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The Role Of Interface Aesthetics And Shopping Task On Consumer Purchase Intentions: Effect Of Animation On Web Based Stores

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SCHOOL OF SCIENCE & TECHNOLOGY

A thesis submitted for the degree of

Master of Science (MSc) in e-Business, Innovation and Entrepreneurship

DECEMBER 2016

THESSALONIKI – GREECE

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Abstract

This dissertation was written as a part of the MSc in e-Business, Innovation and Entrepreneurship at the International Hellenic University.

More and more e-commerce websites are using animation due to intense competition in order to stimulate web users' interest. But what is the impact of moving animation on consumer perceptions towards the web page? Is this interaction affected by users' online shopping behavior, which can be either utilitarian or hedonic? While it has been studied extensively its effect on banner-ads, it is not clear its consequences on non-banner-ads e-commerce web pages. This research tries to answer these questions by studying how interface aesthetics and shopping task can influence consumers' perceived ease of use, satisfaction, entertainment and loyalty, by manipulating the aspect of animation. This experimental research proves that animation can enhance perceived aesthetics and entertainment but there were not enough evidence to support any main effect of animation on perceived ease of use, satisfaction and loyalty. Moreover, it is not supported an interaction effect of animation and shopping behavior on consumers' perceptions. Some theoretical and managerial implications are discussed at the end of this paper.

Eleni Kolliga

(23/12/2016)

Contents

1 Introduction

According to Statista, it is expected that online buyers worldwide to be more than 2 billion in 2019. Additionally, B2C e-commerce sale worldwide is expected to reach $2,35 trillion in 2018. Doubtless, this is a promising sector with lots of upcoming trends and innovation, but it is important to have previously understood the consumer decision process in the digital environment.

Chapter 2 contains findings from previous studies. First, there are analyzed concepts of aesthetics in general. Aesthetics is a very complex term, highly related with emotions and little research has been done on how it can affect users' preferences [2]. Li and Yeh [9] defined *design aesthetics,* regarding the e-commerce sector, as an appealing website and it can be viewable through various elements, cues and objects on a web page. By manipulating those aspects, aesthetics can be a powerful marketing tool and affect users' preferences towards a site [10]. There are two important debates in the literature on whether aesthetics is viewed objectively or subjectively and whether it is affected based on user's purpose in his/ her mind while browsing [3, 10]. Both debates though were found to be incompatible in today's world and there is an interaction between the functional and aesthetic characteristics of a product [8].

Moreover, it is analyzed the shopping behavior of the web users, who fall into two categories of online shopping behavior, based on their motivational orientation: *hedonic* (feel) and *utilitarian* (think) shopping behavior [3]. Consumers are either browsing for fun and enjoyment (hedonic behavior) or with a specific purpose to purchase (utilitarian). It was found that depending on user's motivation, aesthetics will be perceived differently; and that these behaviors are precursors of consumer satisfaction, trust, commitment and loyalty, which will be affected indirectly [2].

The purpose of this study is to examine the effect of animation, one of the aesthetics' aspects, based on the moderator effect of online shopping behavior which can be either utilitarian or hedonic. Prior research [32] studied the effect of animation on utilitarian and hedonic perceptions, recall and attitude towards a product. They found that animation enhances user's attitude towards a product with hedonic dimension, but this may not be applicable for products with utilitarian dimension ($0,05 < p < 0,1$). They

examined the effect of animation on product attitude while this research will go backward and examine the effect of animation on consumers' perceptions (satisfaction, ease of use, loyalty, entertainment) *based on* the shopping behavior. It is a direction that no one investigated so far, while there is a lot of disagreement in the literature on whether animation leads to positive or negative perceptions.

Afterward, it is analyzed the concept of the landing page, which is the "storefront" of a company's website and the first web page a web user views in his/her way to complete an online action [40]. Lindgaard, Fernandes, Dudek and Brown [5] made a pioneering experiment in order to examine how quickly a web user forms his/her opinion regarding a website's visual appeal. It was found that visual aesthetics can be assessed within the first 50ms and this judgment may affect other perceptions that the user forms about the site (e.g. usability, enjoyment, loyalty etc). So, it is highly important to be aware of all the different elements and their effects when designing a web page.

Some questions this research addresses are: *Can animation play a vital role on online users' aesthetic appraisal? Will this be different according to their motivational orientation? Are other user's attitudes affected if the web page uses moving animation?* Web animation has been defined as "*motion of any kind on websites* [31], is used for many reasons and is increasingly applied to web pages lately, because of the high connecting speed capabilities and evolution of software tools [31], but most important because of the intense online competition [28]. However, it is not clear its consequences on online shoppers' attitudes. So far, literature studying animation splits into two streams, the one has examined banner advertisement and the other non-banner advertisement web pages, while the first stream has been investigated more [28]. The second stream has only investigated animation effects on performance, attention, recall, clicking behavior and errors [28, 31, 32], while it has not been examined the direct effect of animation on perceived aesthetics and other perceptions. Animation, as a major factor of users' perceived complexity, can play an important role in users' perceptions but it is not clear how different types or levels of animation can have a negative or positive impact [24, 29]. So, it is obvious the need of investigating it in more depth.

Next, it is analyzed the effect of aesthetics in general and under the influence of animation, on consumer perceptions, namely ease of use, entertainment, satisfaction and loyalty. All of them have been found to have a positive relationship with aesthetics. Moreover, they all have a positive relationship with purchase intentions [2, 4, 8, 12, 20,

24, 36]. Finally, in this chapter, I briefly discuss the importance of aesthetics regarding users' purchase intentions. If a website can provoke positive emotions to customers, this will lead to a reduced perceived risk and encourage customers to make a purchase [41].

In Chapter 3, I am describing the research model that is used in this study, where animation and shopping task are the independent variables while perceived aesthetics, entertainment, satisfaction, ease of use and loyalty are the dependent variables. Aesthetics will be treated as a depended variable because I want first to examine whether animation will impact aesthetics in a positive or negative way. I am examining the main effect of animation on the dependent variables as well as the interaction effect of animation and shopping task on the dependent variables. Furthermore in this section are developed the hypotheses that are testing the proposed model, based on extant literature and findings from previous relevant research.

Chapter 4 contains the research methodology that I followed for this experimental research. In order to test the proposed research model, I conducted a 2 (Animation: Yes vs. No) x 2 (Shopping Task: Hedonic vs. Utilitarian) experiment and designed 4 e-commerce websites where I manipulated the level of animation (animated vs. static content) and the type of shopping task (utilitarian vs. hedonic). A total number of 127 volunteers took part in this experiment and their responses were collected using an online questionnaire. The variables were measured by adapting and adopting existing multi-item measures. They responded in their own environment, under no supervision. The experiment consisted of four complementary parts using four independent samples. Finally, in order to validate the experiment and test if I had effectively manipulated animation and shopping task, I included some manipulation check questions.

Next, in Chapter 5 the collected data are analyzed with SPSS and in Chapter 6 are discussed all the possible theoretical and managerial implications of the findings as well as the limitations of this research. A Factorial Analysis of Variance (ANOVA) was conducted to compare the main effects of animation and the interaction effects of animation and shopping task on the dependent variables (aesthetics, entertainment, satisfaction, loyalty, ease of use). Only the two (2) out of ten (10) hypotheses were supported, while the others were rejected.

Findings of this study revealed that animation can play an important role in aesthetics and most specifically, by applying moving animation it can enhance it. These findings confirm previous studies [8, 25, 27], where researchers had applied other types of

animation, on other devices and with different goals. But applying moving animation should be done carefully because this will immediately affect consumers' perceived aesthetics and therefore affect their purchase intentions.

The most important finding from this study is the positive relationship between animation with aesthetics and animation with entertainment. While increased aesthetic theoretically leads to increased consumers' perceptions this was not totally supported by this research. Perceived loyalty, ease of use and satisfaction were not positive with the animated web page, while it could have resulted to negative perceptions if the differences between the groups were statistically significant. The moderator effect of the shopping task did not affect consumers' responses overall but this study revealed potential interaction between animation and shopping behavior. However, the hypotheses related to this interaction effect were not supported, but new questions were raised from this study that could be tested in the future. I strongly recommend testing the same interaction effect on mobile devices where the challenges are increased compared to a computer, and also examine different types of animation. Current research has some limitations which have possibly affected the results of the experiment and need to take into consideration. In general, it is a study that did not succeed to reveal a significant interaction between animation and shopping behavior, but it raises some questions that should be examined in a future research.

2 Literature Review

In this section are analyzed existing researches and studies regarding some concepts of aesthetics, in general, and the aspect of animation, in particular. Additionally, it is analyzed the relationship between aesthetics, online shopping behavior and consumers' perceptions towards an e-commerce website. Finally, there is a short presentation on the importance of consumer's perceptions on user's purchase intentions.

2.1 Website Aesthetics

2.1.1 Concepts of Aesthetics

Aesthetics has its roots from the Greek word *aisthanomai*, which means "*perception by means of the senses*" (Routledge Encyclopedia of Philosophy) but for this research, the most appropriate meaning for aesthetics is "*an artistically beautiful or pleasing appearance*" (The American Heritage Dictionary of the English Language). The word "aesthetics" has taken many different meanings throughout the years according to the viewpoint each researcher had and its field of study [10]. In the ancient world, aesthetics and engineering were identical concepts and not until the early 20th century, aesthetics began to be considered as a powerful marketing tool. Aesthetics has been ignored even in Human Computer Interaction (HCI) books and guidelines, where functionality and usability were more important when designing a website. In a more relevant research, Li and Yeh [9] refer to the definition of design aesthetics as "*the balance, emotional appeal, or aesthetic of a website and it may be expressed through the elements of colors, shapes, language, music or animation*" (p.674).

However, recent studies proved that a beautiful and visually appealing website can affect user's preferences [10]. The words aesthetics and beauty are used interchanging in some papers, with some of them pointing some differences, while there is a difficulty to distinguish them and even examine them [5]. The purpose of this research is not to define aesthetics, therefore the words aesthetics, beauty and visual appeal are going to be used interchanging and will not examine their possible differences. Furthermore,

there are not many studies on aesthetics related with the web because reaction, which is related to perceived aesthetics, falls into two categories: rational and emotional [11]. Aesthetics and emotions are very complex concepts that many support are very difficult to study them [11] and even understand if aesthetics is a rational or emotional reaction [5]. It is also supported that emotional reactions can be caused before rational; right after the user is exposed to the incentive [5]. This is extremely crucial for the marketing sector in the digital world, where online users are constantly exposed to various stimulus and their decisions can be affected subconsciously before they conclude to a purchase decision with logical steps. Of course there is the ethical aspect that all marketers should consider when developing a web stimulus and try not to deceive and sway consumers without noticing. The concept of morality is beyond this research's purposes but I believe that when referring to people's reactions we should always consider first if our actions are ethical or not and not ignore it for the purposes of consumerism and profit.

From a philosophical approach there is a long-term debate about aesthetics on (1) whether an aesthetics perspective can be formed when the user has a certain purpose in mind while viewing an object, and (2) whether it should be viewed objectively or subjectively [3, 10]. The first disagreement in the literature is based on two extreme opinions. On the one hand, there are beliefs that if the object is functional and usable for the user's purpose then it is aesthetical appealing, and on the other hand there are advocates who support that the aesthetic perception is developed only when the user examines the object with the lack of any certain purpose in mind. This research is aligned with what Thomas J. Watson said: "*Design must reflect the practical and aesthetic in business but above all…good design must primarily serve people*". In today's world where consumers are extremely informed and always connected, I will also agree with Lavie and Tractinsky [10], that both opinions are incompatible and that "*products are judged on both their instrumental and aesthetic merits*" (p.272).

The second debate is something that we all have faced sometime in our lives: Is beauty objective or subjective? The objective view focuses on the object's characteristics that will please any user [8] while the subjective view finds a relationship between emotion, beauty and the development of personal feelings based on individual's experience [10]. Some theories support that an aesthetic attitude is formed based on both the stimulus and the object's attributes, and on the user's personality [10] concluding that there is an interaction between those theories [8] which makes the process of user's perceived aesthetics even more complex. Accordingly, this research will view aesthetics as

an interaction of website's properties and user's subjective experience that will affect his/her judgment regarding the website. Despite that each person has its own point of view, it is supported that people follow some *"general principles of 'styles' or 'trends' or 'fashions' in what they consider to be beautiful"* (p.87) [11].

From an empirical approach, the studies about aesthetics can be categorized to the *"experimental"* research and to the *"exploratory"* research [10]. Advocates of the *experimental approach* argue that in order to analyze aesthetics you have to manipulate specific elements and examine their outcome based on how users react. This approach has been highly criticized that "the whole picture" is going to affect users' aesthetics perception and not just isolated items [3, 10]. Therefore, website visitors develop their aesthetic judgment towards a website with a holistically approach and don't perceive the elements of a website as isolated items. In other studies was also found that when users had to judge a website it was mainly based on the overall website design [42, 43]. Nevertheless, extant researches have manipulated isolated items and did not pay attention to the whole aesthetics of a website [3]. The *exploratory research* is mainly used in environmental and architectural studies and is more concerned about users' emotion based on more complete and instinctive incentives [10]. In this experimental research I will manipulate elements on a website but the aesthetics will be measured as a whole on whether the website was aesthetic appealing overall.

2.1.2 The Influence of Utilitarian and Hedonic Online Shopping Value

As far as the e-commerce context, users are divided into two categories of online shopping behavior, based on their motivational orientation: *hedonic* (feel) and *utilitarian* (think) shopping behavior [3]. They either browsing just for pleasure or searching with a predefined purchase intention and their motivation orientation (hedonic or utilitarian) will affect their website preferences related to visual aesthetics [3].

