ONLINE MASS CUSTOMIZATION:
A STUDY ON CONSUMERS' PREFERENCES ON THE REPRESENTATION OF ONLINE MASS CUSTOMIZABLE PRODUCTS

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

MASS CUSTOMIZATION THROUGH ONLINE SHOPPING: A STUDY ON CONSUMERS' PREFERENCES ON ONLINE PRODUCT CUSTOMIZATION

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This study examines the consumers' preferences concerning the representation of online mass customizable products and their attributes. A literature review is conducted in order to specify mass customization and its levels from different perspectives and identify the factors that affect consumers' online shopping motivations. To obtain further information about online mass customization experience from consumers' perspective, a study is conducted with 40 participants who actively shop online in order to examine ten different websites that offer online mass customization. The study revealed that there are six main factors that affect consumers' preferences on online mass customization websites: accessibility and convenience, searching, visual layout, evaluation, mass customization toolkit and transaction. Consequently, suggestions for the representation of products and their attributes according to consumers' preferences are presented to provide necessary input to the product designers and interface designers that develop websites and related online mass customization toolkits for online shopping and mass customization.

Keywords: Mass customization, consumers' preferences, online mass customization websites, online shopping, product representation, mass customization toolkit.

ÖZ

ÇEVRİMİÇİ KİTLESEL ÖZELLEŞTİRME: ÇEVRİMİÇİ KİŞİSELLEŞTİRİLEBİLİR ÜRÜNLERİN TEMSİL EDİLMESİNDE TÜKETİCİLERİN TERCİHLERİ ÜZERİNE BİR ÇALIŞMA

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Bu araştırmanın amacı, tüketicilerin çevrimiçi [online] kitlesel özelleştirmedeki ürünlerin ve özelliklerinin temsilindeki tercihlerini incelemektir. Kitlesel özelleştirme ve farklı bakış açılarından kitlesel özelleştirme düzeylerini açıklayan literatür araştırmasında, tüketicilerin çevrimiçi alışveriş ile ilgili motivasyonları da ele alınmıştır. Çevrimiçi kişiselleştirilebilir ürün tercihlerini, tüketicinin bakış açısından daha detaylı olarak anlamak amacıyla, on farklı kitlesel özelleştirme sunan web sitesi, aktif çevrimiçi alışveriş yapan 40 katılımcı ile incelenmiştir. Araştırmaya göre kullanıcıların çevrimiçi kitlesel özelleştirme web sitelerindeki tercihlerini etkileyen altı ana faktör bulunmaktadır: ulaşılabilirlik ve elverişlilik, arama, görsel düzen, değerlendirme, kitlesel özelleştirme aracı ve satın alma işlemi. Bu çalışmanın sonucunda, ürün tasarımcılarına ve websitesi ve kitlesel özelleştirme aracı geliştiren arayüz tasarımcılarına, tüketicilerin çevrimiçi kitlesel özelleştirilebilir ürün ve özelliklerinin temsili hakkındaki tercihlerine yönelik öneriler sağlayacak biçimde sunulmaktadır.

Anahtar Kelimeler: Kitlesel özelleştirme, tüketici ürün tercihleri, çevrimiçi ürün kişiselleştirme web siteleri, çevrimiçi alışveriş, ürün temsili, kitlesel özelleştirme araçları.

To My Grandparents

Tülay & Azmi Yılmaz

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TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

CHAPTER 1

INTRODUCTION

The variety of products and their accessibility have been increasing by means of the Internet and online shopping ever since they have become an indispensible part of everyday life. People have been able to attain the products or services they want via many different channels. Even though this accessibility has strengthened the interest of the consumers for online shopping, the vast amount of mass-produced products have urged the consumers for differentiation and a need for customized and self-expressive products.

Consumers have become more convinced about online shopping with the aid of non-misleading, reliable interfaces; correct information sharing of products, dependable photographs and visual media. One of the many opportunities that online shopping offers to the consumers is that it is practical to buy a certain product avoiding the demanding process of searching physically in stores and comparing the alternatives. The Internet provides vast amount of information that one can review and compare products effectively spending less time, and acquiring in-depth knowledge about products.

To give an example of the niche market today, there is a great deal of websites that are discovered everyday by the consumers such as small boutiques, blogs, and e-commerce websites. Consumers aim to find different products and gadgets which cannot be found in regular life, however eventually all these products become available in more than one website and months later hit the shelves in the stores, sometimes even in lower prices. This vicious cycle continues for the consumers who desire custom and unique products.

Mass customization makes it possible to break this vicious cycle and provide individually customized products and exciting shopping experiences to consumers (Lee and Chang, 2010). Thus, the consumers are able to discover their actual needs, both aesthetic and functional. By means of mass customization, the consumers are able to make their choices in a given context; they can find a way for self-expression through the desired customized products with avoidance of similarity.

While online shopping is an appropriate medium to be shaped, mass customization is a prominent way for offering unique products for consumers. Therefore online shopping and mass customization should be evaluated along with this interplay.

1.1 Problem Definition

Recent years have shown that mass customization has caught the attention of both academia and industrial practitioners (Jiao et al., 2003). Along with the fields of marketing, consumer engineering, product management, engineering design, information technology, business strategy and most prevalently, strategic management have been tackling mass customization from various aspects. According to the review of the relevant literature, it has come out that only limited sources have examined mass customization in terms of product representation and consumer preferences in mass customization. There are constrained theoretical studies from only a few recognized names considering mass customization toolkits. The toolkits -mediatory between the consumer and the brand that provides customizable products- are one of the most significant steps that provide a sense about online mass customization. However, the theoretical studies do not compensate for the need of practical research about consumer interaction with toolkits. Frank Piller (2004), one of the leading scholars in the mass customization literature, emphasizes that there are only anecdotal studies that describe mass customization toolkits in a narrative style, avoiding the consumers' interaction and hands-on experience. Most consumers have an imagination about mass customization however they do not have any experience, through which they can present their preferences in customizing a product. Correspondingly, consumers' preferences about customizable product representation and customizable product attributes in online mass customization are still unanswered subjects to be studied in terms of providing feedback and necessary data for the product designers who design online customizable products, the brands who offer these products online, and for the website designers who prepare the interfaces and toolkits through which online product customization takes place.

1.2. The Aim and Objectives of the Study

The aim of this study is to evaluate consumers' experiences with online mass customization website interfaces and understand consumers' preferences about online mass customizable product attributes and their representation. Consequently, it is intended to provide information to the product designers about products and their attributes that the consumers want to customize via online shopping. It is also hoped to contribute to designers developing websites and related online mass customization toolkits for online shopping and mass customization.

1.3. Research Questions

In pursuit of the aim and objectives stated above, the research questions for this study are as follows:

- How do the online mass customization websites affect consumers' preferences for online mass customization process?
- What are the factors that affect consumers' approach towards online mass customization websites' interfaces?
- What are consumers' preferences regarding the representation of a product in an online mass customization website?

1.4. The Structure of the Thesis

The thesis is composed of six chapters:

Chapter 1 comprises of a brief introduction, problem definition, the aim and objectives of the study, research questions, and the structure of the thesis respectively.

Chapter 2 presents the literature review findings. The literature review begins with the background information and definition of mass customization. Later, “the four faces of mass customization” which is introduced by Joseph Pine and James H. Gilmore, two influential and pioneering authors in the literature of mass customization, are reviewed. Here, combination and comparison with other authors’ descriptions of similar levels of mass customization are presented. The following section includes the requirements of mass customization and design parameters for mass customization, eliciting the success factors of mass customization systems. Next, toolkits of mass customization are discussed, which play an important role as a mediator between consumers and the suppliers/manufacturers. The continuing section is a general assessment about mass customization, presenting its benefits and limits.

Chapter 3 presents the second part of the literature review, which contains findings about factors affecting online shopping. Since online shopping is a wide topic, the distinctive topics that are related with consumers’ preferences in online shopping are examined. Factors such as demographics, psychological perception, consumers’ online shopping motivations, and consumers’ online shopping experience and website-based other aspects are explained.

Chapter 4 explains the methodology of the study carried out in order to understand consumers’ preferences in online mass customization websites and representation of products and their attributes. The study is carried out in two phases: in the first phase, a preliminary study comprising of a website survey is conducted, where ten ideal online mass customization websites are deduced to be used in the main research. In the second phase, the main research takes place, which is conducted with 40 participants. This chapter also includes the structure of the main research.

Chapter 5 contains the findings and results of the main research, which is consisted of two stages. The first stage includes participants performing tasks by examining random pairs from the ten websites investigated in the preliminary study. The second stage of the main research involves both qualitative and quantitative survey, where the participants are asked to fill the Likert scale survey along with open-ended questions. This chapter reveals the outcomes of the main research.

Chapter 6 summarizes the conclusions and outcomes from the preliminary study and main research by revisiting the research questions. In addition, it includes a brief discussion of consumer preferences and design implications for future research.

CHAPTER 2

MASS CUSTOMIZATION

Considering the fact that mass customization, as the main subject of this thesis, reaches various other disciplines including marketing, business management, engineering, as well as design, an extensive exploration of the topic is required. Since the subject of the study necessitates the examination of both mass customization and online shopping, a holistic approach should be adopted. However, online shopping on its own is an extremely comprehensive field.

A manifold review of the literature on mass customization, online shopping, and consumers' preferences in online product customization were conducted to construct the framework of the study. Databases including Proquest, JSTOR, ScienceDirect, Elsevier, EBSCO Host, Research Gate, in addition to the field-specific journals and sources from the literature's prominent name Frank Piller's website (www.mass-customization.de) and publications were reviewed with the following combinations of keywords: "mass customization", "product customization", "online shopping", "consumer preferences", and "online mass customization".

2.1. Introduction to the Concept of Mass Customization

The term *mass customization* is a buzzword, which has been described from various perspectives with numerous elucidations. Table 1 outlines the definitions of mass customization proposed by the scholars throughout the years since it emerged. As can be observed from the table, each scholar refers to mass customization differently, and most of them have revised their own definition in time.

Table 2.1. Definitions of mass customization

Scholar	Definition
Stanley M. Davis (1987, pp169)	“The same large number of consumers can be reached as in mass markets of the industrial economy, and simultaneously treated individually as in the customized markets of pre-industrial economies.”
Joseph Pine (1993, pp44)	“Today I define Mass Customization as the low-cost, high volume, efficient production of individually customized offerings."
Giovani Da Silveira et al. (2001, pp1)	“Mass customization relates to the ability to provide customized products or services through flexible processes in high volumes and at reasonably low costs.”
Frank T. Piller (2004, pp315)	“Mass customization refers to a customer co-design process of products and services, which meet the needs of each individual customer with regard to certain product features. All operations are performed within a fixed solution space, characterized by stable but still flexible and responsive processes.”
Andreas M. Kaplan and Michael Haenlein (2006, pp176-177)	*“Mass Customization-working definition:* Mass customization is a strategy that creates value by some form of company–consumer interaction at the fabrication/assembly stage of the operations level to create customized products with production cost and monetary price similar to those of mass-produced products.” *“Mass Customization-visionary definition:* Mass customization is a strategy that creates value by some form of company–consumer interaction at the design stage of the operations level to create customized products, following a hybrid strategy combining cost leadership and differentiation.”
Martin Schreier (2006, pp319)	“The main objective of mass customization is to provide superior consumer value. It is assumed that a certain value increment stems from increased satisfaction with the individualized product.”

Table 2.1. (Continued)

Mitchell M. Tseng and Jianxin Jiao (1996, pp153)	"Mass customization aims to provide consumer satisfaction with increasing variety and customization without a corresponding increase in cost and lead-time."
Mitchell M. Tseng and Jianxin Jiao (2007, pp2)	"Mass customization is a new paradigm for industries to provide products and services that best serve consumer needs while maintaining near-mass production efficiency. From an economic perspective, mass customization enables better match between the producers' capabilities and consumer needs."

The term 'mass customization', in this thesis, refers to individually modifying, assembling or changing certain elements that constitute a product according to consumers' needs and desires, within a set of modules of choice that are predefined by the supplier/brand (Merle et al., 2008; Piller, 2007a).

Mass customization is generally confused with the term 'personalization', which is best to be distinguished from the beginning. As Piller (2007a) defines, personalization is about selecting or filtering information objects for an individual by using the individual's information from his consumer profile, which gives data about the consumers' previous and potential future choices to the supplier. Subsequently, the supplier is able to present a set of recommendations to the consumer by estimating their consumer-specific choices. Here, the consumer participation in personalization is passive. However, the type of consumer participation is different in mass customization. The consumer plays an active role in the co-design phase, physically and mentally in the design of a product that they can then purchase (Franke and Piller, 2003). Mass customization provides not only the end product but also the experience and processes that engage an interaction between the consumer and the product. For that reason, mass customization should not be considered as a result, but a process.

It should be stated that, web-based personalization differs from the same term used in the field of product design, where product personalization is defined as the adaptation of a product by the consumer him/herself (Sel, 2013). Some of the references use product personalization and mass customization terms interchangeably. However, product personalization is only one branch of mass customization that will be explained in section 2.3 where the *four faces of mass customization* are described.

2.2. Background of Mass Customization

It is useful to briefly recapture the progress of production from the past to present that will shed light to todays understanding of mass customization. As the distribution of labor embarked upon a new structure, the society no longer made only the products that they required for individual use, but realized also to pay attention on works they were skilled at. As a result of this, craftsmanship emerged to be one of the operational dynamics in the modern economy (Kaplan and Haenlein, 2006). The emergence of professions such as the blacksmith, tailor and carpenter paved the way to acquire products that exactly fit to consumers' needs without being obligated to be able to build the product themselves. In spite of that, the manual labor and customization caused expenditure of materials and excessive costs, which were unaffordable considering the conditions back then.

With the Industrial Revolution, mass production dominated manufacturing and labor. The first moving assembly platform-based product Henry Ford's Model T was introduced in 1908 (Kaplan and Haenlein, 2006). Beyond the famous motto of *"You can have any color car so long as long as it's black",* Ford left its mark on the history of mass production in terms of contributing the first platform-based products that were produced in quantity with a structured design (Alizon et al., 2009).

As Kaplan and and Haenlein (2006) stress, during the mid 1950's the aspiration for obtaining customized products increased and for the first time market segmentation was introduced by Smith in 1956. Marketing segmentation was about the adaptation of product and marketing effort according to consumers' needs which constituted the demand side of the market (Smith, 1995). However a middle way could still not be achieved between cost-effective standard mass-produced products and highly customized products with an expensive price.

Stanley M. Davis (1987) coined the term mass customization as producing products or services to correspond with individuals' needs with near mass production efficiency. Following the pioneer, significant researchers extended the definition and dimensions of mass customization.

At the present time, with the promising manufacturing capabilities such as additive manufacturing and advanced information technology and contributions of the Internet, mass customization persists to provide an implementable system. The substantial flux of modern economy introduces a fresh point of view where the companies are demanded to alter their activities from a seller's approach towards a buyer's point of view, correspondingly triggering an increase of product variety offered by the enterprises (Fürstner and Anišic, 2010).

Reichwald et al. (2004) state that mass customization changes traditional product development and moves towards a two-stage model. They define the first stage as the realms of company/designer that construct the solution space, while they specify the second stage as, the consumer acting as co-designer. The second stage is one of the most significant points that radically change the passive role of the consumer to an active partner in a process of adding value. As Piller (2004) designates, mass customization is a vision for companies to shift the manufacturer-oriented approach to a genuinely consumer-driven perspective, thereby initiating value-added products that are consistent with each individual consumers' needs and desires, and performing this pursuant to the profitable relevant cost.

In today's growing technology and rising demands, consumers desire high quality products with sensitive prices (Shamsuzzoha et al., 2009). But most importantly, the contemporary consumers seek unique products that both correspond to their needs and express themselves. This growing demand for customized products are urging the companies to produce products that are both cost efficient for themselves and satisfy consumer requirements (Shamsuzzoha et al., 2009).

Modifying the product itself for the utility function and needs of the individual consumers is one thing, but customization of the packaging and/or the representation of the product are another significant ways of seizing the consumers' willingness to purchase a customized product. From browsing for the potential product, trying out and selecting its attributes according to one's own preferences and fit, purchasing the desired result, waiting for its delivery, and to receiving the self-designed item as an end-product, in short, the whole process needs to be considered in order to present a successful experience of mass customization.

2.3. The Four Faces of Mass Customization

Many companies are faced with a growing trend towards individualization. Consumers with great purchasing power desire to express themselves via products they possess and this is made through mass customized product choices. However, the objective of mass customization is to make customized products accessible for large market segments, avoiding it to be a tailor service just for premium consumers (Piller et al. 2006). Along with this information, Gilmore and Pine (1997) have pointed out that the companies throughout the world have adopted mass customization to provide unique value to their consumers in an efficient way. It is necessary for the companies to know what kind of customization would fit to their business model and correspond to the needs of their consumers.

Gilmore and Pine (1997) have identified four approaches to mass customization, which have visibly influenced the literature and most scholars have constructed their studies around these classifications. These four approaches are *collaborative, adaptive, cosmetic* and *transparent* customization respectively. During the design of a product or a process, it is important that each approach is examined extensively, so that they could best function as a driver for a successful customization. These approaches may be combined or operated individually, depending on the product and requirements of the consumers' needs. The examples in the following section will give a more clear idea about the implementation of the four approaches. Figure 2.1 illustrates the changes in the product and representation in the four approaches.

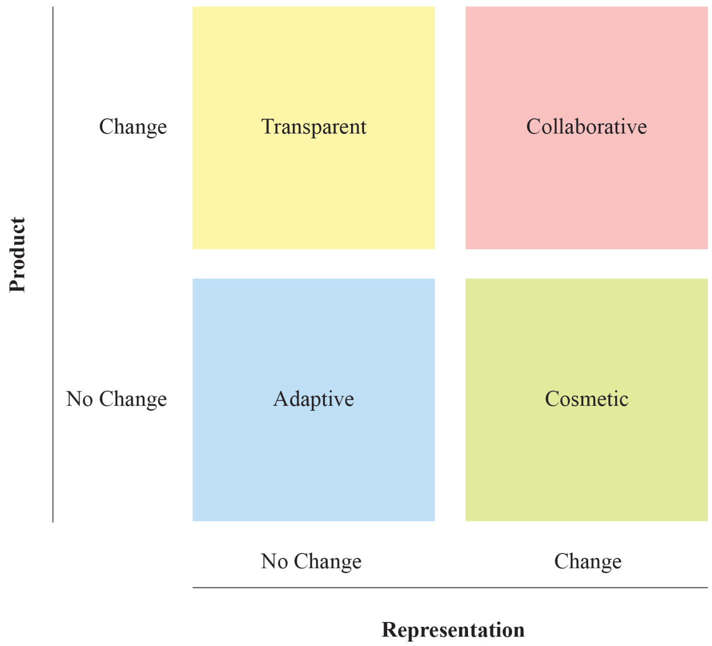

Figure 2.1. The four approaches to customization.
(Adapted from Gilmore and Pine, 1997: pp95)

While *collaborative customization* involves both functional (product) and aesthetic (representation) apparent changes by the consumer, *transparent customization* is applied unnoticeably, where the companies observe the consumers' preferences and customize their choices for them. Therefore, although the product seems to be the same, its representation is altered. In *cosmetic customization*, the base product is standard. However, as the name implies, the consumers implement the customization cosmetically, where the consumers are allowed to customize the product's outer representation. On the other hand, *adaptive customization* provides standard products, neither their functional nor aesthetic attributes can be altered by the consumers. They can only adapt' the attributes of the standard product according to their needs and preferences. To be more explicit, these four approaches will be discussed with examples.

2.3.1. Collaborative Customization

Collaborative customization intends to communicate with the consumers in order to assist them to determine their real needs and to identify the particular product attributes that fulfill those needs (Gilmore and Pine 1997). Collaborative customization can be considered as the most fundamental approach of mass customization. Gilmore and Pine (1997) emphasize that collaborative approach is generally useful where the consumers cannot easily articulate their needs and get discouraged when forced to choose from an excessive amount of options.

It should not be forgotten that mass customization does not mean to satisfy whatever the consumer desires (Du et al., 2006). However, adopting the viewpoint of the consumer and extracting the exact need of them with a matching product offering within the frame of manufacturing capacities successfully provides the companies to meet consumers' needs and increase consumer-perceived value.

Dell Computer -a successful computer brand- is generally cited as one of the most prevailing examples that provide collaborative customization. The consumers cooperate with Dell to determine the components they want to configure, which are then developed by the company, satisfying exactly the needs of each individual consumer and consequently produced without any finished goods inventory risk (Cohen and Pine, 2007; Piller and Walcher 2012). Figure 2.2 presents one of the steps of the configurator in Dell's website, in which the consumers are able to select the attributes from a predefined list of options and build computers according to their preferences.

In Dell's case, they have diversified important amount of options such as memory capacity, size, color, etc. to be customized for further needs for an individual, since the modular designed product and flexible manufactured components are quite standard. Therefore, Dell has adopted the strategy ‘standardize to be customized’ for all required components (Pollard et al., 2008, pp84).

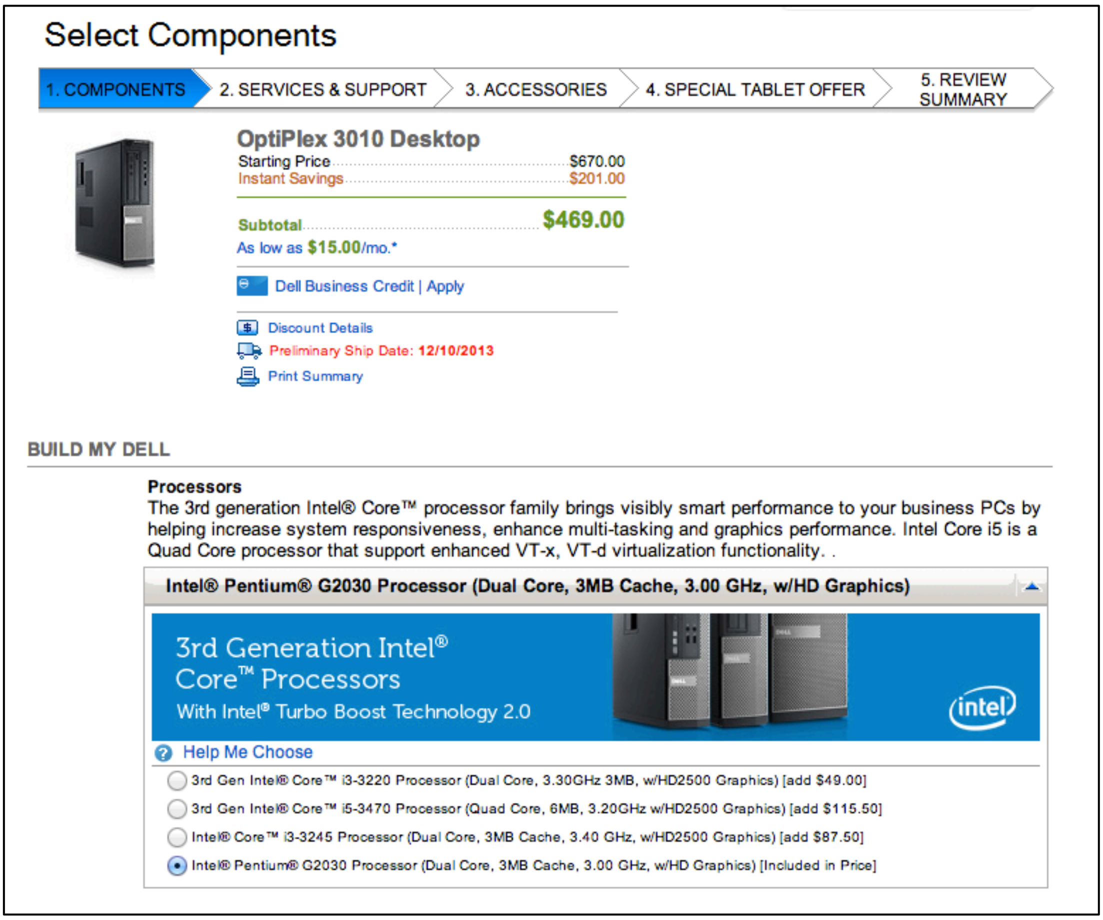

Figure 2.2. Screenshot from Dell Computer’s Online
Mass Customization Toolkit (www.dell.com) Accessed: September 2014.

Gilmore and Pine (1997) discuss the most significant benefit that of collaborative customization that makes it ahead of mass production is that, mass producers constantly attempt to add new features to the products in order to develop the functionality of the existing offerings, which may sometimes improve value to the consumers but mostly remain inadequate. When the consumers are forced to be contented with the standard product, they somehow try to modify the products themselves. On the other hand, collaborative customization makes it possible to substitute these backend solutions with front-end specifications (Gilmore and Pine, 1997). Due to this, most of the collaborative customizing companies concentrate on the design of the product.

Another product category that is fond of collaborative customization is the shoe industry. Most of the consumers are faced to give up a perfect fit for both feet, since either one is tight or loose while the other one fits appropriately (Gilmore and Pine, 1997). Since collaborative customization requires change both in the product itself and the representation of the product to some extent, miAdidas and Shoes of Prey are effective examples that utilize collaborative customization on an online basis. These examples will be explained later in details in the following sections.

2.3.2. Adaptive Customization

Gilmore and Pine (1997) describe that adaptive customization offers standard products, however these are designed in such a way that the consumers can alter the products later by themselves. This means that the companies that adopt adaptive customization change neither the product itself nor the representation of it, whereas they offer the consumers to alter both in order to fulfill their own specific needs. Adaptive customization can be useful in the cases where the consumers desire the product to perform in various ways depending on different circumstances, where the design and function of the product enable the consumer to customize it according to their own preferences. To be more explicit, automobiles are good examples for adaptive customization; the drivers and users are able to manipulate and customize the specifications according to their preferences and ease of use (McFaddin, 2007). The driver's seat can be adjusted according to the ergonomic fit for the driver; the rear-view mirror can be adapted according to the sight of the driver; the rear seats can collapse to make more space for storage; racks can be attached to the roof or the back of the car for bikes or luggage and so on. McFaddin (2007) exemplifies this type of customization with a vehicle model: Pontiac Aztec. This minivan-like highly versatile vehicle includes built-in tent extension, air mattresses and cooler, adapting to behave as a whole-package camper. Adaptive customization therefore provides the opportunity to modify a standardized product according to the needs of the end-user.

2.3.3. Cosmetic Customization

Cosmetic customization basically changes a standard product's representation, where the consumers use the product similarly, but are allowed to alter the presentation of the product in order to appeal to a specific consumer (Gilmore and Pine, 1997; McFaddin, 2007). The very common examples that first come to mind are the custom apparels, mostly t-shirts, accessories, and promotional products. *Zazzle* is a well known website for cosmetic customization in these days. The consumers are able to choose a standard product, like a t-shirt, select colors from the predefined list on the website, upload images or texts, add their names on the design and order the customized product. Although cosmetic customization does not allow modifying the product's functionality or fit, there is an immense amount of companies that apply cosmetic customization and satisfy the consumers' need for uniqueness and self-expression.

Zazzle has even begun to provide custom chocolates to their consumers. Figure 2.3 displays www.zazzle.com's screenshot on how consumers choose chocolate bases and five different ingredients among over a hundred of ingredients.

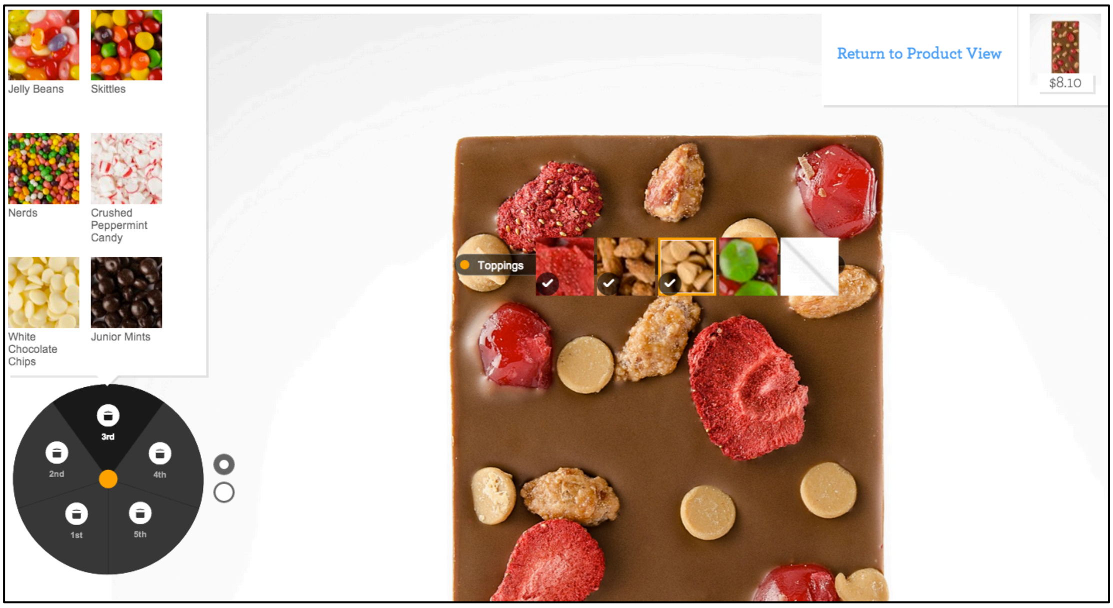

Figure 2.3. Screenshot from Zazzle's Online Mass Customization Toolkit www.zazzle.com (Accessed: August 2014).

Another product category that is worth to mention at this point is smart phone cases. People are constantly buying custom smart phone cases that match with their outfits, represent their characteristics and gratify their desire to be notable. *Kabuk*, a Turkish brand that provides custom smart phone cases in an online store www.telefonkilifim.com, is an accurate example for cosmetic customization. The consumers are able to upload the images they wish to be printed on their cases; adjust the image the way they prefer (enlarge, reduce or rotate), and add text to their design. Figure 2.4 illustrates the interface of the customization page of www.telefonkilifim.com.

Figure 2.4. Screenshot of the Online Mass Customization Toolkit of Kabuk, Telefon Kılıfim www.telefonkilifim.com (Accessed: July 2014).

Gilmore and Pine (1997) state that the companies whose products already fulfill nearly each of their consumers' needs should implement cosmetic approach and only a touch of customization for the appearance of the product is required. By this way, the companies offer diverse options of product representation that fulfill the need for uniqueness of consumers.

What Gilmore and Pine (1997) define as cosmetic customization is often referred in different ways by various scholars. Some scholars like Mugge et al. (2009) refer to the general concept of *mass customization* as product personalization, giving approximately the same definition of Gilmore and Pine's (1997) cosmetic customization, but entitling the concept differently. Nonetheless, considering his profound impact on the literature of mass customization, this thesis acknowledges Piller's (2007) definition of personalization, which is mentioned earlier in Section 2.1.1. Gilmore and Pine (1997) and Piller (2007) have a similar understanding in terms of defining cosmetic customization and transparent customization. The mere difference is that Piller (2007) names cosmetic customization as aesthetic customization, and transparent customization as personalization.

2.1.2.4. Transparent Customization

Transparent customization offers each individual consumer unique goods or services without explaining them explicitly that the products and/or services are tailored to their individual needs and preferences (Gilmore and Pine, 1997). The companies that adopt transparent customization observe their consumers' behavior and choices, avoiding direct interaction with them, and then unnoticeably customizing their preferences within a standardized package.

As mentioned in the previous sections as an example for personalization, Amazon.com takes information from consumers' previous orders or browsing. Then, it automatically offers similar products that the consumer may be interested in for their next purchase (McFaddin, 2007). In order to avoid any confusion about the keywords of the relevant literature, it should be highlighted that Piller's (2007) definition of personalization and Gilmore and Pine's (1997) description of transparent customization completely overlap.

In addition to the web applications of transparent customization, there are other examples that come across in other areas of the daily life. Gilmore and Pine (1997) exemplifies Ritz-Carlton Hotels; in order not to bother their consumers with pages of surveys on preferences, they have structured a database that collects the consumers' preferences observed during each stay on things such as hypoallergenic pillows, chocolate chip cookies or classical radio stations, and so on. Then this information is used to tailor the service for each consumer for his or her next visit. Transparent approach is applicable when consumers' needs are generally predictable or can easily be determined, particularly when consumers are reluctant to directly collaborate with the companies about their specific needs and preferences (Gilmore and Pine, 1997). The key for best making use of these four approaches is to know whatever means of customization the businesses require to provide the necessary consumer unique value (Gilmore and Pine, 1997).

Section 2.1.2 presented the four faces of mass customization. While sometimes it is practical to implement a single approach, most of the time it is essential to combine two or more approaches. Gilmore and Pine (1997) summarize that the most advantageous way of customization is to combine all four approaches as:

> *"They demonstrate the need to mix the direct interaction of collaborative customization, the embedded capabilities of adaptive customization, the forthright acknowledgment of cosmetic customization, and the careful observation of transparent customization into one's economic offerings" (Gilmore and Pine, 1997, p.92).*

2.4. Levels of Mass Customization

Piller (2004) designates three levels of mass customization: style (aesthetic customization), fit and comfort, and lastly functionality.

2.4.1. Style: Aesthetic Customization

Style, or in other words aesthetic customization, pertains the alterations which address sensual or optical senses, such as selecting colors, styles, application, cuts or flavors (Piller, 2004). A significant amount of companies that apply mass customization provide their consumers to modify the outer appearance of the product. Since the product does not require any alterations in terms of its functioning and molding, it is easier to manufacture aesthetic customized products. The consumers all around the world are substantially demanding aesthetic customized products. However, Piller (2004) questions the value offered by aesthetic customization. He also continues that there is not sufficient evidence proving that customizing only the style of the product does not provide adequate unique value to the consumer. Nonetheless, Piller (2004) determines that the companies that only allow aesthetic customization mostly fail.

Contrary to Piller, according to the findings of their study, Mugge et al. (2012) discuss that increasing the degree of aesthetic mass customization has a positive impact on the product's self-expressive attributes. As a result, consumers' intention to purchase a product is positively affected. In addition to this, they also deduce that aesthetically customized products develop a symbolic value, where the consumers find traces of their identity within that particular product. Moreover, consumers appreciate aesthetic customization because it offers them an enjoyable experience (Mugge et al., 2012; Franke and Piller, 2004). Aesthetic components of a product are rather more subjective than the utilitarian attributes. Therefore, their evaluations are based on active responses (Mugge et al., 2012).

One of the most well known examples of aesthetic customization, which is also quite popular among the scholars, is Nike ID, sports shoe brand Nike's online sports shoe customization program. In its website Nike ID offers its consumers to modify the sports shoes' components, i.e. base, tip, laces, sole, etc., according to their preferences of colors, from the predefined list. Therefore, Nike limits consumer integration and feedback as much as possible and mainly allows the consumer to alter the representation of the product according to their needs (Piller, 2004). Figure 2.5 illustrates the online mass customization toolkit of Nike ID, where the consumers perform product configuration.

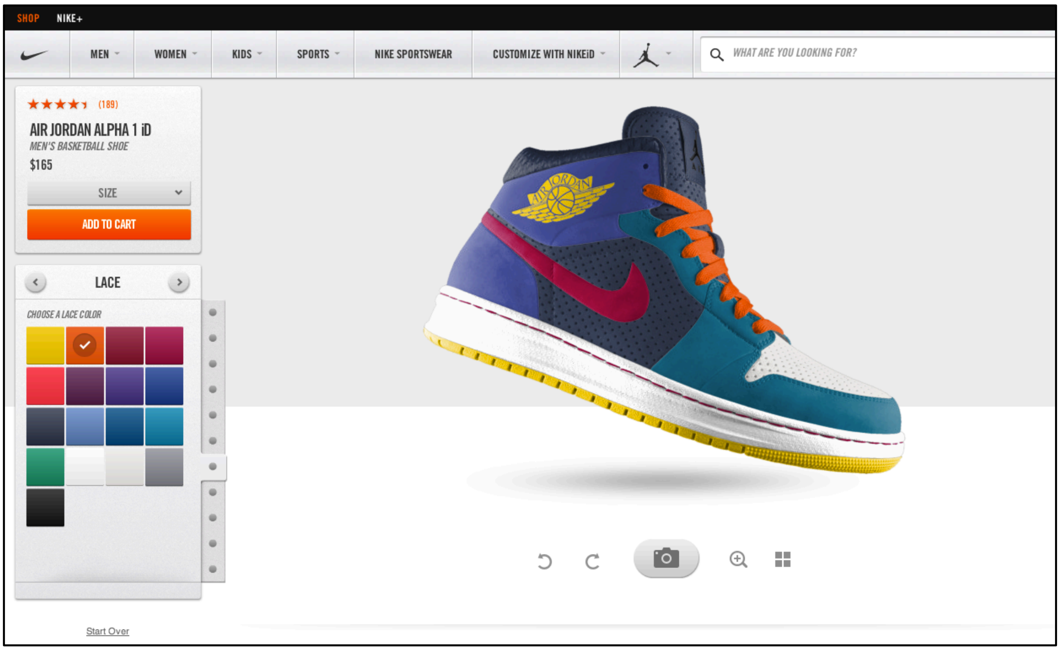

Figure 2.5. Screenshot of Nike ID's Online Mass Customization Toolkit www.nike.com/us/en_us/c/nikeid (Accessed: July 2014).

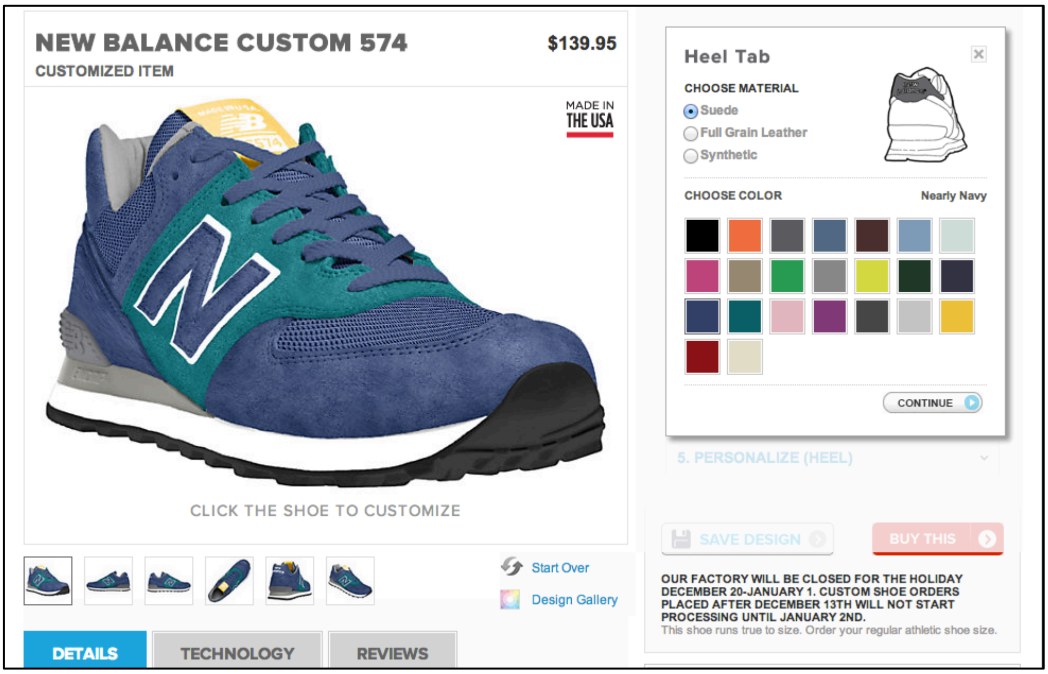

Figure 2.6. Screenshot from New Balance's Online Mass Customization Toolkit www.newbalance.com (Accessed: August 2014).

