesthetics of the page?

|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| A | <input type="radio"/> |
| B | <input type="radio"/> |

10. Filter (2/3): the usability of filter?

|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| A | <input type="radio"/> |
| B | <input type="radio"/> |

11. Filter (3/3): which one do you prefer?

- A
- B
- Doesn't matter

### Group 5: Sort

12. Sort (1/2): the usability of the function?

|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| A | <input type="radio"/> |
| B | <input type="radio"/> |

13. Sort (2/2): which one do you prefer?

- A
- B
- Doesn't matter