Cai and Xu [2] examined the effect of website aesthetics on consumer shopping value. They separated consumer value into *product value* and *shopping value*. Then they further separated product value into *shopping process value* which is related to the utilitarian shopping behavior and *shopping enjoyment* which is related to the hedonic shopping behavior. It was found that those dimensions will be directly affected by website aesthetics and that are precursors of consumer satisfaction, trust, commitment and loyal-

ty which will be affected indirectly. This study will have a clear distinction between hedonic (e.g digital cameras, laptop computers) and utilitarian products (e.g. flowers, perfumes). According to the authors [2], products can be either hedonic or utilitarian; however, even the same product can be both hedonic and utilitarian based on the user's shopping motivation. For example, if you have to book one tourist package abroad for you and your boss to go for a business meeting and one package for you and your friend for holidays, these two different shopping tasks have different shopping motivation despite that the tourist package may be the exact same one. In their study [2] it was found that based on the shopping behavior the user will perceive the aesthetics differently. When users are searching for a hedonic product they look for a more enjoyable, funny and playfulness website [16], rather than when they search for a utilitarian product where they seek for a specific product in a pressure of time [3]. The purpose of this study is to examine the effect of animation, one of the aesthetics aspects, based on the moderator effect of shopping behavior which can be either utilitarian or hedonic.

Prior research [32] found that if the animation is applied on a website improperly this can lead to negative perceptions of the website's products, but if used properly leads to positively perceived attitudes towards website's products. Accordingly, it is obvious that a product perceived more positive will have more chances to be bought. They studied the effect of animation on utilitarian and hedonic perceptions, recall and attitude towards a product. They applied *moving animation* (involves objects moving) which is spreading widely throughout e-commerce websites [32] and task dissimilar animation (content type). They resulted that animated items improved recall for these specific items rather than when those were static. They also found that animation enhances both utilitarian and hedonic perceptions towards a product. A partially supported hypothesis $(0,05 < p < 0,1)$ of their research suggested that animation enhances user's attitude towards a product with hedonic dimension but this may not be applicable for products with utilitarian dimension. But it is a partially supported hypothesis and we did not take some clear answers on whether animation leads to more positive perceptions regarding the aesthetics of the website when the shopping task is hedonic rather than when is utilitarian.

They examined the effect of animation on product attitude while this research examines the effect of animation on consumers' perceptions based on shopping task (before the users have to assess website aesthetics, they will know their shopping motivation).

Concluding, this research will further examine and test the effect of moving animation on consumers' specific attitudes (satisfaction, ease of use, loyalty, entertainment) given two different shopping tasks, one with utilitarian dimension and one with hedonic dimension.

2.1.3 Dimensions of Website Aesthetics

Aesthetics has to do with the senses, but when you observe a website you don't use your taste, smell, touch. Although, if you visit a couple of websites you may notice that some of them use a song or a jingle in order to stimulate more of the users' senses. This research will analyze only the visual aesthetics that has to do with the sight. At this point, it is very important to note that visual aesthetics needs to "communicate" with website design for the final outcome [9]. However, in the e-commerce field, little research has been done on how aesthetics elements on e-commerce web pages affect consumer behavior [2] and there are not enough and appropriate tools for measuring aesthetics in the field of human-computer interaction [10].

Studies so far, have handled visual aesthetics either to be one-dimensional or multi-dimensional. Recent researches, however, indicate that visual aesthetics is multidimensional [8]. Nevertheless, in e-commerce literature, there isn't a consensus of aesthetics' dimensionality [2]. Furthermore, it is suggested, that multi-item scales are more suitable when measuring visual aesthetics than single-item measures because the later have important drawbacks such as they cannot seizure complexities and assume that visual aesthetics is a one-dimensional construct. Moreover, when multi-item scales are used, researchers follow ad-hoc developed scales or single scales for evaluating the aesthetics of the whole website. But those two approaches have not been validated which is crucial for scale development [8].

Using exploratory and confirmatory factor analysis Lavie and Tractinsky [10] tried to develop a valid measurement model by focusing on the subjective perceptions that the users had regarding the aesthetics qualities of websites and proposed some aesthetics measures. Their research concluded to two dimensions of perceived aesthetics, the "*classical aesthetics*" (which is highly related to usability) and the "*expressive aesthetics*". The expressive aesthetics enhances the hedonic shopping behavior and uses more rich content, such as graphics, animation etc. and affects their enjoyment while classical

aesthetics is linked with the utilitarian shopping behavior [2]. It is known that when users shopping with the utilitarian motivation they will focus more on the information they are looking for and try to satisfy their need [7, 12].

That two-dimension model is the most widely recognized model in the literature so far [2, 8]. They conducted 4 studies, started with a set of 44 items (with the help of experts of the field) and used various types of web sites. Users characterized as "aesthetic", "pleasant", "clean", "clear" and "symmetrical" the design of websites with "classical aesthetics" while the websites with "expressive aesthetics" were characterized as "creative", "original", "sophisticated", "use of special effects" and "fascinating". Both dimensions appeared to cause both emotional and rational responses [5]. In general, their work [10] concluded that web users will judge websites based on both classical and expressive principles. Online consumers want a website to be "clear", "symmetrical" etc., but they also appreciate and consider designer's creativity, when they purchase a hedonic or a utilitarian product [2]. Furthermore, a website has to be both classical and expressive aesthetical appealing because the same product for one buyer may be hedonic and for another buyer may be utilitarian [2]. Lavie and Tranctinsky [10] insisted that *classical* and *expressive* aesthetics are interacting but they are clearly distinguishable perspectives. This may be very important since we can understand that we all have some standards about a website (to have clear design, to be pleasant to our eyes, the elements to be symmetrical and properly ordered etc.) but we also need to see the designer's personal touch and creativity on the design, otherwise this may affect negatively our preference for the website. But from the designer's perspective, their work has been raised some thoughts because if a website receives low rate in "pleasant" it isn't clear for the designer what to improve [8].

Furthermore, Moshagen and Thielsch [8] conducted a series of 7 studies and identified 4 interrelated but discernible facets of perceived visual aesthetics, "simplicity", "diversity", "colors" and "craftsmanship" in their attempt to develop the Visual Aesthetics of Website Inventory (VisAWI). They concluded that web pages with simple layouts, diversity (number of different elements on a website [3]), modern technologies (not given the impression to be outdated) and proper selected, placed and combined colors can affect positive an aesthetics appraisal. If modern technologies, like animation, give the impression to web users that the website is synchronous and thus affect

positively their aesthetic appraisal, we can assume more specifically that animation can lead to enhanced perceived aesthetics (H1).

2.1.4 Concepts of Landing Page and First Impression

We have all heard that "*First Impression is usually the Last Impression*" and we can assume why this could be applied best for websites more than anything else. In a digital world, where the next e-shop or website is one click away, companies don't have all the time they would like in order to convince a user to buy from them or that they are trust-worthy. Beauty is considered as a "*value positive, intrinsic and objectified*" [8]. Being "*intrinsic*" indicates that an aesthetic attribute can be developed as soon as the user views the object without thinking of its utility first [8]. This is very important since we have already mentioned the long-term debate on whether aesthetics attitude is actually formed if the user has or not a purpose on his/her mind. Despite object's utility for a specific purpose, its perceived beautifulness will be developed immediately. Additional-ly, it is confirmed that aesthetics can be a powerful digital marketing tool, since it can affect consumers' preferences, before even start navigating the e-commerce website.

Little research has been on landing pages and how users feel about a company's page when asked to take an action as soon as they visit this page. But first we have to define what a landing page is.

Ash, Page and Ginty [40] gave the following definition:

> "*A landing page is any webpage on which an Internet visi-tor first arrives on their way to an important action that [a company] want them to take on [their] site. The landing page can be part of [their] main website, or a stand-alone page designed specifically to receive traffic from an online marketing campaign*" (p. 4).

According to that, the landing page is the "storefront" of a company's website and it could be one page where the users arrived for a specific purpose (e.g. to receive a dis-count, get informed for new products, download an app, etc.) or it could be the first step

of the path that a user has to follow on a website in order to complete a task (e.g. buy a product, download a software, subscribe, etc.). The authors [40] identified as critical factors for the efficiency of the site 1) the landing page and 2) the whole path of the site. Furthermore, the landing page will determine if the user will stay and continue exploring the site or will click the back button and leave the page. Separating the landing page of the whole website gives us the feeling that is a very important factor for the success of the e-commerce website.

Lindgaard et al. [5] made a pioneering experiment in order to examine how quickly a web user forms his/her opinion regarding a website's visual appeal. It was found that visual aesthetics can be assessed within 50ms and this judgment may affect other perceptions that the user forms about the site (e.g. usability, enjoyment, loyalty etc.), usually being affected at a later stage while browsing the website. Their results indicated that visual appeal was affected probably by design elements such as layout, color etc, but their experiment could not identify those specific elements with the method they used. Furthermore, authors stated that in the case of a positive first impression the users may later ignore drawbacks that otherwise would be important for them (results showed that their opinion was quick and consistent based on different time limits – from 50ms to 500ms). This also applies to the case that the users form a negative bad first impression and leave the page, while the subsequent experience could be flawless and useful. This is very crucial for e-commerce pages that do not pay attention to their landing pages which actually give web users the stimulus to form a positive or negative first impression that will affect their relationship with the website. Some of this research's questions include: *Can animation play a vital role on online users' aesthetic appraisal? Will this be different according to their motivational orientation? Are other user's attitudes will be affected if the web page uses moving animation?*

2.1.5 Aspects of Visual Aesthetics of Websites and Animation

The concept of aesthetics in user interface design has many aspects. Facets of interface aesthetics that affect user's preferences include *color, animations, balance, symmetry, harmony, complexity, variety, diversity, order, structure, grouping, images, icons, graphics, novelty, creativity, simplicity, clarity, text, fonts and links* [8]. By manipulating those attributes on a website, designers can affect user's emotions, percep-

tions and actions while browsing a website [3]. Moreover, interface aesthetics can catch user's attention and involve them deeply in a particular activity or task [2]. Accordingly, a positive aesthetic perception can lead a web user to complete a task online (e.g. buy a product, download software, subscribe to a newsletter etc.).

Several recent researches have concluded that interface aesthetics is a key determinant of customers' satisfaction, usability, usefulness, ease of use, enjoyment, pleasure, loyalty, intention to revisit [2, 8] and that there are indications that visual aesthetics can affect user's general impression of the system such as website's information, credibility and trustworthiness [8]. According to the previous, we conclude that a positive aesthetic perception of a website can lead to positively perceived satisfaction, entertainment, loyalty, ease of use etc. (H2, H3, H4, H5) and finally to an enhanced purchase intention. This is a critical point during the development of a website when the technical and the marketing team members have to cooperate, give great attention to aesthetics and produce a high appealing e-commerce website.

The goal of this research is to further explore how website aesthetics can affect customers' perceived ease of use, entertainment, loyalty and satisfaction by manipulating the aspect of animation on the visual design of the landing page. Web animation has been defined as "*motion of any kind on websites*", can have different size, speed, location, content design (task-similar/task-dissimilar) and color [31], and is used for many reasons (e.g. graphic enhancement, fun, improve learning etc.) despite that some researchers believe that it may annoy and distract users from their task [28]. When we say that an animated object is task similar this means that the animation is applied on a targeted interface element, while a task dissimilar animation is applied on a non-targeted interface element. This means that when a user searches for a specific type of laptop and this is animated then the animation is called task similar. If the animated object is the logo for instance then the animation is task dissimilar.

However animation has been used more often the last years due to high connecting speed capabilities and evolution of software tools [31] and due to intense online competition [28], while it is not clear its consequences on online shoppers' emotions and thus perceived aesthetics. Extant literature splits into two streams. On the one stream animation has been examined for its relationship with banner advertisement and on the other stream with non-banner advertisement web pages, while the first stream has been investigated in more depth [28]. The second stream has investigated animation effects on

performance, attention, recall, clicking behavior, errors [28, 31, 32], while it has not been investigated the direct effect of animation on perceived aesthetics. Hong, Thong and Tam [23] pointed out that the knowledge on banner-advertisement animation, where users learned to ignore them - known as "banner blindness" [29]- is not applicable in non-banner-advertisement content since there is no evidence for assuming something like that. In fact, some users characterized animated banner-ads as annoying and extended their time spend on a website searching for what they were looking [28]. But can we arbitrarily assume the same if the background image, the content or design elements of an e-commerce web page are animated? In this research, we will try to give more light on the effects of non-banner-ads animation on consumer's perceived aesthetics for e-commerce websites. Furthermore, we will try to address any possible effects of animation on consumer perceived entertainment, satisfaction, ease of use and loyalty as we have already pointed out their positive relationship with aesthetics and its importance on purchase intentions.

As we have discussed, most research about animation focus on online banner-advertisement while it has not been investigated the effect of web animation on e-commerce websites [28, 31]. Hong et al. [28] conducted an online shopping experiment on how animation affects user's clicking behavior, task performance and perceptions for both searching (specific product brand) and browsing (not a specific brand) tasks, examining only task-similar animation and using one type of animation (i.e. flashing). It was found out that the presence of animation on an e-commerce page grabbed user's attention and an animated web object had more possibilities to be clicked in their browsing shopping behavior. According to the authors, this applies most in the case where only one item is animated on the page, which will grab user's initial attention. But the presence of animation had a negative impact on user's task performance and perceptions. More specifically if a user is involved with a browsing shopping behavior the animation will cause a much bigger negative impact on task performance than when the user has a searching shopping behavior. But this comes in contrast with a more recent research where we further assumed that modern technologies (including animation) lead to positively perceived aesthetics and since positively perceived aesthetics lead to positively perceived perceptions [8].