Besides Nike ID, other sport shoe brands are also applying aesthetic customization on an online basis, such as New Balance. Similarly to Nike ID, New Balance also allows consumers to customize the components' color and material of the sports shoe. Figure 2.6 shows the screenshot of the website of New Balance where consumers are allowed to customize various products with the help of mass customization configurator.

2.4.2. Fit and Comfort: Customization According to Measurements

Fit and comfort level of customization is based on the fit of the product in terms of its size to either body measurement of the individual or other physical dimensions and/or objects (Piller, 2004). Fit and comfort is considered to be the most significant and strongest argument for mass customization, yet again is the most intricate level considering the capabilities of manufacturing, consumer engagement to the process and costly expenses. Piller (2004) describes fit and comfort customization as:

> *"But it is also the most difficult dimension to achieve in both manufacturing and consumer interaction, demanding expensive and complex systems to gather the consumers' dimensions exactly and transfer them into a product which has to be based on a parametric design (to fulfill the requirement of a stable solution space)"(Piller, 2004, pp.321).*

Therefore, the companies that implement mass customization are faced with the fact that the most favorable level of mass customization is the most challenging to implement, which can not be applicable for every business.

2.4.3. Functionality: Mass Customization of Technical Specifications

Functionality is the last chain of mass customization, where specifications such as speed, power, cushioning, output devices, precision, upgradeability or similar technical attributes are addressed (Piller, 2004). Functionality requires the attainment of bringing out the necessary information on consumers' desired preferences and needs concerning products' functions. In some cases, manufacturing the desired functionality is quite achievable. As Piller (2004) illustrates, developing software content of a product sets a ground for an increased customizability of functional components. Ceaselessly reconfiguring a product can be possible by means of the embedded configurators as a new technology for the consumers. However, providing mass customization merely in a self-customizable manner with a closed system will avoid businesses to earn from their own products. Therefore, they need to offer add-on services that will make the consumers depend on the company to create a continuous relationship.

In spite of software, not every customization requirements can be integrated digitally in a product. Unfortunately, there is a significant incompetency about manufacturing-based customization regarding functionality. Functionality is considered to be the least facilitated level of mass customization (Piller, 2004).

To conclude about the levels of mass customization, no matter what the scholars entitle these levels, aesthetic customization or personalization, collaborative customization or fit and function, the literature agrees that the ideal way of mass customization is to combine these levels. According to Piller's (2004) definition of the levels of mass customization, miAdidas, a world-wide known sports shoe brand Adidas' customization program, accomplishes to combine the three levels, which is the most challenging yet most affective way of mass customization.

Adidas offers a full range of customization options in miAdidas program: fit (length and width of each foot); performance (outsole and midsole options and seasonal upper materials); and design (selected among over a hundred color combinations and optional embroidered lettering). These stages are required to be done in person at selective Adidas stores (Boër and Dulio, 2007). However, the online store of Adidas allows consumers to perform the aesthetic customization (choosing the color combinations). Since Adidas supplies a full package, the level of the product, process and information complexity, and consequently the costs are much higher in Adidas compared to the brands like Nike ID or New Balance that only provides aesthetic customization (Piller, 2004). Nevertheless, Piller (2004) states that Adidas manages to interact with its consumers and gather the necessary data on market trends and individual preferences. By this way, consumers' willingness to pay and value for the customized products are higher at Adidas. If Adidas does not focus on communicating with the consumers and engaging them to the mass customization process, even the most advanced and perfect fulfillment system would make no sense if it cannot prove its added value to the consumer (Berger et al., 2003).

2.5. Requirements for Design for Mass Customization

The literature involves various different terms with similar content concerning the requirements for design for mass customization, introduced by a number of researchers. There are four major requirements that designate companies' capability to implement mass customization (Piller et al., 2012; Duray et al. 2000). In this dissertation, the contents are discussed under *Solution Space Development, Modularity,* and *Choice Navigation*, respectively.

2.5.1. Solution Space Development

The most crucial capability of a company that is aiming to implement mass customization is to determine the characteristic needs of its consumers (Piller et al., 2012). While mass production deals with the central tendency of the consumers' needs and offers them only a restricted amount of standard off-the-shelf products, mass customization entails understanding consumers' requirements and preferences in a product. Mass customization provides a continuous communication and a more instant feedback circle from the consumer to the company.

As Piller and Walcher (2014) describe, once the company identifies the needs of its consumers, 'boundaries of its playground' is determined. To be more explicit, the company sets the ground for its solution space, and decides what specifications it will present in its products and what it will not.

Identifying the solution space also implies to reinforce the 'playground' with the past experiences and know-how of previous consumers and almost-consumers (the consumers that come to the final stage of customization but give up purchasing the product) (Piller and Walcher, 2014). These data gathered from the past experiences can be turned into advantage, and used for developing the preferences of products to improve consumers' satisfaction.

Naturally, the success of a solution space development is also correlated with the potential sacrifice that consumers are volunteered to make for customized products such as the price they are willing to pay and delivery time of the mass customized products (Silveria et al., 2001).

2.5.2. Modularity

Mass customization stands for providing unique products for individual consumers in high volumes with a cost-effective manner by means of the available information technology and flexible manufacturing processes (Duray et al., 2000). Literature suggests that modularity is the key to attain low cost mass customization. Modularity can be used in various ways on account of an affective mass customization; modularity in production enables achieving economies of scale and scope, while modularity in product design supplies diversity of configurability and speed, which in turn, provides a better operation of manufacturing and positive responses from the consumers. Duray et al. (2000) stress that modularity supplies a commonality in the production side of the components, while offering prominent end products to the consumers.

Even a few decades earlier, the scholars agreed that modularity played a critical role in optimizing mass customization. As Tseng and Jiao (1996) suggest, one of the key enablers of mass customization is to assemble the most cost-effective building blocks. By this way, the companies are able to re-use their design, which brings about the increase in production capacity, tooling and supplier base, time and cost efficiency in design and manufacturing.

While the re-use of internal modules and components provides convenience to companies' economy, in the meantime diversity of the choices in customization offers an enjoyable process and satisfying end products to the consumers (Tseng and Jiao, 1996).

Modularity allows offering a reasonable amount of choices to the consumers, since they may struggle to decide in the case of unlimited choices that may cause mass confusion. With modularity, the resulting modules are mixed, swapped or completed at the final stage of production that correspond to each individual consumer's preferences (Kaplan et al., 2006).

2.5.3. Choice Navigation

The final significant requirement for successful mass customization that a company should possess is the ability to identify its consumers' problems and suggest solutions, while offering the optimal amount of options to avoid burden of choice (Piller et al., 2012). When consumers are faced to deal with an excess variety of choices, the cognitive cost of evaluation will be heavier than the convenience of being offered more choices, leading to 'paradox of choice' or 'mass confusion' (Teresko, 1994). Hence, the costs might reduce the consumer value of customized products (Schreier, 2006). The consumers can feel frustrated and therefore postpone or completely cancel their buying decisions. For this reason, the third requirement, which Piller et al. (2012) define as: *"The organizational capability to simplify the navigation of the company's product assortment"*.

Choice navigation needs to be implemented for successful mass customization. The consumers are given choices through the medium of configuration systems called 'mass customization toolkits'. When the choice navigation systems are structured in an optimal way, by presenting a relevant amount of attributes to consumers, toolkits can create a positive attitude on the consumers. It should be remembered that the foremost reason why consumers would embrace mass customization is the creative and unique products they bring about as a result of an enjoyable customization process, which enables them the feeling of accomplishing a satisfactory outcome (Piller, 2004). Therefore, choice navigation and therefore, toolkits can provide intrinsic and social benefits that impress consumers with a positive impact, which will hopefully make them eager to experience the process of mass customization again. Piller et al. (2012) express that choice navigation is determined according to:

- The visual realism of the toolkits,
- Usability of the toolkits,
- Creativity of the process and attributes offered to the consumers,
- Enjoyment of the process,
- Diversity and extent of choices that are able to build unique products,
- Uniqueness of the end product.

2.6. Design Parameters in Mass Customization

In their study on user design of customized products, Randall et al. (2007) have introduced two design parameters in mass customization.

Randall et al. (2007) indicate that the consumers are knowledgeable about their utility function concerning a particular product, however unsurprisingly; they have a limited understanding of the technical domain of the design problem. Conversely, the manufacturer is competent about the technical domain but lack an understanding of the consumers' preferences in a product.

When the consumers are introduced to the process as decision-makers about the attributes of the product in mass customization, the intended result is to offer such a product that both satisfies consumers' needs and provides a higher willingness to pay for the particular product. Notwithstanding, either due to the overwhelming confusion of inexperienced consumers or to the excessive information and design complexity caused by the supplier, design defects may arise (Randall et al., 2007). Due to this, the consumer is left with a product that does not exactly fit her needs.

This lack of proper interaction can be caused by several reasons. First, in the case where the consumer determines product's functional attributes, satisfying the consumer's preferences is difficult to transfer especially in online mass customization. Second, as Terwiesch and Loch (2004) indicate, when a product's functional specifications are designated with several different design parameters that originate from holistic user needs, a complex mapping of the design parameters is raised.

Randall et al. (2007) have presented two underlying systems concerning consumers' co-design of mass customized products: parameter-based systems and needs-based systems. Parameter-based systems allow the consumer to identify quantitative and technical values of the attributes of the product, whereas needs-based systems provide the consumers the possibility to define a comparative importance of their needs. Accordingly, an optimization algorithm comes into play to offer the consumer such design parameters that have the potential to enhance the functionality of that particular product.

Especially in the case of parameter-based systems, the consumers' expertise plays a significant role. If the consumers have a good command on the products' attributes and specify their needs consciously, the comfort and fit of the product increase (Randall et al. 2007). Electronic products are one of the foremost product categories that reveal the importance of consumer expertise, which is likewise observed in the field study of this dissertation. On the other hand, novices are better in expressing their product specifications via needs-based systems. With an automated system, they are able to combine an attainable set of design parameters according to the relative importance of their needs, which provides better fit and comfort to the consumer.

To better imply the difference between these systems, Randall et al. (2007) have generated a structure of need-based and parameter-based systems to consumer utility for laptop computers as shown in Figure 2.7. The fundamental difference between parameter-based approach and needs-based approach is the variables – “knobs” as Randall et al. (2007) describe – that are briefed to the designer.

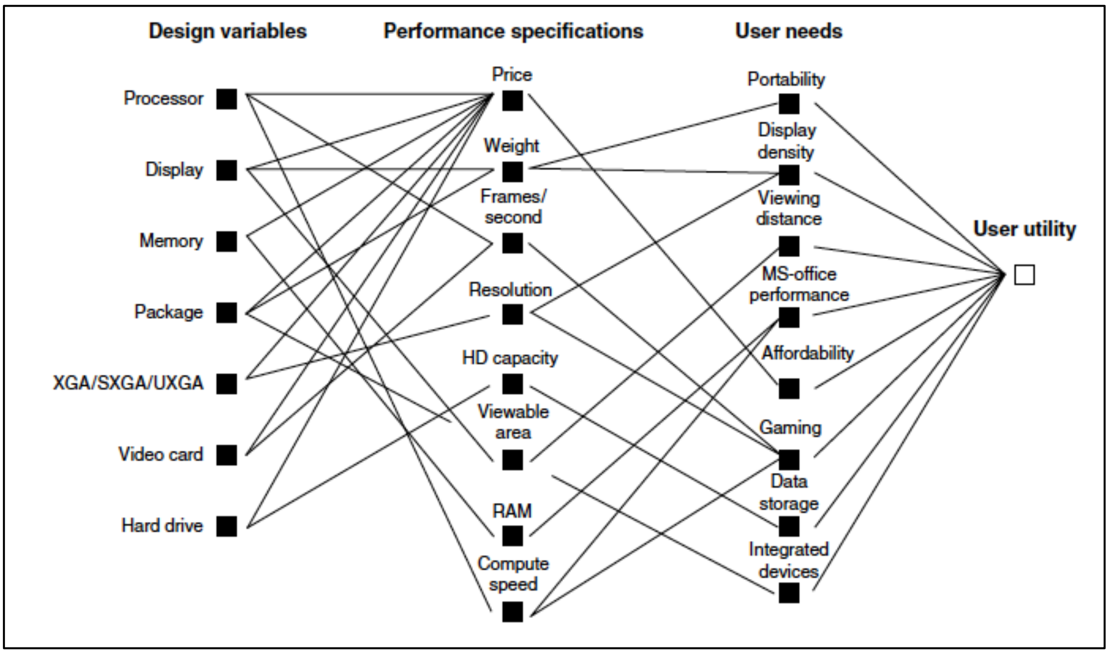

Figure 2.7. Structure of Need-based and parameter-based systems to provide consumer utility for laptop computers (Randall et al., 2007; pp269).

As can be observed from the left column of Figure 2.7, design variables of the utilitarian attributes of the product are presented for a parameter-based system. The right *user needs* column lists the needs of the consumer, which necessitates less technical knowledge about the utilitarian attributes of the product, but serves to consumers’ relative importance of needs.

There are pros and cons for both of the approaches. The parameter-based approach is definite and predictable. Therefore the design space is defined and allows fine-tuning with slight alterations in the design parameters. On the other hand, since needs-based approach depends on the relative importance of a need, the design parameters may have to go through discontinuous changes.

The consumers are obliged to be competent about the technical domain of a product in the parameter-based approach in order to get a satisfying product. However, needs-based approach only expects the consumers to express their relative importance of their needs, which can cater for both novices and expert consumers.

Presenting the design variables of a product as in the parameter-based approach is essential in order for the consumer to see the technical domain of the product. This allows the consumer to compare the defined and transparent attributes of the product with others. In spite of that, understanding the needs of the consumer and providing them the appropriate environment to comprehend their product preferences and revealing the "black box" of the consumer is just as important to procure the necessary data for the designers, which constitutes a significant part of the purpose of this study.

2.7. Mass Customization Toolkits

Depending on their category, not every product has to be fully configurable; sometimes the manufacturing capability of the companies and the design of the products constrain customizability (Shamsuzzoha et al., A 2009). Moreover, since it is not possible to consider the consumers as design specialists in the manufacturer's product field, it would not be fair to expect the consumers to come up with effectively producible and creative custom designs. To solve this uncertainty and still provide the consumers the freedom to compose customized products, manufacturers who have pioneered in this field have brought about configurators, also known as mass customization toolkits, that ease the process for the consumers and help them to be involved in the design of the products effectively (von Hippel et al., 2002).

With the help of the toolkits, consumers are given the opportunity to select predefined packages and configurations, or to combine particular features of the products. Mass customization toolkits are organized as 'user-friendly' design tools that allow trial-and-error experimentation processes and enhance users to develop new products for themselves (von Hippel et al., 2002; Franke et al. 2008). The customers' requirements and choices are mapped within a configurator to create different product options. The mass customization toolkits, which can be an online catalog, an interactive website or a software application, increase the accuracy of the product to meet consumers' expectations, while simplifying the process and reducing the complexity for the consumers (Ristov & Ristova, 2011). Most of the toolkits also present an estimated delivery time as the consumer is done customizing the product.

A well-designed mass customization toolkit can offer assorted advantages over traditional product development (Thomke et al., 2002). To begin with, a successful toolkit is remarkably better at achieving customer satisfaction, since customers are more conscious about what they need than the manufacturers. Secondly, the use of websites speeds the completion of designs and lastly, if the customers follow the rules appropriately within the toolkit, their design of products will be ready for manufacturing without returning for any revisions (von Hippel and Thomke 2002).

2.8. A General Assessment of Mass Customization

The researchers have analyzed mass customization's advantages and limits thoroughly but separately. Therefore, it is worthwhile to examine mass customization from a broader perspective, including both its benefits and limits.

2.8.1. Benefits of Mass Customization

Mass customization originates from the aspiration of integrating the consumer into the manufacturing and design processes in order to fulfill the needs and preferences of individual consumers, thus, increasing the value creation with an enhancement of communication between the company and the consumer (Kaplan et al., 2006). The benefits and strengths of mass customization regarding the fulfillment of consumers' needs have been noticed way before. Even the references, from almost two decades earlier acknowledge that the consumers are willing to pay more as long as their specific needs are satisfied (Tseng and Jiao, 1996). Along with this, the significant benefits of mass customization are explained below.

- **Mass customized products correspond to the consumers' individual needs and provide increased value to consumers.**

  Instead of standard mass produced products, mass customized products offer consumers to alter the products according to their own needs and desires, which in turn increases the appreciation of the value of the product (Hunt, 2006). With the available and developing technology and manufacturing capability, mass customization necessitates flexibility and quick responsiveness, therefore is determined to provide what they want; aesthetic, fit and/or functional (Pine et al., 1993).

- **Mass customization is a beneficial way of differentiating companies among their competitors and acts as a segmented market.**

  Jiao et al. (2003) discuss that companies with low to medium production volumes can overtop their competitors by facilitating mass customization, with the aid of flexible manufacturing systems and computing technologies.

- **Mass customization supplies customized products with near mass production efficiency with a cost-effective manner, avoiding unnecessary inventory.**

  It provides the ability of supplying a full line of products with lower costs. Since mass customization's system works as production to order, not production to stock, it reduces the risk of producing obsolete inventory and material waste, and manufactures according to the demand of the consumers (Pollard et al., 2008).

- **Mass customization provides the active participation of the consumer in the design process, which gives them an enjoyable process of customizing their own products.**

  Even though the mass customized products are composed according to the predefined list of choices, consumers may perceive themselves as the designers of the products (Schreier, 2006). Therefore, consumers embrace the "I designed it myself" effect (Franke et al., 2010; pp3).

Mass customization makes the consumer engage in their own problem solving process and contemplate about own preferences in a product, instead of a passive take it or leave it approach like an off the shelf product.

- **Consumers that act as co-designers in the process of mass customization are likely to give more value on the product.**

  Mass customization provides consumers the pleasure of acting as a co-designer of the product. Due to the time and effort they spend on the product, it becomes more valuable. They even might undergo strong feelings of pride, which Schreier describes as "pride of authorship" (2006; pp323).

Merle et al. (2008) have conducted a qualitative study on a group of twenty participants, using the Nike ID program to measure the mass-customized product and the mass-customization experience value. According to the responses of the participants, the mass customized *products*' value can be evaluated as utilitarian, unique and self-expressive, while the *experience* of mass customization comprises hedonic and creative fulfillment values. One of the beneficial perspective that mass customization can make use as an opportunity, is the consumers' willingness to experience and the enjoyment of the customization process.

Piller (2004) also describes how important the experience of consumer engagement is to the value that consumers place on customized products. His research has shown that consumers place value on the following: *product satisfaction, fit, uniqueness, process satisfaction, flow, pride of authorship, peer recognition* and *emotional factors.*

Another significant benefit of mass customization is that co-design platforms concede the consumers to design their own products (Berger and Piller, 2003). In these platforms, instead of structuring endless questions and expect every consumer to answer them, consumer integration is in the foreground; consumers play an active part and provide beneficial contents about their preferences on customized products. Apart from these, empirical studies point out that consumers are willing to pay 150 percent more to a customized product, since it provides a better fit to their requirements and satisfy their need of self-expression (Franke and Piller, 2004; Piller, 2004).

2.8.2. Limits of Mass Customization

To begin with the grounding of the term mass customization, as Piller (2004) states, the term lacks a general definition, which prohibits the spreading of carrying out mass customization. Its interdisciplinary structure makes it hard to comprehend its functions and abilities. There are several limitations of mass customization that require to be worked out and gradually transform into opportunities.

Production technologies, the means for developing better toolkits and their accessibility via the Internet are promising progresses for implementing mass customization. Nevertheless, the outcomes of purchasing a customized product are still quite vague to the consumers and this prejudice prevents them to discover the benefits of mass customization (Hunt, 2006).

Adding up to this, the consumer often has the substantial information about his/her requirements, but has limited or no understanding of the technical prerequisites of the design problem. Conversely, the manufacturer is sufficient in grasping the technical requirements but lacks the knowledge about the consumer's preferences (Randall et al., 2007). Sometimes this dilemma is caused by external complications. The consumer lacks the knowledge about a particular product and is incapable of proceeding with the customization process properly, or simply is not conscious about his/her individual needs (Fürstner and Anišic 2010). This unilateral lack of communication is an external threat that causes a stillborn situation and makes mass customizers' hands become tied.

- **Consumers may have limited knowledge about the solutions that would match with their needs.**

  Consumers in general are quite unaware of what solution might be compatible with their needs (Piller, 2003). Sometimes, they may not even be certain about their needs as well. Therefore, they are confronted with indecision during the process of designing the product.

- **Unfamiliarity with using the toolkits might negatively affect the designing process and willingness to pay.**

  Discomforts with using a toolkit that consumers are not familiar with or do not have enough knowledge about, might also cause frustration and end up by terminating the process of customizing. For that reason, the front end of consumer integration in a mass customization system plays a crucial role that needs to be handled attentively (Piller, 2003). Designing the configuration system -the toolkits- should consider the user-friendliness of the interface. Moreover, feasible amount of options should be offered in order to avoid turning the consumers away just from the beginning of the customization process.

- **Dealing with an excess amount of choices may cause mass confusion.**

  The burden of facing excess amount of options causes information overload to the consumers (Piller, 2004). The companies need to figure out what their consumers might want, and build up the choices of attributes accordingly with a reasonable amount.

- **Information gap regarding the attitude of the supplier might cause a negative impact on consumers' buying behavior of customized products.**

  Even though there exist many implementers of mass customization, customizing a product with a set of tools is quite unknown for many consumers (Piller, 2004). Therefore, the company needs to place trust to the consumers about the usage of toolkits and guide them in a proper way such that the process will not intimidate them. Besides this, the consumer has a cloud of thoughts in mind, considering the trustworthiness of the company, the correspondence of the product one sees on the monitor with the actual product, the period of time he/she has to wait for the delivery of the product and so forth. These are important matters that make mass customization challenging.

- **From an academic perspective, there is a serious insufficiency of practical field research on understanding mass customization from consumers' point of view.**
  There are real life examples of companies that implement mass customization. However there are only a few studies that set up an interaction between the user and the customized product. The consumers do not have hands-on experience with mass customization or its toolkits. Therefore, understanding consumers' preferences and choices become an important problem. This is one of the very reasons for this particular study.

2.9. Consumers' Needs and Preferences in Mass Customized Products

Mass customization of products should be implemented according to the needs and preferences of the consumers. However consumers' preferences are not always easy to extract. As Cunhaa et al. (2010) describe, choosing selective attributes of a product is an outcome of a cognitive process, filtering and combining them according to both objective and subjective variables. In some cases, as Thomke and Hippel (2002) determine, even when the consumers are decisive about their needs, they are not able to transmit the necessary data to the companies or manufacturers adequately. Therefore consumer driven strategies can cause unnecessary costs to the companies, thus the consumers' expectations need to be analyzed thoroughly before getting ahead of mass customization strategies.

2.9.1. Factors Affecting Consumer Preferences in Mass Customization

Lihra et al. (2012) identified various aspects that affect consumer preferences on mass customized products. An extensive amount of attributes that can be customized in a product is expected to have a positive impact on the consumers' product preferences. This does not mean to cause an information overload to the consumer with hundreds of different options in a single attribute, but to allow them to be involved in the design decisions of the overall product as much as possible. Lihra et al. (2012) also highlight some aspects that are expected to cause a negative impact on consumer preferences. Duration of the customization time needs to be optimized so that the consumer will not feel reluctant to continue with the customization process. The excessive amount of options that cause mass confusion, explained earlier in the previous sections, and complexity of the interface of the mass customization toolkits can prolong the period of time. Therefore the consumer may not complete the purchasing action. Another aspect that may prevent the consumer to complete the purchasing of the product is undoubtedly the price of the mass customized product (Lihra et al. 2012). Mass customization in general aims to maintain the near mass production efficiency and demand only relatively higher prices in order to achieve large masses. However, some companies offer overwhelming prices for their customized products, which cause negative impact on consumer preferences of customized products. Delivery time is considered to play a negative role in consumers' preferences of customized products. The consumer may be enjoying the process of customization and picturing how amazing the product will be, perfectly fitting to his needs, until discovering the long-drawn-out delivery time of the product right before finalizing the purchase. This can cause the consumer to postpone or completely terminate purchasing. Therefore, the companies need to provide an inviting environment and minimize the negative impacts as much as possible for the consumers to prefer mass customized products.

Piller (2007) emphasizes that according to several studies, most engineers have deduced that the primary obstacle that the consumers face is not the product complexity, but lack of knowledge about the particular product. As explained in section 2.6 Design Parameters in Mass Customization, consumers without necessary knowledge about the product cannot fully express their preferences. This can also be caused by the companies that provide customized products. If they are not able to generate the mass customization toolkits and transfer the adequate information about the product, the necessary communication between the company and consumer will not be reached.

Likewise, the communication problem can occur from the consumers' perspective. Piller et al. (2004) state that most of the consumers are unable to describe their needs even when they precisely know what they want. Consumer integration to the design of a customized product therefore provides easier access to consumers' preferences. As Piller (2004) describes, tastes and design patterns are subjective issues and hard to be described by the consumers. Even functionality is a subjective matter when it comes to consumer preferences. With the assistance of a proper design toolkit, the companies are able to transfer these needs and preferences into customizable products within the frame of manufacturability and accumulate this 'sticky information' to provide more accurate data about consumers' preferences (Piller, 2004, pp. 327).

Du et al. (2003) explain that understanding consumers' preferences from a consumer point of view is significant, however comprehending the individual consumers from the designers' point of view is just as important to guide the consumers and help them explore the preferences of attributes of a product that they need.

2.9.2. Consumers' Need for Uniqueness

Gabrielsen et al. (2010) emphasize that especially for the last few years, the aesthetic attributes of design of a product is emerging to play an important role on the added value of the product. Consumers have begun to appreciate the non-functional attributes of a customized product and their preferences have importantly shifted on these particular specifications. Functionality is still an important focus on customized products, however the self-expressive attributes of a product and need for uniqueness of the consumers are getting ahead. As Hunt (2006) articulates, the opportunity to alter a product's attributes of mass customized products satisfies the needs of the consumers who desire to express their self-concept with uniquely self-expressive products.

CHAPTER 3

FACTORS AFFECTING CONSUMERS' PREFERENCES IN ONLINE SHOPPING

With the advance of the Internet, a paradigm shift has emerged in the way things are (Richa, 2012). The increase of computers in households paved the way to the access of Internet (Ganguly et al., 2010). The routines and daily habits of individuals have drastically changed. Internet has become a primary source for the consumers to search for and use information. Along with the Internet's immense offerings, consumers' shopping perception has also changed. Consumers expect to get immediate response when they are comparing products in terms of their prices and information. The factors that affect consumers' preferences in online shopping are explained in details in the following sections. These categories have been identified as a result of an extensive review of the related literature. Depending on their content, these factors are divided into two main categories: *consumer based factors* and *web based factors*. To begin with, the consumer category includes five main factors, which are *demographics, psychological perception, online shopping motivations,* and *online shopping experience*. The website category contains nine main factors namely *ease of use, perceived usefulness, privacy and security, interface design, product information, product representativeness, ease of navigation, reliability and fulfillment, customer service quality and delivery speed*. Table 3.1 encapsulates the whole categorization regarding the factor types and individual factors related to consumers' online shopping preferences, together with the major findings of associated studies. The following sections discuss these factors in reference to the literature review.

Table 3.1. Factors related to online shopping

	Consumer-Based Factors				
Factor Types	Demographics				
Individual Factors	Gender	Age	Education	Income	Culture
Studies	[Kumar (2000); Office of Fair Trading (2007); Wynn (2009)]	[Office of Fair Trading (2007) ; Sorce et al. (2005)]	[Wu (2003); Sultan (2011)]	[Clemes et al. (2014)]	[Chau et al. (2002)]
Major Findings	Male consumers tend to buy electrical products more than females, where females are more likely to purchase apparel and household products online.	There are mixed findings about the relationship of consumers' age and factors affecting their online shopping preferences. However, studies show that younger consumers find online shopping more convenient than older consumers do.	Participants with higher education level are found to have positive attitude scores towards online shopping.	Chinese consumers with higher incomes do not prefer to shop online, which may be interpreted as they prefer to buy branded products from up-market retail stores and examine products physically.	Due to the unique characteristics and reciprocity of culture and technology, consumers' online shopping behaviors are only slightly different in varied cultures.

Table 3.1. (Continued)

	Consumer-Based Factors				
Factor Types	Online Shopping Motivations		Psychological Perception		
Individual Factors	Information Seeking	Convenience	Perceived Risk	Attitude	Behavior
Studies	[Zeithaml et al. (2002)]	[Clemes et al. (2014); Ahuja et al. (2003); Chiang & Dholakia (2003); Jiang et al. (2013)]	[Cox & Rich, (1964); Ye, (2004)]	[Kumar (2000); Kim (2004); Monsuwé et al. (2004); Noh (2008); Jun et al. (2011)]	[Solomon, (1998); Koufaris (2002); Keisidou et al., (2011)]
Major Findings	It is more beneficial in online shopping to receive direct information from a website rather than visiting the stores as it is done in offline shopping.	Convenience is concerned to be one of the primary factors that motivate consumers to shop online.	There are levels of uncertainty of the consumers when they make a purchase decision while online shopping, which is defined as perceived risk.	Attitude is a person's overall assessment of a favorableness of a certain behavior. Consumer attitude is a significant factor to distinguish consumer to shop online.	Consumer behavior studies the processes of the consumer's act of selecting, purchasing using and/or disposing the products to satisfy their needs and desires. Online consumer behavior is more demanding, challenging and practical in comparison with offline consumer. Therefore the loyalty of online consumers is lower compared to offline consumers.

Table 3.1. (Continued)

	Consumer-Based Factors				
Factor Types	Online Shopping Motivations				
Individual Factors	Enjoyment	Perceived Lower Prices	Time Saving	Variety Seeking	Immediate Possession
Studies	[Monsuwé et al. (2004)]	[Ahuja et al. (2003)]	[Ahuja et al. (2003)]	[Rohm et al. (2004); Clemes et al. (2014)]	[(Rohm et al., 2004)]
Major Findings	Consumers develop a more positive attitude if they enjoy their online shopping experience and more likely to welcome the Internet as a shopping medium.	Better prices are found to be an important motivation for consumers to shop online.	Time saving is one of the reasons that make consumers prefer online shopping.	Variety seeking is an important motive that encourages consumers to shop online. Therefore online retailers should increase the product types and brands that are available online.	Consumers can expect instantaneous delivery of products and prefer immediate possession of products.

Table 3.1. (Continued)

	Consumer-Based Factors				
Factor Types	Online Shopping Experience				
Individual Factors	Emotion	Products Purchased Online	Satisfactory Levels of Prior Online Purchases	Personalization	Apprehensiveness of PC & Internet Usage
Studies	[Koufaris (2002)]	[Chiang & Dholakia (2003); Office of Fair Trading (2007)]	[Monsuwé et al. (2004)]	[Wynn (2009)]	[Kumar (2000)]
Major Findings	Emotions are influenced by the physical and social stimuli in the environment and the individual's personal traits, which can all have an effect on consumers' act of online shopping.	Product types influence consumers to shop online. Although there are mixed findings about products purchased online, products such as books and tickets are purchased more frequently.	It is identified that prior online shopping directly impacts attitudes towards shopping online. When a consumer goes through a satisfactory online shopping experience, their intentions to shop online in the future are more likely.	Personalization provides an individualized shopping experience, where consumers are able to find products that match their needs much more easily.	Familiarity with computers and online shopping procedures has a positive effect on consumer to shop online.

Table 3.1. (Continued)

	Website-Based Factors				
Individual Factors	Product Representativeness	Product Information	Interface Design	Privacy and Security	Perceived Usefulness
Studies	[Parks, J. H. (2002)]	[Park & Kim (2003);	[Ganguly et al. (2010)]	[Shergill & Chen (2005); Chen et al. (2010); Delafrooz et al. (2011); Clemes et al. (2014)]	[Castañeda et al. (2007); Jaturavith (2007); Chen et al. (2010); Cyr (2010); Jun & Jaafar (2011)]
Major Findings	Product movement in websites makes people pay more attention, and influences a positive mood on the consumers. On the other hand, there is no significant effect of the product image size to the consumers' attitude towards online shopping.	Quality of information is found to be the most important factor among the attributes of an online shopping website.	Interface design of a website comprises of information design, visual layout design and navigation design.	Trust and security issues are the main factors that prevent consumers from online shopping. Online retailers should inform consumers by means of posting formal privacy policies of their online security system on their website, specify rights and obligations of trading parties, and more importantly, acquire superior encryption technology.	Perceived usefulness is a primary determinant that positively affects the intention to continue visiting and shopping from a website, and encourages consumers to develop favorable attitude toward online shopping, irrespective of the level of experience of the user.

Table 3.1. (Continued)

	Website-Based Factors		
Individual Factors	Delivery Speed	Customer Service Quality	Ease of Navigation
Studies	[Chen et al., 2010)]	[Minjoon et al. (2004); Sorooshian et al. (2013)]	[Cyr, (2008)]
Major Findings	It is one of the essentials of consumer satisfaction to provide a reliable and accurate delivery.	Consumers' satisfaction in online shopping is directly related with customer service quality. Customer service quality requires the information of consumers' needs, preferences and their expectations from the online shopping process.	Consumers expect the online shopping websites to be easy to navigate in.

The examination of the relevant literature review reveals that are that there is not enough qualitative research questioning consumers' preferences in online shopping. There are a vast number of empirical studies, which are generally related with demographics of the consumers, mostly implemented in Far East countries and in the US. There are very few studies made in Turkey and likewise, these studies concentrate merely on the demographics of the consumers. Apart from demographics, consumers' behavior and attitudes towards online shopping is another subject that is intensively examined. However, these are mainly empirical studies and instead of one-to-one questionnaires, surveys are applied to a large number of participants. Therefore, it is evident that the literature needs an in-depth study for examining consumers' preferences and their hands-on experience in online shopping.

3.1. Consumer-based Factors related to Online Shopping

Consumer-based factors include various aspects that are consumer originated. These are namely *demographics*, *psychological perception, online shopping motivations, online experience,* and *online shopping experience*.

3.1.1. Demographics

The most persistently studied factor in online shopping is by far consumer demographics (Zhou et al., 2007). The literature review proves that there have been many researches questioning the effects of consumers' gender, income, age, education and culture on online shopping.

3.1.1.1. Gender

There are varied approaches concerning the effect of gender in consumers' online shopping preferences. Wynn (2009) conducted an empirical survey using Likert Scale in order to evaluate the contribution of demographics to consumers' intentions to engage in online apparel shopping. The target group of 18 years and older was reached by online surveys. According to her study, female participants tend to buy apparel online more than male participants. Female participants are more concerned with the fit of apparel products than males. Male consumers are more interested in purchasing electronic products such as TV, computer software and/or hardware, entertainment or leisure items. On the other hand, female consumers tend to purchase online household products more than males (Kumar, 2000). In Richa's (2012) research, it is found that females shop online more frequently than male participants. While male participants shop averagely 1-2 times per month, female participants shop 3-4 times per month from the Internet. Richa interprets this as females being more impulsive buyers than males, since females are tend to be more interested in sales and promotional offers and follow these more than male consumers.

3.1.1.2.Age

There are several studies that examine the influence of age on searching and purchasing products online. According to the research of Sorce et al. (2005), younger consumers tend to search products more and longer in online stores than older consumers, while there is no distinct difference encountered between two age groups in terms of the amount of products purchased online. This leads to the conclusion that older consumers shop online as much as the younger consumers do. Nonetheless, the time and effort they spend for online shopping causes reluctance, therefore older consumers are more decisive and focused on what to buy and try to spend their time more effectively, while younger consumers spare more time for searching through products and the pre-purchase process. The same research attained that younger consumers find online shopping convenient more than the older consumers do.

The product categories also vary according to different age groups. Sorce et al (2005) present that younger consumers purchase music and music related products, while older consumers in their focus group tend more to buy garden tools.

3.1.1.3. Education

Wu's study (2003) determined that the participants with junior high school education have higher attitude scores towards online shopping. Sultan et al. (2011) indicate that consumers who prefer online shopping primarily consist of individuals with higher education and income level. In their research, Sultan et al. (2011) conducted a survey in Gotland University, where 75% of the respondents were bachelor and master students. Contrary to this, Richa (2012) argues that education does not significantly affect online shopping in the Indian context.

3.1.1.4 Income

Hashim et al. (2009) noted that the level of income and job description have an effect on preferences on online shopping. Their results show that consumers with higher level of income and with management level jobs are more likely to prefer online shopping. On the other hand, according to Richa's (2012) research findings, there is not a distinct correlation between consumers' level of income and online shopping.

3.1.1.5. Culture

As Zhou et al. (2007) state, culture contains values that affect societal perceptions, attitudes, preferences and responses. There are a number of studies that examine how cultural values affect online shopping. Most of these studies are performed locally to get an understanding of that specific culture's tendencies and approach to online shopping. Culture is one of the most important factors in demographics that affect online shopping preferences on consumers. Al-Qudah et al. (2013) indicate that culture's influence can be observed in consumers' behavior and attitudes while shopping online. Willingness to pay and trust in online transactions is also affected by consumers' cultures.

3.1.2. Psychological Perception

Psychological perception of consumers regarding online shopping is affected by consumer *behavior*, consumer *attitude* towards online shopping and *perceived risk* of consumers.

3.1.2.1. Behavior

Consumer behavior studies the processes of the consumers' acts of selecting, purchasing using and/or disposing of the products to satisfy their needs and desires (Solomon, 1998). Koufaris (2002) states that the online consumer behavior is more demanding, challenging and practical in comparison to offline consumer. Therefore the loyalty of online consumers is lower compared to offline consumers. Consumer behavior is influenced by cultural, social, personal and psychological factors (Keisidou et al., 2011).