Hong et al. [28] stated that this is explained by *Central Capacity Theory* (theory for divided attention), which explains that the presence of animation will capture a percent-

age of user's total attention (involuntarily) and thus will be more difficult to stay focused in their task. Contrary, selective attention is the focused attention on certain things [28]. Attention plays a critical role in animation. Especially in the e-commerce context, where users can be distracted very easily, the animation could be one way to grab user's attention. But what are the consequences? Will this lead to a positive or a negative perceived aesthetics? In general, when people are exposed to a stimulus, this will grab a fraction of their attention and the direction of the attention will affect their perception, memory and actions, while things that will not attract their attention will not be perceived [31]. This study will examine only the browsing task type, where users are browsing on a site for not a specific brand in mind [28]. According to the authors, this is the case when online buyers intend to purchase a product but haven't decided which specific brand to buy. And this is the situation where many factors can affect users' preferences toward a product including aesthetics since users are still in a searching mode where they have to examine all possible alternatives [28].

Another research suggests that elements such as the amount of text, animation, graphics, hypertext structure and navigation tools affect user's perceived website complexity and therefore other perceptions such as ease of use, website quality, satisfaction etc., but all studies disagree on whether complexity has a positive or negative effect on user experience [24]. According to that, we can understand that animation, as a key determinant of users' perceived complexity, can play an important role and may have a direct effect on user's perceived ease of use but it is not clear how different types or levels of animation can have a negative or positive impact. Rau, Gao and Liu [29] examined the effect of static and floating animation on banners, and they didn't notice any differences on performance time and animation recognition between those two types of animation. Web users, they concluded, are more used to identify and avoid animation (either static or floating) in order to complete their tasks. They also examined different levels and movements of animation and they found out that if the users perceive something as an advertisement or irrelevant to what they were looking for, then this will not grab their attention and process it. But what happens when the animated object is not an advertisement? And is an image of a product or its description? Moreover, according to their study, the different movements of the animation (moving down or up/down or randomly) were not perceived differently by the users when they had to recognize the animation. This led us to assume that all types of animation (flashing, slide-in, fade-out etc.) will be perceived as the same type of the users and have the same impact.

It was also found that visual complexity affects users' perceived aesthetics within 17ms [13]. This is an even shorter timeframe than the 50ms that aesthetics can be assessed, according to a previous study [5]. Thus, before web users judge a website on its aesthetic merits, they will first assess how complex it is, with important consequences on perceived aesthetics. Nadkarni and Gupta [24] had also found that online shopping behavior (utilitarian or hedonic) affect the relationship between perceived website complexity and satisfaction and more specifically, it was negative when users had utilitarian shopping behavior and inverted-U when had experiential (hedonic) shopping behavior. They also suggested exposing the users to different levels of complexity by determining their purpose according to their past experience with the website. Moreover, their results indicated that users with extended online experience perceived lower website complexity than those with little online experience.

Additionally, Hong et al. [28] proposed that a more familiar and experienced web user someone is, the less he/she will be distracted from animation especially when they searching for something specific and not just browsing. After 10 years of this research, we assume that the web user is now away more experienced with online activities. According to Internet World Stats, Internet users are 3,611,375,813 worldwide (900,4% growth from 2000) and according to Statista the time spent on the Internet every day is on average more than 6 hours (ages: 16-64, 4th quarter of 2014). However, there is confusion on researchers about the effects of animation on whether those are affected by general continuous exposure on animation or by exposure to a specific type of animation [28]. In conclusion, this research assumes that today's online users are familiar with online activities and have been exposed to some kind of animation.

2.2 Factors Affecting Consumers' Online Purchase Intentions

2.2.1 Concepts of Ease of Use

Perceived ease of use can be defined as "*the degree to which a person believes that using a particular system would be free of effort*" [39]. Their research suggests that perceived ease of use is one of the antecedents of online purchase intention. Moreover, their study resulted in a positive relationship between perceived ease of use and intention to purchase online. Ramayah and Ignatius [36] through their research concluded to

the same results. This means, that when an online potential buyer perceives a website as easy to use and effortless, then the possibilities to purchase are bigger than when the user finds an e-commerce website not easy to use.

Perceived ease of use can be affected by various things on a website and therefore affect consumers' behavior. Additionally, it was found a relationship between aesthetics and perceived ease of use [9] while we have already discussed (2.1.5) that animation can affect consumer' perceived ease of use [2, 8] but we do not know the effect of this relationship based on different levels of animation given different shopping motivations (utilitarian vs. hedonic).

It is known, however, that when web users are hedonic motivated, visual appeal of an e-commerce web page will increase consumer's perceived usefulness and ease of use [15]. So, according to the previous, we may assume that animation (that we have already assumed to increase aesthetics) may lead to enhanced perceived ease of use when the user is hedonic oriented rather than when he/she is utilitarian oriented (H6e).

2.2.2 Concepts of Loyalty

Loyalty, and more specifically e-loyalty, is defined as "*a customer's favorable attitude toward the e-retailer that results in repeat buying behavior*" (p.276) [44]. Loyalty can be one of the most crucial factors in determining the success of an e-commerce store. It is highly costly to always search for new customers, so it is valuable for e-retailers to keep existing ones coming back and purchase again from their e-shop. If the number of loyal customers increases by 5% this can lead to 70% increased profits [4]. There is a clear value for internet vendors to pay attention to the factors influencing loyalty.

The relationship between web aesthetics, loyalty and purchase intentions is still unclear [4]. Cyr, Head & Ivanov [16], proposed a model where perceived ease of use, usefulness and enjoyment would be affected by aesthetics and lead to loyalty. Their study was only for mobile devices and they treated enjoyment as a hedonic factor and usefulness as a utilitarian factor of their model. Their result revealed that design aesthetics can impact crucial antecedents of loyalty in mobile commerce. This research will further test how the animation will directly affect loyalty on web based stores.

Jones, Reynolds and Arnold [20] hypothesized that hedonic value has a stronger impact on loyalty than utilitarian value, but it was not fully supported. The thought behind that was that loyal customers would have an emotional experience from their shopping relationship with the vendor and that could lead them to an increased commitment and devotion. Therefore, this research also assumes that animation, aspect of aesthetics, will lead to enhanced perceived loyalty in hedonic shopping value than in utilitarian shopping value (H6d).

2.2.3 Concepts of Entertainment

Entertainment and enjoyment are two synonym words that someone feels when being amused by something. Perceived enjoyment is related to the perceived enjoyable shopping experience that a web user may feel when shopping online [36]. Authors [36] studied, among others, the impact of perceived enjoyment on purchase intentions and they revealed a positive relationship between them ($\beta=0.32$; $p<0.05$). So, it is quite clear that when an online shopper perceives a website as enjoyable and entertaining, the chances to complete an online purchase are highly increased.

While it is increasingly recognized that aesthetics can play a vital role in consumer perceptions, only a few researchers tried to examine how aesthetics can be perceived according to different shopping tasks [7, 12]. In their study, they examined aesthetics based on the two-dimensional model proposed by Lavie and Tractinsky [10]. Their research purpose was to examine how classical and expressive aesthetics could affect consumer's perceived usefulness, ease of use and enjoyment, with the moderating effect of utilitarian and hedonic shopping task. They stated that hedonic shopping task will affect in a more intense way enjoyment, than when users searching in a utilitarian mode. Since the hedonic task is influenced more by the expressive aesthetics (that makes use of more graphics and modern technologies), we therefore can assume that animation will lead to more positive perceived enjoyment (entertainment) when the task is hedonic oriented than when it is utilitarian (H6b). Browsing just for pleasure on the Internet is the analog to "window shopping" in the physical stores, and is highly related to consumers' enjoyment [36].

2.2.4 Concepts of Satisfaction

Satisfaction is *"the summary psychological state resulting when the emotion sur-rounding disconfirmed expectations is coupled with a consumer's prior feelings about the consumer experience"* (p.125) [35]. From this definition, we can first identify the relationship between satisfaction and emotions and therefore aesthetics, as we have already declared the strong interaction between them. Second, we can assume that satisfaction is affected by the user's expectations from an e-commerce store. Recent researches have proven that aesthetics is a decisive factor of consumer attitudes, including satisfaction [2, 8].

Wang, Hernandez and Minor [15] in their study examined the effect of aesthetic formality and appeal on consumer perceived online service quality and satisfaction given two different shopping tasks (task-oriented and task-free). Task-oriented in their study refers to the utilitarian shopping behavior while task-free to the hedonic. It was found that aesthetic appeal has a significant effect on satisfaction and more important this is negative for task-oriented shopping behaviors. In a more general context, they proposed that when the user is hedonic oriented, aesthetics will be the key determinant of increasing consumers' emotions and perceptions. And they strongly declared that enhanced aesthetic appeal may lead, thought, to negative perceptions if it doesn't provide any hint for helping users complete their tasks. This is also confirmed in their second study [4] related to purchase intentions.

Furthermore, as we have already discussed Nadkarni and Gupta [24] found out that online shopping behavior (utilitarian or hedonic) can affect the relationship between perceived website complexity and satisfaction. Since animation is one of the antecedents of visual complexity we can further assume a relationship between animation and perceived satisfaction. Their results indicated that perceived satisfaction was negative for increased visual complexity when users had utilitarian shopping behavior and inverted-U when had experiential (hedonic) shopping behavior. Related to this research's purposes, we can assume according to the previous, that animation will lead to enhanced perceive satisfaction when the user is browsing just for pleasure rather than when searching online with a predefined shopping intention (H6c).

2.3 Consumer Purchase Intentions

This research does not focus on whether online visitors of a website will make a purchase online. It examines the procedure before that step, whether the online buyer finds appealing enough the website from the first impression of the landing page so that in the end will purchase online, affected by consumer's preferences. Karvonen [11] revealed that "*beauty may be the decisive factor when wondering whether or not to trust a service enough to conduct business online*" (p.87). This applies to all activities with a business purpose that are placed online. A beautiful interface has the "power" to make a user leave personal information on a web page while registering to a newsletter, to give his/her credit card number when buys a product or service, to pay his/ her bills using electronic accounts, to download a software to his/her computer etc. The success of e-commerce may be based on that. So, it is obvious the strong relationship between aesthetics and purchase intentions and how important it is to design carefully a website.

Kim and Lennon [41] examined the relationship between external (merchant's online reputation) and internal factors (design, fulfillment, customer service, security) of a website that can affect consumer's perceived risk and emotion (directly connected with aesthetics), and how these can affect their purchase intentions. An important implication was that if a website could provoke positive emotions to customers, this would lead to a reduced perceived risk and encourage customers to make a purchase. Emotional reactions can be evoked by different environment incentives, including aesthetics. Chang and Chen [33] stated that consumers are searching for clues and signs from the digital environment that will convince them that they will not lose anything from a specific online transaction.

However, this research will not examine the relationship between loyalty, satisfaction, entertainment, ease of use and purchase intentions but only the impact of animation on user's attitude towards a website. The results will not be restricted to the purchase action but can be applied to other activities that the user is able to do. The thought behind this is that according to each e-shop's purpose, at any given time, the user will be asked to do something different. For example, if the e-commerce page wants to increase its email list, online vendor's desire will be probably that the users will click the "Subscribe" button or if they want to introduce a new product line they may want the users to click the "Learn more" button.

3 Research model and hypotheses

In this section, I will describe the research model used in this study and also develop the hypotheses that are going to be tested.

3.1 Research model

In this research, I hypothesized that animation, one of the aspects of website aesthetics, will have a significant effect on consumer attitudes and more specifically on entertainment, satisfaction, ease of use and loyalty. Furthermore, this effect (animated vs. static website) is being moderated by the shopping task (utilitarian vs. hedonic). A proposed research model, based on Cai, Xu and Yu [7, 12] model, is depicted below in Figure 1 below:

Figure 1 - Proposed Research Model
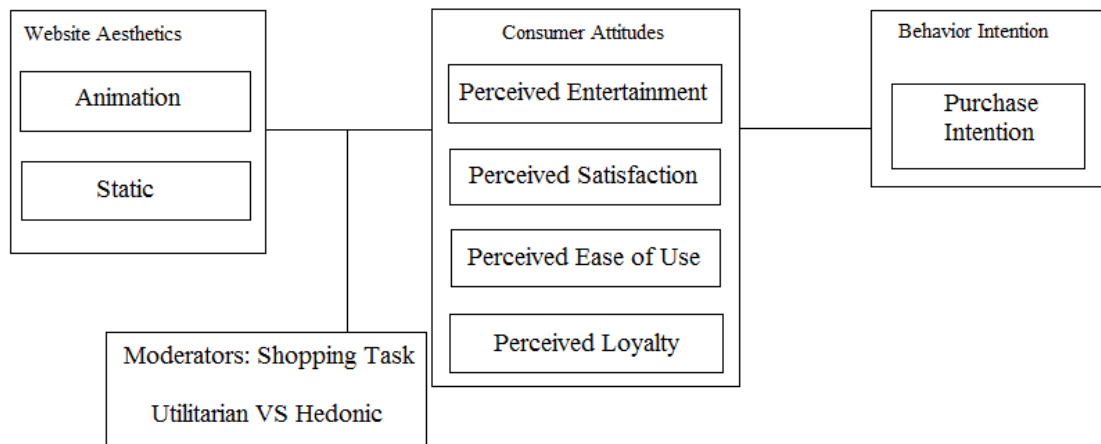
We have already discussed that it is proven in the literature that consumer attitudes towards a website can directly affect purchase intentions positively so we will not

examine it further in this study. Animation and shopping task are the independent variables while perceived aesthetics, entertainment, satisfaction, ease of use and loyalty are the dependent variables. I will examine the main effect of animation on the dependent variables as well as the interaction effect of animation and shopping task on the dependent variables.