3.1.2.2. Attitude

Attitude is a person's overall assessment of a favorableness of a certain behavior (Kumar, 2000). For instance, a person may enjoy reading a book alone, where the act of reading a book alone is the behavior, and enjoyment – the feeling– is the attitude of the person. Consumers' attitude directly affects consumers' buying willingness (Jun & Jaafar, 2011). The attitude towards online shopping can be described as the degree that the consumer evaluates online shopping at the website of the retailer either positively or negatively (Noh, 2008). Consumers' attitude highly depends on the online shopping experience they go through. If they go through an enjoyable online shopping experience, they develop a positive attitude towards online shopping which increases their tendency to embrace the Internet as a shopping medium (Monsuwé et al., 2004). Consumers' online shopping attitudes can also be affected by their preferences of social motives of shopping experiences (Wynn, 2009), meaning that some consumers prefer to shop outside and be involved in social experiences along with purchasing, while others can enjoy the practical and time-efficient online shopping. In these cases, websites are beginning to offer more interactive experiences in order to increase the social activity online and attract the attention of the traditional offline shopper as well (Kumar, 2004).

3.1.2.3. Perceived Risk

There are levels of uncertainty of the consumers when they make a purchase decision while online shopping, which is defined as perceived risk (Cox & Rich, 1964).

Perceived risk is an underlying driver of consumer behavior in online shopping, where consumers experience pre-purchase uncertainty as to the type and degree of expected loss resulting from the purchase and use of a product (Ye, 2004). Bauer (1960) introduced this concept to consumer behavior to investigate the motivations and consequences like information seeking, brand loyalty, opinion leaders, reference groups and pre-purchase deliberations. Consumers attempt to lessen their uncertainty during an online purchase decision by means of gathering more information about he particular product and seek reviews and recommendations from certain trusted review and comparison websites or from people they know.

As Monsuwé et al. (2004) describe, consumers' prior experiences about online shopping are important determinants of perceived risk levels. Provided that, positive online shopping experiences decrease the level of perceived risk. On the other hand, if the consumers evaluate their past experience negatively, they will be unwilling to undertake online shopping for their future purchase intentions.

3.1.3. Online Shopping Motivations

There are various aspects of online shopping that consumers find beneficial and motivate them. These are namely: *convenience, information seeking, immediate possession, variety seeking, time saving, perceived lower prices,* and *enjoyment.*

3.1.3.1. Convenience

Convenience designates the practices and services that minimize the time and effort during the transaction process that the consumer experiences in online shopping websites (Chen et al., 2010). Convenience is considered to be the primary reason that encourages consumers to shop online. In their study, Ahuja et al. (2003) indicate that the students in their study group explain convenience as avoiding dealing with the salespeople, parking problems and checkout lines. Online shopping presents better convenience than other shopping mediums, which motivate consumers to shop online (Chiang & Dholakia, 2003). Contrary to what is believed, consumers are more interested in convenience as a motivation to shop online rather than price advantages

(Ahuja et al. 2003). OFT (2007) lists the general point of view of the consumers when describing the convenience of online shopping. Accessibility from anywhere with the Internet at any time is the foremost driver of online shopping convenience (Jiang et al., 2013; OFT, 2007). They do not need to leave home and stroll around until they find a product that matches their needs. Therefore consumers are able to enjoy the accessibility of products and brands, which are not available around their location. Being able to track their product is another reason for them to find online shopping convenient.

3.1.3.2. Information Seeking

The Internet offers a whole extent of information, where the consumers seek to eliminate the unreal and grasp correct information about particular product. Participants of the focus groups in various researches state that they appreciate diverse and comprehensive product information, which can be gathered from user comments, comparison websites, and the retailers (OFT, 2007). As Zeithaml et al. (2002) indicate, online shoppers find it beneficial to acquire information directly from a website while online shopping. On the other hand, in offline shopping, they have to visit the store and communicate with the sales person. Therefore online shopping makes it easier to access information about the products.

3.1.3.3. Immediate Possession

Consumers can expect instantaneous delivery of products, which brings about the term *immediate possession* (Rohm et al., 2004). While there are retailers that provide fast delivery from their online shopping websites, some others may not be able to allow immediate possession to their consumers due to location, product procurement and so forth. Therefore, immediate possession as a driver may lead both to online and offline stores in various cases.

3.1.3.4. Variety Seeking

Variety seeking can be expressed as the need to diversify options of stores, brands and/or products (Rohm et al., 2004). Online shopping provides simultaneous multiple product searching. For that reason, consumers are able to search for products that differ in terms of brand, model, price, color, context and so on. The ability to make instant comparison between the products makes online shopping more beneficial than offline shopping in terms of variety seeking.

3.1.3.5. Time Saving

Time saving is one of the most beneficial conveniences that online shopping offers to the consumers (Sultan et al., 2011). Browsing a product online can save much more time than visiting physical stores in offline shopping. Traveling is eliminated when it comes to online shopping. Moreover, consumers are able to shop whenever and wherever they like. Therefore, consumers do not have to wait for the opening hours of the offline stores when they can easily visit the websites of the desired products. Especially when the product they are looking for is available in other countries, it is much more time saving to buy it online than waiting for the chance to go there.

3.1.3.6. Perceived Lower Prices

Better price option is another important driver for online shopping. Survey of OFT (2007) indicates that nearly three-quarter of the participants stated lower price as a motivation to shop online, and more than half of them stated that special offers and free delivery of goods are other financial benefits of shopping online.

3.1.3.7. Enjoyment

Monsuwé et al. (2004) describe enjoyment as gratification and playfulness of the experience of online shopping, instead of merely completing the purchasing task. Koufaris (2002) indicates that the online shopping environment does not always offer the enriching and fulfilling shopping experience as offline shopping provides, since it is restricted with images of the products and text based information. Nonetheless, Kim etl al. (2007) indicate that enjoyment resulting from the online store environment can positively affect the online shopping experience and consumer satisfaction.

3.1.4. Online Shopping Experience

User experience surrounds all aspects of the end-user's interaction with the company, its services and products, where the online experience is related to the feelings the consumers have when they are in an act of online activities (Zhou et al. 2007). According to their study, Levin et al. (2005) revealed that consumers prefer online shopping in situations where there is a wide range of product attributes to be selected and shopping quickly is prevailing. Shopping quickly requires the consumer to know specifically what they want and be knowledgeable about the particular product. On the other hand, when personal service is required and the consumer needs to see-touch or handle the product, consumers prefer offline shopping to online shopping.

The online shopping experience incorporates the feelings consumers have when they are in the act of shopping online. The online shopping experience is an important determinant for the consumers' attitude towards online shopping and it is one of the major components that pave the way for a successful purchasing act (Zhou et al. 2007). Consumers' enjoyment of online shopping is as significant as traditional offline shopping, since it influences their attitude towards online shopping (Jarvenpaa et al., 1997). Nonetheless, due to the fact that online shopping is limited with two-dimensional visuals and text, it cannot always be as emotionally fulfilling and enriching as traditional shopping in the physical world (Koufaris, 2002). The shopping happens at a distance rather than face-to-face, which is brought home to consumers. (Ergin & Akbay, 2008; Wynn, 2009). Online shopping experience is affected by various aspects, which are *apprehensiveness of PC and Internet usage* of the consumer, *personalization, satisfactory levels of prior online purchases, products purchased online,* and *emotion.*

3.1.4.1. Apprehensiveness of PC & Internet Usage

Consumers' attitude towards the Internet depends on their frequency and level of experience. The higher the experience, the more apprehensive the consumers get during the online shopping process (Castañeda et al., 2007).

3.1.4.2. Personalization

Personalization is becoming a substantial component of the Internet and web applications. There are heterogeneous groups of online consumers that differ in their demographics, skills, and experiences, with varied needs and preferences (Ristov & Ristova, 2011). For that reason, it is necessary to provide an adaptive interaction method of presentation of information content for these diverse consumers, estimating their backgrounds and previous experiences, as well as their possible future needs and expectations (Leckner et al., 2003). Considering the online shopping websites that first come to mind, each of them are using personalization to provide relatively more precise service to their consumers. For example, Amazon.com bears the forefront of advanced personalization (Piller, 2007). Its recommendation engine associates with the purchase histories of each consumer with other consumers who have made similar purchases with a list of *"consumers who bought this item also bought …"* which guides and eases the consumers shopping experience.

The banners that give advertisements of various online shopping websites are also signs of personalization. For instance, when browsing for a specific product in a website, and then not continuing with the process of purchasing, the latter websites that the consumers enter will automatically give the advertisement of that specific product, reminding of the item and trying to persuade the consumer for the act of purchasing. To sum up, personalization uses consumers' actions and preferences to present a similar pattern of choices that the consumer may enjoy.

3.1.4.3. Satisfactory Levels of Prior Online Purchases

Monsuwé et al. (2004) argue that previous online shopping experiences influence future online shopping. It is identified that prior online shopping directly impacts attitudes towards shopping online. When a consumer goes through a satisfactory online shopping experience, their intentions to shop online in the future are more likely. Contrary to this, if they evaluate their prior experiences negatively, they feel reluctant to pursue any other online shopping process.

3.1.4.4. Products Purchased Online

The product type is an important aspect for consumers in terms of their preferences in online shopping. *Search goods* are products or services that consumers can easily detect their price and other attributes before buying them, while *experience goods* require personal examination, where the consumer does not initially have full knowledge about the quality and experience the content of the good except for its price. Consumers' tendency to buy *search goods* online are higher than *experience goods*, since search goods' attributes are readily observable prior to purchase (Chiang and Dholakia, 2003). Product type is a significant factor in online shopping when it comes to search them in terms of color, size, fabric, fit, etc. (Axelsson, 2008). Consumers feel restricted while online shopping since they lack the opportunity to touch and perceive the fabric or texture of the products; or if the particular product group is apparel, they do not have the chance to try them on. Search goods such as CDs are standardized, where there is no necessity to interact with the product. Therefore, consumers prefer more to buy products like books, videotapes, airline/train tickets, electronics, CDs, groceries, and flowers online [(Monsuwé et al., 2004; Richa (2012)]. Accordingly, the retailers need to grasp the consumers' usage of products and guide them with their online purchase decisions (Wynn, 2009). OFT (2007) reveals the product types the UK consumers mostly purchase online, which are mainly air tickets, hotels, books, music/software downloads, followed by electrical items.

3.1.4.5. Emotion

In his research, Koufaris (2002) states that emotions are influenced by the physical and social stimuli in the environment. Stimuli can be as simple as the color of the room the individual is in. As well as the environment, the emotional responses of a consumer are also affected by his/her personality traits, where these can have an effect on the consumers' ability to complete an online shopping task and social interaction.

3.2. Website-based Factors related to Online Shopping

Along with the consumer-based factors, there are website-based factors that affect consumer preferences in online shopping. These are mainly *perceived usefulness, privacy and security, interface design, product information, product representativeness, ease of navigation, customer service quality* and *delivery speed*.

3.2.1. Perceived Usefulness

Usefulness is related with the overall design of the website and its functionality (Chen et al, 2010). As Cyr (2010) states, the location of the visual elements like icons, text, and images of the products within the website set grounds for the usability of the website, whereas navigation and the structure of the website also play an important role in perceived usefulness. Rating usability is based on assessing the user's experience with the website, therefore requiring an attention to the interface of the website (Zviran et al, 2006). In their empirical study, Castañeda et al. (2007) have deduced that perceived usefulness is the primary driver of the consumers' intention to visit a website, regardless of their level of online experience. However as a matter of course, the effect of perceived usefulness of a website is more visible to the consumers who use the Internet more frequently.

3.2.2. Privacy and Security

Internet shopping entails more uncertainty and risk compared to traditional shopping. The virtual environment does not provide the opportunity to physically check the quality of a product before purchasing it. Hence, the security and safety of sharing one's payment details, credit card and personal information is hard to monitor since the retailer does not physically exist in front of the consumers (Chen et al., 2004). Zeithaml et al (2004) explain that privacy is concerned with the protection of personal information of consumers, which preserves the anonymity and does not share personal information with other websites. Meanwhile, security deals with the protection of users from financial risks and fraud from using their credit card numbers or other financial account information. Trust and security issues are the main factors that prevent consumers from online shopping. Online retailers should inform consumers by means of posting formal privacy policies of their online security system on their website, specify rights and obligations of trading parties, and more importantly, acquire superior encryption technology (Clemes et al. (2014); Delafrooz et al. (2011); Shergill & Chen (2005); Chen et al. (2010)). Both privacy and security are significant factors that affect consumers' approach to online shopping. Still in today's world, consumers feel insecure about sharing their personal information or entering their credit card information to online shopping websites.

3.2.3. Interface Design

Website's interface is the medium between the retailer and the consumer, where it is important that the interface design should catch the attention of the consumer and keep them interested and enjoyed so that they can continue the process of purchasing. Since the consumers are limited with this two-dimensional information on the Internet, the websites are crucial mediators between the retailer and the consumer. The interaction between consumers' shopping orientation and interactive features of the website are the defining elements of consumers' act and attitude for online shopping (Zhou et al., 2007). Ganguly et al. (2010) argue that the website design primarily deals with how information is presented on the website, followed by concerns with the aesthetic look of the visual layout and navigation within the website. Wulf et al. (2006) describe pleasure as the degree to which the user perceives visiting the website as enjoyable, which is an important requirement for a positive online shopping experience (Wulf et al., 2006). According to Koufaris's (2002) findings, since online consumer is the combination of a traditional shopper and a computer user, the interface design of the websites, visual layout and navigation within the website is as important as accessing lower priced products. Therefore, in order to keep consumers doing online shopping, the interface design of the online shopping websites should be user-friendly and enhance human-computer interaction.

3.2.4. Product Information

Cyr (2010) emphasizes the importance of information design, which refers to website elements that convey accurate or inaccurate information about products or services to a user. Wolfinbarger and Gilly (2000) describe that the Internet provides price information as well, as a part of product information, which allows consumers to make comparison between multiple websites. Being able to access accurate product information easily with the Internet being near at hand in today's world, consumers feel a sense of control that encourages them to shop online. Nonetheless, sometimes insufficient navigation and complicated searching systems prevent the consumers to receive the necessary product information. For that reason, product information should be provided with a proper interface layout (Wolfinbarger and Gilly, 2000).

3.2.5. Product Representativeness

According to their study, Kim et al. (2007) revealed that presenting different ways of exploring product attributes such as zooming in, rotating, and viewing multiple images of the product on virtual models encourages the consumers to be more involved in the online shopping process and make them spend more time on the website voluntarily with satisfaction. For that reason products' representation is an important factor that affects consumers' preferences in online shopping.

3.2.6. Ease of Navigation

Even if detailed information is put on the site, consumers may sometimes leave the site if they find it difficult to navigate within the website and look for what they want (Cyr, 2008). For that reason, consumers expect the online shopping websites to be easy to search.

3.2.7. Customer Service Quality

Minjoon et al. (2004) reveal in their research that consumers' satisfaction in online shopping is directly related with customer service quality. Customer service quality requires the information of consumers' needs, preferences and their expectations from the online shopping process. The study of Minjoon et al. (2004) also suggests key points of achieving a successful customer service quality. These are reliable/prompt responses, attentiveness, ease of use and access. By acquiring these, the online retailers can get a better understanding of the consumers' judgment on service quality. Sorooshian et al. (2013) state that in order to improve customer service quality in online shopping websites, the website designs need to outdistance the competitors' website.

3.2.8. Delivery Speed

Delivery involves the total amount of time spent in shipping and receiving the product (Chen et al., 2010). It is one of the essentials of consumer satisfaction to provide a reliable and accurate delivery. Delivery speed can be either a vital benefit or a disadvantage for the consumer. Since convenience (shopping wherever and wherever one desires) is one of the most important motivations for consumers to shop online, delivery speed is an important enhancer.

3.3. Discussion

This chapter has presented the consumer-based and website-based factors that affect consumers’ preferences in online shopping. Along with the information deduced from the literature review regarding mass customization, these factors will set a basis to the field study that will be conducted.

CHAPTER 4

METHODOLOGY

The literature review focused on mass customization, the levels of online mass customization; the factors affecting consumers' online shopping behavior and consumers' attitudes towards online mass customization. The literature provides extensive theoretical background on these particular subjects, however there is few research for evaluating consumers' preferences and their experience about customizing products online. Therefore, a field study is constituted in order to understand consumers' preferences about online mass customizable product attributes and their representation, and evaluate consumers' experiences with online mass customization website interfaces.

This chapter explains the major components of the study, the data collection method and the data analysis methods used within the research. Specifically, website survey about the existing active online mass customization websites and their features; categorization of these features deduced from the exploration of websites enhanced with literature review; qualitative and quantitative survey with active website users that have online shopping experience; data collection, content analysis and their contribution throughout the study will be explained.

4.1. Aim of the Field Study

The aim of this study is to evaluate consumers' experiences with online mass customization website interfaces and understand consumers' preferences about online mass customizable product attributes and their representation. Accordingly, a research instrument is developed based on the literature review.

The field study investigates consumers' preferences on customized products' attributes, their perspectives on online shopping, as well as the experience of customizing products online.

4.2. Research Stages

The research consists of two stages: preliminary study and main research. Figure 4.1 gives the outline of the research. The preliminary study investigates the existing active online mass customization websites, where their features that may affect consumers' attitudes towards online shopping and product customization are explored. Following this, the categorization of the factors that influence consumers' experiences with online mass customization websites are discerned. During this process, not only the website survey, but also findings from the literature review is taken into account.

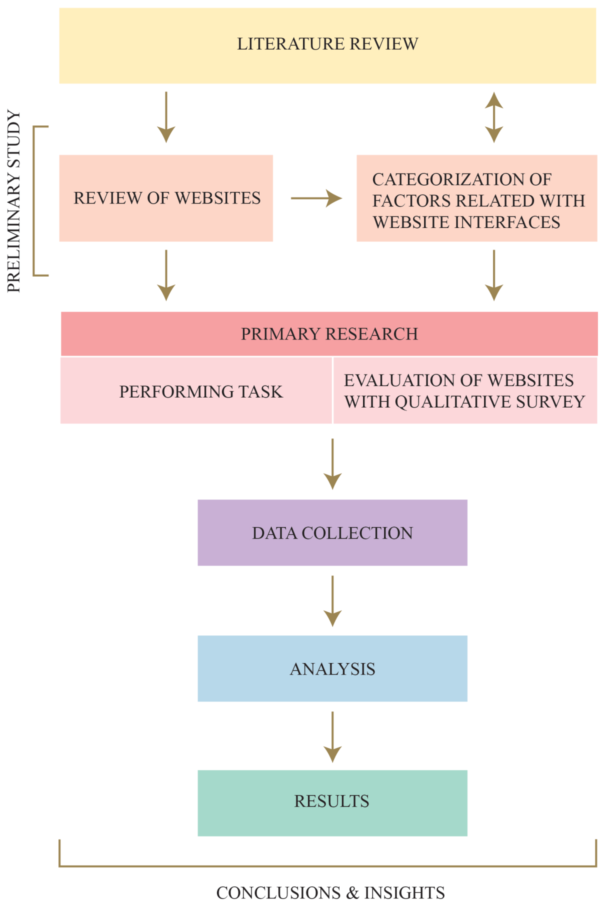

Figure 4.1. Research Stages

4.3. Preliminary Study

The preliminary study consists of two stages: review of websites and examination of website interfaces. In the first stage, a review that determines websites allowing online mass customization is carried out. Among these, there are a few websites that also take place in the resources studied earlier in the literature review, such as Dell, Nike ID and miAdidas. These brands are considered to be quite prominent in the field of mass customization. Therefore they are included in the website survey. Apart from these, there are several other websites that are added to the list. These are selected according to their popularity, website interface design, mass customization toolkit and variety of customizable product attributes. Since there happens to be an immense amount of websites that use the words "custom products" or "customize your own product", there is information pollution and not every website provides actual online mass customizable products. Therefore the websites that have limited and questionable online mass customization toolkits and product attributes are excluded from the website survey.

After explaining the general scenario of customizing products online in each website, the second stage examines the factors affecting the website interface design and its usability for each website.

4.3.1. Stage One: Review of Websites

According to the literature review regarding mass customization and online shopping, an intersection of product categories are assessed. According to this, apparel, consumer electronics and sport shoes are found out to be the product groups that are mostly bought online and mostly customized. Taking this in consideration, a review of websites is made to explore the most popular and effective online mass customization websites according to their structure, interface design, content, product representation and scenario of online mass customization from entering the home page to the transaction process. This review intended to form a basis to the main research where consumers' evaluation of website interfaces and their preferences on online mass customizable product attributes and their representation were investigated.

At some point, a certain sufficiency was attained by the diversity of website interfaces. The remaining websites that were afterwards omitted from the study were either very similar to the other websites' scenario and/or features, or they lacked adequate necessities to go through the online mass customization process. For that reason there are ten websites scrutinized and included in the study. Table 4.3 shows the list of websites and the product field that they provide online mass customization. To name briefly, *121 Time*, a wrist watch brand; *Bo Concept*, a furniture brand; *Lewis and Taylor Shirts*, custom men's shirt brand; *Nike ID*, sports shoe brand; *miAdidas*, sports shoe brand; *Shoes of Prey*, women's shoe brand; *Skin It*, a brand for cases and skins for electronic devices; *Dell*, laptop brand; *Zazzle*, providing online customization for miscellaneous products and *Toshiba*, a laptop brand.

Table 4.1. List of websites that are included in the website survey.

	Brand	**Website**	**Product Field**
1)	121time	www.121time.com	Wristwatch
2)	Bo Concept	www.boconcept.com	Furniture
3)	Dell	www.dell.com	Laptop
4)	Lewis and Taylor Shirts	www.lewistaylorshirts.com	Men's Shirt/ Apparel
5)	miAdidas	www.adidas.com/us/customize	Sports Shoe
6)	Nike ID	www.nike.com/us/en_us/c/nikeid	Sports Shoe
7)	Shoes of Prey	www.shoesofprey.com	Women's Shoe
8)	Skin It	www.skinit.com	Cases & Skins for Electronic Devices
9)	Toshiba	www.toshiba.com/us/	Laptop
10)	Zazzle	www.zazzle.com	Miscellaneous

4.3.1.1. 121 Time

www.121time.com is a website that sells Swiss made wristwatches. Along with 121 Time brand, the website provides various other watch brands to the consumers. This website is one of the rare websites that allows online wristwatch customization extensively.

a. Homepage: The website welcomes the user with a dark background home page with a large slider that immediately catches the attention. Figure 4.2 demonstrates a screenshot from the homepage of 121 Time's website. The header provides simple menu titles such as "Home", "Watches", "About Us", and "Contact Us". Along with these titles, there is a search tool that enhances the users to find what they are looking for more practically. The buttons above the header such as "Login, "My Account", and "Check Out" on the left hand side, and the currency and language options on the right hand side give the idea that this website has an active online store that serves internationally and the users are able to create an account and start shopping according to their preferences.

Figure 4.2. Screenshot from the homepage of www.121time.com (Accessed: October 2014).

The "Contact" and "Help Center" buttons are placed in the footer, which is easily manageable. Moreover, the users are able to see the social media icons and payment method icons in the footer. Thus, they are able to determine which payment methods are acceptable and in which social media they can share the products they like.

Coming back to the most central and prominent element of the home page – the sliders – they display the wristwatch collections that are available in the online store and most importantly, they emphasize the "Online Configurator", where the users are directed to the mass customization toolkit and customize the wristwatches they desire to have.

b. Mass Customization Toolkit / Product Page: After clicking on the "online configurator" link, the users are led to the page where they select the collection of the wristwatches that also can be described as the base product. In this page, the users have the option to click on the "Customize Your Watch" button on the right hand side. This button gives the idea that the user will customize the watch from scratch with the exploded view of a watch. After clicking on "Customize Your Watch" or "Configure It" button, which appears in the ready collection products, the website directs the user to the mass customization toolkit page. In this page, there are three main steps for customizing the watch: creation, upgrade and personalization. In the *creation* step, the user is able to customize the **movement** (Classical, Chronograph, Automatic etc.), **case style** (its form, material and finish color), **bezel** (60 minutes, triangles, indexes, plain, or covered with gemstones etc.), **dials and hands** (Selection of numbers' display: Roman numbers, Arabic numbers, line or blank, in addition to color and style selection of movable hands), and **strap** (material, pattern and color selection). It is important to mention that these options depend on the base products. Figure 4.3 illustrates the screenshot from 121 Time's configurator, where the user is about to select the strap material and color of the wristwatch.

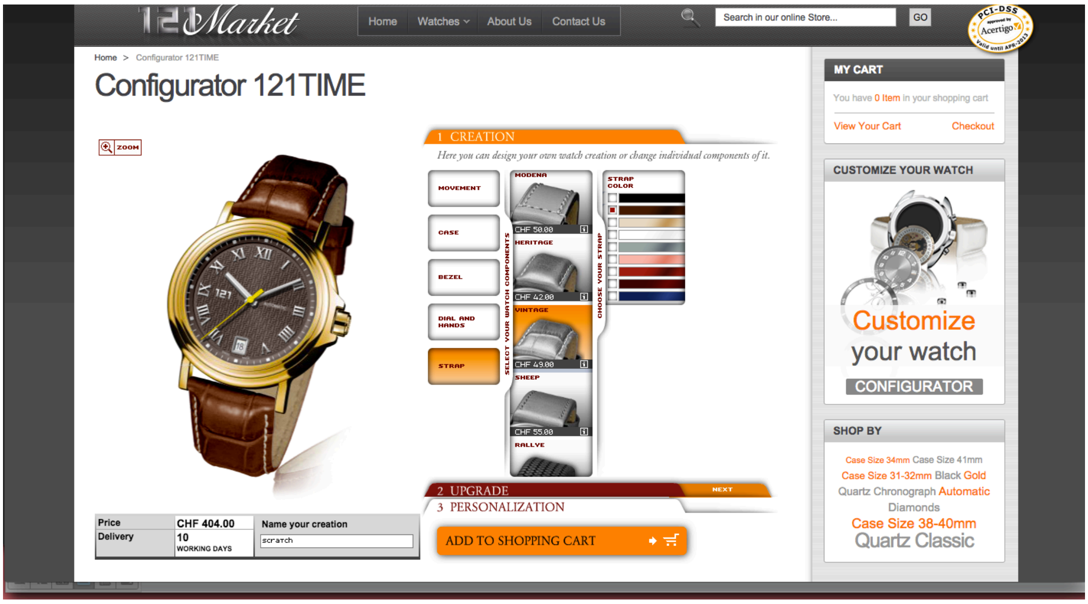

Figure 4.3. Screenshot from the mass customization toolkit of www.121time.com
Accessed: October 2014

For instance, if a collection does not support the customization of the movement of the watch, it is not provided in the toolkit. In the *upgrade* step, the user is able to customize the strap size, water resistance, and strap's buckle type. Finally in the *personalization* step, the users have the opportunity to add engraving to the back of their watches. This can be either a text they desire or a symbol they can select from the predefined list the toolkit provides. During the customization process, the user is able to see the price changing instantly at the bottom of the page as the preferences are selected step by step.

c. Check Out and Transaction Page: After the customized product is ready to buy, the user clicks on the "Add to Cart" button and "My Shopping Cart" is listed on the next page. The product's name, its thumbnail image, quantity and total price is clearly listed as shown in Figure 4.4. If the user is not finished with shopping, they can click on the "Continue shopping" button and browse on the website without losing the customized product and their cart. Otherwise, if they have decided to buy the product, they click "Begin Checkout" and receive the payment page.

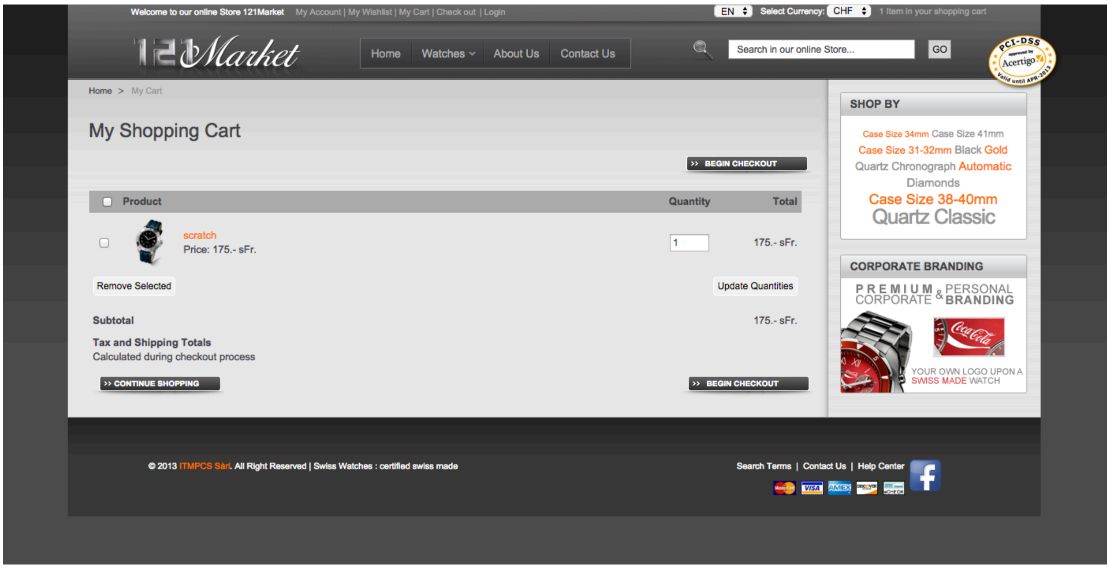

Figure 4.4. Screenshot from the transaction page of www.121time.com (Accessed: October 2014).

4.3.1.2. Bo Concept

Having a deep-rooted history, Bo Concept is a Danish furniture design company that has many retailers worldwide. In their website, it is stated that they began online sales in 2012. Nonetheless, currently it is not possible to complete transaction over the website and one way or another the consumers have to visit the retailer and make purchase offline. Yet, before visiting the retailer, they are able to see all the collections that are available in their country and customize furniture online according to their preferences.

a. Homepage: Before the home page, an introductory page with a map opens when the user enters the www.boconcept.com website. Here, the users need to select their location so that the page directs them to their country's website. For that reason, the home page opens with the language of that particular country so that the users do not need to trouble to set their language.

The home page has a defined and clear header with the titles of "Furniture", "Accessories", "Design in 3D", "Inspiration" "News" and "About Bo Concept". Therefore one can easily understand that this is a furniture design brand that provides online product customization to the website users. The background of the homepage changes according to the country selection. For that reason, it can be understood that the location is taken into account while designing the interface.

The home page is divided into several squares, providing systematical order to the page. These squares include the main slider that gives examples from the collections as shown in Figure 4.5. The others refer to assistance and consultancy, campaigns and sales, information about the product designers, online catalog and so forth as scrolled down.

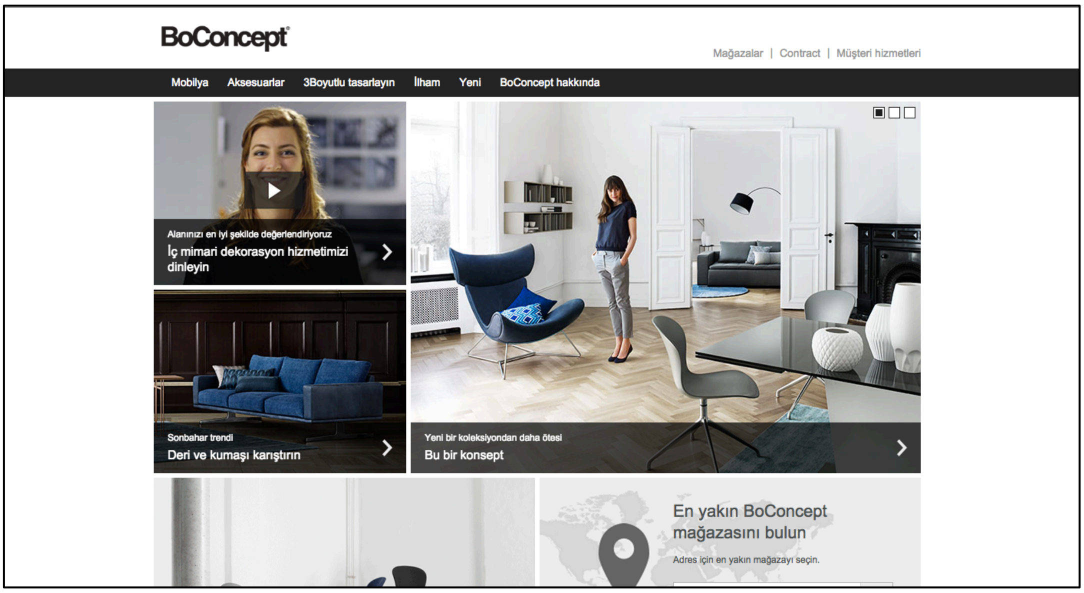

Figure 4.5. Screenshot from the home page of www.boconcept.com (Accessed: October 2014).

The footer includes titles like “About Bo Concept”, giving information about the history of the company, the product designers, and contact information; “Bo Concept Essential”, covering catalog and newsletters and “Customer Service” providing assistance with the product care.

b. Mass Customization Toolkit / Product Page: To customize a product, “Design in 3D” is clicked from the header and the user is led to a page that lists names of product collections. Although the products are categorized as sofas, living, wall systems, storing, dining, sleeping, and working, the collections under these categories have no thumbnail images. For that reason it is inevitable that the user has to spend a long time to discover and understand the products. After clicking to a product collection name, a page lists the image of the products in that collection. When the user selects the base product from that page, with the help of a blue "Design in 3D" button, the mass customization toolkit page opens. The toolkit provides different customization features for each furniture. To give an example, for the online customization of a sofa, the toolkit allows the user to alter its combinations, fabrics, leathers, legs, armrests and modules. As for a wardrobe, the user can alter its cabinet, front, rails, and interior for wardrobes. The preferences are listed below the image of the product in thumbnails. Figure 4.6 displays the mass customization toolkit, where the user is able to view the measurements of the furniture, rotate the product's 3D image and see it from different perspectives, zoom in/out and discard the design if they do not like the combination.

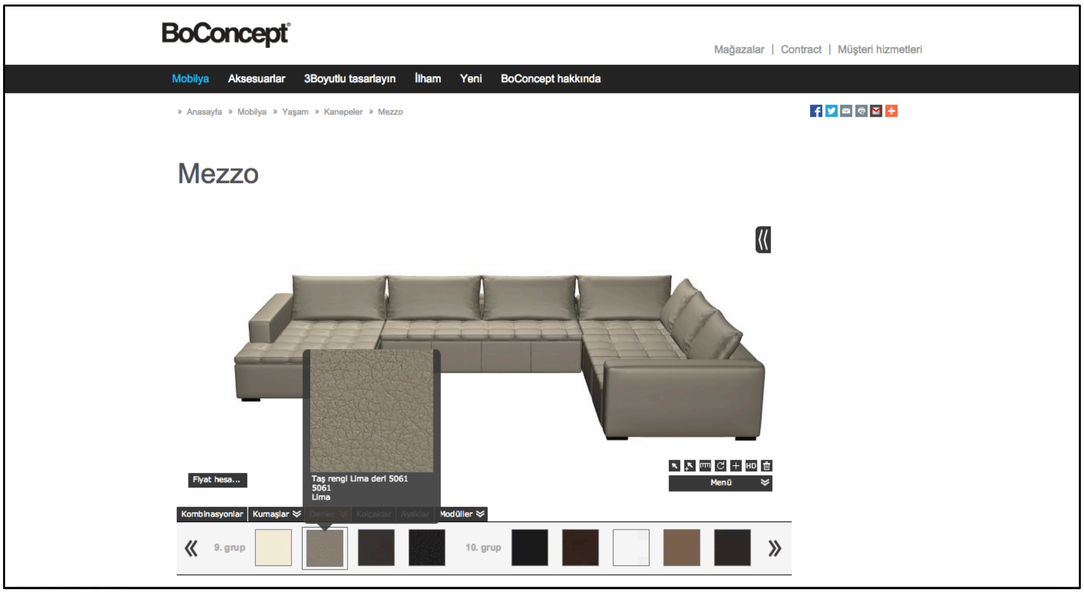

Figure 4.6. Screenshot from the mass customization toolkit of www.boconcept.com (Accessed: October 2014).

Below the mass customization toolkit, the website gives important information such as the features of the product (removable headrests, seat cushions attached with Velcro, adjustable armrests and so forth), product's designer, delivery, materials used and care instructions.

c. Check Out and Transaction Page: After the product is finalized, the website allows the user to save and/or print the image of the product. Moreover, they are able to share the customized product via social media. As mentioned earlier, the website does not provide an online store. Therefore it is not possible to complete the customization process with a purchase. However, the users can either save the image or send the design to Bo Concept and visit the retailer to speak to a consultant and finalize the purchase.

4.3.1.3. Dell

Dell is a multinational computer technology brand that develops, sells, repairs and supports computers and related products and services. Dell is considered to be a remarkable brand adopting mass customization in computer technology field.

a. Homepage: The homepage opens up with a central slider displaying simplistic images. Figure 4.7 presents a screenshot from the home page of Dell. The header is comprised of the "For Home", "For Work", "Support" and "My Account" titles, along with a search bar on the right hand side.

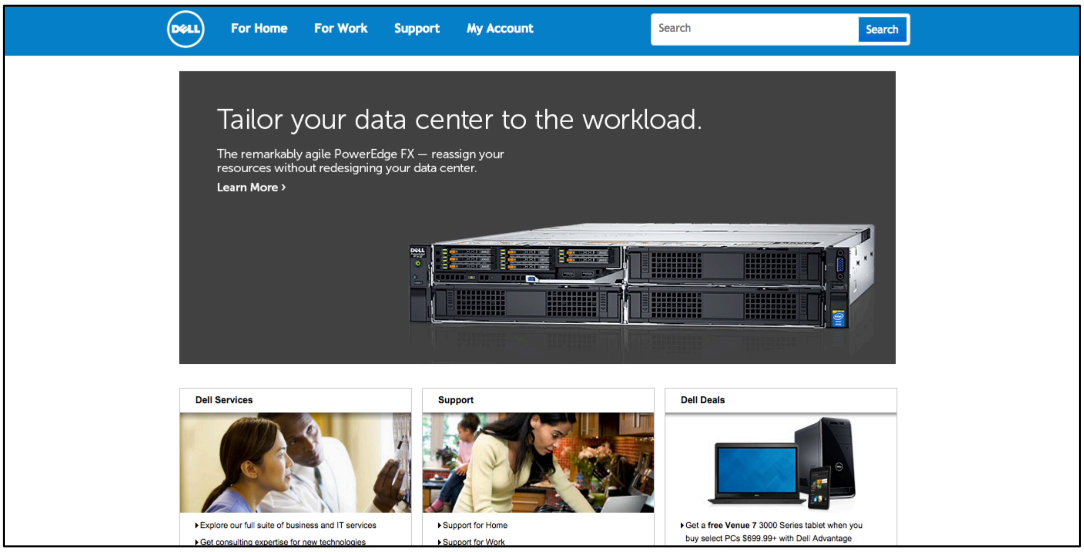

Figure 4.7. Screenshot of the homepage of www.dell.com
(Accessed: October 2014).