3.2 Hypotheses Development

Since the effect of animation on website aesthetics and user's perceptions, moderated by the shopping behavior, has not been investigated so far, there was the need to approach this interaction in general, including other influential factors as well. Aesthetics has a great power on affecting users' attitudes and preferences and this requires of being even more careful in the marketing and product design steps [25]. They conducted an experiment to examine how different interaction styles can affect user's perceived aesthetics. They examined a metaphor-based (applied animation on human figures) versus a menu-based website. The website was not related to e-commerce but was providing historical information. The one website was static while the other had animated images and figures, while both of them were judged for their usability, recall, interface aesthetics (classical vs. expressive) and engagement. The animated website had better ratings on the expressive aesthetics rather than in classical aesthetics and was perceived as more engaging, but it had worse ratings on usability.

They concluded that the effect of animation on interface aesthetics is moderated by the aesthetics' dimensions (classical vs. expressive). Since classical aesthetics is linked with utilitarian motivation and expressive aesthetics is linked with hedonic motivation [2], we will further assume that animation will lead to increased perceive aesthetics in hedonic shopping motivation rather than utilitarian. However, their study did not consider the shopping behavior and the overall preference for both websites was equal after all. Moreover, there could not be a purchase intention because the website was only for informative reasons, thus the users could not be assigned with a shopping task. Their sample consisted of 23 males and 5 females. But regarding animation, even gender differences can result in different perceptions of aesthetics, loyalty, trust and satisfaction. with females preferring less the websites with the extensive use of animation while males preferring them more [26].

Huhtala, Sarjanoja, Mäntyjärvi, Isomursu & Häkkilä [27] in their study examined the effect of animation on mobile screens. Mobiles have more challenges comparing to PCs, due to technological restrictions and speed capabilities. They supported that animation can make mobile applications user interface more pleasing and enhance usability. They applied fade in, fade out and zoom in animation, with different speeds on their experiment. There was found that there is a complex relationship between aesthetics and usability but both of them can be perceived more positive with the use of animation. This research's results are in strong contrast to the previous where animation did not enhance usability.

There is clearly a disagreement on the extant literature and needs of further research. Thus, our first 5 hypotheses will be to test the effect of animation on aesthetics, entertainment, loyalty, satisfaction and ease of use. Based on the second (most recent) research we assume a positive effect on aesthetics when the website is animated rather than when it is static (H1). And since aesthetics is a key determinant of the other attitudes we have mentioned with a positive relationship, we therefore assume that an animated website will have a more positive effect on them rather when it is static. We therefore propose the following hypotheses:

H1: *Websites with animated content have a more positive effect on consumer perceived aesthetics than websites with static content.*

H2: *Websites with animated content have a more positive effect on consumer's perceived entertainment than websites with static content.*

H3: *Websites with animated content have a more positive effect on consumer's perceived satisfaction than websites with static content.*

H4: *Websites with animated content have a more positive effect on consumer's perceived loyalty than websites with static content.*

H5: *Websites with animated content have a more positive effect on consumer's perceived ease of use than websites with static content*

Utilitarian/ Hedonic Perceptions

According to Lai, Kuan, Hui and Liu [32], animation enhances user's attitude towards a product with hedonic dimension but they declared that this hypothesis may not be applicable for products with utilitarian dimension. Contrary, we will further test if animation enhances users' attitude towards a website (aesthetics, entertainment, loyalty, satisfaction, ease of use) when they are subjected to hedonic shopping tasks rather than when they are involved with utilitarian related tasks. Moreover, according to the analysis in 2.2.1-2.2.4 we developed H6a, H6b, H6c, H6d and H6e hypotheses:

H6a: *Websites with animated content will lead to more positive perceived aesthetics for hedonic products and less positive for utilitarian products*

H6b: *Websites with animated content will lead to more positive perceived entertainment for hedonic products and less positive for utilitarian products*

H6c: *Websites with animated content will lead to more positive perceived satisfaction for hedonic products and less positive for utilitarian products*

H6d: *Websites with animated content will lead to more positive perceived loyalty for hedonic products and less positive for utilitarian products*

H6e: *Websites with animated content will lead to more positive perceived ease of use for hedonic products and less positive for utilitarian products*

4 Research methodology

In order to test the proposed research model, I conducted a 2 (Animation: Yes vs. No) x 2 (Shopping Task: Hedonic vs. Utilitarian) experiment in this experimental research. I designed 4 e-commerce websites where I manipulated the level of animation (animated vs. static content) and the type of shopping task (utilitarian vs. hedonic) and then measured subjects' responses.

4.1 Participants

I used an online questionnaire (surveymonkey.com) to measure consumer responses using multi-item scales. The measurement items were developed by adopting and adapting existing validated items with slight changes where necessary. To measure entertainment I adopted Hausman and Siekpe [38] scale. For consumer satisfaction, I adopted the measurement scale from Cyr [37]. I adapted the scale of Corritore et al. [42], Cyr et al. [16] and Wang et al. [15] for measuring consumers' perceived ease of use. The items of loyalty were adopted from Cyr et al. [16] and Cyr [37]. Finally, for measuring design aesthetics I adopted Cyr et al. [16] and Li and Yeh [9] measurement scale. Each item was measured on a five-point Likert scale from (1) Strongly Disagree to (5) Strongly Agree. At the end of the questionnaire, the participants were asked some demographic questions. In Appendix A are all the measurement items used in this survey.

A total number of 127 participants from different backgrounds took part in this experiment. The volunteers from the pilot study did not take part in the main experiment. The participants were randomly divided into 4 groups, as seen in Table 1 below: 30 participants asked to complete the shopping task with the utilitarian dimension and browse the animated website, 33 participants asked to complete the shopping task with the utilitarian dimension and browse the static website, 33 participants asked to complete the shopping task with the hedonic dimension and browse the animated website and 31 participants asked to complete the shopping task with the hedonic dimension and browse the static website.

Table 1 - Participants' assignment

Shopping Task	Animation	
	Yes	*No*
Utilitarian	30	33
Hedonic	33	31

As far as their demographics, 57 (44,9%) were males and 70 (55,1%) were females. People aged between 25-34 were almost half of the total sample (55,1%). Regarding the educational background, 45,7% have a bachelor's degree and 37,8% hold a masters degree. Most of them have been using the Internet for many years with 23,6% of them using it approximately 9-10 years so far. 59,8% of the respondents are utilizing Internet 1-5 hours every day without including time spent while working or checking their emails. Regarding their frequency on purchasing products/ services online, 27,6% are buying once a month, 26% 2-3 times a year and 20,5% 2-3 times a month. Table 2 below gives demographic information regarding the sample.

Table 2 - Demographic information about the respondents

Measure	Items	Frequency	Percentage
Gender	Male	57	44,9
	Female	70	55,1
Age	18-24	36	28,3
	25-34	70	55,1
	35-44	17	13,4
	45-54	2	1,6
	55-64	1	0,8
	65-74	1	0,8
Highest level of education	Completed some high school	2	1,6
	High school graduate	18	14,2
	Bachelors degree		45,7

	Masters degree	58	37,8
	PhD degree	48	0,8
		1	
Internet experience in years	5-6	8	6,3
	7-8	14	11
	9-10	30	23,6
	11-12	19	15
	13-14	22	17,3
	15-16	17	13,4
	17-18	9	7,1
	19-20	5	3,9
	21-22	1	0,8
	23-24	1	0,8
	>24	1	0,8
Time spend online per day	None	1	0,8
	1-5	76	59,8
	6-10	37	29,1
	11-15	12	9,4
	>16	1	0,8
Frequency of online purchases	Everyday	1	0,8
	2-3 a week	6	4,7
	Once a week	10	7,9
	2-3 a month	26	20,5
	Once a month	35	27,6
	2-3 a year	33	26
	Once a year	3	2,4
	Almost never	12	9,4
	Never	1	0,8
(N=127)			

4.2 Experimental sites

The experiment was first pilot tested with a convenient sample to ensure that the selected product, shopping tasks and type of animation were appropriate and furthermore to eliminate potential problems. Four volunteers, with different background and online shopping experience, agreed to participate in the pre-test. They read both descriptions of the tasks and were requested to categorize them based on the hedonic and utilitarian dimension. The items used for measuring hedonic (fun, exciting, delightful, thrilling and enjoyable) and utilitarian (necessary, effective, helpful, functional and practical) values were adopted from Lai et al. [32] and answered in a 5-items Likert scale.

I carefully selected the type of product to be bought and the color's combination. The product that was selected was the same for all the websites, a mobile phone. According to GRECA (Greek e-Commerce Association), 47% of Greek online shoppers had purchased mobile devices through the Internet in 2015, so I chose that product in order to find a quite big sample. The product (mobile device) was familiar to them and they didn't like or dislike the website design, based on the colors, layout, text etc., so it was neutral overall. Finally, they were asked to reply with "Yes", "No" or "Not Sure" to the question whether they had noticed any moving animation on the website. Based on their responses I finalized the design of the website and the process of the experiment.

Then, I developed 4 e-commerce websites for the purpose of this experiment. For the designing of the websites, I used a cloud-based web development platform in order to create HTML5 websites (Wix.com). Regarding the aesthetics, I tried to present a neutral website in order to give emphasis on the effect of animation. I also, wanted the respondent to have been exposed to this kind of online transaction and be familiar with it, so I used the color combination of Skroutz.gr, which according to Alexa has a country rank of 8. The product layout was similar to Plaisio.gr, another site with high traffic in Greece (#88 country rank), according to Alexa.

A two-way factorial design was used and the 4 web pages were exactly the same with the only difference that the 2 of them had some animated items. I applied one-time animation with 3 seconds duration and the animation type was slide-in (from left to right) for all the elements that I chose to animate (both task-similar and task-dissimilar). The one-time animation was found to be equal to constant animation and there wasn't

any difference in users' responses given these two types of animation [30]. I therefore studied only the type of moving animation that appears immediately as you land on the web page and while scrolling down. Figure 2, Figure 3 and Figure 4 depict screenshots of the websites that were developed for this experiment.
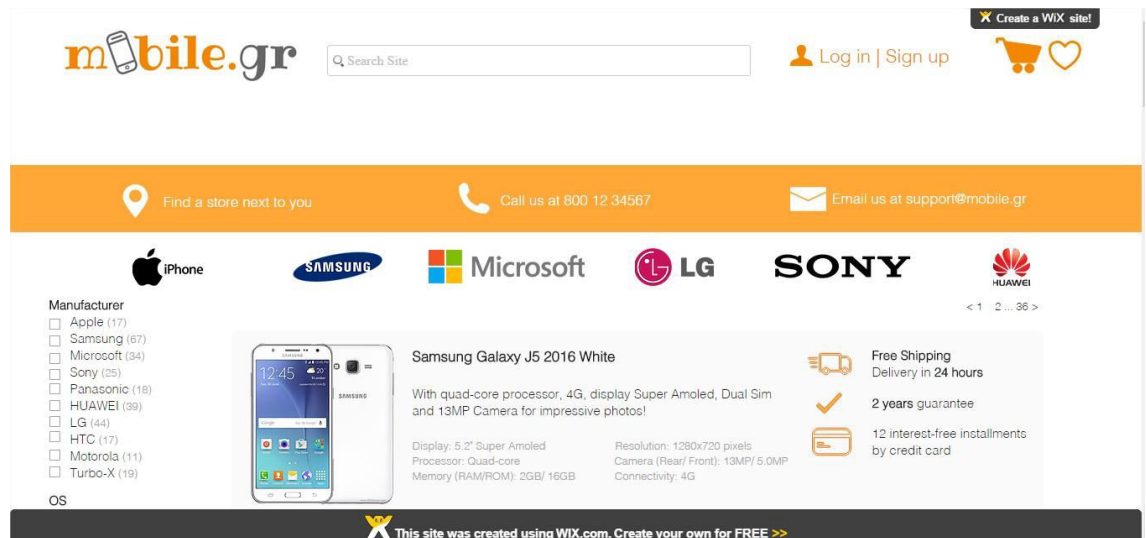

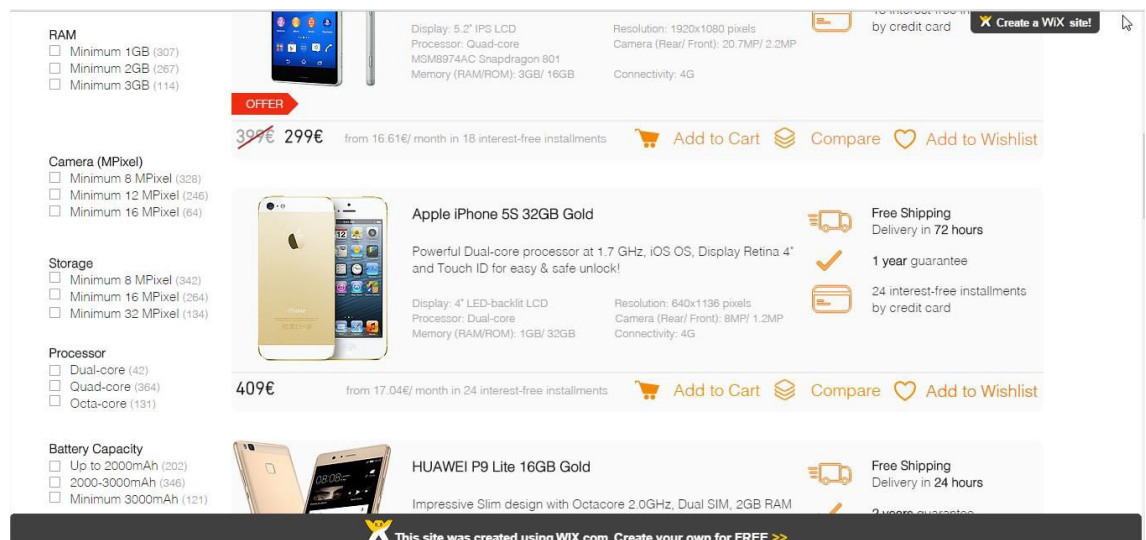Figure 2 - Web page screenshot above the fold

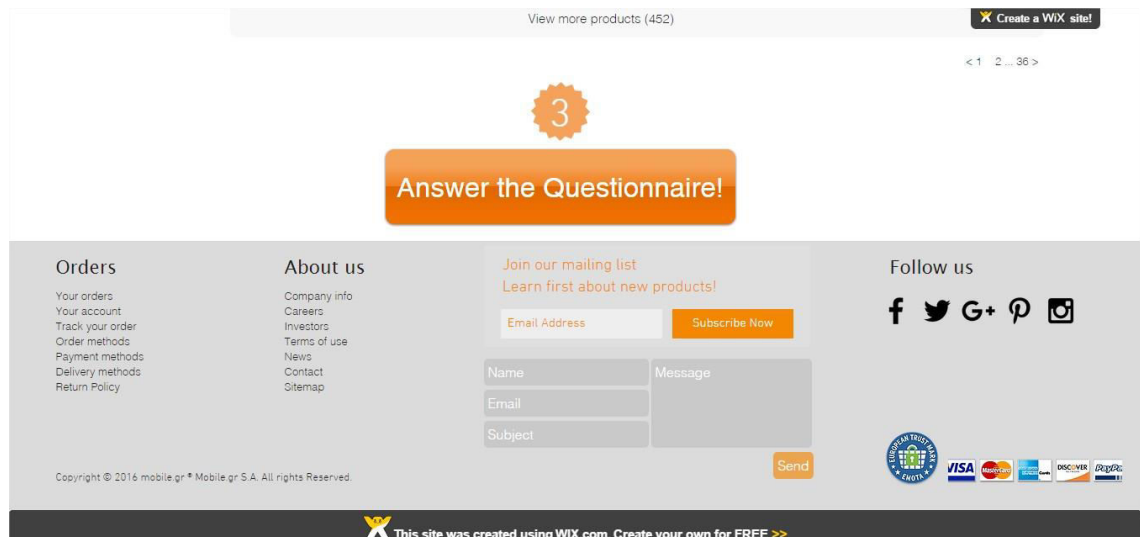Figure 3 - Web page screenshot while scrolling down

Figure 4 - Web page screenshot footer

4.3 Experimental tasks

When the full experiment began, the participants responded in their own environment, under no supervision. In contrast with prior research where all experiments took place in laboratories, this study was conducted in a free environment and more specifically in participants' personal space. They have been previously asked to view the website from their desktop and not their mobile device since the website building platform did not support animation over mobile websites. Thus, the purpose of this experiment was to investigate only the web based stores.

In Appendix B, are screenshots of the web page that the respondents saw upon agreed to participate in the experiment. They had to (1) read the instructions before proceeding to the browsing of the website (2) view the website and (3) answer the questionnaire.

The experiment consisted of four complementary parts using four independent samples. In the two parts of the study, once the participants were ready to begin, they read the following, which was the assigned shopping task, related to the utilitarian dimension of the product (necessary, effective, helpful, functional and practical):

"Imagine that your business mobile phone has just broken down, and you have to buy as soon as possible a new one in order to answer back to your clients' calls and messages. After a quick search on the Internet from your desktop, you click to browse the mobile phones of the e-shop: mobile.gr"

In the other two parts of the study, the participants read the following, which was the assigned shopping task related to the hedonic dimension of the product (fun, exciting, delightful, thrilling and enjoyable):

"Imagine that you have plenty of time to search for a new mobile phone. You are thinking of changing your old device with a new one, from where you will be able to see HD videos on YouTube and text with your friend through various social media. After a search on the Internet from your desktop, you click to browse the mobile phones of the e-shop: mobile.gr"

They then proceeded to the browsing of the e-commerce web pages and then continued with the completion of the questionnaire. The whole process was on average a 5 minutes procedure since the website was not functional and the users could not continue browsing other web pages. As we have already mentioned, aesthetics can be assessed in the first 50ms, and the purpose of this study is to examine how this can affect users' preferences without having to browse the whole e-shop in order to judge the online vendor.

In order to validate the experiment and test if I had effectively manipulated animation and shopping task, I included some manipulation check questions. To test if I had manipulated animation correctly I asked if they noticed any moving animation ("Yes", "No", "Not sure" were the answer options) and to test if they perceived the shopping task correctly I asked whether the task was relevant to something critical for their job (utilitarian dimension) or it was for personal enjoyment (hedonic dimension).

5 Data analysis and results

The data analysis was carried out using SPSS 23.0. A factorial analysis of variance (ANOVA) was conducted to compare the main effects of animation and the interaction effects of animation and shopping task on the dependent variables (aesthetics, entertainment, satisfaction, loyalty, ease of use). Animation included two levels (animated and static website) and the shopping task had two levels too (utilitarian and hedonic).

First, I used a one-way analysis of variance (ANOVA) to examine the main effect of animation on each of the dependent variables and determine if there were statistically significant differences between the means of the independent groups and tested each hypothesis. In Table 3 below, are reported the descriptive statistics for all the hypotheses tested.

Table 3 - Descriptive Statistics

Variables	Static Website[a]		Animated Website[b]		F	p
	M	SD	M	SD		
Aesthetics	14,5469	3,21173	15,8571	2,474716	6,617	0,011**
Entertainment	10,2813	2,46544	11,3968	1,88833	8,177	0,005***
Loyalty	11,4219	2,25237	11,2222	2,03553	0,274	0,601
Satisfaction	11,0781	2,29080	10,8730	1,95508	0,294	0,589
Ease of Use	17,4531	2,30892	17,0794	2,39153	0,803	0,372

[a]n= 64. [b]n=63. *p<0,1. **p<0,05. ***p<0,01

Testing Hypothesis H1 (Aesthetics)

The intention in Hypothesis H1 was to test whether animation implemented on websites has a positive effect on consumer perceived aesthetics – dependent variable- , rather than when the website is static and does not have animated objects. The one-way ANOVA revealed significant difference [$F_{(1,125)}$=6,617; p=0,011<0,05] in perceived aesthetics when the website had animated content (M=15,8571; SD= 2,474716)

and when it doesn't (M=14,5469; SD= 3,21173). Hence, hypothesis H1 is supported. So we can state that the aspect of animation can play a great role in consumers' perceived aesthetics and therefore affect their purchase intentions. In Figure 5 below are illustrated the mean differences for aesthetics, where clearly the animated website was better scored than the static website.
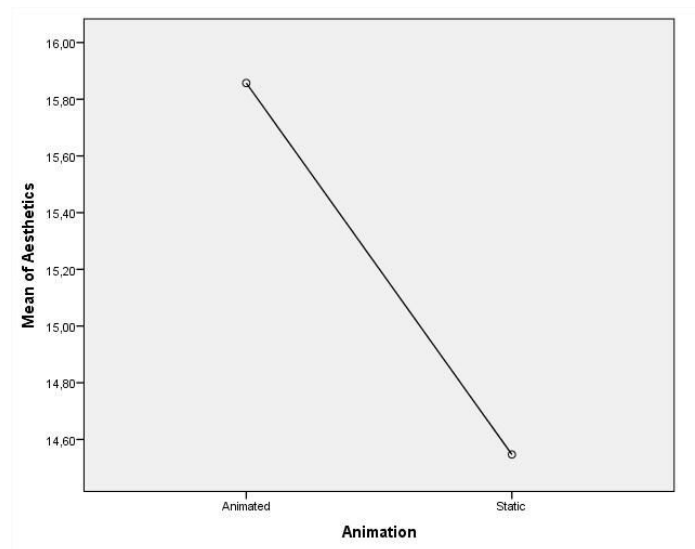

Figure 5 - Means Plot – Aesthetics

Testing Hypothesis H2 (Entertainment)

As predicted, respondents evaluations on perceived entertainment were significantly higher [$F_{(1,125)}$=8,177; p=0,005<0,05] in the group with the animated content (M=11,3968, SD=1,88833) that in the group with the static (M=10,2813, SD= 2,46544). Hypothesis H2 is supported and we conclude that animation can play a vital role on user's perceived entertainment regarding an e-commerce site and therefore affect his/her purchase intentions. Below, in Figure 6 below, we can see the mean plots for entertainment.
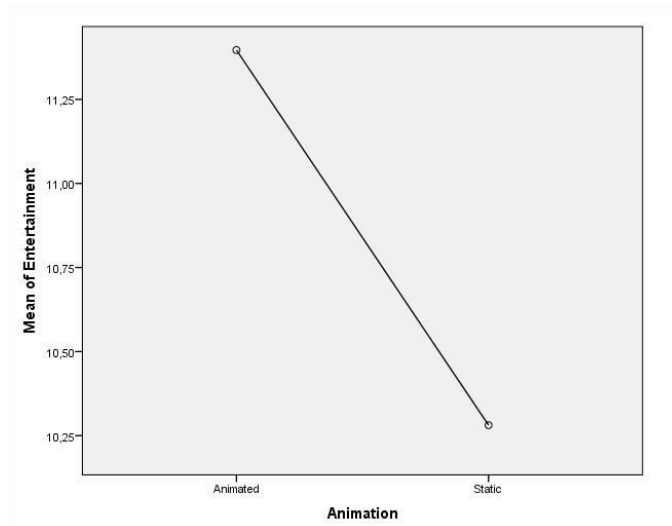
Figure 6 - Means Plot – Entertainment

Testing Hypothesis H3 (Satisfaction)

Respondent's evaluations regarding satisfaction did not reveal any significant differences [$F_{(1,125)}$=0,294; p=0,589>0,05] between the sample groups that were subjected to the static (M=11,0781, SD= 2,29080) and animated website (M=10,8730, SD= 1,95508). Thus, we don't have enough evidence to support our initial thoughts that animation can affect users' perceived satisfaction for an e-commerce site, and more specifically to enhance it when users browse an animated website. Moreover, as we can see in Figure 7 below, perceived satisfaction had better scores with the static content.
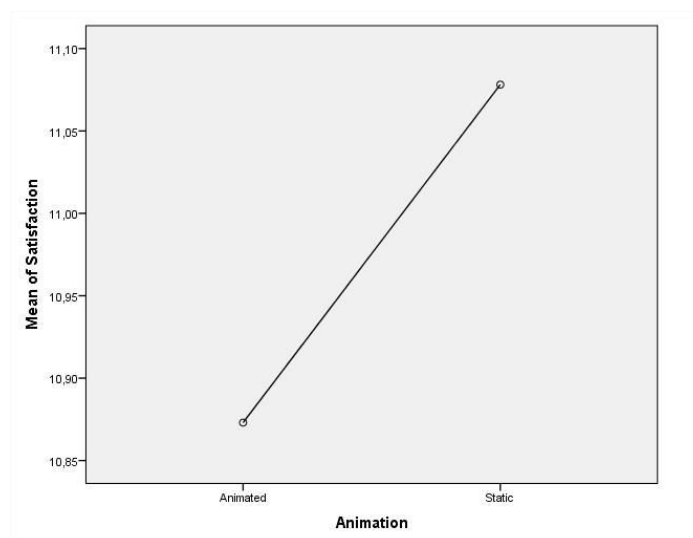

Figure 7 - Means Plot – Satisfaction

Testing Hypothesis H4 (Loyalty)

Testing this hypothesis, regarding consumers' perceived loyalty based on the two levels of animation, we did not find any significant differences [$F_{(1,125)}$=0,274; p=0,601>0,05]. We cannot further argue that animation can affect users' perceived loyalty in a way that this will affect their purchase intentions. In fact, results are opposite to what we have assumed and loyalty would have a more positive effect with static content (M=11,4219, SD= 2,25237) rather that with animated content (M=11,2222, SD= 2,03553) if there were significant differences to support this. Figure 8 below depicts the means for perceived loyalty.
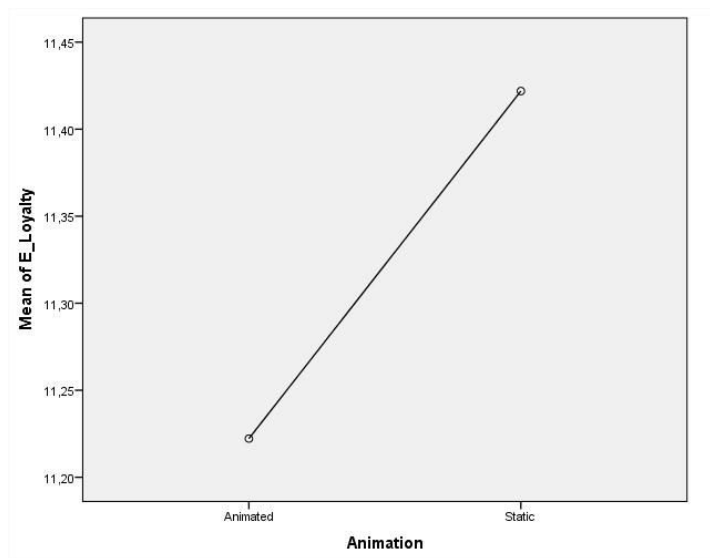

Figure 8 - Means Plot – Loyalty

Testing Hypothesis H5 (Ease of Use)

Regarding perceived ease of use, hypothesis H5 was rejected too, since there were not significant differences [$F_{(1,125)}$=0,803; p=0,372>0,05] between the two sample groups; the one that browse the static web page (M=17,4531, SD= 2,30892) and the one that browse the animated web page (M= 17,0794, SD= 2,39153) . Despite our predictions, that animation can enhance users' perceived ease of use, results revealed the opposite, as shown and in Figure 9 below.
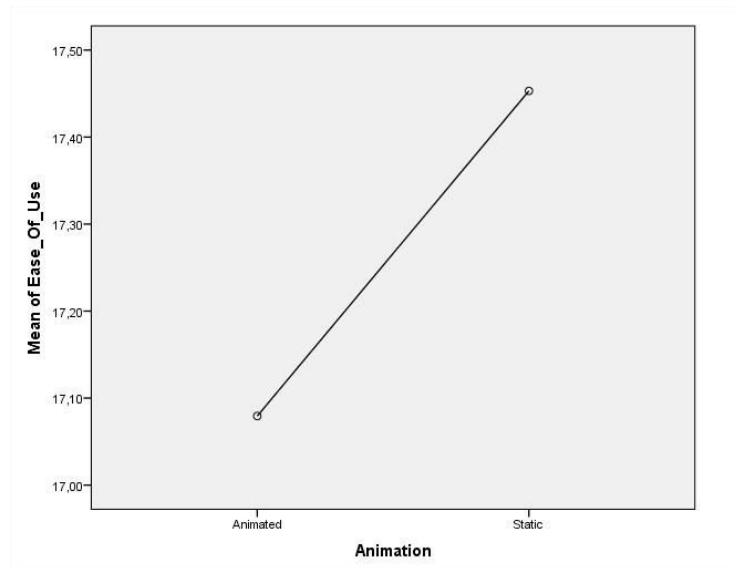
Figure 9 - Means Plot – Ease Of Use

Testing Hypotheses H6 (H6a-H6e)

Finally, I checked the interaction effects between animation and shopping tasks on each of the dependent variables. Results are reported on Table 4 below.