Below the slider, the home page provides information about Dell Services, Support and Dell Deals, including the top selling products. When the page is scrolled to the bottom, there is a neat footer containing the “Do More with Dell”, “Company”, “Legal” and “Community” titles, and their subheadings. At the right corner of the footer, the users are able to select their countries which directs to that particular country’s website.

b. Mass Customization Toolkit / Product Page: If a person is not familiar with the fact that Dell provides mass customization, one simply can not discover this until selecting a product to buy, since there is no indication, button or a slogan emphasizing that the users can customize the products online. When the users select a base product, such as a laptop, the users are led to the “customize and buy” button to proceed to the mass customization page. The mass customization begins with component selection as shown in Figure 4.8. The component selection includes *processor, operating system, office productivity software, Dell data protection, encryption security SW, Dropbox for business, Adobe creativity and productivity Software, security software, digitally delivered software, operating system recovery options, optical software, camera software, carrying cases, absolute computrace, multi-select monitors, configuration services, monitors & docking solutions, keyboard* and *additional mouse*. After the components are customized, services and support section is selected according to the users’ preferences. This section consists of *warranty & services*, *accidental damage, extended battery services, keep your hard drive, data protection offers* and *installation services*.

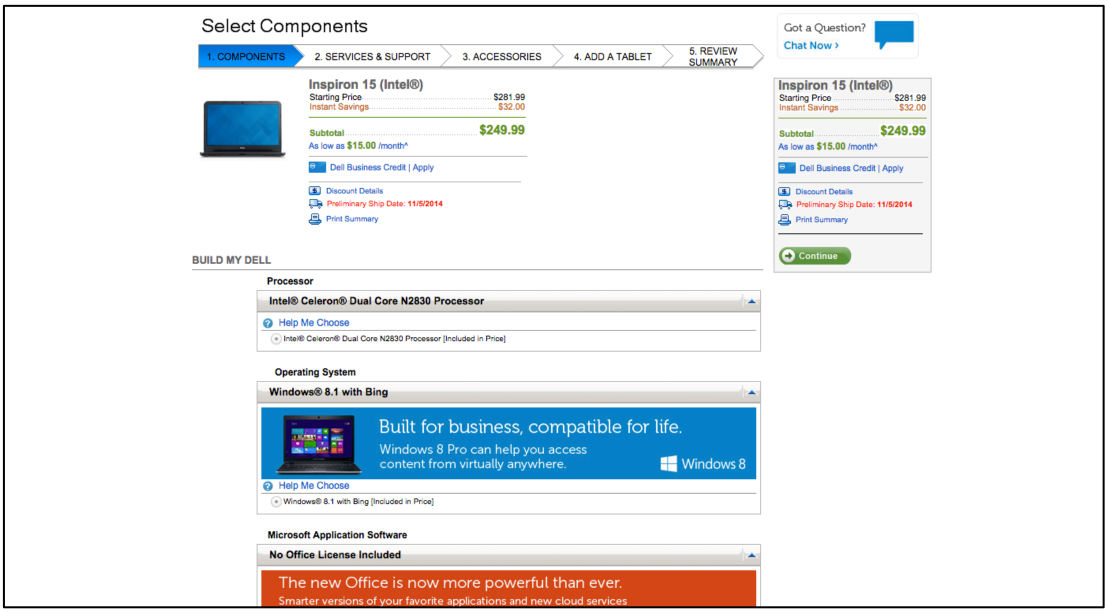

Figure 4.8. Screenshot from component selection page from www.dell.com (Accessed: October 2014).

The third stage contains accessory customization, such as: *Bags and Carrying Cases, Business Essentials, Customer Favorites, Software Solutions, Financial Software*, and *Networking Wireless Access Points.*

The fourth stage of customization involves adding a tablet if preferred. When the users are ready to continue to check out, they review the product summary and examine each feature they select for their product.

c. Check Out and Transaction Page: After clicking on the "check out" button, the users are directed to the shopping bag list where they are able to view the product's model, name and its thumbnail image as demonstrated in Figure 4.9. After finalizing their decision on the selected product, they click on "check out" once more. After this, the user either signs in or proceeds as a guest user and fills the shipping and payment forms, verifies order and completes transaction.

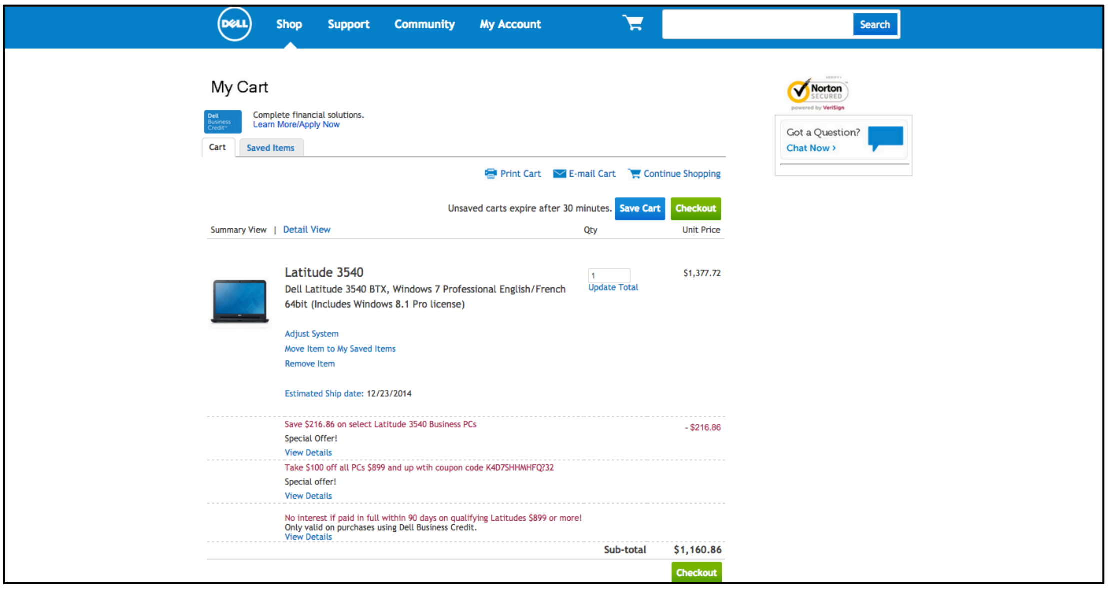

Figure 4.9. Screenshot from the “my cart” page before leading to the transaction page in www.dell.com (Accessed October 2014).

4.3.1.4. Lewis & Taylor Shirts

Lewis & Taylor Shirts is a brand based in Hong Kong, known for their custom dress shirt manufacture serving all over the world. Their reputation comes from using exquisite fabrics from Europe and Asia. They provide online customizable shirts to their customers on their website (www.lewistaylorshirts.com).

a. Homepage: The website has a clear home page. Instead of a dynamic slider, there is a large and static image that displays a man wearing a shirt. Although the header is quite narrow and it is rather hard to read the logo, the logo is repeated on the large image in a bigger size. In addition to this, there is a distinct blue “Design your shirt” button on the image that directs to the customization page, which can be seen in Figure 4.10. This helps the user clearly understand the purpose of the website. The header consists of the "Shop", "Design a Shirt", "Collections", and "Contact Us" titles. On the right hand side of the header, there are “login”, “register” and “cart” buttons that direct the user to either sign up or login and see the status of the products added to their carts.

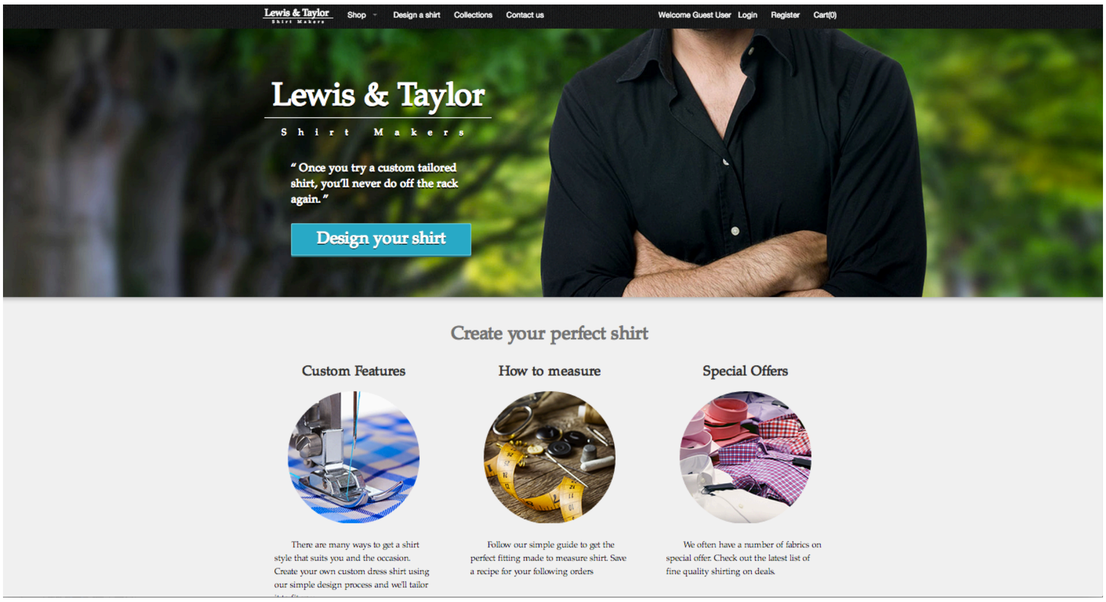

Figure 4.10. Screenshot from the home page of www.lewistaylorshirts.com (Accessed October 2014).

Below the static image, there are three circular images placed alongside, giving information about how to create the perfect shirt. When the website is scrolled, there is another module that displays the ready to customize shirts of Lewis & Taylor Shirts Collection.

The footer of the website presents to the point titles that lead to the relevant pages, such as “design guide”, “shop”, “our story” and “follow us”. Besides these, the users are also able to see the Visa, MasterCard and PayPal icons that express the allowed payment methods.

b. Mass Customization Toolkit / Product Page: Clicking on either the “design your shirt” button on the large image or the “Design a Shirt” button on the header directs to the customization page, where the users are able to view every single customizable feature of the shirts. The user has to select their preferences in order. The predefined features are namely *fabric* (there is a filtering system under this feature where users are able to find their desired fabric according to color, count, brand, origin, pattern, weave and other special qualities such as wrinkle free, stretch and so on), *button* (this section provides options about button type, its color, button hole thread type and gives suggestions about which button goes better with which shirt), *collar style* (traditional, classic, English wide, English wide 2 button, button down, granddad, English cut away, English cut away 2 button), *cuff style* (cuff single button round, cuff French angle, two button round, single button angle, Portifino, cut French square, cuff French round or single button square), *front style* (hidden placket, no placket or placket), *back style* (box pleat, side pleat, split yoke or plain), *tail style* (normal tail, square tail, square tail with split, normal tail with gusset or semi tail), *pocket* (standard, slit, round or none), *monogram* (selection of the color, font and placement of the monogram with maximum three letters), and *size* (where the users have to give their precise body measurement according to the measurement guide with either imperial or metric system). Figure 4.11 shows the collar style selection tab of the mass customization toolkit. After each of these features is customized, the summary of the features is listed under the "Shirt" title. Here, the users are able to view all of their preferences at once and the total price of the shirt. If they are satisfied with the product they are able to "add to cart", make comments and save the recipe of the shirt on this page.

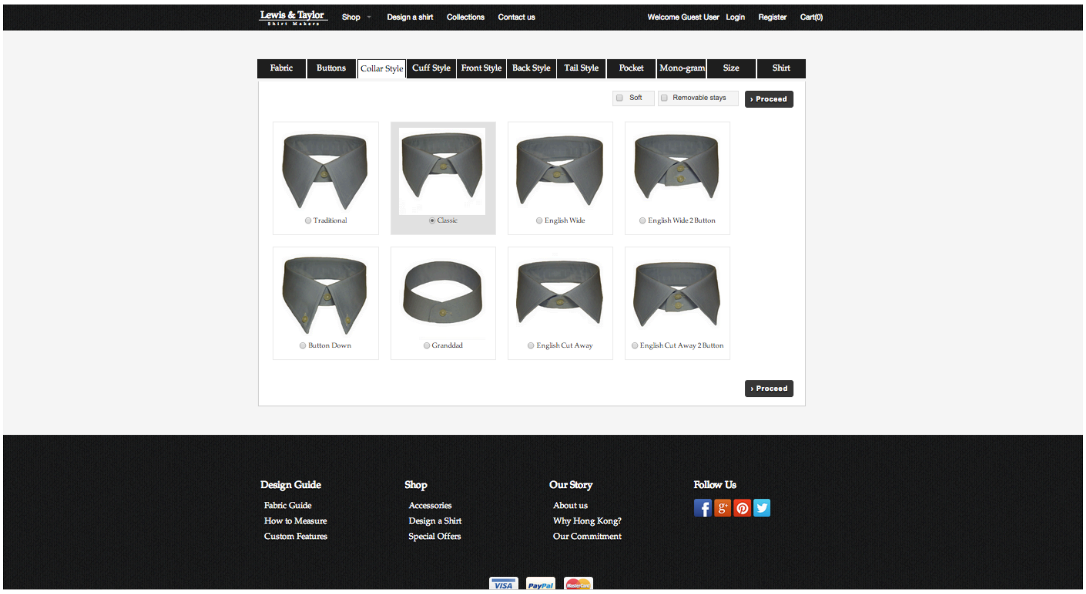

Figure 4.11. Screenshot that displays collar style selection from the mass customization toolkit of www.lewistaylorshirts.com (Accessed October 2014).

c. Check Out and Transaction Page: When the user clicks on the "add to cart" button, a page that presents the check out options appear. Here, the user can either login as a regular customer or continue the transaction page as a guest user. As the user enters their email information, a scrollable page opens where the summary of the product is displayed on the top and following comes the delivery address form as shown in the screenshot provided in Figure 4.12. In this particular form it can be confirmed that Lewis & Taylor Shirts deliver worldwide including Turkey. After filling the shipping information, the website directs the user to the payment page.

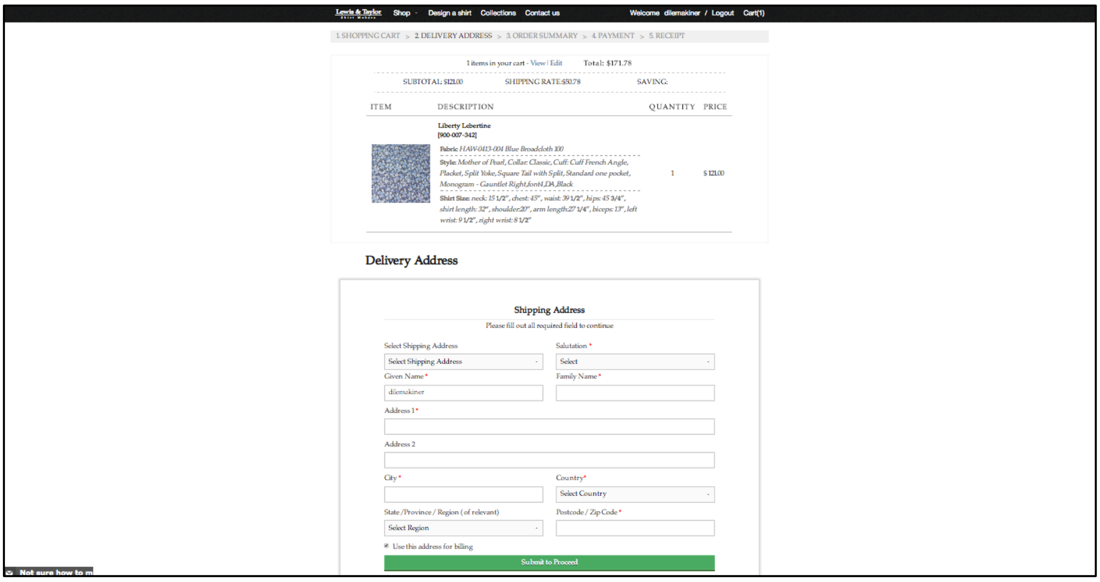

Figure 4.12. Screenshot demonstrating the delivery page, which will direct to the transaction page in www.lewistaylorshirt.com (Accessed October 2014).

4.3.1.5. miAdidas

Adidas is a German multinational brand that can be considered as a pioneer of sports shoes and apparel. Adidas allows online mass customization in its website. However, it is limited to certain countries. For instance, it is not available for Turkey, therefore when the user attempts to open www.adidas.com, it directs to its Turkey website and online mass customization is not visible. Accordingly, the user needs to browse *www.adidas.com/us/customize* in order to see the mass customization page.

a. Homepage: The hectic header that is divided into three rows, displayed in Figure 4.13 with three different colors and a large static image, welcomes the user. The first row of the header from the top displays the menu of main Adidas website, containing namely “Men”, “Women”, Kid”, “Sports”, “Brands”, “Customize” and “miCoach”.

On the right, the search bar, account and shopping bag icons take place. The second row of the header exists occasionally, to present seasonal campaigns or specialties. The third row presents the customization menu: “Shoes, “Apparel”, “Clothing”, “View all Customizable Products” and “Your Saved Designs”. Although these three different colored rows make the website look intense and crowded, they still reflect the three stripes of Adidas and fit the general atmosphere.

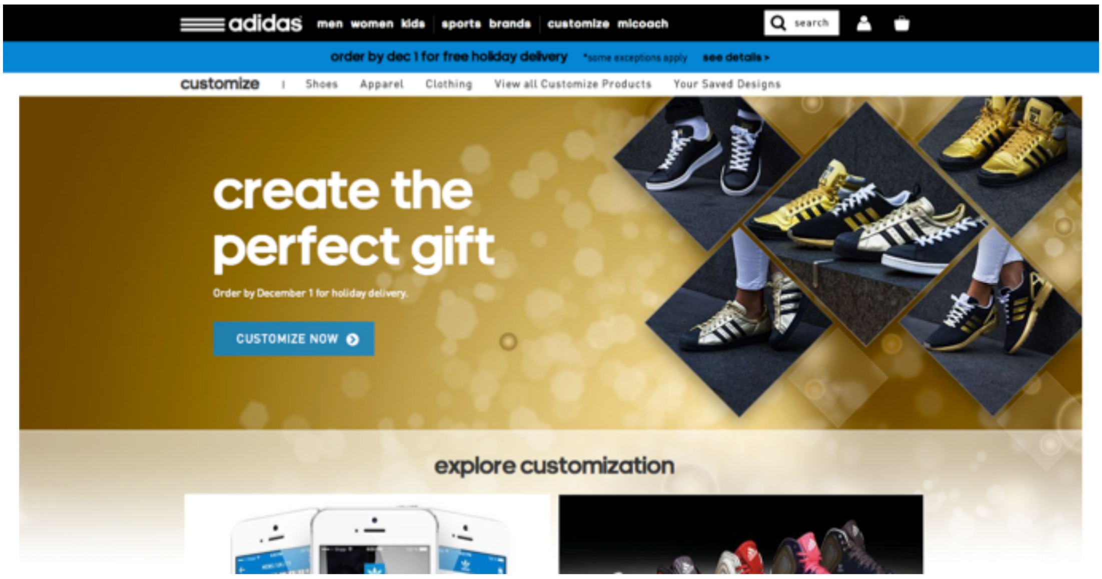

Figure 4.13. Screenshot of the homepage of miAdidas
www.adidas.com/us/customize (Accessed: October 2014).

The “customize now” button on the static image calls the attention to the customization page. When the homepage is scrolled down, the website provides some images to explore online product customization.

Contrary to the previous websites that have been examined, the footer of this website is quite crowded, revealing all sub-headings of the collections, support, privacy terms and about page. There are small icons of MasterCard, Visa, American Express and PayPal to show which payment methods are available.

b. Mass Customization Toolkit / Product Page: The “customize now” button directs to a list of products, where the users are allowed to filter the products to find a precise model. miAdidas provides the filtering module on the left of the page.

However, the same static large image on the home page is repeated above the product list. For that reason, the product list and filtering modules are barely visible

in the first place and the users need to scroll down to get a better view. The filtering is done according to *gender*, *category*, *price*, *brand*, *sports* (running, soccer, basketball, football, baseball, golf, softball or tennis), *colors*, *collection* and *new arrivals*. miAdidas offers online customization on certain apparel as well as sports shoes. However, there are much more preferences for sport shoes. For that reason, sports shoe will be considered as base product. When the base product is selected, the 3D virtual image of the product appears on a large scale in the mass customization page.

miAdidas provides few amounts of features to the users. Figure 4.14 illustrates the toolkit's interface and attributes. The toolkit offerings are divided into five main titles: *main* (including the alteration of the colors of the base material and heel lining), *top* (tongue logo print, color selection of first and extra pair laces), *back* (color of heel patch and heel patch print), *personalize* (sock liner base color, sock liner print color and text personalization limited with 20 characters), and *size*. Meanwhile, as the product is selected, the price of the product is indicated on the left side, above the product features.

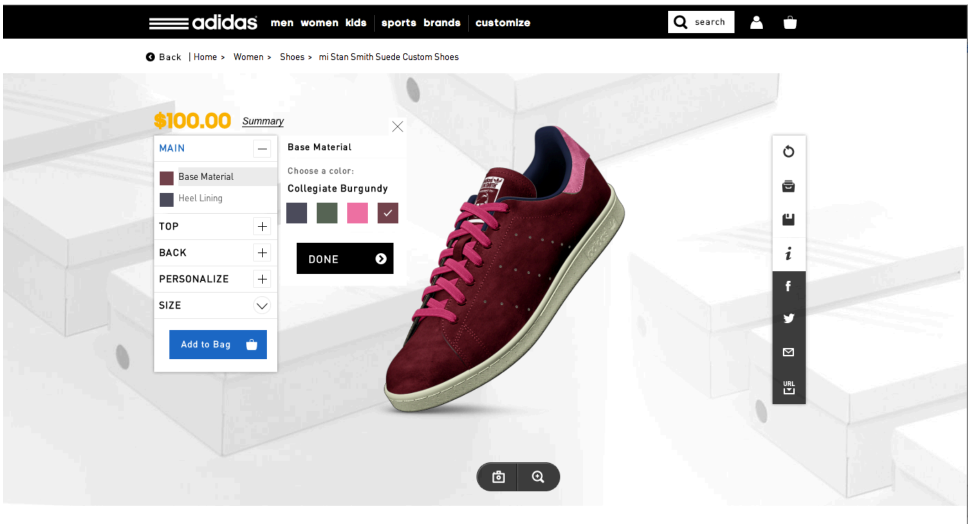

Figure 4.14. Screenshot of the mass customization toolkit of miAdidas www.adidas.com/us/customize (Accessed: October 2014).

During the customization process, the users are allowed to rotate the virtual image by clicking and dragging the image. Below the image, there are two icons for zoom in/out and saving image. On the right, there is a toolbar displaying icons of “start over”, “your designs”, “save to account”, “see miAdidas video”, and social media.

c. Check Out and Transaction Page: When the user is finished with customizing, they use the blue “add to cart” button on the left and the website directs them to their bag: selected products with their details are seen. As observed in Figure 4.15, in “your bag” page, the users can either click on the “Check Out” button or continue shopping. The Check Out button leads to a three-step page where the users fill their delivery details, review and make the payment and finally the order is placed.

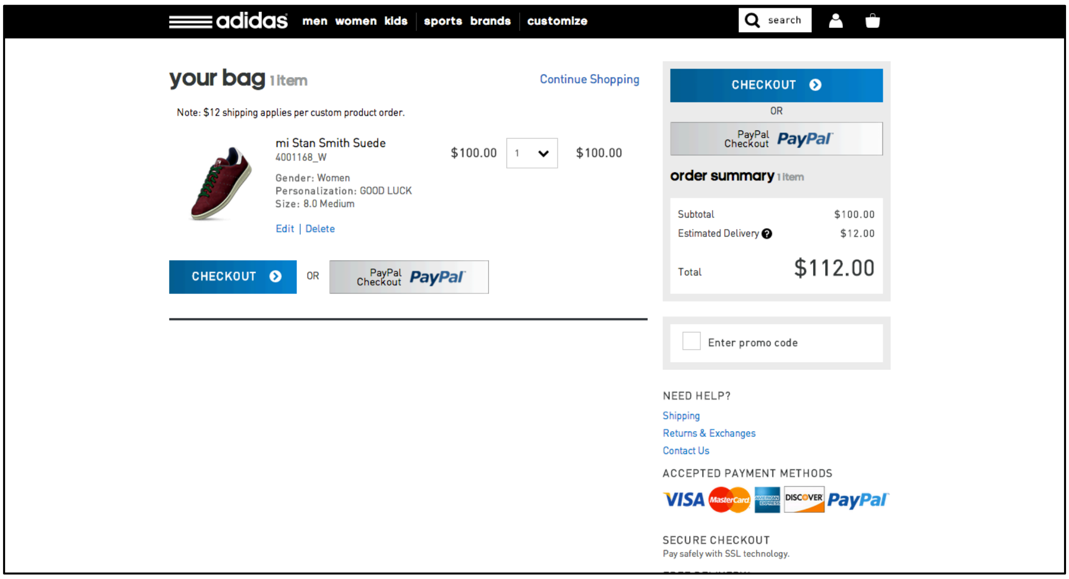

Figure 4.15. Screenshot of the “Your Bag” page that leads to check out page in miAdidas www.adidas.com/us/customize (Accessed: October 2014).

3.3.1.6. Nike ID

When it comes to sports footwear and apparel, Nike is one of the most prominent brands in the world. On their website (www.nike.com), they not only provide mass produced collections of their products but also offer online mass customization under the name Nike ID.

a. Homepage: The slider takes up an important amount of space on the homepage of the website. The slider images are made up of strong and competitive people wearing Nike, which reflects the soul of the brand correctly. As can be observed in Figure 4.16, the menu on the header consists of a "Home page" (symbolized with the "swoosh"), "Men", "Women", "Kids" and "Explore" on the left hand side, while "Join" and "Login" buttons are placed on the right hand side. In the middle of the header, there is a search bar that makes it easier for the users to find products, considering the fact that Nike has immense amount of collections and products.

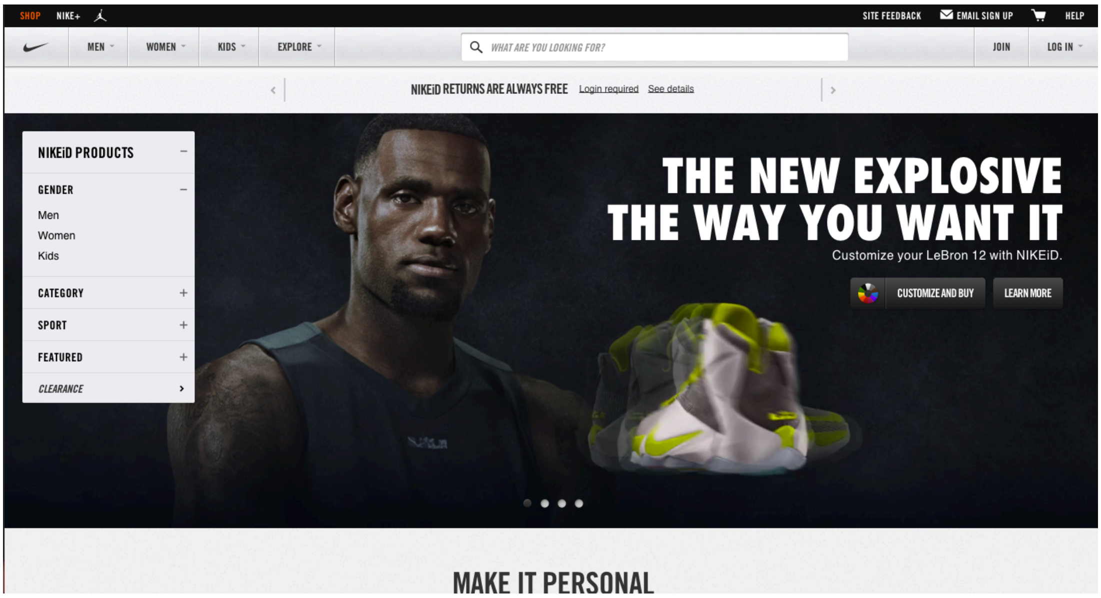

Figure 4.16. Screenshot of the home page of Nike ID
www.nike.com/us/en_us/c/nikeid (Accessed: October 2014).

When the homepage is scrolled, a simplistic footer comes along with a black background containing titles such as "Find a Store", "Get Help" and "About Nike" with subheadings. Along with these, social media icons and privacy policy also takes place in the footer.

b. Mass Customization Toolkit / Product Page: To find the mass customization page, the user needs to click on "Explore" from the menu and find the "Customize with Nike ID" button below the "Collections" heading. Therefore, it can be slightly problematic to find if it is a person who has not heard of Nike ID and its offerings before.

Nike ID page greets the user with a large slider similar to the one on the homepage. On each of the slider, there is a fixed “Customize and Buy” button with a color scheme icon, which draws the attention to being able to customize the sports shoes. This button can be seen in Figure 4.16.

There is a filtering module on the left, where the users are able to filter Nike ID products to achieve their desired product. The products can be filtered according to *gender*, *category* (which also involves sports bag apart from the sports shoes), *sport* (running, basketball, Jordan, sportswear, training, football, soccer, golf, skateboarding and tennis), *collections*, *color*, *material*, *fan gear* and *clearance*. Correspondingly being selected, the base product’s virtual image opens in a large scale. The specific name of the product, its price and reviews are shown on the left hand side. If the users prefer to buy the base product, they simply enter their size below the product’s name and add to cart. Otherwise, they can click on the “Start Customizing” button on the left hand side or on the product itself that says “Click to Start” to lead the user begin customizing the product.

The mass customization toolkit provides a 3D virtual image where the users are able to rotate the image and examine the product from different perspectives, zoom in/out and take screenshots to save the desired combinations of the product. As shown in Figure 4.17, the users can rotate the product’s virtual image and view it from various angles.

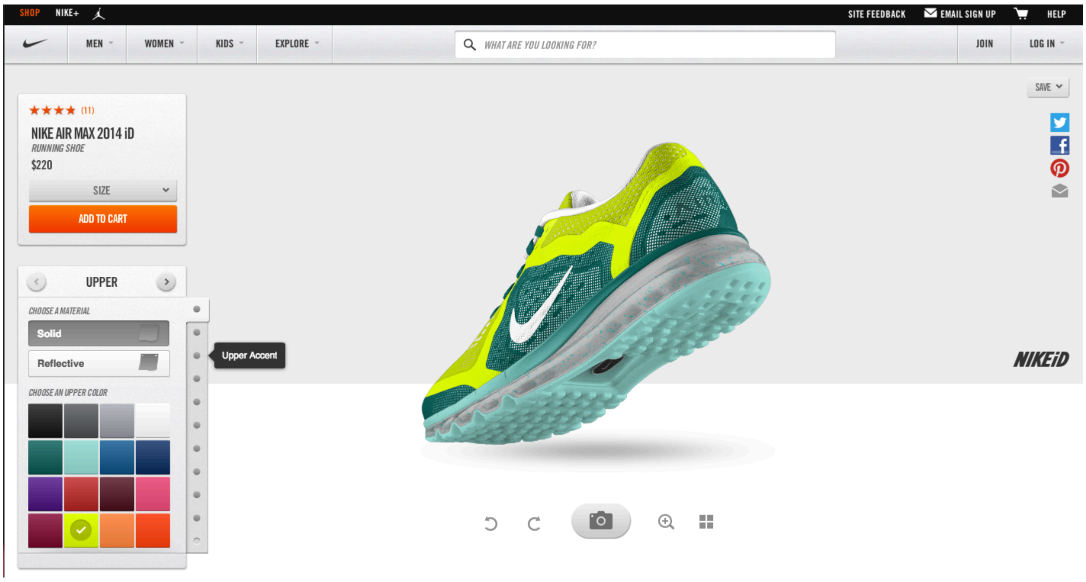

Figure 4.17. Screenshot from the mass customization toolkit of Nike ID www.nike.com/us/en_us/c/nikeid (Accessed: October 2014).

There is a menu on the left that displays the features of the product that can be altered. Reminding that the features may differ according to the product collection, the forefoot, quarter, heel, lining, Swoosh, laces, eyelets, heel loop, tongue loop, outsole and heel ID can be altered from the predefined list of the toolkit. While some of the parts allow both material and color alteration, some only allow color change. If the users are not satisfied with the customized product, they can click on the "start over" button below the mass customization toolkit and restart. If they are indecisive about how to customize, they can scroll the page and go through the list of "Start with an Inspiration" and view the combinations for that specific product.

c. Check Out and Transaction Page: After the user is all set with the product that is customized, they can "add to cart" and either continue to shop or proceed to check out. To see their cart, the users can click on the trolley icon on the right corner of the header and see the list of the products. The website allows the users to remove the product from the list or edit it before they finalize the purchase. As shown in Figure 4.18, on the right hand side, there is a summary form, which shows the subtotal, total and estimated shipping and handling time. Below this information, there is an eye-catching orange "Check out" button, which directs to the shipping and payment forms and order preview. The product details and their estimated delivery time are still visible on the right column.

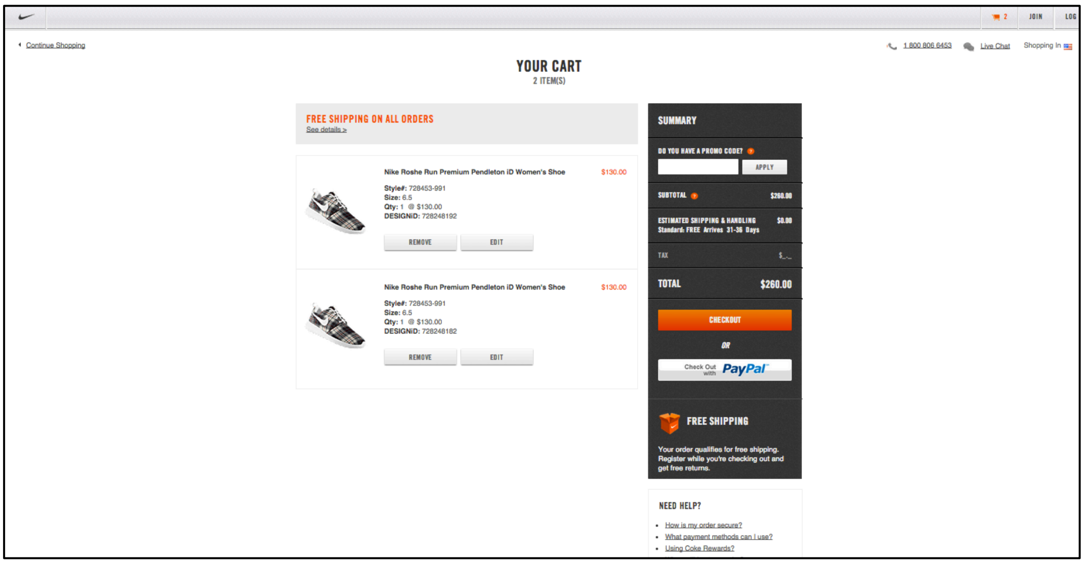

Figure 4.18. Screenshot from the check out page of Nike ID
www.nike.com/us/en_us/c/nikeid (Accessed: October 2014).

4.3.1.7. Shoes of Prey

Shoes of Prey is a multi-channel retail brand that sells women's shoes and enables consumers to design their own shoes online (www.shoesofprey.com).

a. Homepage: The homepage opens up with a dynamic slider displaying videos of women using the customization toolkit and wearing their customized shoes. The femininity of the website is given mainly by the handwritten signature-like logo. The use of display fonts on the slider also enhances this atmosphere.

Above the header on the left, there is an inscription saying, "We ship to Turkey". Therefore the website detects the user's location and indicates its shipment being available to the user's country from the very beginning. Considering that many online shopping websites do not provide this information on their home page and the user needs to dig in the footer to get shipping policies, this feature is quite useful. Next to this inscription, the currency and language selection is made and on the right corner, "stores", "my shoes" and "cart" take place.

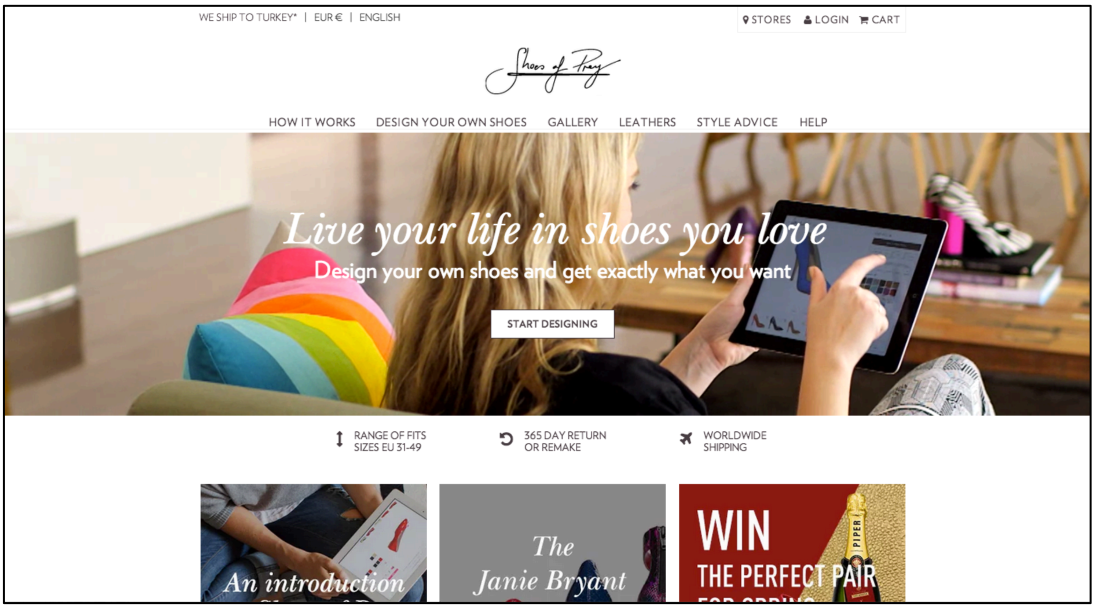

Figure 4.19. Screenshot of the homepage of Shoes of Prey
www.shoesofprey.com (Accessed: October 2014).