Table 4 - Descriptive Statistics

Dependent Variables	Independent Variables	F	p
Aesthetics	Animation	6,415	0,013*
	Shopping Task	3,195	0,076*
	Animation*Shopping Task	1,140	0,288
Entertainment	Animation	7,963	0,006***
	Shopping Task	4,569	0,035*
	Animation*Shopping Task	0,992	0,321
Loyalty	Animation	0,354	0,553
	Shopping Task	2,929	0,090*

	Animation*Shopping Task	0,059	0,809
Satisfaction	Animation	0,313	0,577
	Shopping Task	0,409	0,524
	Animation*Shopping Task	0,369	0,545
Ease of Use	Animation	0,891	0,347
	Shopping Task	1,186	0,278
	Animation*Shopping Task	0,635	0,427

*p<0,1. **p<0,05. ***p<0,01

For aesthetics, the interaction effect ($F_{(1,123)}$= 1,140; p=0,288>0,05) was insignificant, thus H6a is rejected. This means that the interaction effect of animation and shopping task was not significant so that the respondents would have perceived aesthetics differently for each scenario. However, it is partially supported ($F_{(1,123)}$= 3,195; p=0,076<0,1) that perceived aesthetics is developed according to the shopping task if it is utilitarian or hedonic oriented. Which is something that has been argued a lot in the literature and our findings are aligned with Cai and Xu [2] and Deng and Poole [3], that based on the shopping behavior the online shoppers will perceive aesthetics differently. In Figure 10 below we can see the means plot for the interaction effect, where I noticed an exponential interaction because one line is steeper than the other despite the fact that both are in the same direction.
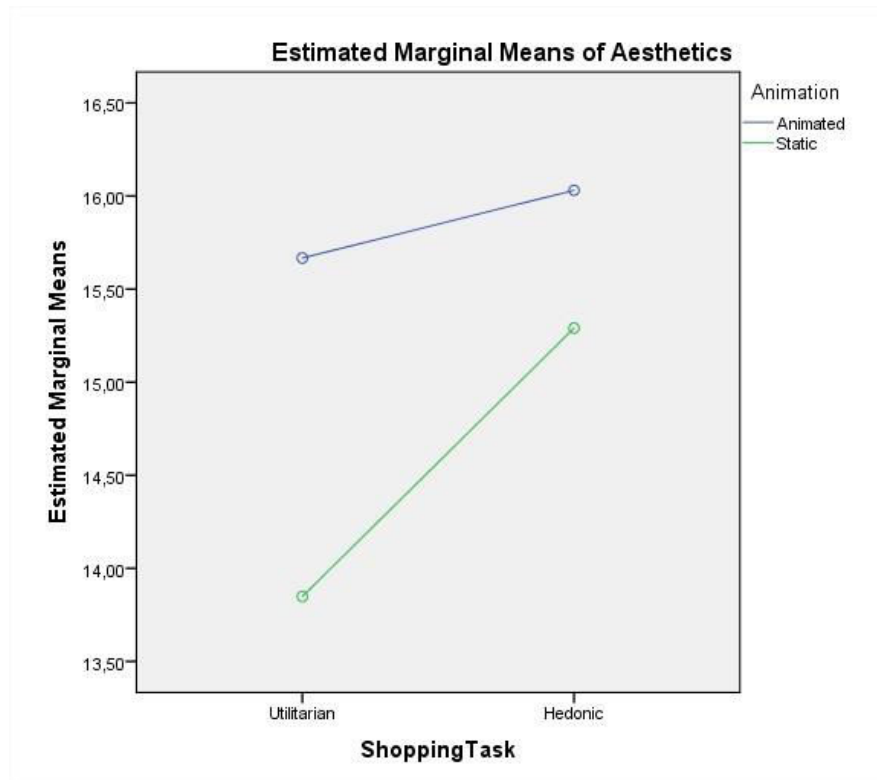
Figure 10 - Means Plot – Interaction effect – Aesthetics

The interaction effect between animation and shopping task for entertainment ($F_{(1,123)}$= 0,992; p=0,321>0,05), was also insignificant and H6b was rejected too. But we concluded that entertainment can be perceived differently depending on the shopping motivation ($F_{(1,123)}$= 4,569; p=0,035<0,05). This is something confirmed by the literature too [7, 12], wherein hedonic motivation users are more likely to assess a website more positive in its perceived entertainment rather than when they are shopping utilitarian oriented. Figure 11 below depicts the interaction effect on entertainment.
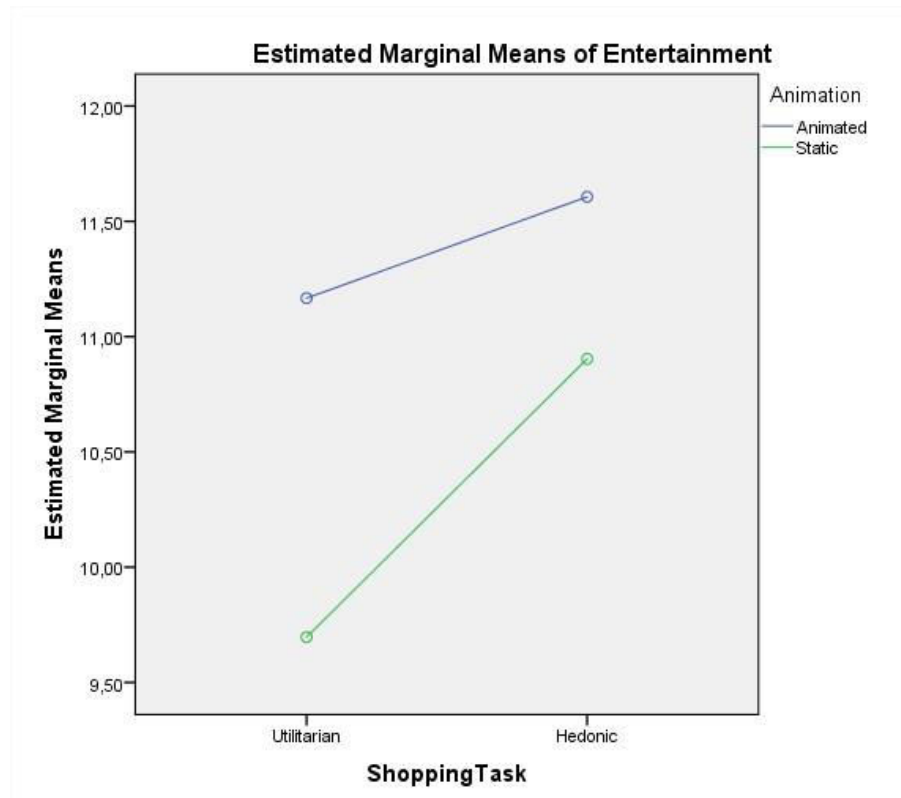
Figure 11 - Means Plot – Interaction effect – Entertainment

Furthermore, the interaction effect for loyalty ($F_{(1,123)}$= 0,059; p=0,809>0,05) was insignificant and H6c was rejected. So, from this experiment, we could not further state for example that if subjects interact with an animated website with hedonic motivation will have a more positive perceived loyalty than with a sample subjected in a static site with utilitarian motivation. Overby and Lee [22], revealed that satisfaction is the key determinant of loyalty. Again, I can assume that this strong relationship had a big impact on loyalty. We can also see in Figure 12 below that the shopping tasks had almost the same results in both static and animated web pages, and that static content had a more positive effect overall for both shopping tasks.
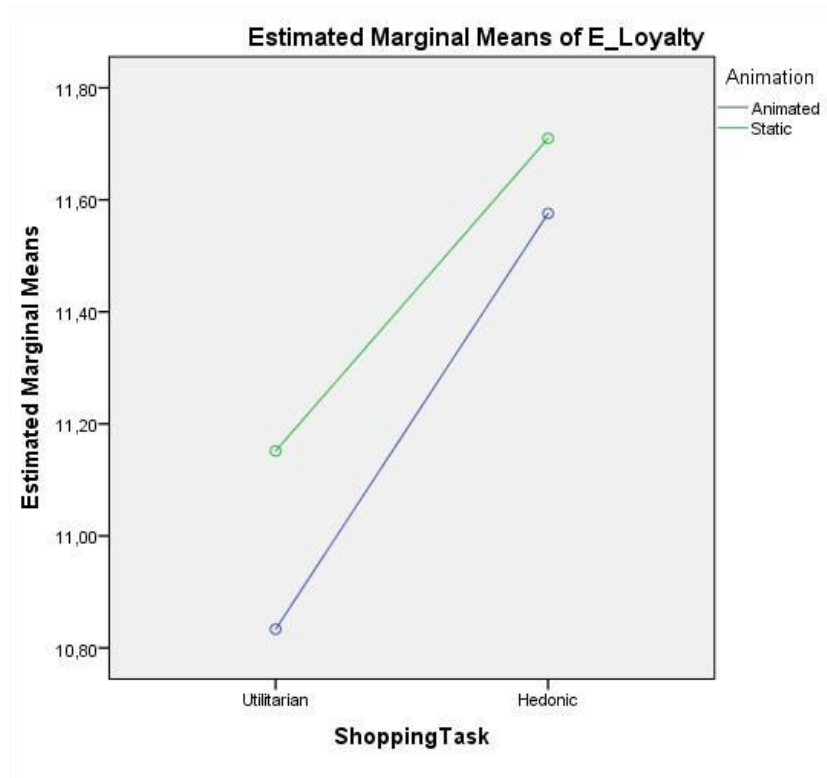
Figure 12 - Means Plot – Interaction effect – Loyalty

Finally, the interaction effect for perceived satisfaction ($F_{(1,123)}$= 0,369; p=0,545>0,05) and perceived ease of use ($F_{(1,123)}$= 0,635; p=0,427>0,05) were again insignificant and H6c and H6e were rejected respectively. Since the F-ratio was not significant for none of the dependent variables I did not continue with a post hoc analysis. It is quite interesting that satisfaction and ease of use had opposite results on the interaction effect of animation and shopping task as we can see in Figure 13 below. For satisfaction, there is a possible interaction that needs of further examination. In the utilitarian task, static and animated web pages had almost the same effect on perceived satisfaction for both samples; but in the hedonic task, satisfaction was perceived more positive in the static website, while animated web pages had almost the same result for both shopping tasks. However, it was not statistically significant to further explore this interaction. In contrast, ease of use was perceived almost the same in hedonic motivation, but in the utilitarian shopping task, static content had a more positive effect on perceived ease of use. Concluding, in Table 5 below, there is the summary of hypotheses' results.
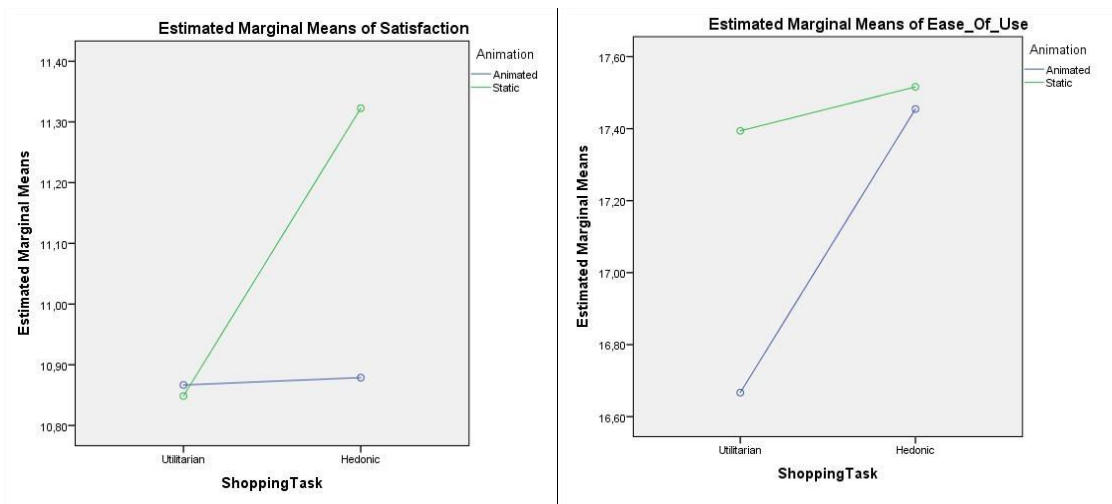
Figure 13 - Means Plot – Interaction effect – Satisfaction (left) and Ease of Use (right)

Table 5 - Summary of hypotheses' results

H1	*Websites with animated content have a more positive effect on consumer perceived aesthetics than websites with static content.*	Supported
H2	*Websites with animated content have a more positive effect on consumer's perceived entertainment than websites with static content.*	Supported
H3	*Websites with animated content have a more positive effect on consumer's perceived loyalty than websites with static content.*	Rejected
H4	*Websites with animated content have a more positive effect on consumer's perceived satisfaction than websites with static content.*	Rejected
H5	*Websites with animated content have a more positive effect on consumer's perceived ease of use than websites with static content.*	Rejected
H6a	*Websites with animated content will lead to positive perceived aesthetics for hedonic products and negative for utilitarian products*	Rejected
H6b	*Websites with animated content will lead to positive perceived entertainment for hedonic products and negative for utilitarian products*	Rejected
H6c	*Websites with animated content will lead to positive perceived loyalty for hedonic products and negative for utilitarian products*	Rejected
H6d	*Websites with animated content will lead to positive perceived satisfaction for hedonic products and negative for utilitarian products*	Rejected
H6e	*Websites with animated content will lead to positive perceived ease of use for hedonic products and negative for utilitarian products*	Rejected

Manipulation Checks

In order to test the different groups that actually differed for the different levels of the independent variables, I developed manipulation checks to filter participants and tested the validity of the volunteers' responses at the significance level of 0,05. For the manipulation checks, in order to compare the means of the independent sample groups, I run independent t-test on the same dependent variable. I wanted to test (1) if they did notice the animation effect on the animated website and if they did not on the static website, (2) if they perceived correctly the shopping task assigned to them (hedonic versus utilitarian). So, for the question, if they noticed any moving animation I got the following results, depicted in Table 6 below. According to that, the two groups have a significant difference ($p<0,05$), so we can state that animation levels were perceived correctly in each group.

Table 6 - Independent t-test for animation

	Animation	N	Mean	SD	t	df	Sig.
Did you notice any moving animation while looking at the website?	Animated	63	1,56	0,819	-5,576	125	0,000
	Static	64	2,26	0,563			

As far as the shopping task, the respondents were asked what the task had to do. The utilitarian motivation was reflected by the "critical for my job" answer and the hedonic motivation by the "for personal enjoyment" answer. Results are depicted in Table 7 below. According to that, the two groups have a significant difference ($p<0,05$), so we can state that the shopping task was perceived correctly for each case.

Table 7 - Independent t-test for shopping task

	Shopping Task	N	Mean	SD	t	df	Sig.
Was the requested	Utilitarian	63	1,63	0,703	-3,078	125	0,003

online shopping task critical for your job or was it for personal enjoyment?	Hedonic	64	1,94	0,351

6 Discussions and implications

In this section, I will discuss the findings of the experiment, the theoretical contributions of this survey, any possible limitations, how the findings can be implications for online vendors and make some proposals for future research.

6.1 Findings and Implications

The results of this experimental research revealed some theoretical and practical implications that definitely need further investigation. First, it was found that animation can play an important role in aesthetics and most specifically, by applying moving animation it can enhance it. These findings confirm previous studies [8, 25, 27] where researchers had applied other types of animation, on other devices and with different goals. It is very important to understand the importance of applying animation on an e-commerce page because this will immediately affect consumers' perceived aesthetics and therefore their purchase intentions. It is one of the many aspects of animation that needs careful examination before applying it on a product, its description or even on irrelevant objects on the page. It will grab users' attention subconsciously and will affect their preferences over the whole system. Web designers and information technology managers should cooperate from the very beginning of a project with the marketing team. The designing of a website can enhance or destroy the marketing strategy if those modern technologies won't be applied carefully.

Despite the fact that the interaction effect for aesthetics was not statistically significant, in Figure 10 above, we can observe that while in hedonic behavior the animation did not affect that much users' perceived aesthetics, in the utilitarian behavior we can see that animation increased significantly their aesthetic assessment. This was a neutral website which with the static content had worse ratings in aesthetics than with the animated content in utilitarian shopping behavior. If this hypothesis will further be examined and supported, web designers can use properly different types of animation and enhance consumers' perceived aesthetics in both shopping motivations. And why I

think this is important? Because online vendors could never know if a web visitor of their e-shop is under hedonic or utilitarian motivation in order to present them different web pages. By applying animation carefully they will be able to enhance their assessment over aesthetics even if they are utilitarian or hedonic motivated.

Finding that animation can also affect positively perceived enjoyment opens a new chapter that needs further investigation. Figure 11 above showed that there isn't a significant difference on enjoyment under the two different shopping orientations, despite that previous research [7, 12] had found that hedonic motivation will generate a more pronounced effect on enjoyment than with utilitarian motivation. This was not proven in this research, though.

However, it is quite important that animation enhances enjoyment overall, which is highly related to unplanned and spontaneous purchases [21]. The authors [21] also concluded that since enjoyment has a strong relationship with hedonic shopping motivation, these unscheduled and impulsive purchase actions are also highly related to hedonic motivation. This research, thus, can suggest applying moving animation on web pages suitable, in order to increase the hedonic elements that can trigger a purchase intention.

While Cyr et al [16], had proved entertainment to be a predictor of loyalty, in Cyr [37], and Shun and Yunjie [44] studies were supported that satisfaction can positively affect loyalty. If in this research, entertainment had affected loyalty, then animation would have a positive impact on loyalty. However, animation had influenced negatively loyalty, as happened in satisfaction. So, in this experiment where satisfaction was perceived negatively with animated content, this had a big negative impact on loyalty too. This experiment also confirms another hypothesis of their study [37, 44] where enjoyment does not predict loyalty. If this was true, then given the positive relationship this experiment revealed between animation and entertainment, loyalty would have been perceived positively when the website had animation on the layout. And, if we analyze it in more depth, since loyalty is linked to user's willingness to return to the online store, it is more likely to be influenced more by satisfaction, which is directly affected by the relationship that had developed between the user and the online retailer.

As we saw in Figure 12 above, the shopping task did not change how animation would affect loyalty, and the means plot are parallel. However, we can note that static content had better ratings over animated content overall. And this raises some interesting new questions like *What type or in what intense can we utilize animation so that we*

can enhance aesthetics and enjoyment but will also not affect loyalty negatively? It is a query that this study could not examine and I suggest to be further investigated. While loyalty is a critical factor for online businesses I feel that it is an important issue to consider before continuing to the designing of the web page interface.

The hypothesis regarding the effect of animation on satisfaction was not supported and moreover, if there was a statistically significant difference in the two groups, then it would have resulted to a theory opposite of what we have assumed. In both studies [4, 15] was supported that enhanced perceived aesthetics will lead to negative perceived satisfaction especially if there wasn't provided any useful cue to help users accomplish their task. Animation applied in this research was both task-similar and task-dissimilar. According to the results from the previous study, I can understand that maybe this combination of types of animation did not impact positively to perceived satisfaction. If I had applied only task-similar animation (i.e. animation applied on an object relevant to the shopping task), that could help users complete more easily and quickly their task it may have resulted to increased satisfaction for utilitarian shopping behavior. It is an issue that I definitely suggest to further examine and test under different circumstances and types of animation.

Moreover, the relationship between visual complexity and satisfaction was inverted-U for hedonic shopping motivation [24]. Related to this study's result, I can understand that maybe used animation overcame this ultimate point that up to this was a positive relationship between satisfaction and animation. And this maybe an explanation on Figure 13 above (left part), where static content had way more better results in satisfaction under hedonic motivation. However this was not statistically significant to be supported. But how this ultimate point was reached? Was it too much animation? Or was it to inappropriate applied? Another issue that web designers and marketing teams must consider. There are so many questions that have been raised in this research and I totally suggest examining them in more depth. I can even propose that there should be developed appropriate and valid tools for measuring animation and its impact on other attitudes.

My assumptions regarding perceived ease of use were not supported either. There was not a statistically significant difference between the two groups that viewed the static and animated websites. Moreover, the ratings for ease of use were worse for the web page that had animated objects. And this is something that confirms some theories

that had concluded that simple web pages with no increased complexity are easy to use and that extended use of animation, graphics and amount of text, confuses the users and don't help them complete their task [24].

Comparing these theories with Figure 13 above, where animation had better scores when the task was hedonic oriented I believe that this is more aligned with the previous studies. When the user has utilitarian shopping behavior and is searching with a predefined shopping intention, wants to complete his/her task in a pressure of time and satisfy his/her need. So, increase complexity may deteriorate his/her task performance and that is the reason why perceived ease of use had worse ratings when the task was utilitarian and the web page was animated. But when the task was hedonic oriented the static and the animated sites had almost the same results as shown in Figure 13 above. Despite that the initial hypothesis was not supported, we can see the potential differences on perceived ease of use according to the online shopping behavior.

Concluding, the moderator effect of shopping task could have caused a greater impact on perceived satisfaction and ease of use, under different circumstances. However, this was not statistically supported but there is an exponential interaction and I recommend to be tested by manipulating the aspect of animation in various ways. In general, this study revealed a positive relationship between animation with aesthetics and animation with entertainment. While increased aesthetic theoretically leads to increased consumers' perceptions this was not totally supported by this research. Perceived loyalty, ease of use and satisfaction were not positive with the animated web page, while it could have resulted to negative perceptions if the difference was statistically significant. The moderator effect of the shopping task did not affect consumers' responses overall but this study revealed a potential interaction between animation and shopping behavior. However, the hypotheses related to this interaction effect were not supported, but new questions were raised from this study that should be tested in the future. Hedonic and utilitarian values were found to be enhanced both under the impact of animation [32] and I believe that this was a major reason why this study did not result in significant findings regarding the interaction effect. If the animation has the ability to increase utilitarian and hedonic values with the same strength, this makes it even more complicated to study and analyze.

6.2 Limitations

There are, however, some limitations in this research that need to take into consideration someone when interpreting the outcome of this experiment. I tested each of the dependent variable to be approximately normally distributed for each category of the independent variables (animation and shopping task). The sample is skewed and kurtotic, for all the categories of the independent variable, with insignificant differences from normality ($p>0.05$). Thus, this experiment's data is not normally distributed, in terms of skewness and kurtosis (all z-values were not within +/- 1.96). This may be because the random sample was too small and ANOVA leaded to a false positive result. A non-parametric test should be more appropriate or some changes to the sample to fit the normal distribution would have leaded us to more insightful results.

Furthermore, I only applied simple manipulations of the animation. Different type and direction of animation may have other impact. The duration of the animation was 3 seconds and this could be another reason that we could not draw important conclusion from the interaction effect of animation and shopping task. Constant animation could have concluded to more clear results.

Maybe the research model wasn't appropriate. I assumed a direct effect on these specific consumer perceptions; however, it could be more complicated. There might be other factors that affected these perceptions previously, that combined with animation lead to this research results.

The e-commerce website that the respondents were asked to judge, was only one page and it was not functional and that is another reason that could have affected users' responses. As soon as they realized that they could not proceed in more depth to the website and receive more information this could make them feel insecure and assess the system negatively.

Finally, this study was limited to web based stores and did not consider the effect of animation and shopping task on mobile phones. So, any possible implications may not be further applicable to mobile devices, where users may have different reactions.

6.3 Future Research

As for further research, I think it would be really interesting to investigate the relationship between animation and shopping task with the moderator effect of the type of device. In mobile devices, was found that animation on mobile applications had better results in user's perceived usability and was found a positive relationship between aesthetics [27]. The challenges are increased on mobiles since the loading speed is smaller and the screen size too. Further research should be done on the impact of animation and on other consumers' preferences and purchase intentions in different shopping motivations.

One more thing to be investigated in more depth should be the impact of different types of animation on aesthetics. This study did not examine that, and I believe it is an important issue that needs further examination. The speed, the direction, the content, the movement are all different aspects of animation that this study did not examine and should be studied, in case different types of animation affect consumer attitudes differently. It is important to understand where is the critical point that applied animation will lead to enhanced aesthetics and entertainment, but also won't affect negatively perceived loyalty, satisfaction and ease of use.

Finally, other consumer perceptions might have been affected, that I didn't study in the current research. Perceived usefulness or perceived trust could have been affected and thus influenced other perceptions. I strongly recommend reexamining all hypotheses in the future, considering and different research models. Some perceptions may be interactive in a way that this research could not predict. Aesthetics is already a complex concept and difficult to measure but all of its aspects should be studied in order to give light to unanswered research questions. The digital world is constantly evolving and minute by minute tremendous changes happening. Modern technologies are not restricted to moving animation, but all of them affect perceived website complexity and thus affect web users' emotions and reactions when navigating on a web page.

7 Conclusions

Concluding, this study managed to give some important insights to web designers and digital marketers, on how to handle modern technologies and how these factors can influence user's attitudes over online retailers. Aesthetics can be an amazing tool to stimulate web visitors' interest and make them stay longer than they were planning on a web page or even persuade them to purchase because they felt something beautiful and positive. Enhanced aesthetics can provoke positive emotions and thus affect consumer purchase intentions. The animation is a modern technology, that only the recent years has been used extensively, but it is not clear its effects on consumer perceptions towards an online vendor. The current study only managed to prove that it can enhance perceived aesthetics and perceived entertainment, while we could not draw any significant conclusion regarding perceived ease of use, loyalty and satisfaction.