The header is placed under the central logo, containing "how it works", "design your own shoe", "gallery", "leathers", "style advice", and "help". Right after the header comes the slider, where the "start designing" button is located in order to direct to the customization page, which can be seen in Figure 4.19 displaying the website's home page.

Below the slider, the website is divided into three columns, providing information about Shoes of Prey, its various campaigns and collections and how it works. These are enhanced with images and icons, which helps the user to navigate better. Towards the end of the homepage, there are photos of the consumers from social media sharing their own custom shoes.

The footer provides titles such as "about", "get started", "questions" and "special shoes" with their detailed sub-headings. The overall homepage has a white background, which makes it easier to focus on the images.

b. Mass Customization Toolkit / Product Page: "Start Designing" button on the slider directs to a page where the 2D black and white drawings of shoe styles takes place. Here, there are twelve shoe styles: *ballet flats, mid heels, high heels, extra* *high heels, flat sandals, heeled sandals, gladiators, party heels, flat oxfords, heeled oxfords, ankle boots* and *wedge heels*. Selecting one of these styles leads the user to the mass customization toolkit. It is significant to mention that the website provides calm and neutral pop up bubbles, giving information about various features of the customization process. The user can turn these off if assistance is not required.

As presented in Figure 4.20, there is a large virtual image of the shoe on the left, on the online mass customization page. Comparing to the other shoe brands, Shoes of Prey uses line drawings of the product. Nonetheless, they still provide the ability to rotate the image. Due to that, the users can display the shoes from various angles.

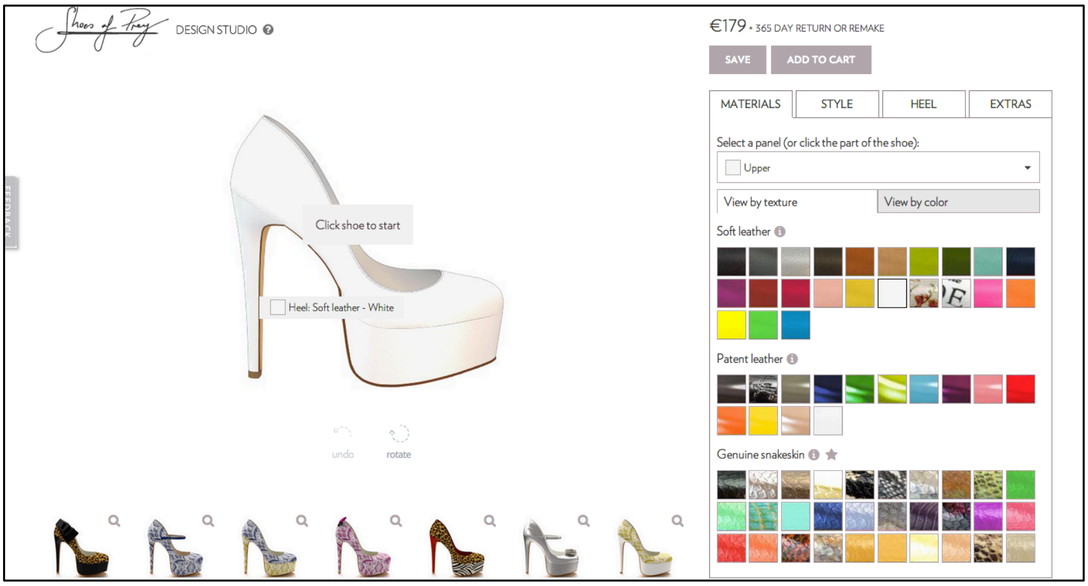

Figure 4.20. Screenshot of the mass customization toolkit of Shoes of Prey www.shoesofprey.com (Accessed: October 2014).

When users click on the image of the product and stroll on the image with the mouse, they can select the parts of the shoe they would like to customize. The customizable features are listed on the right. There are four main categories for alteration, namely *materials* (soft leather, patent leather, genuine snake skin, silk, lace, suede, sparkle, faded soft leather, cotton blend, hair, genuine fish skin, shiny soft leather and vegan), *style* (where the user is allowed to customize the shape of the back and toe of the shoe, or change its base shape completely from the predefined list), *heel height* and *extras* (trim, strap, front and back decorations).

The users are allowed to undo their choices, avoiding them to start all over and get bored with the customization process. Below the virtual image, there are readymade style combinations that can inspire the users.

The price of the image can be seen above the customization toolkit. Just below the price, there are the “Save” and “Add to Cart” buttons helping the user to save their designs and proceed to the payment page.

c. Check Out and Transaction Page: On the check out page, the product and its preferences are listed in details under the “Your Order Summary” title. Figure 4.21 displays how detailed the customized product information is given in the “your order summary” section. When the page is scrolled, “Contact Information” form appears below. Finally, on the third step the user fills the “Delivery Address” form and continues to the payment page with the “Secure Checkout” button.

Figure 4.21. Screenshot of the checkout page leading to the transaction page in Shoes of Prey www.shoesofprey.com (Accessed: October 2014).

4.3.1.8. Skin It

www.skinit.com is a website that allows the users to personalize their electronic devices by means of customizing skins or cases for their cell phones, mp3 players, laptops, PDA devices, cameras or gaming devices.

a. Homepage: Since the covers and skins that Skin It provides can be applied into a variety of products, the homepage contains excessive information to explain the products and their capabilities.

There are dynamic sliders with striking images to encourage the users to shop. The black header consists of a menu with the “Create Your Own”, “Cases”, “Skins”, “Designs”, “Carbon Skins”, “Canvas”, and “More Products” and “E cards” titles, which can be observed in Figure 4.22. The search bar placed above the menu assists the users to find what they are looking for. On the right corner above the page, the “register”, “login” and “cart” buttons take place.

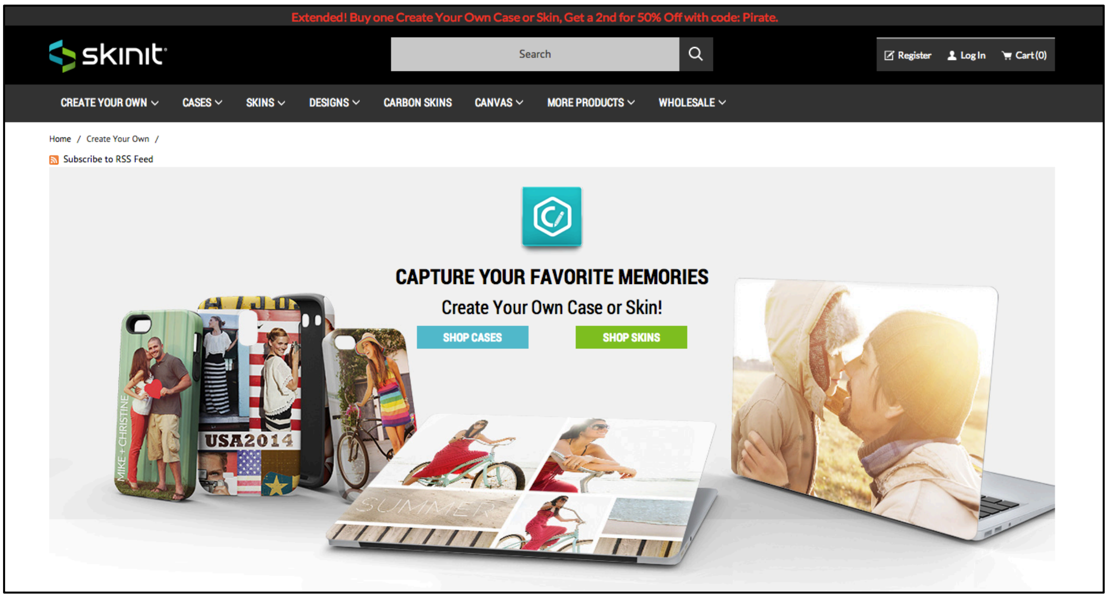

Figure 4.22. Screenshot of the homepage of Skin It
www.skinit.com (Accessed: October 2014).

When the page is scrolled, there are grouped products under “Personalize your device” title. Here, the users can select which product they would like to customize: Smart phone cases, smart phone skins, laptop skins, tablet skins or gaming skins.

Below this section, information about the durability of the skins and cases are explained. Moreover, the new and trending designs also take place to appeal to the user and make them start the customization process. The footer repeats the product groups to simplify the process of searching. Besides these, there are social media icons, testimonials, about company and support sections.

b. Mass Customization Toolkit / Product Page: When the product to be personalized is selected, for instance iPhone 6, the website asks the user whether to continue with cases or skins. Assuming that the user selects case as a base product, four types of cases (Pro Case, Lite Case, Cargo Case, Lenu Case) with different properties are opened up.

After the desired case is selected, the mass customization page is opened. The blank image of the phone case is placed in the middle. There are six categories in the customization toolkit namely *layout*, *images* (assists the user to find an image via upload image, image gallery, the web or social media), *text* (providing color, typeface and point size), *color*, *filters* and *preview*. These categories are expressed with icons to ease the user's navigation in the toolkit, which can be viewed in Figure 4.23. On the right hand side, there are image fitting options where the users can scale, rotate, fit horizontal, fit vertical, move front, move back, center, fit all or delete the images.

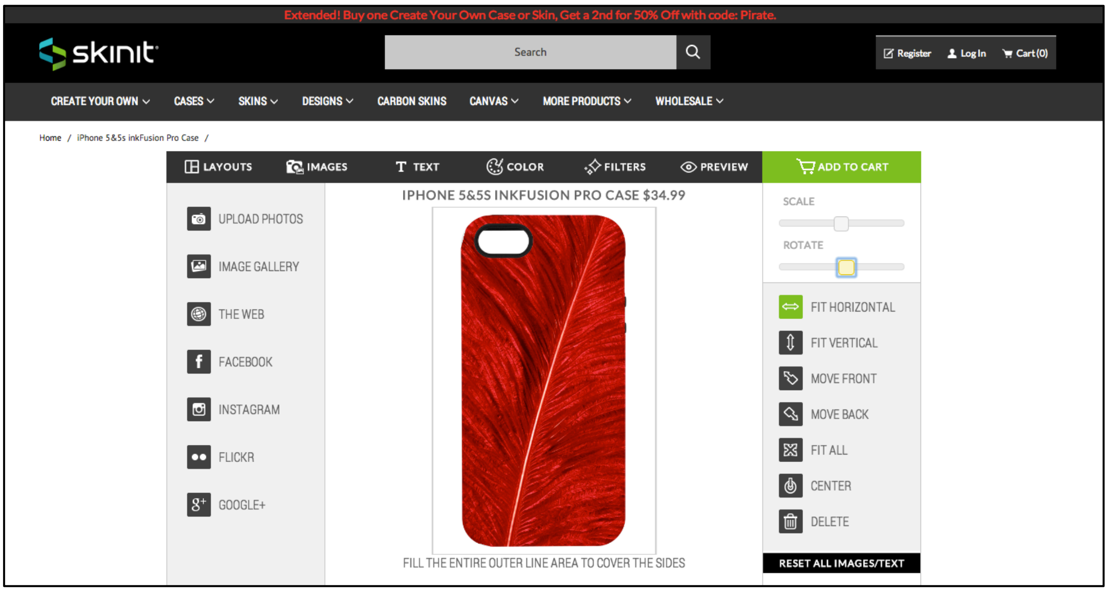

Figure 4.23. Screenshot of the mass customization toolkit of Skin It www.skinit.com (Accessed: October 2014).

c. Check Out and Transaction Page: After the customization process is completed, the user adds the product to cart and sees the product details in the shopping cart page. Here, the user can update the shopping cart, continue to shop or proceed to check out.

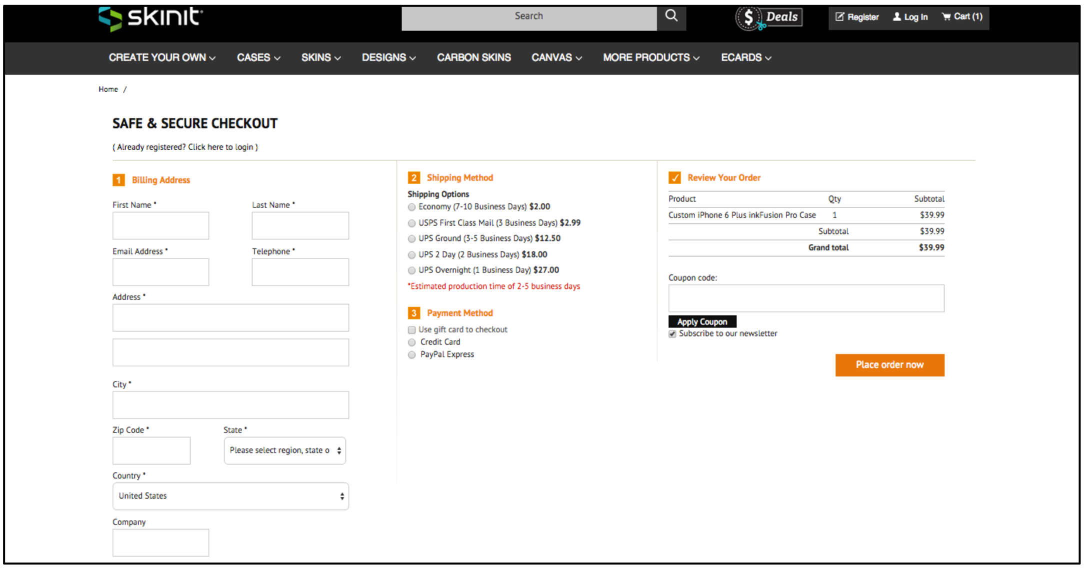

Figure 4.24. Screenshot of the check out page in Skin It www.skinit.com (Accessed: October 2014).

The check out page (Figure 4.24) consists of three steps: filling the billing address form, selecting the shipping method and selecting the payment method. The “Review your order” section summarizes the actions and after clicking the “Place Order Now” button, the transaction is completed.

4.3.1.9. Toshiba

Toshiba is a Japanese multinational brand providing technological electronic products and services including electronic components and materials, power systems, industrial and social infrastructure systems, consumer electronics, household appliances, office equipment, lighting and logistics. Toshiba offers online mass customization in its US website. However it is not available in Turkey's official website. Therefore, only certain countries are able to benefit from online mass customization.

a. Homepage: The neutral homepage has a slim slider giving information about recent campaigns. Unlike Dell, Toshiba mentions customizable products on their sliders as shown in Figure 4.25. Therefore the users have an opinion about the customizable products the moment they enter the web site.

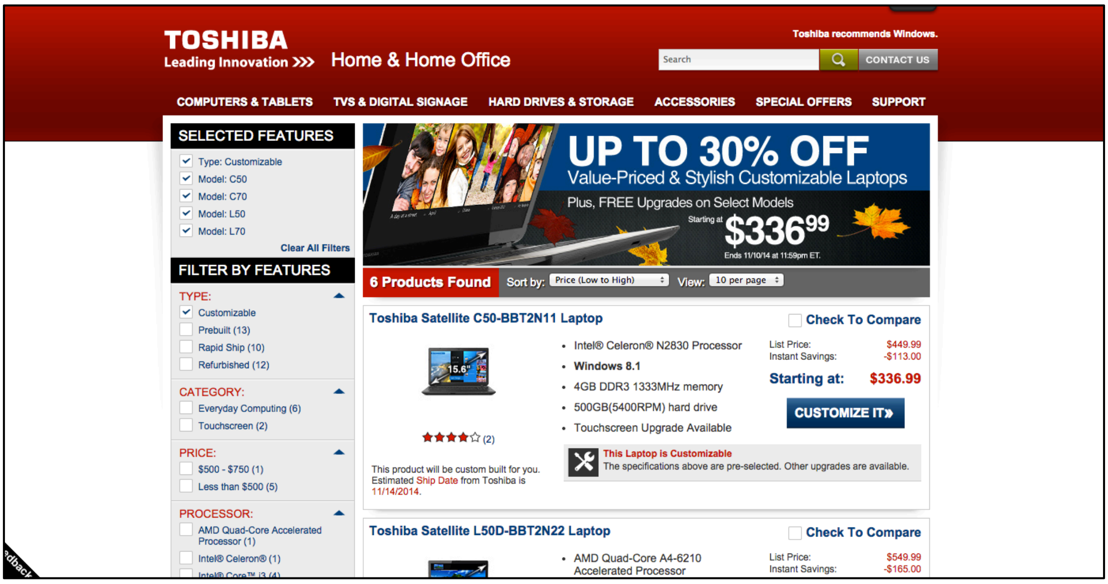

Figure 4.25. Screenshot from the homepage of Toshiba www.toshiba.com/us (Accessed: October 2014).

The header consists of "Computer and Tablet", "TVs and Digital Displays", "Hard Drives and Storage", "Business and Industrial", "Support", "Inside Toshiba", and "News". On the right hand side of the header, there is a search bar. Below the slider, the website displays the popular products, weekly deals and Social Responsibility awards and programs Toshiba is engaged with.

The footer lists the product collections in order to enhance users' ability to navigate. Moreover, "Inside Toshiba" and "Support" sections provide assistance to the users. In addition to these, social media icons also take place in the footer.

b. Mass Customization Toolkit / Product Page: By clicking on the slider related with customized laptops, the website directs the users to customizable laptop models. On this page, there is an extensive filtering system on the left, where the user can filter the products according to their type, category, price, processor, operating system, extras, family and model. When the desired product is found, the users can click on the "customize it" button in order to be led to the mass customization toolkit. In that page, there are several images of the product displaying it in different angles. Right next to the product images, the price is displayed, which instantly changes as the users add features from the customization toolkit below. The toolkit is composed of the following features: *processor, Microsoft operating system, Microsoft Office software, memory, hard disk drive, optical drive, display and touchscreen, wireless LAN and Bluetooth, anti-virus software, Warranty Upgrades and Extended Service Plans, bundles, docking* and *recommended accessories*. The features can not be seen at once: the user needs to scroll down to customize each attribute. Moreover, while scrolling, the header disappears so Toshiba does not use sticky or fixed position headers, which means that active menus scroll down with the page. Therefore in the screen shot of the customization page shown in Figure 4.26, the header cannot be seen.

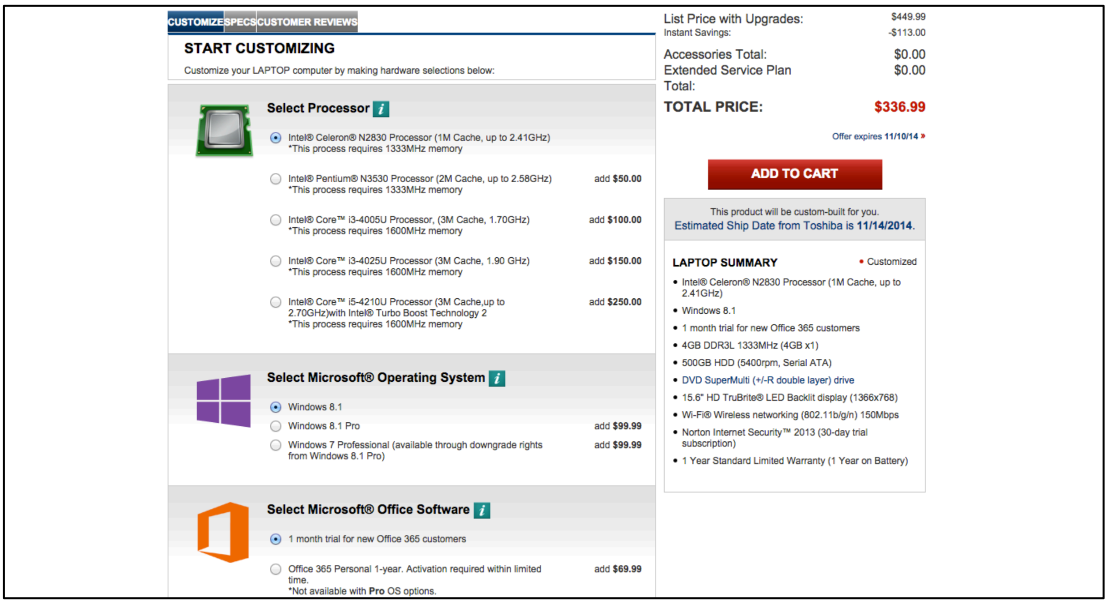

Figure 4.26. Screenshot of the customization page of Toshiba www.toshiba.com/us (Accessed: October 2014).

c. Check Out and Transaction Page: After the mass customization process is completed, the users continue to the check out page, where they either login or proceed as a guest. Just like in the previous websites, Toshiba's check out page includes billing and shipping information form, shipping method selection and final payment information. Similar to the mass customization page, the checkout page requires scroll down to complete each of the steps that are organized as an accordion menu. As seen in Figure 4.27, the website provides the order summary on the right hand side of the page with a thumbnail image of the selected product and total price.

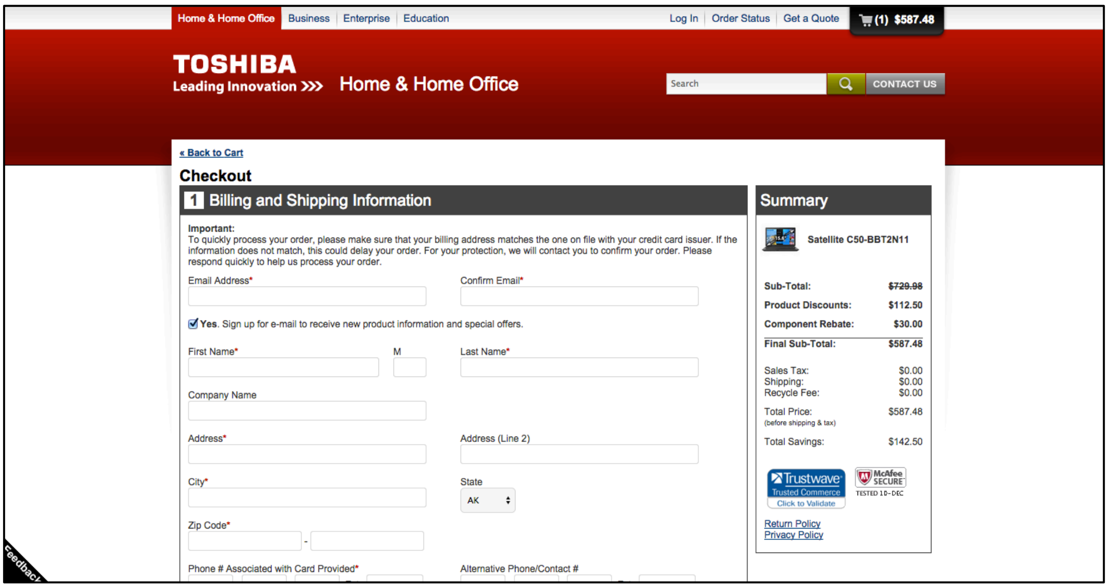

Figure 4.27. Screenshot of the checkout page of Toshiba
www.toshiba.com/us (Accessed October 2014).

4.3.1.10. Zazzle

Zazzle is a U.S. based website where they provide online mass customization for various products, such as apparel, mugs, cases, invitations and so forth.

a. Homepage: The home page has a dynamic slider giving information about the seasonal campaigns and sales. The header consists of "Shop", "Create", "Sell" and "Gifts", which can be seen in Figure 4.28. The emblem of Zazzle is centered and when mouseover, there is a drop down information about the products that can be customized, the makers and the mobile apps. On the right hand side of the header, account and shopping bag icons take place along with the search bar.

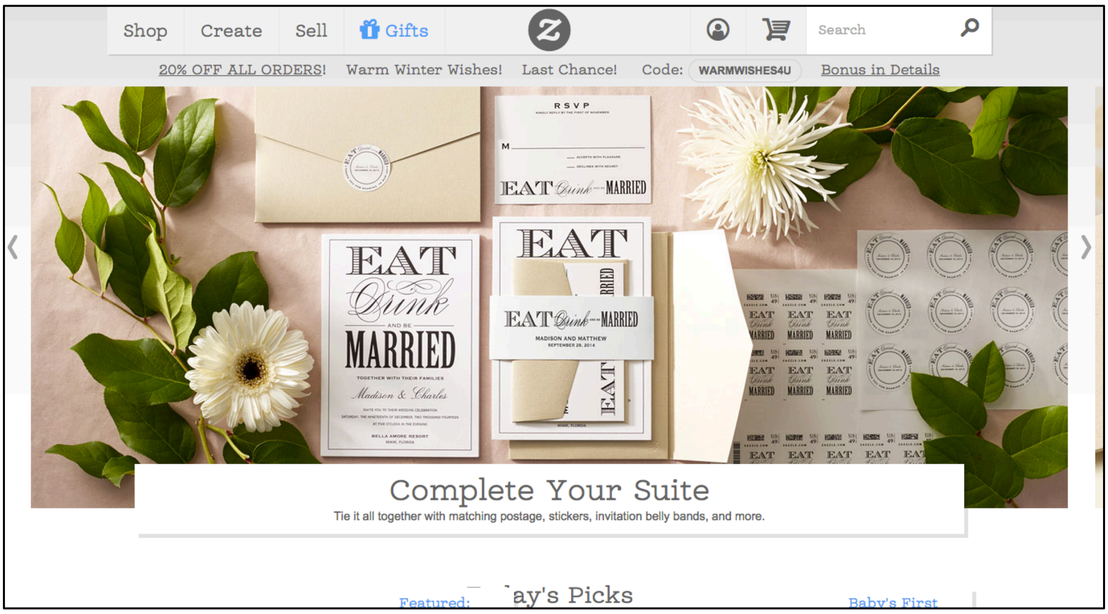

Figure 4.28. Screenshot from the homepage of Zazzle www.zazzle.com (Accessed: October 2014).

b. Mass Customization Toolkit / Product Page: From the "Create" title on the menu, a drop down sub-menu appears where the users are able to view the customizable product categories namely women, men, kids & baby, cards & postage, electronics accessories, office products and home & pets. If the user does not select from the drop down menu, then he can simply click on "create" and the product categories are listed with large circular images as: women's apparel, men's apparel, kid's apparel, cases, business cards, buttons, mugs, stickers, hats, postcards, greeting cards, invitations and postage. There are some other products such as chocolate that can be customized on www.zazzle.com as well.

If the users prefer to make custom cases, they select their smart phone models and they will be directed to the customization page. Figure 4.29 represents the mass customization toolkit for smart phone cases. Here, the product's virtual model is displayed along with the capabilities of zooming in/out, redo and undo. On the right hand side of the page next to the product's image, its name, designer, price and reviews take place. Below this information, the customization toolkit is displayed where the users can customize its color, add text and add image from the computer, web or social media.

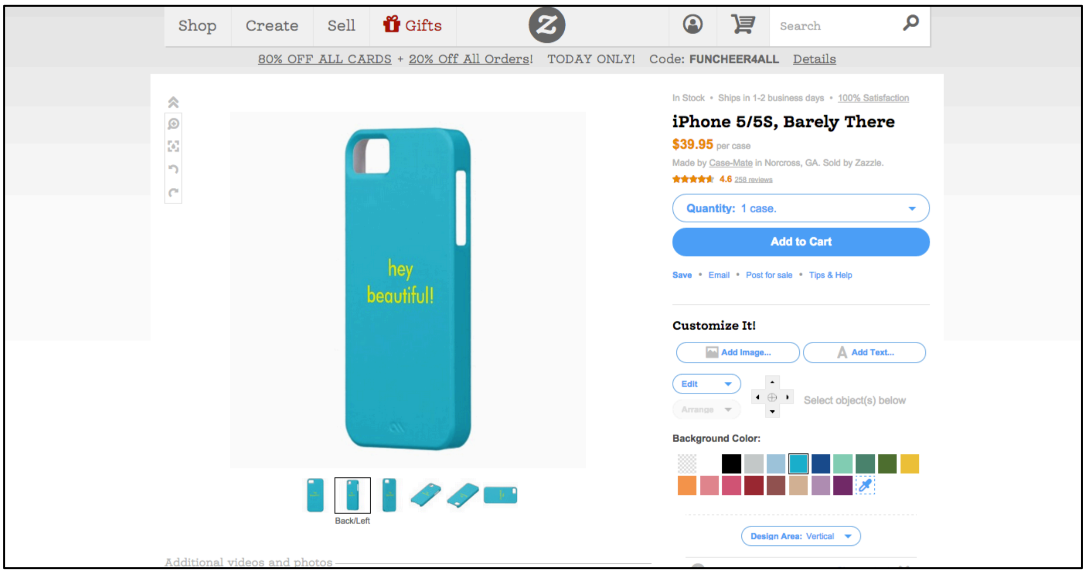

Figure 4.29. Screenshot from the mass customization toolkit of Zazzle www.zazzle.com (Accessed: October 2014).

Further information about the product is given below the toolkit. Features such as durability, compatibility, finish color and its origin are written in this section. The users can read the reviews at the bottom of the page to compare their opinions with previous buyers.

c. Check Out and Transaction Page: When users are set with the design, they can click on the “add to cart” button and review their shopping bag. Just as in the previous websites mentioned, the product's thumbnail image and its features are listed. The users can continue shopping or proceed to check out from this page. Since Zazzle provides delivery worldwide, it is possible for the user to complete the purchase. Firstly, they need to sign in or create an account. Then they are directed to the check out page. In this page they have to fill the address, shipping and payment form in order and review the order after the completion of the transaction, which are located on the right hand side, in the same row with the “checkout” heading (Figure 4.30).

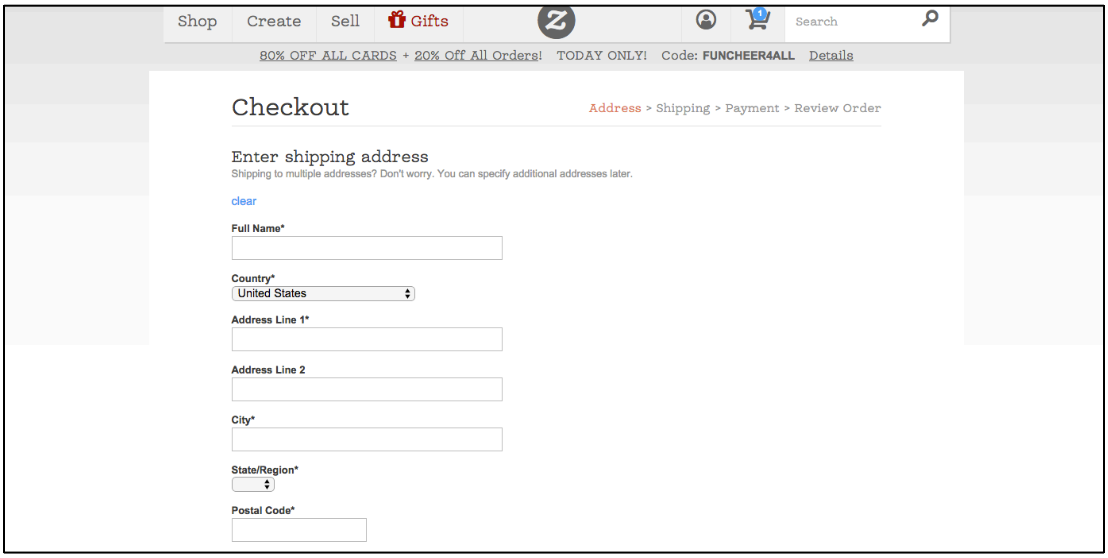

Figure 4.30. Screenshot from the check out page of Zazzle
www.zazzle.com (Accessed: October 2014).

4.3.3. Stage Two: Examination of Website Interfaces

In accordance with the website survey, an overall structure of the websites come forth regarding their interface design, layout, product selection and mass customization toolkits. By combining the observations of the website survey with the information deduced from the literature review, there are several outstanding headings that can be interpreted as the factors that affect evaluating online mass customization websites and representation of online customizable products. These are namely *accessibility and convenience, searching, visual layout, evaluation, mass customization toolkit* and *transaction*.

The *accessibility and convenience* factor involves the downloading speed of the website, questioning how easily one can access it. It also includes the aspect of shipment, whether the particular website provides shipment to the desired location or not. The *searching* factor entails the overall ease of use and navigation within the website. It includes whether the website's filtering and product categorization is useful and practical or not. Hence the name, the *visual layout* factor contains the visual features of the website such as visual attraction, user-friendliness, image sizes, font sizes, icon sizes, use of color and so forth. The *evaluation* factor focuses on how informative the website is about the customizable products. The *mass customization* *toolkit* factor involves numerous aspects such as the realism of the virtual images of the products, product diversity, attribute diversity, attribute categorization, image rotation, ease of use, text/image balance and so on. Lastly, the *transaction* factor comprises of the categorization of the information given in the payment page, the payment methods that are available in the website, and the flawlessness of the payment process.

In this second stage, the *mass customization toolkit*s' common features are summarized in detail in the form of checklists, as shown in Table 4.2. These features are categorized as product, attribute and utilities. The product section contains common features related with the images of the products, such as having multiple images of the product, zooming in/out the image, image rotation and so forth, which are used in the online mass customization toolkits. The second section, attribute, investigates the common features of the mass customization toolkits regarding the representation and content of the product attributes that also involve questioning the type of the attributes (aesthetic, functional and/or fit and measurement). The third section, utilities, comprises of mixed utilities that the mass customization toolkits offer. Guidance for toolkit usage, taking screenshots of the product, starting the design over, sharing the customized product in social media and instant price change as different attributes are added to the product, to name a few.

Table 4.2. Checklists of Mass Customization Toolkits of the Selected 10 Websites

Websites	121 time	BoConcept	Lewis& Taylor	NikeID	miAdidas	Shoes of Prey	Skin It	Dell	Zazzle	Toshiba
Product										
Product Image	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓
Product Image as Thumbnail	✗	✗	✗	✓	✗	✗	✗	✓	✗	✓
Multiple Images of Customized Product	✗	✗	✗	✓	✗	✗	✗	✗	✓	✓
Image Rotation	✗	✓	✗	✓	✓	✓	✗	✗	✗	✗
3D Product Visualization	✗	✓	✗	✓	✓	✓	✗	✗	✗	✗
Zoom in/out	✓	✓	✗	✓	✓	✓	✗	✗	✓	✓
Attribute										
Attribute Categorization	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Filtering of Attributes	✗	✗	✓	✗	✗	✓	✓	✗	✗	✗
Attribute Thumbnail Image	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓
Aesthetic Attributes	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗
Functional Attributes	✓	✓	✓	✓	✗	✗	✗	✓	✗	✓
Fit & Measurement Attributes	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗
Utilities										
Guidance for Toolkit Usage	✗	✗	✗	✓	✓	✓	✗	✗	✓	✗
Screenshot of Product	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗
Saving Design	✗	✓	✓	✓	✓	✗	✗	✗	✓	✗
Start Over Customizing	✗	✗	✗	✓	✓	✗	✓	✗	✗	✗
Undo Action	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗
Sharing in Social Media	✗	✓	✗	✓	✓	✗	✓	✗	✗	✗
Instant Price Change	✓	✓	✗	✓	✓	✓	✗	✓	✗	✓
Total	**8/19**	**12/19**	**7/19**	**17/19**	**14/19**	**12/19**	**7/19**	**4/19**	**8/19**	**8/19**

An overall evaluation of the investigated websites was made in terms of the features of each category. Whether a feature was present or not in a website was marked, leaving each website with a score over 19 features.

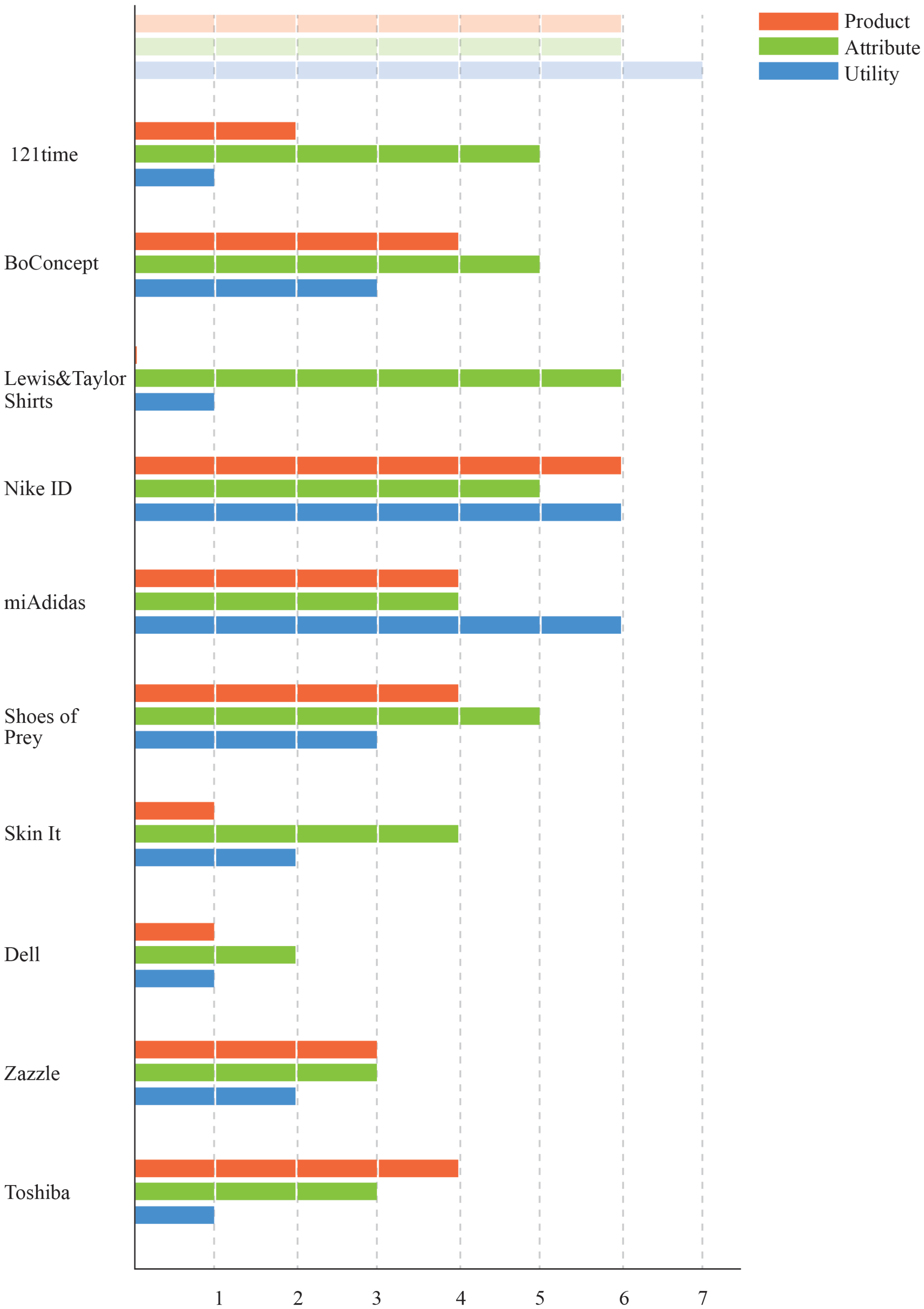

Figure 4.31. Checklist Scores of Mass Customization Toolkits Transferred into Bar Charts

The checklist gives information about the versatility and comprehensiveness of the mass customization toolkits on paper. The scores from the checklist are transferred into bar charts (Figure 4.31), which help in understanding the strengths and weaknesses of each website. To begin with 121 Time, this website has more prominent features in terms of presenting the attributes of the product. It provides all three of the aesthetic, functional, and fit and measurement attributes ready to be customized. This is also related with the product itself. While some of the products allow more alteration, some are limited because of their production capacity or simply of their features that restrict customizing. Returning to 121 Time's website, its most limited category is utility. The users are not allowed to save or undo the design. Moreover, there is no assistance that helps the users to understand where to begin customizing. Nevertheless, the placement of the attributes are systematic, therefore a user who has some experience about online product customization can easily follow the steps. Although the website features give very limited utilities, the interface design is quite understandable.