When graphic designers start to design the layout of a web page, they should first communicate with the marketing team in order to examine how the web stimulus applied on the web page, will further affect users' emotions. I also believe that the nature of the product plays an important role on that. If the user is searching for something under the pressure of time, and animation frustrates him/her, then I would suggest online firms present a static website. However, this was not supported through this experiment, but many factors could have contributed to that. My personal opinion is that hedonic shopping behavior is more important for online firms than utilitarian behavior and should concentrate on that. I am stating this because, today, online users are always connected and while they are watching their favorite videos, or while they are communicating with their friend through various social media, they are exposed to infinite online ads that may or may not choose to click. But if they do, they will not land on the e-commerce page with the intention to complete a transaction. However, if they feel (hedonic) something positive they will probably make a purchase. On the other hand, when they have utilitarian shopping behavior, they probably won't pay much attention to all the cues provided on the page so they will not be distracted from their initial goal.

The possible interactions of animation and shopping task on perceived ease of use and satisfaction increase the interest to further examine all the tested hypotheses. I be-

lieve that if the manipulations were perceived totally correctly and had applied other types of animation, I could have drawn significant results. But there should also be developed tools to measure levels of animation and their possible effects on every perception. Then, it would be easier for digital marketers and engineers to know when and how to use animation on e-commerce stores wisely. The animation is one aspect of modern technologies while new and more innovative ones are starting to disrupt the e-commerce sector. Presenting the products with videos is something that is already used on e-commerce web pages while virtual reality I believe will penetrate soon the e-business field. This study may be the start for setting the importance of classifying modern technologies and their consequences on consumers' preferences.

Bibliography

1. Bugelski, B. R., & Alampay, D. A. (1961). The role of frequency in developing perceptual sets. *Canadian Journal of Psychology/Revue canadienne de psychologie*, 15(4), 205-211. doi:10.1037/h0083443

2. Cai, S., & Xu, Y. (2011). Designing not just for pleasure: Effects of Web site aesthetics on consumer shopping value. *International Journal of Electronic Commerce*, 15(4), 159-188. doi: 10.2753/JEC1086-4415150405

3. Deng, L., & Poole, M. S. (2012). Aesthetic design of e-commerce web pages–Webpage Complexity, Order and preference. *Electronic Commerce Research and Applications,* 11(4), 420-440. http://dx.doi.org/10.1016/j.elerap.2012.06.004

4. Wang, Y. J., Minor, M. S., & Wei, J. (2011). Aesthetics and the online shopping environment: Understanding consumer responses. *Journal of Retailing*, 87(1), 46-58. doi: 10.1016/j.jretai.2010.09.002

5. Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression!. *Behaviour & information technolog*y, 25(2), 115-126. doi: 10.1080/01449290500330448

6. Deng, L., & Poole, M. S. (2010). Affect in web interfaces: a study of the impacts of web page visual complexity and order. *Mis Quarterly*, 34(4), 711-730. http://www.jstor.org/stable/25750702

7. Cai, S., & Xu, Y. (2007). Effects of outcome, process and shopping enjoyment on online consumer behaviour. *Electronic Commerce Research and Applications*, 5(4), 272-281. doi: 10.1016/j.elerap.2006.04.004

8. Moshagen, M., & Thielsch, M. T. (2010). Facets of visual aesthetics. *International Journal of Human-Computer Studies*, 68(10), 689-709. doi:10.1016/j.ijhcs.2010.05.006

9. Li, Y. M., & Yeh, Y. S. (2010). Increasing trust in mobile commerce through design aesthetics. *Computers in Human Behavior*, 26(4), 673-684. doi: 10.1016/j.chb.2010.01.004

10. Lavie, T., & Tractinsky, N. (2004). Assessing dimensions of perceived visual aesthetics of web sites. *International journal of human-computer studies*, 60(3), 269-298. doi:10.1016/j.ijhcs.2003.09.002

11. Karvonen, K. (2000, November). The beauty of simplicity. *In Proceedings on the 2000 conference on Universal Usability* (pp. 85-90). ACM. doi: 10.1145/355460.355478

12. Cai, S., Xu, Y., & Yu, J. (2008, April). The effects of web site aesthetics and shopping task on consumer online purchasing behavior. *In CHI'08 extended abstracts on Human factors in computing systems* (pp. 3477-3482). ACM. doi: 10.1145/1358628.1358877

13. Tuch, A. N., Presslaber, E. E., StöCklin, M., Opwis, K., & Bargas-Avila, J. A. (2012). The role of visual complexity and prototypicality regarding first impression of websites: Working towards understanding aesthetic judgments. *International Journal of Human-Computer Studies*, 70(11), 794-811. doi: 10.1016/j.ijhcs.2012.06.003

14. Roth, S. P., Tuch, A. N., Mekler, E. D., Bargas-Avila, J. A., & Opwis, K. (2013). Location matters, especially for non-salient features–An eye-tracking study on the effects of web object placement on different types of websites. *International journal of human-computer studies*, 71(3), 228-235. doi: 10.1016/j.ijhcs.2012.09.001

15. Wang, Y. J., Hernandez, M. D., & Minor, M. S. (2010). Web aesthetics effects on perceived online service quality and satisfaction in an e-tail environment: The moderating role of purchase task. *Journal of Business Research*, 63(9), 935-942. doi: 10.1016/j.jbusres.2009.01.016

16. Cyr, D., Head, M., & Ivanov, A. (2006). Design aesthetics leading to m-loyalty in mobile commerce. *Information & Management*, 43(8), 950-963. doi: 10.1016/j.im.2006.08.009

17. Chiu, C. M., Chang, C. C., Cheng, H. L., & Fang, Y. H. (2009). Determinants of customer repurchase intention in online shopping. *Online information review*, 33(4), 761-784. doi: 10.1108/14684520910985710

18. Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2002). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of retailing*, 77(4), 511-535. doi: 10.1016/s0022-4359(01)00056-2

19. Bridges, E., & Florsheim, R. (2008). Hedonic and utilitarian shopping goals: The online experience. *Journal of Business Research*, 61(4), 309-314. doi: 10.1016/j.jbusres.2007.06.017

20. Jones, M. A., Reynolds, K. E., & Arnold, M. J. (2006). Hedonic and utilitarian shopping value: Investigating differential effects on retail outcomes. *Journal of Business Research*, 59(9), 974-981. doi: 10.1016/j.jbusres.2006.03.006

21. To, P. L., Liao, C., & Lin, T. H. (2007). Shopping motivations on Internet: A study based on utilitarian and hedonic value. *Technovation*, 27(12), 774-787. doi: 10.1016/j.technovation.2007.01.001

22. Overby, J. W., & Lee, E. J. (2006). The effects of utilitarian and hedonic online shopping value on consumer preference and intentions. *Journal of Business research*, 59(10), 1160-1166. doi: 10.1016/j.jbusres.2006.03.008

23. O'Brien, H. L. (2010). The influence of hedonic and utilitarian motivations on user engagement: The case of online shopping experiences. *Interacting with Computers*, 22(5), 344-352. doi: 10.1016/j.intcom.2010.04.001

24. Nadkarni, S., & Gupta, R. (2007). A task-based model of perceived website complexity. *Mis Quarterly*, 501-524. http://www.jstor.org/stable/25148805

25. De Angeli, A., Sutcliffe, A., & Hartmann, J. (2006, June). Interaction, usability and aesthetics: what influences users' preferences?. *In Proceedings of the 6th conference on Designing Interactive systems* (pp. 271-280). ACM. doi: 10.1145/1142405.1142446

26. Tuch, A. N., Bargas-Avila, J. A., & Opwis, K. (2010). Symmetry and aesthetics in website design: It's a man's business. *Computers in Human Behavior*, 26(6), 1831-1837. doi: 10.1016/j.chb.2010.07.016

27. Huhtala, J., Sarjanoja, A. H., Mäntyjärvi, J., Isomursu, M., & Häkkilä, J. (2010, April). Animated UI transitions and perception of time: a user study on animated effects on a mobile screen. *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1339-1342). ACM. doi: 10.1145/1753326.1753527

28. Hong, W., Thong, J. Y., & Tam, K. Y. (2007). How do Web users respond to non-banner-ads animation? The effects of task type and user experience. *Journal of the American Society for Information Science and Technology*, 58(10), 1467-1482. doi: 10.1002/asi.20624

29. Rau, P. L. P., Gao, Q., & Liu, J. (2007). The effect of rich web portal design and floating animations on visual search. *International Journal of Human-Computer Interaction*, 22(3), 195-216. doi: 10.1080/10447310709336962

30. Hamborg, K. C., Bruns, M., Ollermann, F., & Kaspar, K. (2012). The effect of banner animation on fixation behavior and recall performance in search tasks. *Computers in Human Behavior*, 28(2), 576-582. doi: 10.1016/j.chb.2011.11.003

31. Zhang, P. (2000). The effects of animation on information seeking performance on the World Wide Web: Securing attention or interfering with primary tasks?. *Journal of the AIS*, 1(1es), 1.

    http://s3.amazonaws.com/academia.edu.documents/6025931/10.1.1.13.2921.pdf?AWSAccessKey-

    Key-

    Id=AKIAJ56TQJRTWSMTNPEA&Expires=1482519380&Signature=0qnINbQBm8nUZ6F3oqSeZG9sIA0%3D&response-content-

    disposi-

    tion=inline%3B%20filename%3DThe_effects_of_animation_on_information.pdf

32. Lai, Y. L., Kuan, K. K., Hui, K. L., & Liu, N. (2009). The effects of moving animation on recall, hedonic and utilitarian perceptions, and attitude. *IEEE transactions on engineering management*, 56(3), 468-477. doi: 10.1109/tem.2009.2023454

33. Chang, H. H., & Chen, S. W. (2009). Consumer perception of interface quality, security, and loyalty in electronic commerce. *Information & management*, 46(7), 411-417. doi: 10.1016/j.im.2009.08.002

34. Srinivasan, S. S., Anderson, R., & Ponnavolu, K. (2002). Customer loyalty in e-commerce: an exploration of its antecedents and consequences. *Journal of retailing*, 78(1), 41-50. doi: 10.1016/s0022-4359(01)00065-3

35. Anderson, R. E., & Srinivasan, S. S. (2003). E-satisfaction and e-loyalty: A contingency framework. *Psychology & marketing*, 20(2), 123-138. doi: 10.1002/mar.10063

36. Ramayah, T., & Ignatius, J. (2005). Impact of perceived usefulness, perceived ease of use and perceived enjoyment on intention to shop online. *ICFAI Journal of Systems Management (IJSM)*, 3(3), 36-51.

    http://ramayah.com/journalarticlespdf/impactpeu.pdf

37. Cyr, D. (2008). Modeling web site design across cultures: relationships to trust, satisfaction, and e-loyalty. *Journal of Management Information Systems*, 24(4), 47-72. doi: 10.2753/mis0742-1222240402

38. Hausman, A. V., & Siekpe, J. S. (2009). The effect of web interface features on consumer online purchase intentions. *Journal of Business Research*, 62(1), 5-13. doi: 10.1016/j.jbusres.2008.01.018

39. Van der Heijden, H., Verhagen, T., & Creemers, M. (2003). Understanding online purchase intentions: contributions from technology and trust perspectives. *European journal of information systems*, 12(1), 41-48. doi: 10.1057/palgrave.ejis.3000445

40. Ash, T., Ginty, M., & Page, R. (2012). Landing page optimization: The definitive guide to testing and tuning for conversions. John Wiley & Sons.

41. Kim, J., & Lennon, S. J. (2013). Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention: Based on the stimulus-organism-response model. *Journal of Research in Interactive Marketing*, 7(1), 33-56. doi: 10.1108/17505931311316734

42. Corritore, C. L., Kracher, B., & Wiedenbeck, S. (2003). On-line trust: concepts, evolving themes, a model. *International journal of human-computer studies*, 58(6), 737-758. doi: 10.1016/s1071-5819(03)00041-7

43. Pengnate, S., & Antonenko, P. (2013). A multimethod evaluation of online trust and its interaction with metacognitive awareness: an emotional design perspective. *International Journal of Human-Computer Interaction*, 29(9), 582-593. doi: 10.1080/10447318.2012.735185

44. Shun, C., & Yunjie, X. (2006). Effects of outcome, process and shopping enjoyment on online consumer behaviour. *Electronic Commerce Research and Applications*, 5(4), 272-281. doi: 10.1016/j.elerap.2006.04.004

Appendix A. Survey Questions

Following are the measurement items used in the survey. Each was answered on a 5-point Likert scale from(1) strongly disagree to (5) strongly agree.

A1. Entertainment (Sources: Hausman, Siekpe 2008)

E-1: The website is enjoyable
E-2: The website is pleasing
E-3: This website is entertaining

A2. Satisfaction (Sources: Cyr 2008)

S-1: The website completely fulfills my needs and expectations
S-2: This website satisfies my needs well
S-3: Using this website is satisfactory overall

A3. Ease of Use (Sources: Cyr, Head, Ivanov 2006; Wang, Hernandez, Minor 2010)

EOU-1: Learning to use this website was easy for me
EOU-2: I found it easy to get this website to do what I wanted it to do
EOU-3: The online content was easy to follow
EOU-4: I found the website easy to use

A4. Loyalty (Sources: Cyr, Head, Ivanov 2006; Cyr 2008)

L-1:I would consider purchasing from this website in the future
L-2: I would visit this website again
L-3: I would consider using this website in the future

A5. Design Aesthetics (Sources: Cyr, Head, Ivanov 2006; Li, Yeh 2010)

DA-1:The screen design (i.e., colors, boxes, menus, etc.) is attractive
DA-2: This website looks professionally designed
DA-3: The graphics are meaningful
DA-4: The overall look and feel of the website is visually appealing

Appendix B. Webpage with Instructions

B1. General Instructions of the Experiment

B2. Shopping Task (Utilitarian)

B3. Shopping Task (Hedonic)

Imagine that you have plenty of time to search for a new mobile phone. You are thinking of changing your old device with a new one, from where you will be able to see HD videos on YouTube and text with your friend through various social media. After a search on the Internet from your _desktop_, you click to browse the mobile phones of the e-shop: **mobile.gr**