Just as 121 Time, Bo Concept has the highest score from the attribute category, and also received 4/6 points from the product category. The website allows product image rotation, zoom in/out and 3D product visualization. However, compared to 121 Time, Bo Concept's 3D image is less realistic and it is quite hard to get an exact appearance of the fabric. Bo Concept's utility score is one point higher than 121 Time, which is earned by the ability to share the design in social media.

Lewis & Taylor Shirts is the only website that received highest ranking of 6/6 in attribute category, at the same time receiving no points from the product category. In this website, the user never sees how the end product will look like, however each of the attributes are given so detailed that seeing the end product becomes not that necessary. Its utility category is as weak as 121 Time's. Nevertheless, its well-organized attribute category makes it a useful toolkit.

Nike ID has by far the most versatile mass customization toolkit. It shares the highest ranking in the utility category with miAdidas. It only lacks undo action in the utility category. Moreover, it received 6/6 in the product category, which makes its mass customization toolkit the most favorable one among others in the product category. miAdidas follows Nike ID closely, however its product and attribute categories are slightly weaker than Nike ID. It can be interpreted that shoes are more versatile products to be customized online. Therefore even though not as high as Nike ID, Shoes of Prey received a total of 12/19 points which makes it the 3rd highest ranking website with Bo Concept. Considering Bo Concept's mass customization toolkit menu, Shoes of Prey uses the space more effectively. The size of the attribute thumbnails and texts are larger, where Bo Concept's menu is almost squeezed under the image of the product.

Since it does not offer much alteration, Skin It received fewer scores in the product and utility categories. The product is limited with aesthetic customization and there is not much feature to change in the product apart from its print and text. Therefore there is no 3D image visualization or image rotation. However in the utility category, the user is not able to save or undo the design, which is not related with the product's limitations.

Even though Dell is considered to be an important example that provides online mass customization, its mass customization toolkit received the least score in the checklist. This may be considered because Dell provides only functional customization. However, Toshiba offers the exact same functional customization in laptops but its toolkit is way more versatile than Dell's. Toshiba offers multiple images of the product, and zoom in/out, while these features lack in Dell.

Offering miscellaneous products to be customized online, Zazzle gives a similar toolkit in smart phone cases with Skin It. Zazzle's advantages are zooming in/out the image and providing multiple images of the product. Moreover, Zazzle offers an optional guidance tool where the user can get help about how to customize the product.

The other factors will be evaluated in the main research, since they require the personal opinion of the consumers. Nonetheless, it should be reminded that as the participant group is not actually expected to make purchase customized products they make, the “transaction” factor will only be evaluated visually. According to the checklist of the websites’ mass customization toolkits, there are certain websites that shine through with high scores. However, it should be reminded that this does not prove these particular websites are more preferable by the consumers. It is required to examine consumers' further evaluation and their experiences with the websites to better understand their preferences, which is the primary reason of the main research.

4.4. The Main Research

The factors that are determined from the preliminary study with the help of the literature review and a detailed examination of websites provided grounds for the primary study. These factors are namely *accessibility and convenience, searching, visual layout, evaluation, mass customization toolkit* and *transaction,* as mentioned earlier. The aim of the research is to investigate consumers’ experiences with online mass customization website interfaces and understand consumers’ preferences about online mass customizable product attributes and their representation.

The main research consists of two stages. In the first stage, the participants are asked to examine two websites, which are decided by drawing lots. The participants are expected to experience online product customization by means of exploring the website, customizing a product by using the mass customization toolkit and proceeding to the transaction page. After performing this task, in the second stage, a quantitative survey is conducted with the participants. This survey is comprised of questions about participants' demographic information and statements about the six factors related with their evaluation of the online mass customization websites. The statements are structured in a 5-point Likert scale, where the participants answer according to a Strongly disagree (1) - Strongly agree (5) measure. If the statement is not valid for the particular website, the participant is asked to answer as "not applicable" (0). At the end of the survey, there are open-ended questions, where the participants share their further opinions about the websites.

4.4.1. Population and Sampling

The study is conducted with 40 participants with active online shopping experience. Since the customizable products that are included to the main research come costly, the participants are selected from a higher level of education and income in order to create a realistic matching of the products and the participants.

Sixteen of the participants are between 21-25 ages; 12 of them are in 26-30 age range; eight of them are between 36-40; one participant is between 18-20 ages; and two participants are 46 years and older. Twenty-five participants are university graduates and 15 of them are postgraduates. Their average incomes are 2,000 TL and more. There are 21 females and 19 males. The participants are generally from the design, interior architecture, and engineering professions. The design professionals include graphic designers (5), interior architects (5), industrial designers (3), art director (1), creative director (1), architect (1), UX designer (1), web designer (1) and digital media director (1). The engineering professions include industrial engineers (2), software engineers (2), biomedical engineer (1), electronics engineers (2), mechanical engineer (1), while the rest of the participants are from the finance (1), academic (2), dentistry (2), music (1), sales (2), and personal training (1) professions. In addition to these, there are three students and one newly graduate. Considering this demographic information, the participants have a certain amount of income and a high level of education, with knowledge and experience of online shopping (Appendix A).

To achieve saturation for the study, the optimum amount is determined as eight participants for each of the ten websites. Since the study includes ten different websites, each participant is given two different websites for evaluation. In order to obtain a random pairing, ten letters of the alphabet were assigned to the ten websites. These letters were written eight times on pieces of paper (in order to obtain 80 lots), and distributed into two groups with each letter appearing four times in both groups. One lot was drawn from each group in order to determine the website pairs. Thus, 40 pairs were obtained. The participants were assigned their pair of websites according to the order of lots. Therefore, for each website, eight different participant evaluation was gathered. Table 4.3 presents the matchup of websites and the participants that are expected to examine the related websites. The examination of the websites and completing the survey averagely lasted around 41 minutes (ranging from 27 and 62 minutes). Twenty-eight participants applied the survey one-to-one, whereas 12 participants completed their tasks and filled the survey online.

Table 4.3. Matchup of participants and the websites they are expected to examine.

Websites	Participants							
121 Time	P7	P13	P20	P22	P24	P34	P37	P40
Bo Concept	P5	P8	P15	P17	P26	P27	P32	P39
Dell	P1	P3	P4	P8	P9	P21	P23	P40
Lewis & Taylor Shirts	P2	P6	P7	P10	P12	P19	P23	P25
miAdidas	P4	P28	P30	P32	P33	P34	P35	P38
Nike ID	P2	P9	P10	P11	P12	P22	P27	P28
Shoes of Prey	P1	P3	P16	P18	P20	P29	P37	P38
Skin It	P6	P11	P13	P14	P18	P31	P35	P36
Toshiba	P5	P21	P25	P29	P30	P31	P36	P39
Zazzle	P14	P15	P16	P17	P19	P24	P26	P33

4.4.2. Performing Task

The task expected from the participant is as follows: each participant is expected to search for a customizable product, customize it according to his or her preferences and bring it to the check-out page as if they are actually buying the product. While performing this task, they are expected to explore and examine their websites in terms of its home page usage, visual layout, navigation within the website, searching and filtering, product categorization, mass customization toolkit and transaction. After the task is completed, the participant is expected to fill in the qualitative survey.

4.4.3. Qualitative Survey

The qualitative survey is composed of six sets of categories, which includes a total of sixty statements. The participants were expected to answer these statements in a 1-5 scale of strongly disagree to strongly agree. If a particular statement was not available for the websites that they examined, they answered N/A (0). The survey is divided in two columns, where the participants were able to evaluate each statement separately for the two websites they examined. The complete survey can be found in Appendix B. The English translation of the survey is in Appendix C. The categories are as follows:

a) *Accessibility and Convenience of the Website*
b) *Searching in the Website*
c) *Visual Layout*
d) *Evaluation of the Product Information Provided in the Website*
e) *Mass Customization Toolkit*
f) *Transaction*

4.4.4. Data Analysis

Throughout the study, a qualitative Likert scale survey is conducted. The participants' evaluations according to Strongly disagree (1) - Strongly agree (5) scale are listed and the average score for each statement were calculated, along with the overall averages of each main factor. This was followed by open-ended questions to gather detailed opinions about the participants' experiences and evaluation. Based on these open-ended questions, a thematic analysis was applied to analyze the data where each sentence that the participants indicated for each website is taken into account in order to ascertain a pattern between the statements. The repeating statements and/or adjectives used to describe the websites and their product presentation is noted separately for each and every website. Later, the prominent keywords are grouped in relation with the six factors that set a ground for the primary search, namely: *accessibility and convenience*, *searching, visual layout, evaluation, mass customization toolkit* and *transaction*. By this way, the keywords regarding the participants' preferences about online mass customization websites and their product presentation are revealed for each factor.

CHAPTER 5

FINDINGS OF THE MAIN RESEARCH

This chapter begins with the presentation of the overall results of the primary research in accordance with the six factors namely *accessibility and convenience*, *searching, visual layout, evaluation, mass customization toolkit* and *transaction*. The results will be presented in two parts. The first part conveys the analysis of the Likert Scale survey outcomes under the title of each factor, whereas the second part presents the evaluation and opinions of the participants regarding each website gathered from the open-ended questions and insights during the observation of their task performance. The chapter concludes with an overall discussion for the primary research.

5.1. Overall Assessment of the Websites

The qualitative survey results convey that the participants have evaluated Shoes of Prey (4.15) as the most favorable website in terms of the six factors that affect online mass customization websites and representation of online customizable products. Figure 5.1 illustrates the overall ranking of the websites. *Nike ID, miAdidas* and *Zazzle,* follow *Shoes of Prey*, all of which have scored the same point (3.78). On the other hand, Bo Concept has scored the lowest point (2.53). This is mostly caused by the fact that Bo Concept does not provide online purchasing. Therefore, Bo Concept received no scores from the transaction section of the survey. These will be explained in detail in the following sections.

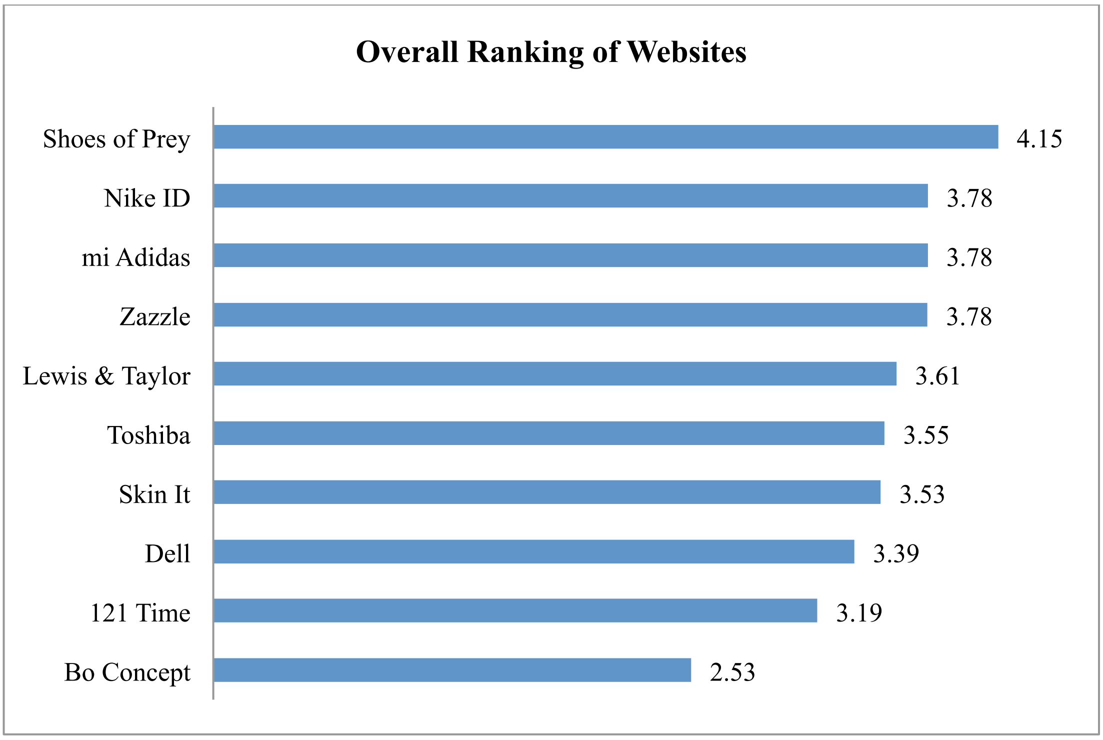

Figure 5.1. Overall ranking of the 10 websites according to the qualitative survey.

Table 5.1. List of Websites that received the highest and lowest scores from the six factors.

	Highest Score	Lowest Score
Accessibility and Convenience	Shoes of Prey	Bo Concept
Searching	Shoes of Prey	Bo Concept
Visual Layout	Nike ID	Dell
Evaluation	Toshiba	Bo Concept
MC Toolkit (General)	Shoes of Prey	Bo Concept
MC Toolkit / Product	Shoes of Prey	Dell
MC Toolkit / Attribute	Nike ID	Bo Concept
MC Toolkit / Utility	Shoes of Prey	Bo Concept
Transaction	miAdidas	Bo Concept

Table 5.1 shows the websites that have received the highest and lowest scores for each category. Shoes of Prey has received the highest scores in the categories of *accessibility and convenience*, *searching*, *mass customization toolkit / product* and *mass customization toolkit / utility.* On the other hand, Bo Concept was evaluated to be the weakest in the *accessibility and convenience, searching, evaluation, mass customization toolkit / attribute, mass customization toolkit / utility*, and *transaction* categories. Apart from Bo Concept, Dell is considered to be the least favorable website in the *visual layout* and *mass customization toolkit / product* category. Nike ID is found to be the strongest website in the *visual layout* and *mass customization toolkit / utility* categories. In addition to these, miAdidas has scored highest in the *transaction* category, while Toshiba was found to be the most informative and detailed website and scored highest in the *evaluation* category.

As for prioritizing the factors according to the usage of a website that provides online mass customization, the participants gave the highest score to accessibility and convenience with 4.70 out of 6 points, followed by visual layout with 4.40 and mass customization toolkit with 3.93, shown in Figure 5.2. In the same ranking, evaluation has received the lowest score with 2.25. According to this result, it is confirmed that the prerequisite of an online mass customization process is the accessibility and convenience of a website, which comprises its downloading speed, ease of access from anywhere, being able to buy the product and ship it to any place the consumer desires. After this precondition is provided, the consumers are able to continue the process free of problems. The second most important factor they expect from an online mass customization website is for it to satisfy them with its visual layout. The evaluation category, which includes the providing of adequate information of a product and comparison of multiple products, has received the lowest score of 2.25.

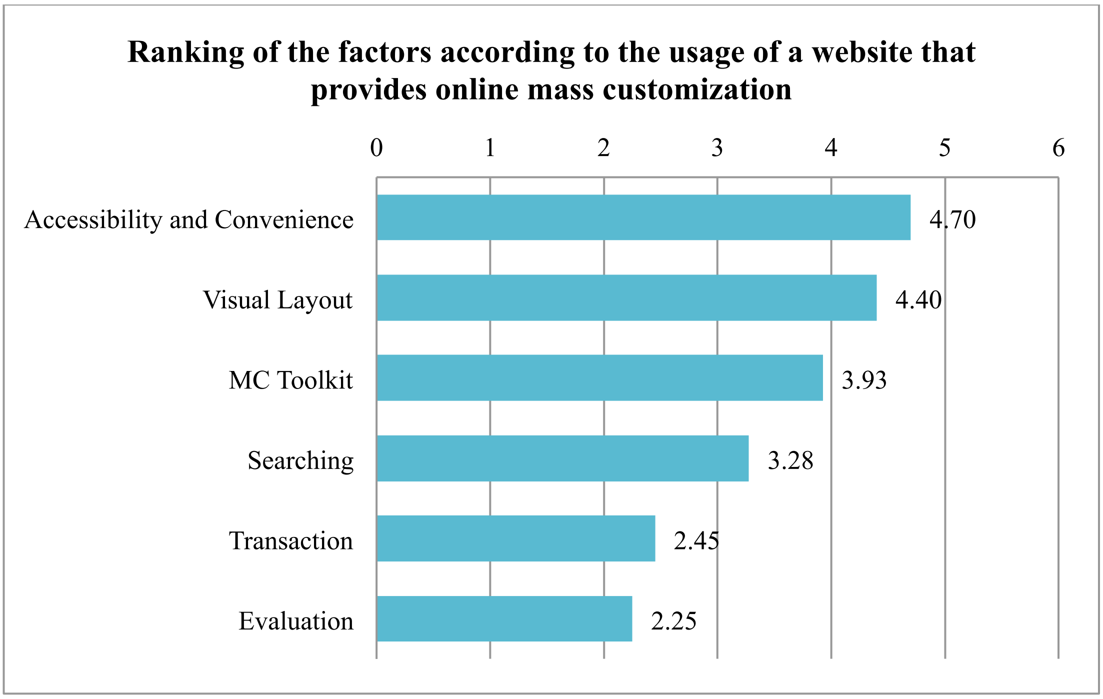

Figure 5.2. Ranking of the factors according to the usage of a website that provides online mass customization.

It is important to understand the factors that make consumers prefer an online shopping website to another, regardless of the website providing online mass customization. Figure 4.3 shows that accessibility and convenience (4.78) is by far the most significant factor similar to the ranking of the factors of online mass customization websites. Likewise, visual layout takes the second place (4.20). On the other hand, the searching and transaction factors are found to be more important in a regular online shopping website, whereas mass customization toolkit takes a more considerable place in online mass customization websites.

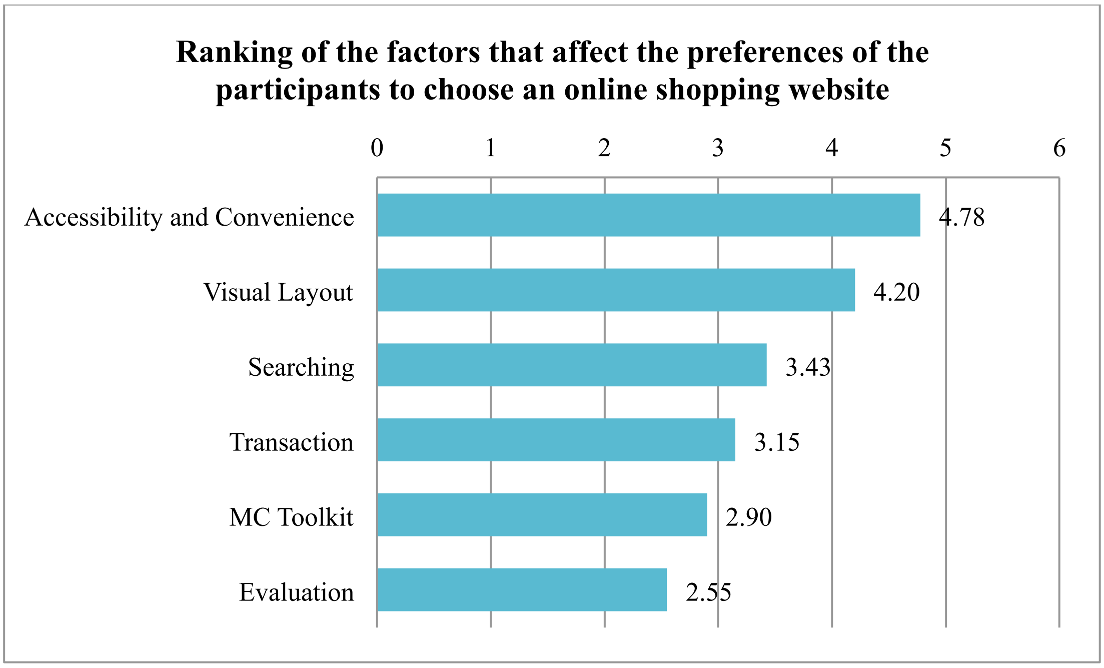

Figure 5.3. Ranking of the factors that affect the preferences of the participants to choose an online shopping website.

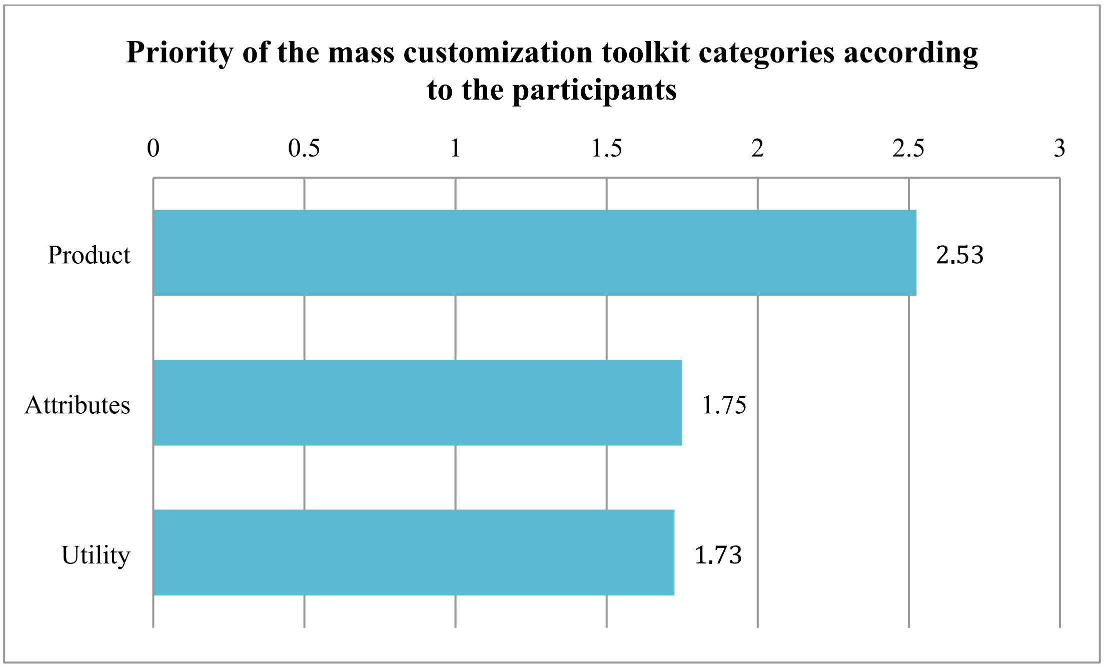

Figure 5.4. Priority of the mass customization toolkit categories according to the participants.

The mass customization toolkit involves three subcategories: product, attributes and utility. According to the ranking of these categories, the participants have evaluated the product category as the highest (2.53), which includes the variety of customizable products, reality of the product's image, image rotation, information and clarity of identifying the customizable components of the product (See Figure 5.4). Attribute (1.75) and utility (1.73) subcategories have received almost the same score.

5.2. Outcomes of the Primary Research According to the Factors

The outcomes of the primary research are given in two parts. The first part includes the results for each factor in detail, and the second part presents the outstanding aspects that the participants give consequence to in terms of these factors.

5.2.1. Accessibility and Convenience

Accessibility and convenience can be considered as the primary motive for online shopping. Therefore fulfilling these requirements is the prerequisite for assessing the other factors. Figure 5.5 shows the ranking of the websites regarding their accessibility and convenience. Due to the fact that they provide international shipping, Shoes of Prey (4.44) and Zazzle (4.19) have by far received the highest scores.

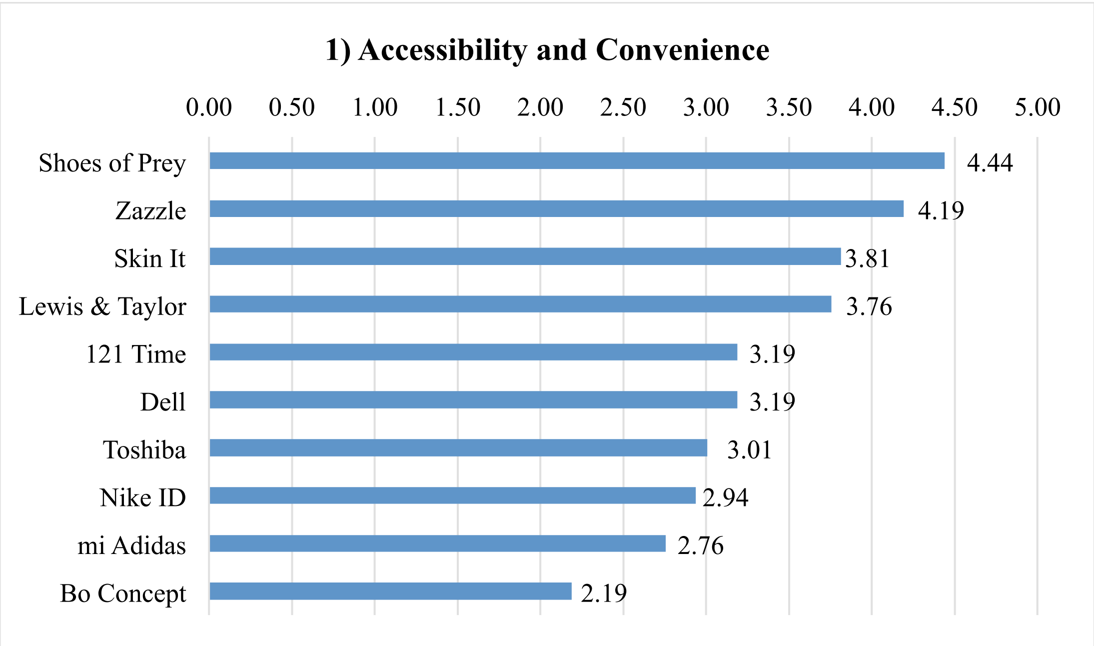

Figure 5.5. Ranking of the websites in terms of the accessibility and convenience factor.

Although Nike ID and miAdidas are considered quite favorable in other categories, their lack of international shipping ranked them with lower scores. However, Bo

Concept (2.19) is the weakest website in this category, since the website does not allow online product purchasing. Therefore the participants did not evaluate Bo Concept as convenient.

5.2.2. Searching

The searching category consisted of statements that question the ease of use, proper categorization and filtering along with the navigation inside the website. According to Figure 5.6, Shoes of Prey received the highest score (4.02), which is followed by Nike ID (3.89) and miAdidas (3.88), where 121time and Bo Concept received equally the lowest score (2.73).

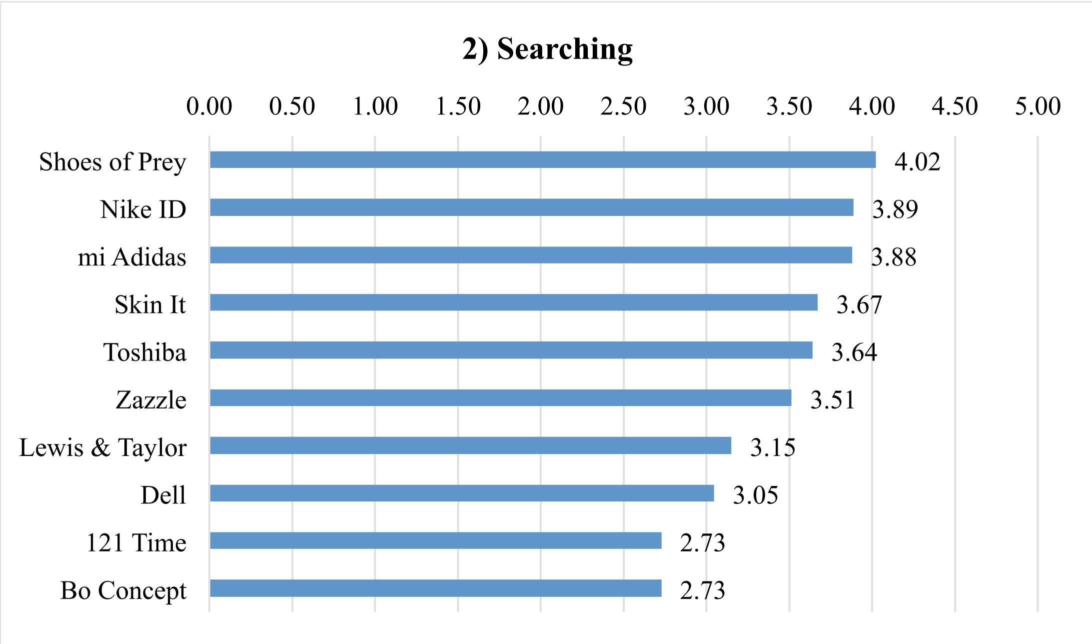

Figure 5.6. Ranking of the websites in terms of searching in the websites.

During the task performing part of the study, some of the participants who examined 121 Time commented that it is hard to find customizable watches even though the website provides online configurator buttons both on the slider and on the right hand side of the website. This is equally related with the visual layout of 121 Time. Regardless, the participants succeeded to find customizable products in 121 Time easier than they did in Bo Concept. This can be interpreted as, since Bo Concept offers a vast amount of different furniture and accessories in its website, it is harder to find the customizable products. They have to find them by means of trial and error. The customizable product categories are not separately given to the users therefore it takes more time to find an online customizable products in Bo Concept. On the other hand, Shoes of Prey is a website that is particularly specialized in online customizable shoes.

5.2.3. Visual Layout

The statements for the visual layout category questioned the websites' visual features such as image hierarchy, font sizes, icon sizes, image quality, color usage, and page scrolling. As Figure 5.7 reveals, the participants truly enjoyed exploring the websites of Nike ID (4.55) and miAdidas (4.48). This can be also related with the brands' effect and the participants' interest in the product. Nevertheless, the participants spent much longer time in these pages not because they were lost but voluntarily wanted to discover the features these websites provide. The results also show that the participants enjoyed searching and customizing shoes online more than laptops, watches or apparel.

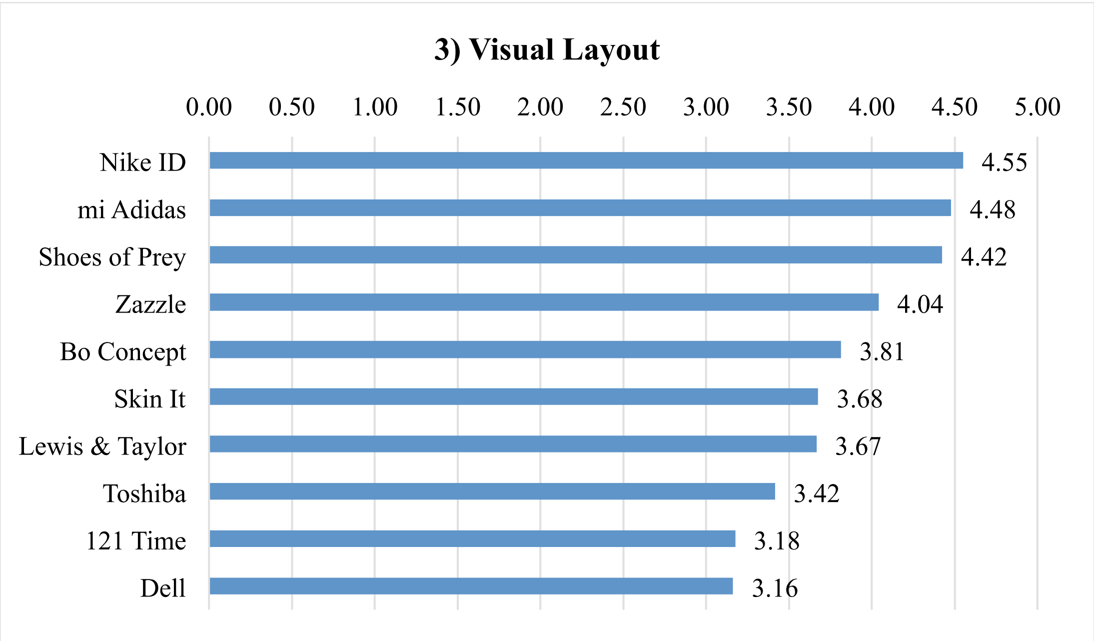

Figure 5.7. Ranking of the websites in terms of visual layout.

Dell received the lowest score (3.16). Participants mostly responded to Dell's visual layout as ordinary and uninteresting. They commented that although it looked simplistic, it lacked emphasis on the products and explanations therefore everything looked the same.

While most of the participants enjoyed customizing a wristwatch in 121 Time, the visual layout caused them to be lost in the website. One of the female participants responded that the general layout, font and color usage gave the website a masculine feeling. Therefore she assumed that only male wristwatches were sold in the website. After using the main menu from the header, she discovered female wristwatch models and customized one long afterwards. For that reason, visual layout is one of the most important factors that affect target consumers' approach to online mass customization websites.

5.2.4. Evaluation

The evaluation category questioned how informative the websites were. Differently from the other categories, Toshiba precedes the other websites and received the highest score (4.00), which is followed by Dell (3.98) and then by 121 Time (3.80) (See Figure 5.8). This can be interpreted by the fact that these websites offer technological and electronic products. For that reason, the participants expect to see more detailed information about product specifications, and they were able to find in-depth technical information in Toshiba's and Dell's websites. On the other hand, websites like Nike ID, Skin It and Bo Concept provide more visuals and therefore text-based information is required less. By this way, Toshiba and Dell are considered to be more successful and fulfilling in terms of the evaluation category.

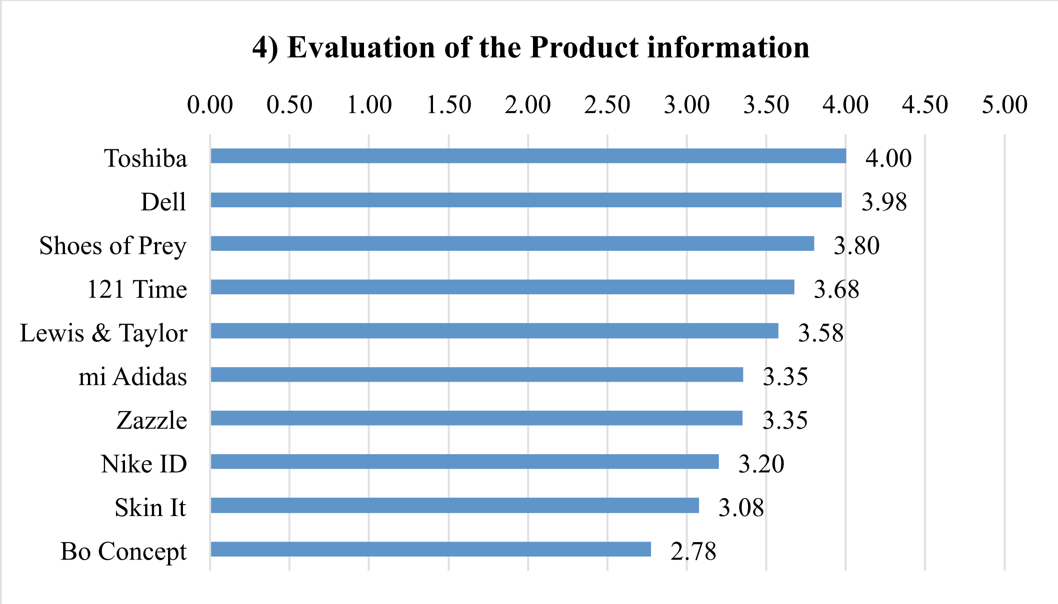

Figure 5.8. Ranking of the websites in terms of evaluation.

5.2.5. Mass Customization Toolkit

The online mass customization toolkit category dealt with the usage of the toolkits that help the users to customize the products. The mass customization toolkit category is examined under three subcategories: *product, attribute* and *utility*. The overall results for the mass customization toolkit are shown in Figure 5.9.

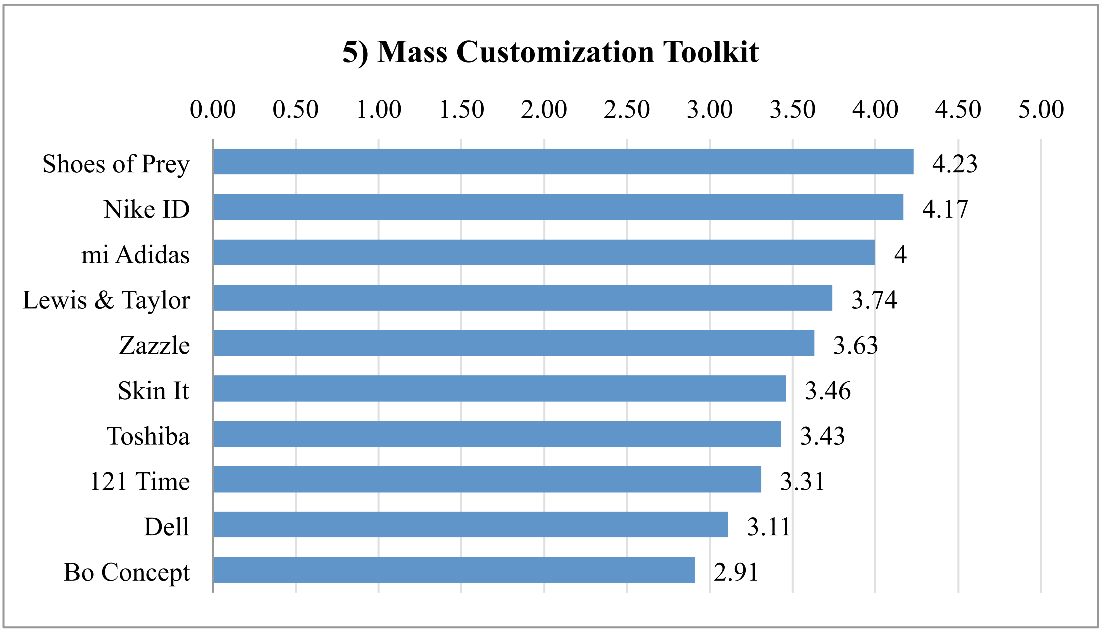

Figure 5.9. Ranking of the websites in terms of mass customization toolkits.

Shoes of Prey has received the highest score with (4.23), followed by Nike ID (4.17) and mi Adidas (4.00). Dell (3.11) and Bo Concept (2.91) have again received the lowest scores. All of the pages that lead to the mass customization toolkit already form a general impression of the website. However, the mass customization toolkit category is the most crucial category of all when it comes to evaluate the representation of online mass customizable products and their attributes.

5.2.5.1. Product

The product subcategory is concerned with the product variety, 3D visualization of product images, realism of the images, image rotation, and how clear the customizable components of the products are identified in the mass customization toolkit.

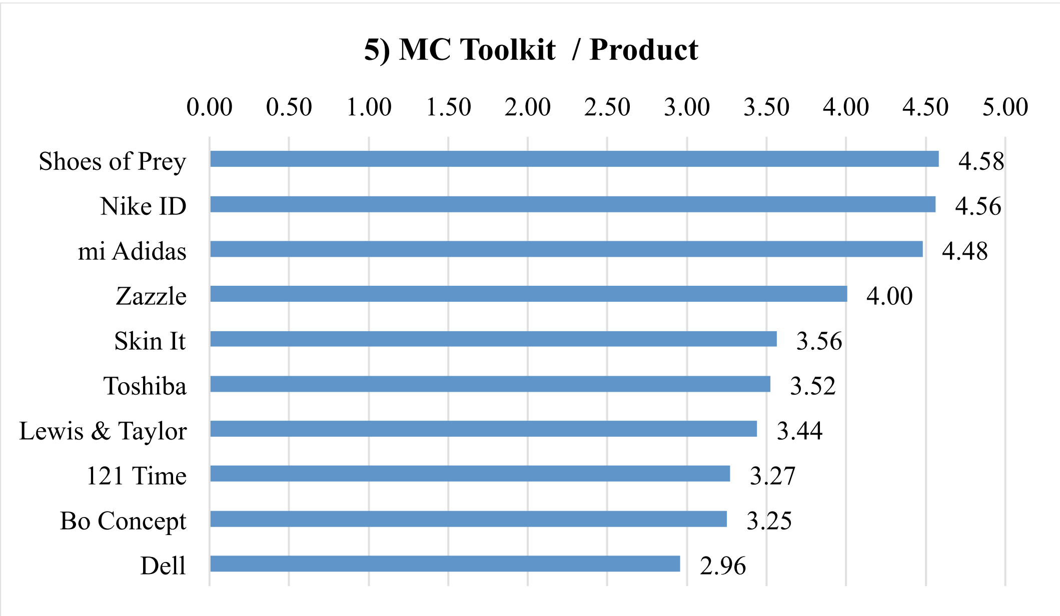

Figure 5.10. Ranking of the websites in terms of mass customization toolkits, product subcategory.

As shown in Figure 5.10, Shoes of Prey (4.58) and Nike ID (4.56) are the most favorable websites in terms of product visualization provided in the mass customization toolkit. The image rotation and clear distinction of the components that can be customized on the shoes are the primary reasons for these high scores. On the other hand, Dell has no clear images of the products except for a small thumbnail.

Since they are buying online, the participants expect to see the products from every angle possible. Considering the fact that laptops are expensive products, it is their right to ask for more visuals since images are the only sources to understand how the products look.

5.2.5.2. Attributes

The attribute category deals with the diversity of attributes offered by the mass customization toolkit and their representation. In this subcategory, as Figure 5.11 illustrates, Nike ID (4.39) is the most favorable website, followed by Shoes of Prey (4.30), Lewis & Taylor Shirts and Zazzle receiving the same score of 4.07. Bo Concept is rated the lowest with a score of 2.77. Nike ID and Shoes of Prey clearly define the customizable attributes of the products in thumbnails. Moreover, the attributes are classified according to the parts of the shoes like insole, heel, toe and so forth. The materials are separately categorized in Shoes of Prey, such as laces, leather, and fabric. By this way, the users are guided easily and are not confused during the customization process. Nevertheless, these two websites offer a vast amount of color and material choices. This has negatively affected some of the participants, since they expect the least amount of attribute choices and prefer to leave most decisions to the brand itself.

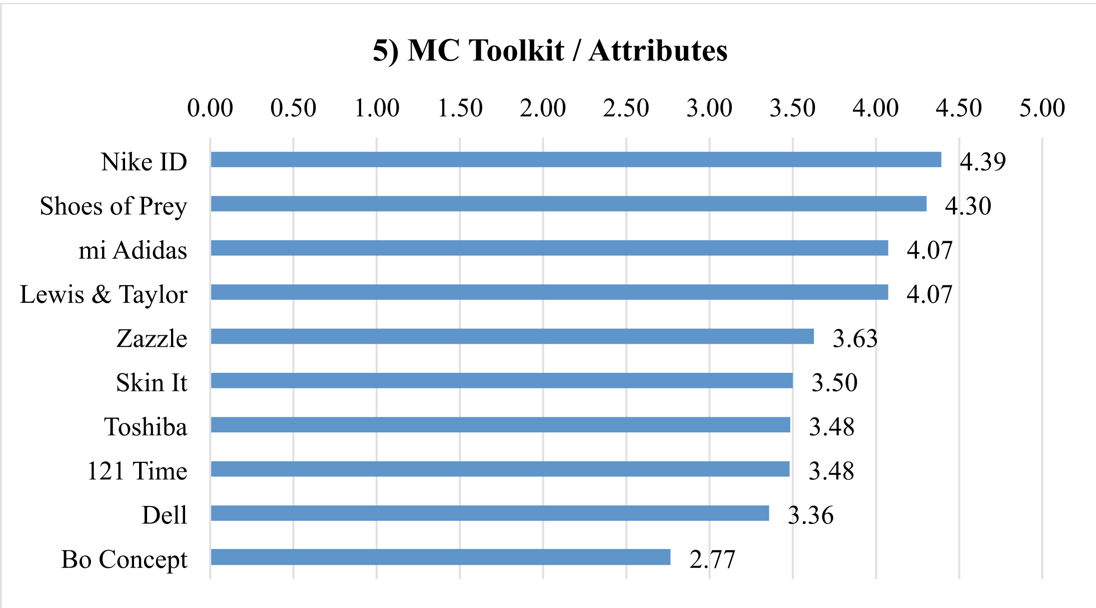

Figure 5.11. Ranking of the websites in terms of mass customization toolkits, attribute subcategory.

Although Bo Concept provides various fabric, modularity and material choices, the icon and thumbnail sizes are too small for the respondents to understand easily. In addition to this, the toolkit of Bo Concept offers completely different products as well as the selected base product. For that reason, the user loses the base product he/she selected while trying different modules for the furniture.

5.2.5.3. Utility

The utility of mass customization toolkits is as significant as their visual layout. Therefore this section evaluates the functionality of the toolkits, such as the usage of the area inside the website, undo buttons, instant price change as the attributes are added and guidance inside the toolkit. In this subcategory, Shoes of Prey received the highest score (3.83) again, followed by Lewis & Taylor Shirts (3.72). Bo Concept received the lowest score (2.73) (See Figure 5.12). This can be explained by the slowness of Bo Concept's toolkit. Most of the participants were frustrated with waiting for the toolkit to process the changes they make on the product. Another weakness of Bo Concept is the area usage inside the website. While Shoes of Prey and Lewis & Taylor make use of the area as efficient as possible, Bo Concept's toolkit covers one third of the whole page, which looks quite small. Inevitably, the thumbnail sizes are also too small to understand.

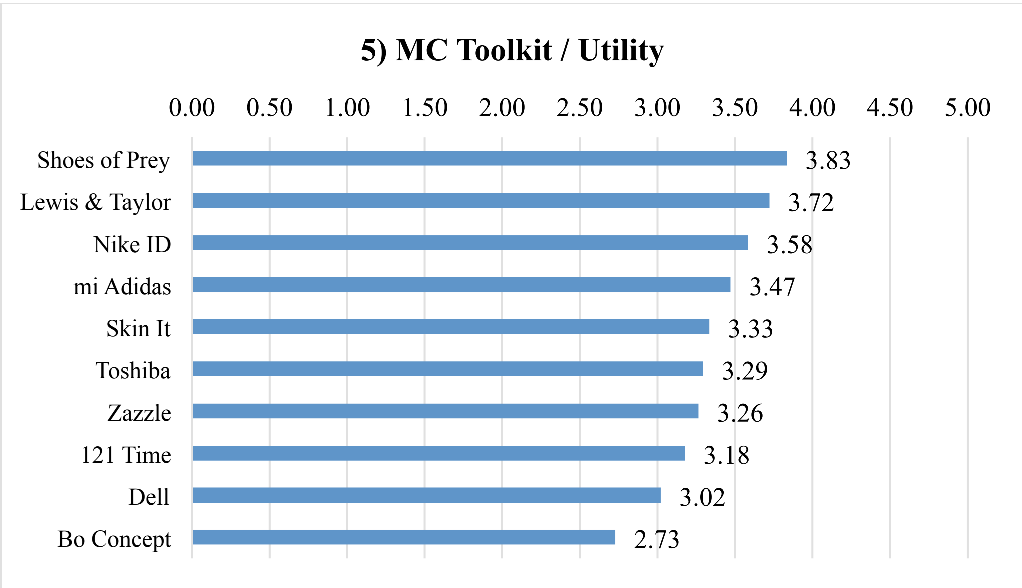

Figure 5.12. Ranking of the websites in terms of mass customization toolkits, utility subcategory.

5.2.6. Transaction

The final category of transaction deals with the usefulness, trustworthiness and practicality of the payment page. Since the participants did not actually buy the products they customized, they evaluated this category visually, and if experienced any errors they mentioned these in the open-ended section of the survey. Figure 5.13 shows the scores of the websites in transaction category. As mentioned earlier, Bo Concept does not provide online purchasing in its website. Not surprisingly, Bo Concept received the lowest score (0.75) in this category. miAdidas stands out amongst others with (4.20).

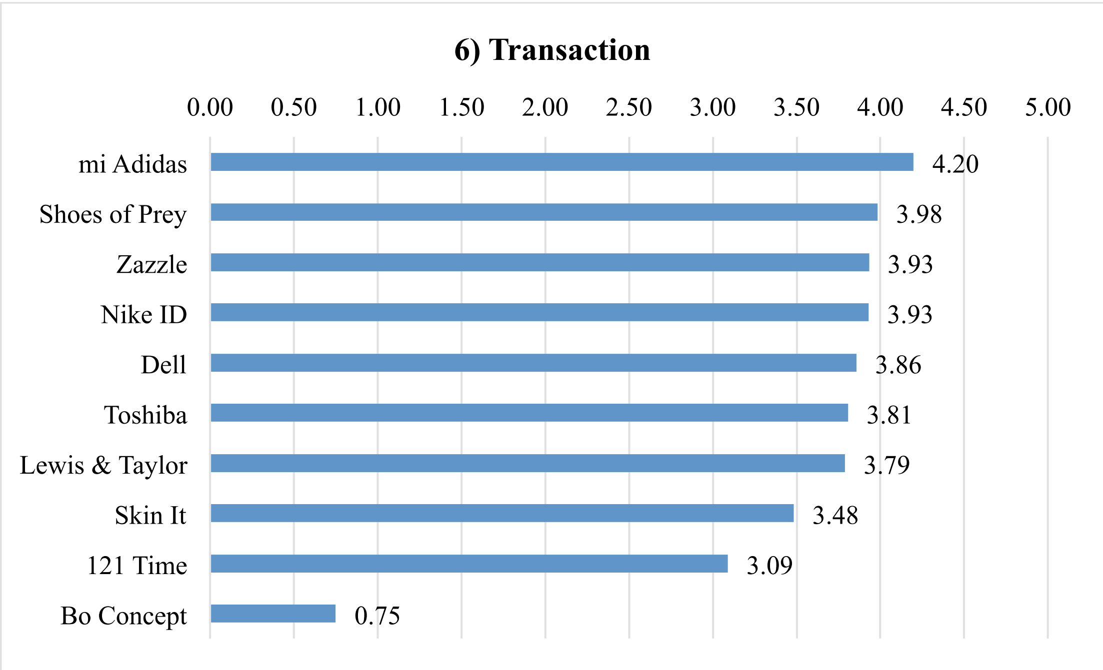

Figure 5.13. Ranking of the websites in terms of transaction.

Participants have stated that having the logos of the payment methods enhances the trustworthiness and gives a secure feeling about buying products online from that particular website. PayPal is considered to be an important criterion for the participants to proceed to the transaction page.

In some websites like Zazzle and Skin It, the participants searched for discount codes for their smart phone cases from the search engine. Obtaining a discount code makes it easier for the participants to decide on proceeding with the purchasing process.

5.3. Evaluation of Answers Given to the Open Ended Questions

The answers given to the open-ended questions were gathered and a content analysis was conducted in order to reveal the aspects that participants found worth mentioning in terms of their expectations from product presentations from online mass customization websites. Relevant keywords were grouped under similar themes. The themes were then categorized under the main factors that affect consumers' preferences regarding online mass customization.

With the open-ended questions, the participants explained whether they found the websites they examined user-friendly or not by providing their motivation behind. Later, the participants provided the positive and negative aspects of each website in terms of online mass product customization and the representation of the customizable attributes.

According to their answers, there are several outstanding aspects that the participants evaluated either positively or negatively regarding their expectations from an online mass customization toolkit, the customization process and the representation of the customizable products and their attributes, as shown in Table 5.2.

Table 5.2. Participants' expectations from online mass customization websites

Factors	Aspects
1. Accessibility and Convenience	Speed
	Shipment
2. Searching	Ease of Use
	Navigation
	Categorization
	Guidance
	Filtering
	Finding Customizable Products
	Practicality
3. Visual Layout	Visual Attraction
	Guidance
	User Friendliness
	Visual Clarity
	Understandability

Table 5.2. (Continued)

3. Visual Layout	Trustworthiness
	Informativeness
	Image sizes
	Font sizes
	Icon sizes
	Masculinity-Femininity
4. Evaluation	Information
	Comparison
	Trustworthiness
5. MC Toolkit	Realism
	Guidance
	Enjoyment
	Product Diversity
	Attribute Diversity
	Understandability
	Categorization
	Order
	Image Rotation
	Speed
	Functionality
	Instant Visualization
	Detailed Information
	User Involvement
	Ease of Use
	Practicality
	Text / Image Balance
	Image Quality
	Allowing Self Expression
	Being Able to See the Features at Once
	Seeing the End Product
	Toolkit Attractiveness
	Worthiness of Spending Time
	Having an Up-to-Date Interface
6. Transaction	Completion
	Payment Methods
	Discount Codes
	Error
	Categorization

The aspects that were found significant for the *accessibility and convenience* factor category are: *speed* and *shipment*. In terms of accessibility and convenience, downloading speed of the website is found to be the most important factor. Since one of the most primary motivations in doing online shopping for consumers is ease of access, whenever and wherever they like, without wandering around in the offline stores for hours, they expect the website to download fast. They expect the online shopping process to be more timesaving. Therefore, if the website is not fast enough, they lose their motivation to proceed and simply give up on the website.

The prominent aspects concerning the *searching* factor category are: *ease of use*, *navigation, categorization, guidance, filtering, finding customizable products,* and *practicality*. Primarily, the ease of use and navigating within the website is very significant. Moreover, the product categorization and filtering save time, not to forget that proper guidance helps the users to be directed to the relevant product's page. For online mass customization websites, it is crucial to be able to access the customizable products. Therefore, if the website does not emphasize custom products, the users gets lost and assume that the website provides only standard products.

The *visual layout* factor involves many significant parameters about the presentation of the products and organization of the websites, which are namely *visual attraction, guidance, user friendliness, visual clarity, understandability, trustworthiness, informativeness, image sizes, font sizes, icon sizes,* and *masculinity-femininity*. To begin with, the website needs to be visually attractive so that it appeals to the user and enables them to stay in the website and spend more time and in the meantime, enjoy the process. The website requires to be user-friendly as well. In the case of Dell, most of the participants felt quite reluctant to explore what Dell offers to them because they found the website visually boring. On the other hand, websites such as Shoes of Prey caught participants' attention and made them enjoy the exploration process. Another important aspect of visual layout is providing the elements in an adequate size. Meaning that the font choices, and their sizes need to be both readable and legible. The icon and image sizes also need to have a visible size so that the users will capture what the website offers much more easily.

As much as the visual attractiveness, the visual clarity and understandability of the website also leads to trustworthiness. The use of color is an important supporter of the visual layout. Therefore it is useful to make smart choices on the color and use of images within the website so that the users will not get any unwanted impressions.

In terms of evaluation, it is revealed that the participants pay attention to detailed and adequate information about the products, as well as to being able to compare multiple products. The information that the website provides needs to be reliable for a long-term relationship. Therefore, the participants expect the website to be trustworthy.

Mass customization toolkit factor contains the most comprehensive list that the participants expect from an online mass customization website. These are *realism, guidance, enjoyment, product diversity, attribute diversity, understandability*, *categorization, order, image rotation, speed, functionality, instant visualization, detailed information, user involvement, ease of use, practicality, text/image balance, image quality, allowance of self expression, being able to see the features at once, seeing the end product, toolkit attractiveness, worthiness of spending time and effort*, and *having an up-to-date interface*.

In terms of a customizable product and its presentation, the participants expect 3D realism, product diversity, image rotation and instant visualization. The attribute diversity, and the way it is categorized and presented to the user is another significant aspect. For an efficient and enjoyable customization process, the participants expect a proper guidance inside the toolkit, where they will save time and spare more time on decision making on the customized product rather than trying to understand how the toolkit works.

The mass customization toolkit requires making a balance between text and image so that the users will not get lost. In Toshiba and Dell, the websites provide too much technical detail and less amount of image, which visually tires the users and they try to finish the task as fast as possible. On the other hand, the instant visualization of the products provide user involvement and users feel more interacted with the process and able to see what the end product will look like.

From the *transaction* factor category, *completion, payment methods, discount codes, error* and *categorization* are found to be important aspects for participants' preferences. The participants expect to see an organized categorization of the order summary, contact information, delivery address and payment page. The payment methods and discount coupon offering are other advantages that the participants prefer to see. During some of the task performing, the transaction page gave error and the participants had to start over, which negatively affected the trustworthiness of the payment page and the participants felt discouraged to proceed.

5.4. Discussion

The results of the primary research reveal that the combination of a favorable visual layout and mass customization toolkit provides a successful representation of customizable products and their attributes. This can be supported by the insights collected during the observation of participants' task completion. The participants' detailed responses are explained under each website.

5.4.1. 121 Time

Three out of eight participants evaluated 121 Time's website as user-friendly. The participants have mainly encountered some technical inconveniences. For instance, P22 argued that when she tried to undo an action, the customized watch that she was building up was gone and she had to start all over again. P13 experienced a similar problem during the transaction page. When he added the product to cart and tried to check out, the checkout form did not open properly and when he refreshed the page, the customized product was reset.

The overall loading of the page was found to be very slow. Therefore most of the participants did not enjoy the process as much as they did in the other websites. There are several other outcomes regarding the visual layout of 121 Time. For instance, P22 argued that the grey use of color in the overall visual layout, the use of fonts and the emphasis of wristwatches for men on the home page slider makes the user think that the website provides products only for men. After exploring further, she discovered the products for women and proceeded with the customization process. Figure 5.14 demonstrates the main slider and color usage of 121 Time.

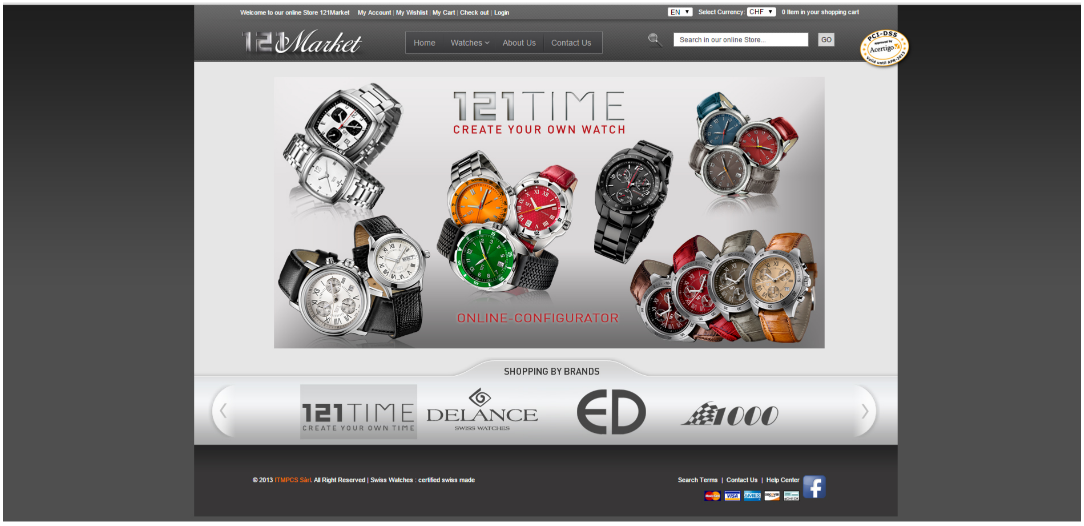

Figure 5.14. Screenshot from the home page of 121 Time's website www.121time.com (Accessed: March 2015).

In terms of the mass customization toolkit, P37 complained that the product is viewed from a single angle, and he would rather prefer to rotate the image to understand what the customized result will look like. Even so, generally all the participants agreed that the image of the product was realistic. Moreover, the information given about the products were quite satisfying.

5.4.2. Bo Concept

Three out of eight participants evaluated Bo Concept as user-friendly. However nearly all of them felt quite discouraged to continue with the customization process since the provided area in the customization toolkit was not found to be adequate and its downloading speed was quite time taking. For instance, P5 stated that although the toolkit provides utilitarian features such as being able to select each module and delete the unwanted ones, it had too many bugs and did not function properly. He also added that the Flash technology used for the toolkit is quite old and caused errors.

P8 stated that although the mass customization toolkit seems fun and provides a 3D image of the product, it is quite hard to get there in the first place and discover the customizable products within the website. He added that after spending 10 minutes to find customizable furniture, seeing the tiny area provided for the toolkit is quite disappointing. For P8, the most negative aspect of Bo Concept is that the user spends a lot of time to customize a product but leaves it like that without purchasing it. Therefore even though it gives an idea about the final product, the process being left unfinished is not a desirable condition for the participant. Similarly, P32 stated that since the consumer will have to go to the offline store to buy the product in any case, there is no meaning in customizing the product online.

Although the general visual layout is evaluated as clean and understandable, the mass customization toolkit's icon sizes were found to be too small and the area was not used efficiently within the website. Figure 5.15 presents the icon sizes of the attributes in the mass customization toolkit.

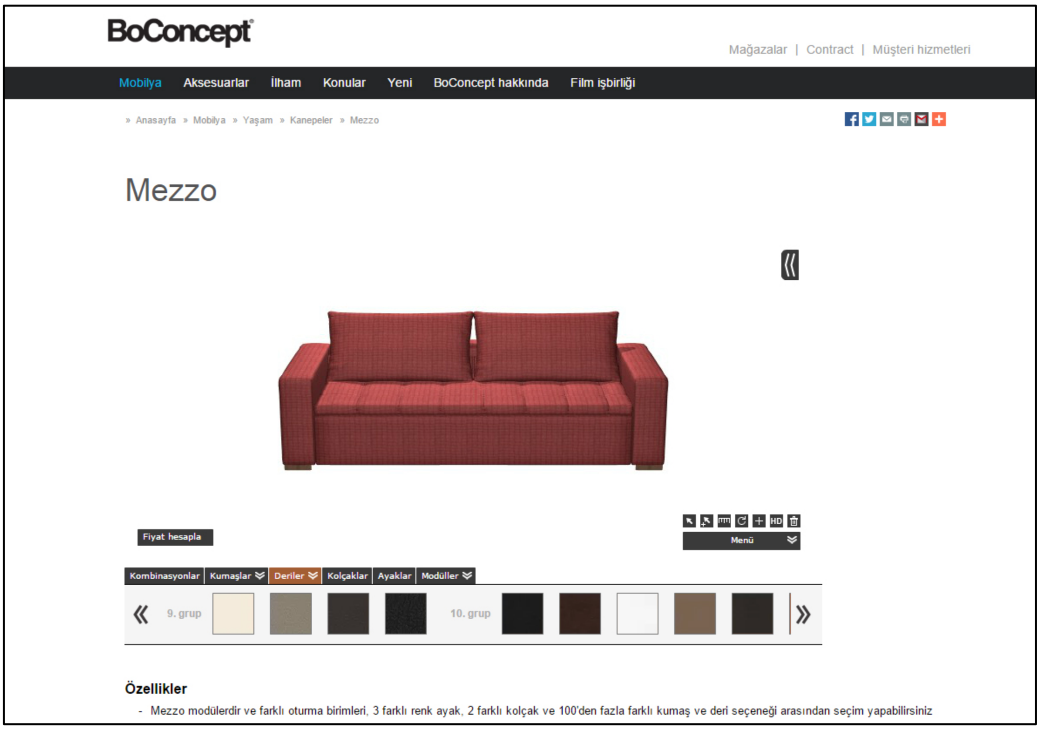

Figure 5.15. Screenshot from the mass customization toolkit of Bo Concept's website www.boconcept.com/tr (Accessed: March 2015).

5.4.3. Dell

As explained earlier, Dell's website is considered to be one of the less favorable among others. From the eight participants who examined Dell, only half of them evaluated Dell as user-friendly. In terms of visual layout and mass customization/product categories, Dell received the lowest scores from the Likert scale. Similarly, participant P1 found Dell's interface and mass customization toolkit quite complex and got bored during the customization process. She stated that it was hard to discover which laptops were customizable and that took most of her time during the task performing, which made her reluctant to continue with the customization process. She also added that the customizable components' titles are neither visually distinctive from the attributes nor explanatory. Therefore the user gets lost while trying to understand which attribute belongs to which component. Another point that she highlighted is that the user needs to scroll a lot in order to see all the customizable attributes, which is evaluated as a weakness for an online mass customization website. The participants always prefer to see at least the titles of the customizable components at once, so that they understand in what range they are allowed to change the product. P40's statement supports this: he argued that searching of the website is quite hard to follow, whereas the customizable attributes of the laptops cannot be seen all at once and thus the user gets lost.

What makes Dell favorable is the evaluation factor. The participants have stated that Dell provides detailed and satisfactory information about the products, giving clear and comprehensive information on the prices, features and information about the additional products.

Mass customization toolkit of Dell lacks images of the products. It only provides written information about the products after the user comes to the mass customization toolkit page. Figure 5.16 gives some idea about the text and image distribution on the toolkit. There is only a small thumbnail of the product's image, where the rest of the attributes are listed as text. P3 remarked that she would prefer to see the image of the laptop that she was customizing. In addition to this, P4 argued that the font sizes are quite small and the toolkit does not visually emphasize the choices when it is selected. For that reason, the participant was not sure whether he was able to select the attribute or not. Even so, he indicated that the customizable components were listed according to the order of importance.

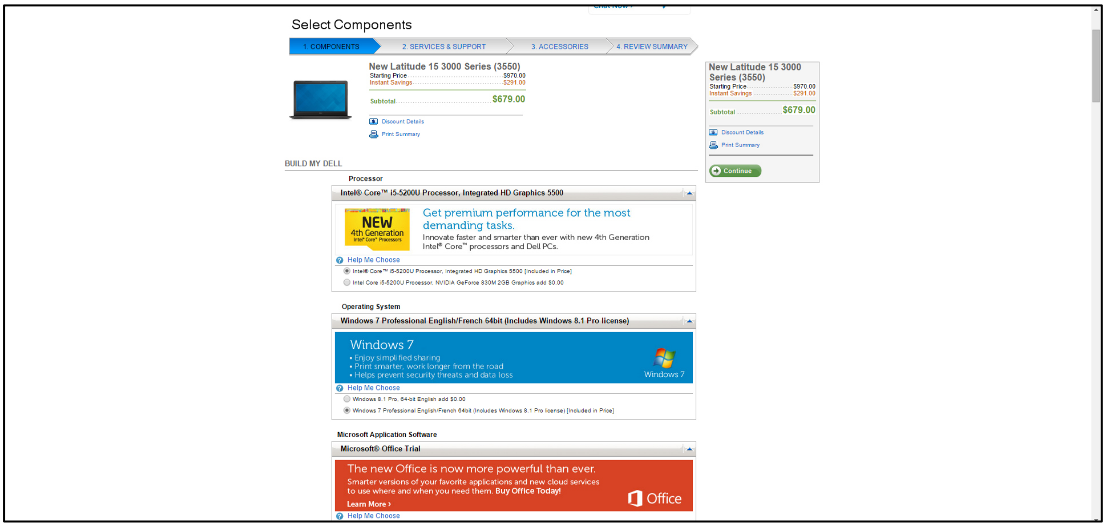

Figure 5.16. Screenshot from the mass customization toolkit of Dell's website www.dell.com (Accessed: March 2015).

There are some responses regarding the content and ability of the customizable attributes as well. As explained earlier, Dell does not allow the user to make aesthetic customization. P23 indicated that he would prefer to be able to customize the laptops aesthetically as well as functionally.

5.4.4. Lewis & Taylor Shirts

Six out of eight participants found Lewis & Taylor Shirts's website user-friendly. In terms of its visual layout, evaluation and searching, Lewis & Taylor Shirts is found to be a clean and understandable website that directly gives the message about what it provides to the users. In general, the participants argue that when an online mass customization website sells only a particular product, it is easier to find what one is looking for. P12's statement enhances this: "Being able to make a detailed and concentrated customization with a single product type is a plus for this website".

There are several positive opinions of the participants regarding Lewis & Taylor Shirts's website. P6 stated "Shirt is a product that is quite complex to customize, however this website allowed me to customize the end product step by step, by means of dividing each customizable attribute and the components with a proper categorization". The Likert scale survey results also support this statement. In the mass customization/attribute subcategory, Lewis & Taylor Shirts received one of the highest points (4.50/5) from the statement: *"The categorization of customizable product attributes is easy to follow"*. On the other hand, the common idea gathered from the participants is that Lewis & Taylor Shirts's website does not provide the visual images of the end product. Therefore the participants argued that they were not sure what they would encounter as the final product. This is one the most crucial aspect that the users expect from all of the mass customization toolkits: being able to see the instant changes on the product's realistic image and view the end product that they will purchase at the end of this customization process.

Although it lacked the images of the products, Lewis & Taylor Shirts is found to be quite satisfactory in terms of the diversity of attributes, clarity of their categorization, and being able to proceed step by step within the mass customization toolkit. Figure 5.17 shows how Lewis & Taylor Shirts categorized the customizable components within its website. P25 remarked that being able to change the selections that she made earlier during the customization process is quite easy and practical to make, which is maintained by means of the clear categorization of the customizable components of the product. Being able to see the list of components and their attributes as a whole makes the mass customization toolkit more favorable for the users.

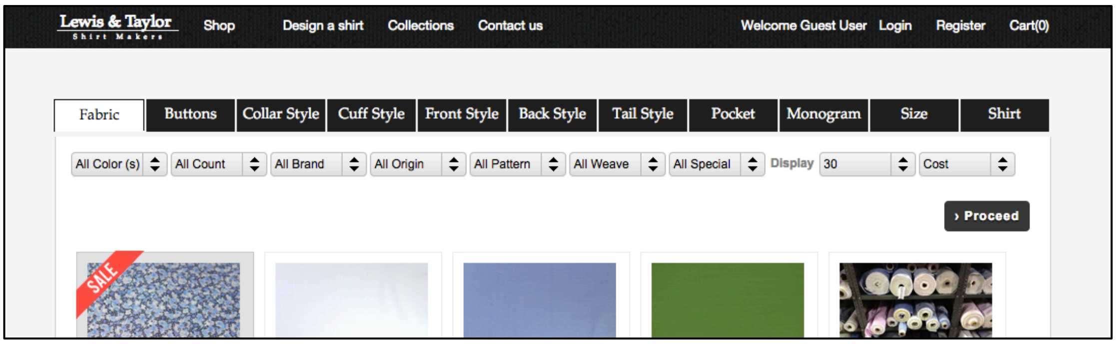

Figure 5.17 Screenshot from Lewis & Taylor Shirts Website, showing the categorization of customizable components. http://www.lewistaylorshirts.com/shirt/fabric (Accessed: March 2015).

5.4.5. miAdidas

Overall, miAdidas is found to be a user-friendly website by all of the eight participants who examined its website. The only major factor that the participants responded negatively was about its accessibility, since it does not allow customizable products to be delivered to Turkey. Nonetheless, the speed and downloading of the page was found to be quite fast and favorable, which positively affected the assessment of the other factors like the searching, mass customization and transaction pages.

miAdidas received positive evaluation from several aspects. Its visual layout is one of them. Its clear explanation and placement of the elements within the website helped the participants to find their way to customizable products. As P35 describes, "the visual language of the website provides a positive experience to the user". Compared to Nike ID, its simplicity made miAdidas more favorable. Some of the participants like P28, who had the chance to compare both miAdidas and Nike ID, stated that Nike ID offered a vast amount of choices, which causes confusion and indecisiveness to the user. On the other hand, miAdidas presents a limited but satisfying amount of customizable attributes, enabling the users to customize in a way more determined and faster. Contrary to these opinions, what some of the participants evaluated negatively about miAdidas is that it provided a very limited amount of colors in the mass customization toolkit. In addition to this, P4 stated that he would rather prefer to be selecting colors from a color palette and customizing the color itself. However, in terms of production, it is not applicable for the company to allow the consumers to enter the color value they wish. P38 found not only the color options but also the general diversity of customizable attributes insufficient. Considering that she examined Shoes of Prey and miAdidas together, she was more satisfied with the diversity of attributes that Shoes of Prey offered.

In terms of its mass customization toolkit, the participants who examined miAdidas evaluated it as functional and practical. Being able to see the product changing instantly as they customized the attributes was one of the forefront aspects that made miAdidas favorable. In addition to this, one of the participants, P38, stated that not only the rotation but also viewing the product from different angles, as shown in

Figure 5.18, made it easier to comprehend what the end product will look like. Furthermore, P33 stated that distinguishing each customizable component of the product with the help of mouseover on the product makes it easier to understand which parts of the product they are able to alter. However, when it comes to the presentation of the customizable attributes of the sports shoes in miAdidas, P33 responded that she would prefer to see the customizable attributes once and all together rather than a drop down menu to get a clearer view about the customizable components. She also stated that it would enhance her time management if the website would indicate in which step she was to complete the customization task.

In terms of its transaction page, offering PayPal within the payment methods was found to be useful, especially for P38.

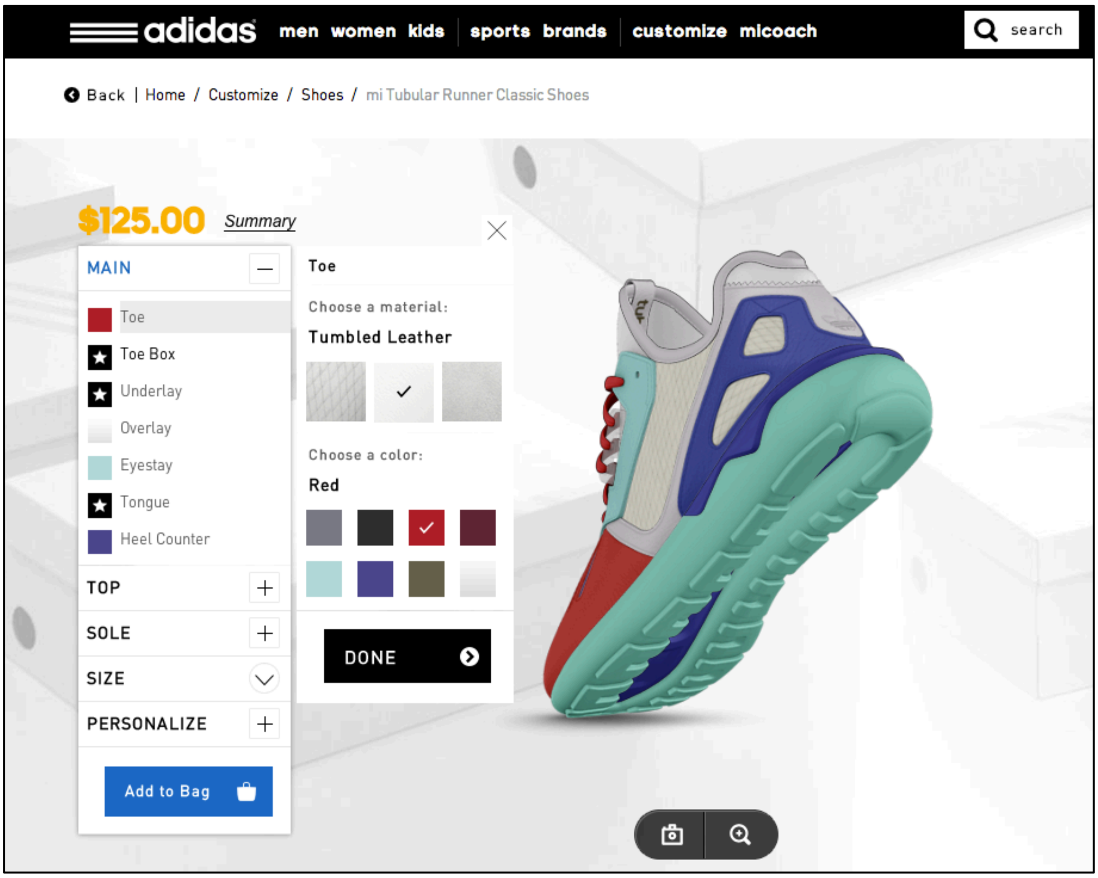

Figure 5.18. Screenshot from miAdidas's website, showing how the product is displayed in different angles.
www.adidas.com/us/ (Accessed: March 2015).

5.4.6. Nike ID

The website of Nike ID is found to be one of the strongest, where all of the participants who examined Nike ID evaluated it as user friendly. The major aspects that make Nike ID favorable is that the visual layout and mass customization toolkit makes it more inviting and attracting. Particularly, image rotation, image sizes, guidance within the website and loading speed of the toolkit made Nike ID more preferable. The visual presentation of the customizable products and their attributes caught the participants' attention. To give an example, while examining Nike ID, P2 stated that he really enjoyed the product exploration and customization process, which he did not want to finish immediately but tried different alternatives in customizable attributes.

The mass customization toolkit is not only aesthetically but also functionally appealing to the participants. The synchronous toolkit that allows the user to see the instant changes on the product as they select attributes is an important benefit that Nike ID offers. Moreover, all of the participants agreed that the visual realism of the product that is presented in the mass customization toolkit was highly satisfactory. Indeed, Nike ID is considered to be offering the most realistic product images in its toolkit among all ten of the websites. In addition to its realism, allowance of image rotation was another significant aspect that made Nike ID favorable. In addition to this, P11 explained that being able to distinct the separate components with the help of mouseover make it easier to understand the parts where the color or texture choice will be applied on. Figure 5.19 sets an example for this by emphasizing the toe part as the customizable area with mouseover.

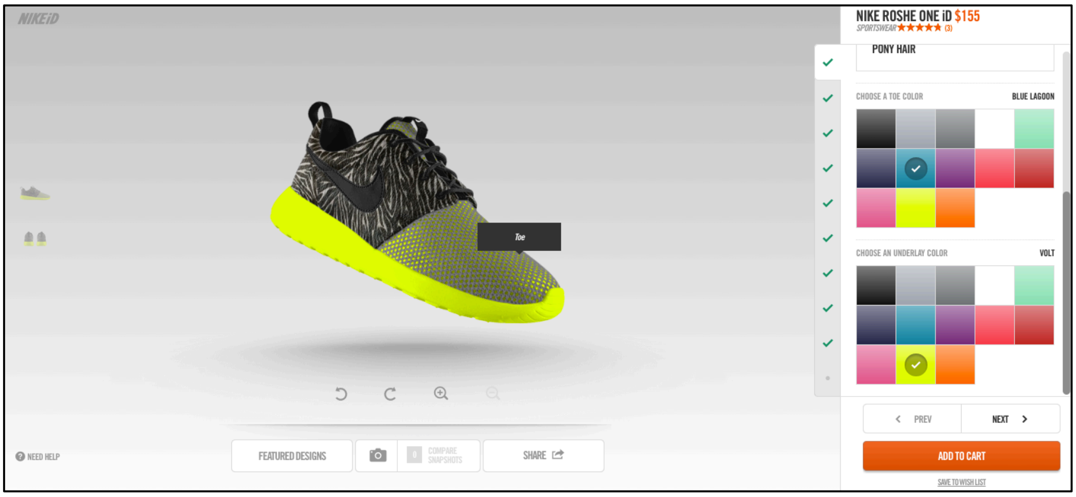

Figure 5.19. Screenshot from Nike ID Website, showing how mouseover guides the user in terms of defining the customizable area on the components.
www.store.nike.com/us/
(Accessed: March 2015).

There are a few negative comments of the participants on Nike ID's website. In terms of accessibility and convenience, P2 and P11 stated that the unavailability to ship to Turkey is a negative aspect for the website that makes it inconvenient to the users in a specific location. In terms of evaluation, P27 argued that the information given about the product was not sufficient. Nonetheless, she remarked that she quite enjoyed shopping within the website and the guidance and visual layout eases the customization process.

P9 stated that there is a "visual show" within the interface of Nike ID that makes it more than favorable. Since it is visually appealing, the participants voluntarily spent more time in order to explore what Nike ID offers in terms of online product customization. However, the same participant stated that even though it is satisfying in many ways, it is arguable that it requires too many customizable attributes. Similarly, P28 also stated that there is a redundant amount of customizable attributes that causes confusion and indecisiveness.

5.4.7. Shoes of Prey

Being the most favorable website, Shoes of Prey is considered to be quite practical in terms of ease of use. The participants stated that the layout clearly explains what the website aims to give. Since it is an online mass customization website specific for women’s shoes, the users did not get lost in the website and were directed easily to the toolkit.

Visual layout of Shoes of Prey received most positive feedbacks from the open-ended questions. As all of the eight participants replied, the simplicity, the minimalist color usage, the correct placement and organization of the menu and other visual elements within the visual layout created a visual harmony. Therefore all eight participants found the website both visually and functionally user-friendly. Being able to provide a visual layout that is both trustworthy and enjoyable is a significant aspect in online mass customization websites. According to the participants’ responses, Shoes of Prey by far succeeded this. During the task performing, P3 stated that Shoes of Prey's visual layout is quite similar to the websites that she uses in her daily life. Therefore, this familiarity helped her to find her way within the website and quickly proceed to the transaction page.

Just as P2 performing in Nike ID, P1 enjoyed exploring Shoes of Prey and particularly spent more time to discover what other attributes she could customize on the shoes. However, in terms of the functional properties of the mass customization toolkit, she stated that it would be easier to see if the rotate and undo buttons are more visible. In addition to this, she claimed that if a particular attribute cannot be selected in a certain product, that attribute should look inactive. Thus, the user will know that he/she is not allowed to select that. There are other minor negative feedbacks regarding the mass customization toolkit of the website. P3 stated that she would prefer to make product comparisons. Shoes of Prey only offers personalization (other alternatives for base products that the user may like), however it does not offer product comparison. Figure 5.20 shows the personalization part along with the overall mass customization toolkit. Concerning the realism of the images, only P16 argued that the 3D images of the products were not realistic. Actually, this is a quite true designation. Shoes of Prey's 3D visual images look more like an illustration or a fashion drawing with its outer strokes. However, the rest of the participants found this way of presentation quite sufficient. Indeed, P37 and P38 were especially satisfied with the 3D presentation and realism of the images.

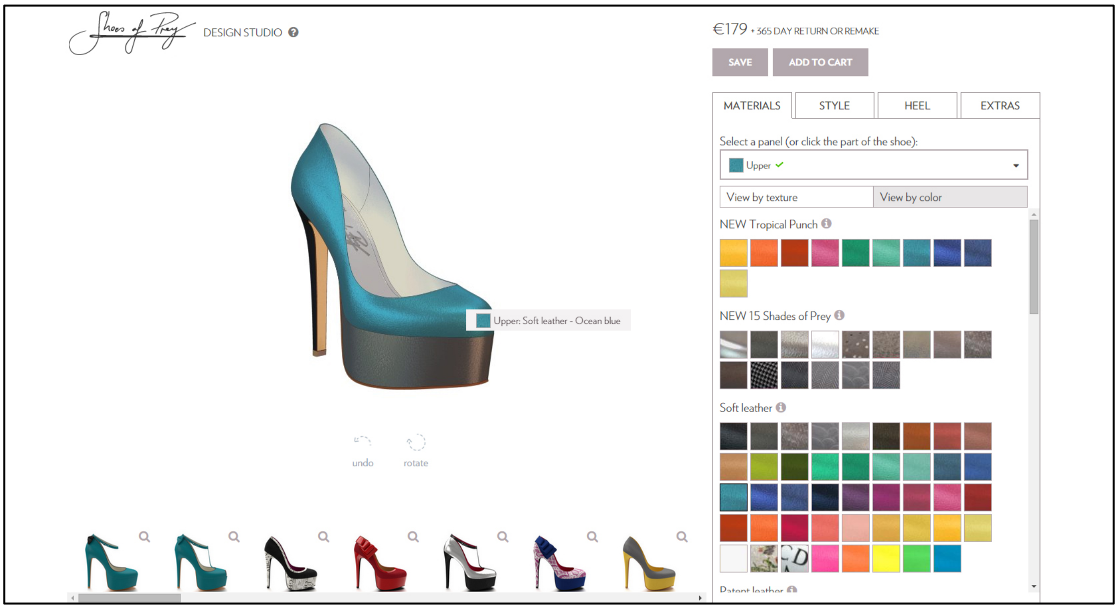

Figure 5.20. Screenshot from Shoes of Prey's mass customization toolkit, showing the personalization offerings below the main product and the attributes listed on the sidebar.
www.shoesofprey.com (Accessed: March 2015).

All participants found the variety of customizable attributes satisfactory. As can be seen in Figure 5.20, the attributes are grouped according to the materials, style, heel and extras. Therefore the users were easily guided within the toolkit. Besides this, the pop-up assistance leading to the mass customization toolkit was found to be quite helpful.

5.4.8. Skin It

Five out of eight participants agreed that Skin It is a user friendly website. Although it seems that the majority commentated as user friendly, the statements given for the open ended questions reveal that there are negative aspects more than positives that make Skin It less favorable. For instance, P13 argued that the variety of customizable products and their attributes were limited. Contrary to this, P6 accepted that since the product itself is simple, the variety of attributes offered was sufficient enough and it provided ease of use.

P36 stated that the website is suitable for its purpose, and it is clear to see the end product in the mass customization toolkit. He also added that it is worth to spend time and effort in order to obtain a customized smart phone case, which is more favorable than to buy a standard product from the store. Nevertheless, even though the overall visual layout and image of the end product it satisfying, he argued that there was no explanation and commitment of the quality of the printing on the smart phone case, which caused insecurity towards to website.

P35 did not find Skin It user friendly. Moreover, he indicated that the scale and rotate features of the toolkit gave an uncontrolled impression. Therefore he was not sure if the image that he uploaded to be printed on the smart phone case would be as precise as he adjusted with the toolkit. The adjustment of scale and rotate features can be seen in Figure 5.21. For that reason, the website did not seem trustworthy for the participant and made him reluctant to proceed.

Figure 5.21. Screenshot from Skin It's mass customization toolkit, showing precision of rotate and scale features given on the right hand side. www.skinit.com (Accessed: March 2015).

Another negative feedback was related with the website's speed. P6 and P11 stated that the website is quite slow where they had to wait awhile to get to the mass customization page.

In terms of transaction, Skin It offers various payment methods, including PayPal. However P14 claimed that she could not find PayPal. Therefore the logos of the payment methods could have been more visible. Despite this, P14 evaluated that it is practical to shop without registering to the website. This helped her save time and another benefit that she was able to find were discount codes, which made Skin It more preferable.

5.4.9. Toshiba

Three out of eight of the participants evaluated Toshiba as user-friendly. Toshiba is found to be the strongest website in terms of the evaluation category.

Unlike Dell, Toshiba provided multiple images of the products within the mass customization toolkit. P25 indicated that it is useful to be able to view the product's image from different angles in detail. About the categorization of the products, P29 argued that since the website provides very comprehensive technical information, the products should be categorized according to the target group and their needs so that the users with basic technical knowledge will not get confused during the product selection and customization processes. Relatedly, P30 remarked that there are too much customizable products, which will not make any difference to a user with limited knowledge on technical properties of the products.

P39 argued that the customizable attribute list was way too long. Instead of giving too much text, the mass customization toolkit could have been supported with images of the laptops. Additionally, she emphasized that the customizable attributes was not properly arranged, it could have been grouped. A favorable aspect of the mass customization toolkit was found to be the instant price change. Both P5 and P25 were satisfied to see the instant price change as more attributes were selected.

In terms of searching, the participants were highly satisfied with the filtering system on the sidebar. Figure 5.22 shows how the filtering sidebar looks like in Toshiba's website. Most of the participants agreed that the website was easy to use and understandable. On the other hand, P29 stated that the website is trying to give more than one messages to the user. For that reason, the website is filled up with unnecessarily crowded information, which confuses the user.

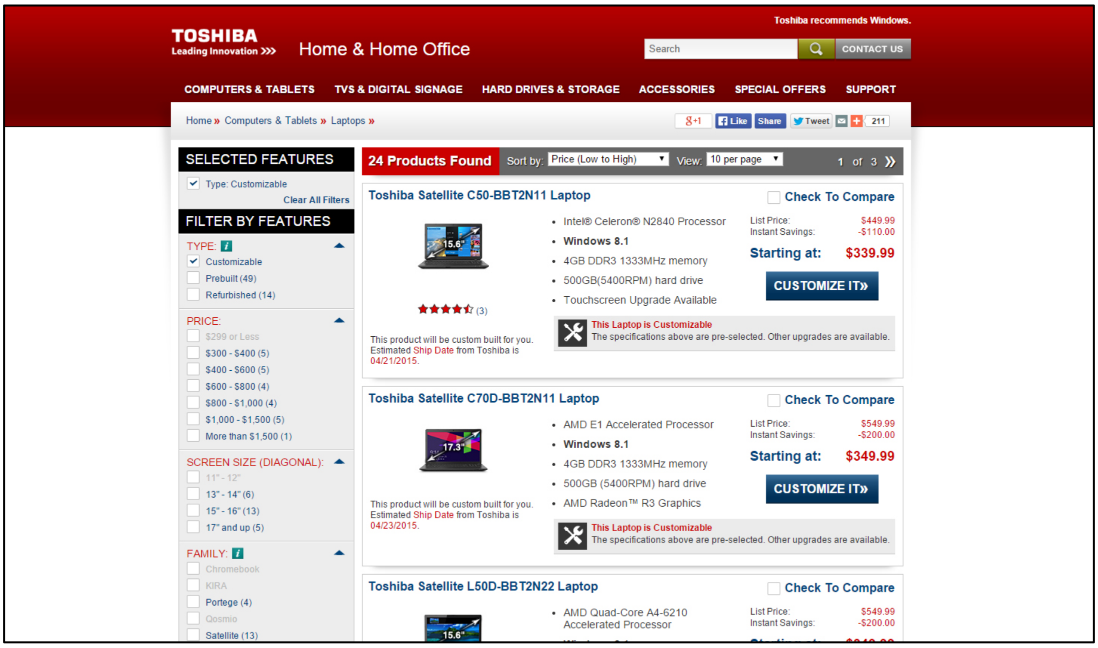

Figure 5.22. Screenshot from Toshiba's website, showing the filtering sidebar and product searching
www.toshiba.com/us/ (Accessed: March 2015).

Some of the participants had to take more time for finding the customizable products, which were accessed by the button on the main slider on the home page, filtering from the sidebar or with the help of the dropdown menu from the header. Therefore the visual layout was found to be somewhat confusing and crowded. P5 summarizes the general outcome for Toshiba's website: "It is functionally successful but aesthetically poor".

The overall assessment of P36 led to the result that Toshiba did not provide any product that has distinctive attributes, which cannot be found in the market or offering a significant price advantage. Consequently, Toshiba does not give the participant a convincing reason to prefer customizing the laptop online rather than buying from the market.

5.4.10. Zazzle

Zazzle is found to be a user-friendly website by seven out of eight participants. The only participant, P24, who did not find it user-friendly, explained that except for the simplicity of the visual layout, there is nothing much to be user-friendly. He expressed that the products' image sizes were not big enough, neither were the font sizes and background colors favorable. Moreover, P16 and P19 stated that neither the general visual layout nor the organization of the mass customization toolkit is visually appealing; besides the use of color within the website is too pale and gives a cheap impression. Apart from this, generally Zazzle received positive feedback in terms of its visual layout. Most of the participants used the word "well organized" for its visual layout, and stated that the guidance was made properly and its menu was clear both visually and in terms of searching. As P14 pointed out, the usage of white background avoids the crowdedness of the images and helps focusing on the products.

In the mass customization toolkit, P26 evaluated the icon sizes as too small and thus, not informative. Figure 5.23 gives some idea about the proportion between the product's image and the icon sizes of the attributes on the sidebar of the toolkit. Nevertheless, he also indicated that Zazzle easily allowed him to transfer his creativity into the product, which is one of the significant aspects the users expect from online mass customization websites. Regarding the mass customization toolkit, the participants were satisfied with Zazzle's product classification and guidance for the toolkit. Being able to see the product from different angles with realistic images made them picture the end product.

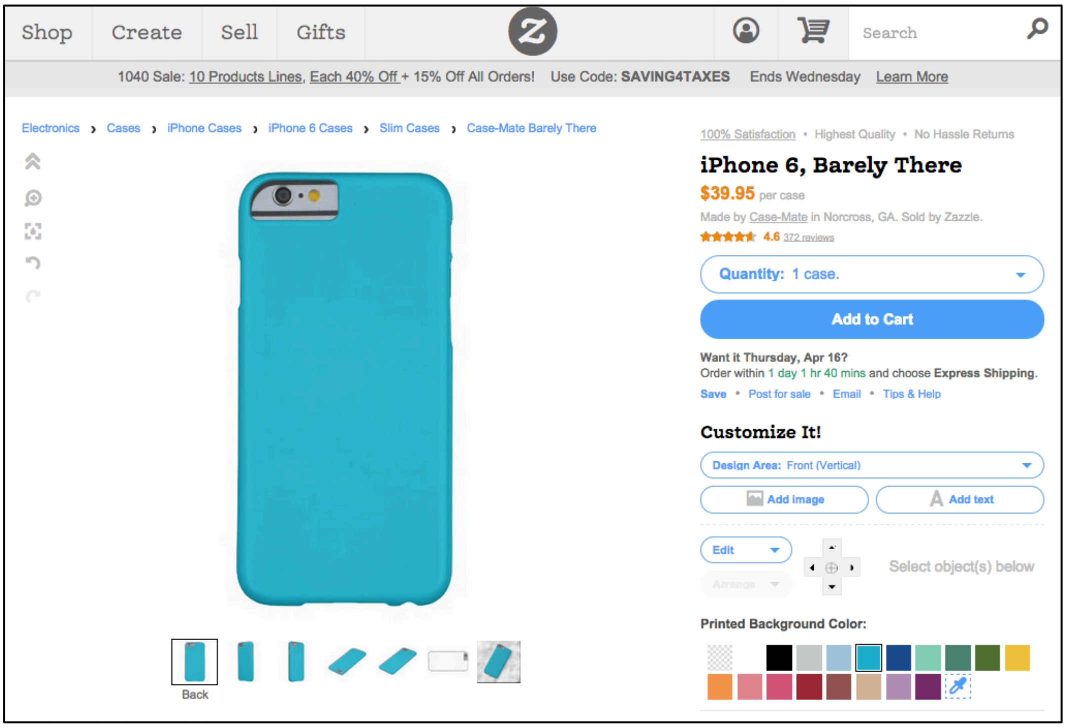

Figure 5.23. Screenshot from Zazzle's mass customization toolkit, showing the proportion between the product's image size and the icons of the customizable attributes. www.zazzle.com (Accessed: March 2015).

About the transaction page, after completing the customization process, P14 searched for a discount coupon for Zazzle's smartphone cases from the search engine. She was positively affected when she found a valid discount coupon. However, the requirement to register to the website in order to purchase the product was not satisfactory for the participant. She stated that she would prefer to be buying directly without signing up the website.

CHAPTER 6

CONCLUSION

This chapter presents the conclusions of the research through revisiting the research questions considering the outcomes of the research according to the findings of the preliminary study and main research. This is followed by the concluding remarks. The chapter concludes with the implications of the study and suggestions for further research.

6.1. Research Questions Revisited

How do the online mass customization websites affect consumers' preferences for online mass customization process?

The literature review conducted prior to structuring the methodology and the field observations from the main research contribute to the determination of consumers' preferences in their online mass customization experiences. The online mass customization process begins with the moment the consumer enters the website. Since consumers' first impression is developed by the time they enter the website, it is essential that the website's layout should be clear and understandable. Another important aspect for a smooth online mass customization process is that the website requires to lead the consumers to the mass customization page from the home page. If there is not enough guidance (button, slider, pop up or any other visual and/or textual indication), the consumers have to wander around the pages within to find a customizable product as in the case of Bo Concept. This negatively affects the online mass customization process and consumers' willingness to proceed.

Another issue related with consumers' preferences is the variety of customizable attributes of a product. The excess amount of choices can affect consumers in both negative and positive ways. Some of the consumers prefer to explore and try each attribute on the product and continue this process until they are satisfied with the resulting product. Especially if they are particularly interested with the product category, they prefer to achieve a customized product different than the base products offered default by the website and they enjoy this process. Contrarily, some other consumers prefer to be directed by the website. For that reason, these consumers find excess amount of attributes confusing. Instead of trying each attribute, they prefer to select a base product that the website offers by means of personalization under the title of 'products you might be interested in'. This group of products is usually the ones that are closer to the taste of the consumer and consumers prefer to select those products and make minor alterations and proceed to the transaction page.

Accessibility and convenience is a factor that the consumers expect by default, since there is no use in customizing a product that cannot be shipped to the consumers' location. Along with this, consumers prefer to complete the customization process on the website, meaning that they expect to buy the product they customized online. In Bo Concept, the website only allows the consumers to customize the products, however they are not able to complete purchasing from the website. Bo Concept directs them to the retailer store to order the desired product. This causes frustration in the consumer. When they invest time to customize a product online, they naturally expect to complete transaction process on the website. They find it time-consuming to customize yet not be able to complete the transaction. Therefore, consumers prefer to be able to purchase the product they customize online.

What are the factors that affect consumers' approach towards online mass customization websites' interfaces?

The results of the main research affirm the information gathered from the literature review and the website survey conducted in the preliminary study regarding the factors that affect consumers' approach towards online mass customization websites. These prominent factors are accessibility and convenience, searching, visual layout, evaluation, mass customization toolkit and transaction. In terms of the interface of the websites, searching, visual layout and mass customization toolkit have an important role. Searching requires ease of use and proper navigation within the website. Along with this, a functioning product categorization and filtering positively affect consumers' approach towards online mass customization websites. Visual layout is another significant factor that includes aspects such as visual attraction, guidance, user-friendliness, understandability, trustworthiness, informativeness and sizes of elements (images, fonts, icons, etc.) used within the website.

What are consumers' preferences regarding the representation of a product in an online mass customization website?

According to the study, it has been understood that there are numerous preferences of the consumers concerning the representation of customizable products in online mass customization website. The most outstanding preferences are:

- 3D reality of virtual images
- Instant changes of the attributes applied on the product
- Image rotation
- Instant price change
- Accuracy of textual information
- User-friendliness of the mass customization toolkit i.e. the size of icons, layout and organization within the website
- Guidance
- Personalization
- Being able to see the attributes and/or their categorization all at once
- Websites that are concentrated on a single product type such as Shoes of Prey

Consumers invest a particular time to the online mass customization process. For that reason, they expect to see a fulfilling result on the virtual model of the product. Consumers' preferences on the representation of online mass customizable products start with the reality of the images of the product. *3D reality of the virtual images* of the products is one of the most essential aspects the consumers prefer to obtain from an online mass customization website. Consumers prefer to see the image of the product as close as possible to the final product. The *instant change of attributes* applied on the 3D model of the product along with the instant price change as new attributes are added to the product are other significant expectations of consumers. By this way, consumers are able to be aware of which attribute costs how much, which positively contributes to their decision making, both price related and attribute related. *Image rotation* is also a significant preference of consumers as they expect to see the products from different angles. If the consumers cannot picture the product, they are not determined to continue the online mass customization process. The *accuracy of textual information* is an important element in the representation of online customizable products. Consumers prefer to be able to get accurate textual information about the products and their attributes so they can associate the information given about the material, size, printing, and so forth with the virtual image given on the website. If the attributes are not sufficiently explained either visually or textually, consumers are reluctant to continue with the online mass customization process since they do not fully understand the content of the attribute.

The time spent on customizing the product is also affected by the *user-friendliness of the mass customization toolkit*. The consumers prefer to be given a proper guidance within the mass customization toolkit. If the consumers are not familiar with the concept, they expect the website to lead them to make selections on the toolkit. Being able to see all of the attribute categories at once or at least in a particular order is another preference of the consumers. By this way, they are informed what customizable attribute is waiting for them. In that account, consumers prefer to see an organized layout of mass customization toolkit with a full efficiency of area usage within the website. The attribute icon sizes and the virtual image size of the product should be as appropriate as possible.

Another outcome is that consumers are more comfortable with an online mass customization website when the website offers only a specific type of product. For instance, websites such as Nike ID, Shoes of Prey, miAdidas, Lewis & Taylor Shirts and 121 Time present only one type of customizable product. On the other hand, Bo Concept and Zazzle offer different customizable product types. For that reason, consumers find it easier when they are able to concentrate on a single product type. Along with this, consumers expect the online mass customization websites to allow them to transfer their creativity into the product, which encourages them to adopt the product more and fulfill their need for uniqueness.

6.2. Design Implications for Online Mass Customizable Products and their Attributes

There has been an important amount of studies regarding mass customization from marketing and production points of view. However, there were not sufficient studies on the representation of online mass customizable products, which is an essential link between the retailer/producer of the product and the consumer. This study has not only presented a theoretical background but also contributed with a hands-on research to this particular area. In order to point out a difference between theoretical findings and practical outcomes gathered from the main study, Table 6.1 shows the ranking of the ten websites according to their online mass customization toolkits.

Table 6.1. Ranking of websites according to their online mass customization toolkits.

Checklist Scores from the Preliminary Study	Scores from the Main Research According to Participants Responses
1) Nike ID	1) Shoes of Prey
2) miAdidas	2) Nike ID
3) Shoes of Prey / Bo Concept	3) miAdidas
4) 121 Time / Toshiba / Zazzle	4) Lewis & Taylor Shirts
5) Lewis & Taylor Shirts / Skin It	5) Zazzle
6) Dell	6) Skin It
	7) Toshiba
	8) 121 Time
	9) Dell
	10) Bo Concept

During the preliminary study, where the website survey was conducted, the features offered by the websites' online mass customization toolkits were transferred into a checklist. According to this list, Nike ID scored the highest, followed by miAdidas. Shoes of Prey and Bo Concept received the same scores in this list, where Dell scored the lowest. This checklist did not include any evaluations of users. Therefore, it only questioned whether a feature was present or not in that specific website's toolkit. The main research reveals that consumers' evaluations are different from the checklist scores. The most apparent difference is the ranking of Bo Concept. Bo Concept received the lowest scores from almost all of the factors during the participants' evaluation. Although Bo Concept's online mass customization toolkit may seem fulfilling on paper, it was found to be the most insufficient website in terms of its mass customization toolkit by the participants. For that reason, even if a mass customization toolkit contains necessary features, it does not guarantee that the toolkit will serve the users satisfactorily. Consequently, the key outcome of this study is that consumers' preferences should constantly be observed and evaluated in order for them to achieve a fulfilling online mass customization experience in an ever-changing environment of online shopping and product customization.

- **Industry Specific Implications**

The research also reveals that product type is a significant variable that affects consumers' responses to the online mass customization websites. Table 6.1 points out the websites that are found to be the most favorable by the participants, which makes it evident that their top three websites provide custom shoes. Since every participant has a lifetime experience with shoes, they somehow have an opinion and knowledge about the product. For that reason, they might have been more interested in Shoes of Prey, Nike ID and miAdidas, and have much more to contribute and expect from these websites and their products rather than the other product categories. Along with this, the realistic visualization of the shoes certainly has an impact on the participants with different interests in meeting in a common ground. Therefore, the combination of consumers' background information and experience about the product, and the capability of the interface designers transforming the product into a realistic virtual image that interacts with the consumers provide an important step to a successful online mass customization experience.

Contrary to shoes, consumers are not much knowledgeable about the electronic products. Even though laptops have become an indispensable part of consumers' everyday life, some of the participants that examined Toshiba and Dell lack technical information. For that very reason, they are not conscious about what attribute they are selecting. According to the observations durding the main research, participants complained about the monotony of both Toshiba and Dell's websites. As a design implication, it can be contributed that instead of listing the technical information textually and constrain the consumers to scroll down too much in order to view all of the customizable attributes, the interface designers can simplify the information by means of infographics and icons. Thus, even a consumer with very limited knowledge about technical features of a laptop can easily select the desired attributes. Despite being as visually attractive as shoes, customizable laptops can become appealing by means of their mass customization toolkit interface designs and the way their information is transferred to the consumers. Therefore, the interface designers play a fundamental role in improving the mass customization toolkits of customizable consumer electronics.

It is important that instead of providing mass amount of product categories in a single website, the retailers should focus on a single product type on their websites if they are offering online customizable products as in the case of Shoes of Prey, 121 Time and Lewis & Taylor Shirts. In these websites, the consumers know exactly what product type they will be facing with. Contrarily in Bo Concept, consumers are confronted with a complex list of products where mass produced products and customizable products are mixed and unless the consumer finds a customizable product by chance, it is definitely not easy to navigate in and find customizable products within the website.

If the retailer does provide multiple product groups in a single website, then the product categorization and distinction of customizable products are important. Just as in Zazzle's case, there are a variety of product groups. However, they are categorized in an understandable way so that the consumers can easily select the product group they are interested in without getting lost in the website. At this point, both the retailer and the web/interface designer plays a significant role in decision making and organizing the website.

- **Implications for the Product and Interface Designers**

Another implication regarding the representation of the products is that the product designers should focus on the products that can be visualized at the end of the customization process. In the case of Lewis & Taylor Shirts, the website offers a very well organized attribute categorization however it lacks a virtual image which is supposed to visualize how the end product will look. For that reason, when the product designers design an online customizable product, they should consider defining the customizable components properly and the interface designers should transfer these into an interactive, reliable and realistic virtual image that provides the end product after customization process.

While custom products provide uniqueness and the freedom of self-expression to the consumers, some of the consumers still prefer to be guided by the brand and/or the retailer. The excess amount of attribute choice (color, pattern, texture etc.) sometimes causes frustration and indecisiveness to the consumers. For that reason, the product designers should provide a concentrated set of customizable attributes.

The interface designers who design mass customization toolkits should consider using the customization area effectively. For instance in Bo Concept, even though there is an adequate space for the mass customization toolkit, the toolkit is fit into a small area. Therefore, the participants found it hard to compherend how the end product will look. Since Bo Concept provides furniture, the area provided for customization requires being much more wider so that the consumers can visualize the products easier. Moreover, it is more favorable by the consumers if the toolkit fits into a single page avoiding too much scrolling.

The website interface designers should also consider to emphasize the customizable products in the home page of the websites in order to attract the attention of the consumers. The usage of sliders, pop up pages and/or buttons on the menu helps guiding the consumers to the customization page.

6.3. Limitations of the Study

In this study, there are several limitations. The first limitation is that there are ten websites included in the research. For that reason, the results might not be generalizable for other websites in different categories that offer online mass customization. Secondly, due to the fact that the overall study takes an important amount of time, in terms of both task performing and survey completion, the availability of participants were limited. Therefore the optimum number of 40 participants is determined in order to receive as much information as possible for each of the ten websites.

The local particularity of Turkey is another limitation. It is not very common to find participants with online mass customization experience. Considering the fact that the main research was conducted in Ankara, Turkey, a restricted participant group was selected. Only some of the participants had prior experience in customizing products online. Nonetheless, all of the participants were experienced and knowledgeable about online shopping. The participants belonged to a high level of education. Therefore, a similar research with a different level of education and competency in the usage of the Internet and online shopping may provide different results. Besides these, the responses especially related with accessibility and convenience of the websites may vary if a similar research is undertaken in a different geography, since most of the websites in the main research did not provide shipment of customizable products to Turkey.

Another limitation is that the participants were expected to continue their tasks until they reach to the transaction page where they did not actually buy the customized products. For that reason, their attitude and preferences may vary in a real online mass customization experience. Their interest in the product categories is also an important variable about their preferences in customizable attributes.

6.4. Suggestions for further research

This study was an exploration of consumers' preferences in the representation of online mass customizable products and their attributes. The Internet is offering great deal of changes both to the retailers and the consumers. For that reason, the technology used in online shopping websites is constantly evolving. It is even observed that some of the interface designs of the websites used in the main research have updated in a few months after the research was conducted. Therefore, it is necessary to follow what is new in online shopping field closely so that it will make a valuable contribution to evolve consumers' experiences of online shopping. Moreover, in order to improve the studies under this field, case studies with specific websites that offer online mass customization can be conducted with focus groups, which may help the interface designers to develop the mass customization toolkits and the representation of the products by receiving instant feedbacks.

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APPENDIX A

PARTICIPANTS' DEMOGRAPHIC INFORMATION AND THE LIST OF WEBSITES THEY EVALUATED

Table A.1. Demographic information of the participants and the list of websites they evaluated

	AGE RANGE	GENDER	EDUCATIONAL BACKGROUND	LEVEL OF INCOME	PROFESSION	WEBSITE A	WEBSITE B
P1	21-25	(F)	University	2,000-3,000 TL	Graphic Designer	Dell	Shoes of Prey
P2	26-30	(M)	University	2,000-3,000 TL	Personal Trainer	Lewis & Taylor Shirts	Nike ID
P3	21-25	(F)	University	1,000-2,000 TL	Interior Architect	Dell	Shoes of Prey
P4	21-25	(M)	University	1,000 TL and below	Composer	miAdidas	Dell
P5	26-30	(M)	University	1,000-2,000 TL	Web Designer	Bo Concept	Toshiba
P6	21-25	(M)	Post Graduate	4,000 TL and above	Electronics Engineer	Skin It	Lewis & Taylor Shirts
P7	31-35	(M)	University	4,000 TL and above	Software Engineer	121 Time	Lewis & Taylor Shirts
P8	31-35	(M)	University	4,000 TL and above	Software Engineer	Dell	Bo Concept
P9	21-25	(M)	Post Graduate	1,000-2,000 TL	Newly Graduate	Dell	Nike ID

Table A.1. (Continued)

P10	26-30	(M)	Post Graduate	2,000-3,000 TL	Graphic Designer	Nike ID	Lewis & Taylor Shirts
P11	31-35	(F)	University	2,000-3,000 TL	Graphic Designer	Nike ID	Skin It
P12	21-25	(F)	University	1,000-2,000 TL	Graphic Designer	Lewis & Taylor Shirts	Nike ID
P13	21-25	(F)	University	1,000 TL and below	Student	Skin It	121 Time
P14	26-30	(F)	University	2,000-3,000 TL	Interior Architect	Skin It	Zazzle
P15	21-25	(M)	Post Graduate	4,000 TL and above	Academician	Bo Concept	Zazzle
P16	21-25	(F)	Post Graduate	2,000-3,000 TL	Dentist	Zazzle	Shoes of Prey
P17	51-above	(F)	University	4,000 TL and above	Finance Director	Bo Concept	Zazzle
P18	21-25	(F)	University	4,000 TL and above	Industrial Engineer	Shoes of Prey	Skin It
P19	21-25	(M)	Post Graduate	4,000 TL and above	Electronics Engineer	Zazzle	Lewis & Taylor Shirts
P20	26-30	(F)	University	3,000-4,000 TL	Dentist	121 Time	Shoes of Prey
P21	26-30	(M)	Post Graduate	3,000-4,000 TL	Interior Architect	Toshiba	Dell
P22	18-20	(F)	University	1,000 TL and below	Student	Nike ID	121 Time
P23	31-35	(M)	University	4,000 TL and above	Art Director	Lewis & Taylor Shirts	Dell
P24	31-35	(M)	University	2,000-3,000 TL	Industrial Engineer	Zazzle	121 Time
P25	26-30	(F)	Post Graduate	3,000-4,000 TL	Biomedical Engineer	Lewis & Taylor Shirts	Toshiba

Table A.1. (Continued)

P26	21-25	(M)	Post Graduate	2,000-3,000 TL	Mechanical Engineer	Zazzle	Bo Concept
P27	26-30	(F)	Post Graduate	2,000-3,000 TL	Industrial Designer	Nike ID	Bo Concept
P28	46-50	(F)	Post Graduate	4,000 TL and above	Sales Manager	miAdidas	Nike ID
P29	31-35	(M)	Post Graduate	4,000 TL and above	Creative Director	Shoes of Prey	Toshiba
P30	31-35	(F)	Post Graduate	4,000 TL and above	Digital Media Director	Toshiba	miAdidas
P31	21-25	(F)	University	1,000-2,000 TL	Interior Architect	Skin It	Toshiba
P32	21-25	(F)	University	1,000-2,000 TL	Industrial Designer	Bo Concept	miAdidas
P33	21-25	(F)	University	3,000-4,000 TL	UX Designer	miAdidas	Zazzle
P34	26-30	(M)	University	2,000-3,000 TL	Graphic Designer	121 Time	miAdidas
P35	21-25	(M)	University	3,000-4,000 TL	Student	miAdidas	Skin It
P36	26-30	(M)	University	3,000-4,000 TL	Interior Architect	Toshiba	Skin It
P37	31-35	(F)	Post Graduate	4,000 TL and above	Academic	Shoes of Prey	121 Time
P38	26-30	(F)	University	4,000 TL and above	Sales Manager	Shoes of Prey	miAdidas
P39	26-30	(F)	Post Graduate	3,000-4,000 TL	Industrial Designer	Toshiba	Bo Concept
P40	36-40	(M)	University	4,000 TL and above	Architect	121 Time	Dell

APPENDIX B

THE SURVEY (IN TURKISH AS CONDUCTED)

Değerli Katılımcı,

Bu çalışma, Orta Doğu Teknik Üniversitesi Endüstri Ürünleri Tasarımı Bölümü'nde devam etmekte olan yüksek lisans tezi kapsamında yapılmaktadır.

Yürütülen araştırma, çevrimiçi olarak kitlesel özelleştirilebilen ürünlerin bulunduğu web siteleri ve tüketicilerin bu web sitelerin ara yüzleri ve ürünlerin sunumu hakkındaki değerlendirmeleriyle ilgilenmektedir. Kitlesel özelleştirme, kişiselleştirilmiş veya özel uyarlanmış mal veya servislerin, tüketicilerin değişen ve çeşitlilik gösteren ihtiyaçlarını karşılamak amacıyla toplu üretim fiyat ve verimliliğine yakın olarak üretimidir.

Çalışma iki aşamadan oluşmaktadır. İlk aşamada iki web sitesini inceleyerek, seçilmiş birer ürünü özelleştirmeniz beklenmektedir. Uygulamaların sonrasında web sitelerini değerlendireceğiniz bir anket verilecektir. Bu anketin amacı, tüketicilerin çevrimiçi (online) kitlesel özelleştirilmiş (mass customized) ürünlerin web siteleri içindeki gösterimini ve özelleştirilebilir özelliklerinin sunumunu nasıl değerlendirdiklerini incelemektir.

Bu çalışmadan elde edilecek veriler yalnızca bilimsel amaçla tez araştırmasında kullanılacaktır. Katılımcıların kişisel bilgileri saklı tutulacaktır. Çalışmanın, anketle beraber, tamamlanma süresi yaklaşık 30 dakikadır. Sorularınız olduğu takdirde aşağıdaki e-posta adresinden bana ulaşabilirsiniz.

Zaman ayırdığınız ve araştırmaya katıldığınız için teşekkür ederim.

Dilem AKINER
ODTÜ Endüstri Ürünleri Tasarımı Bölümü
Yüksek lisans Öğrencisi

e-posta adresi: dilemakiner@gmail.com

Aşağıdaki bilgileri eksiksiz olarak doldurunuz.

Kişisel Bilgiler				
Yaş Aralığınız*	☐ 18-20 ☐ 21-25 ☐ 26-30 ☐ 31-35	☐ 36-40 ☐ 41-45 ☐ 46-50 ☐ 51 ve üzeri	Cinsiyetiniz*	☐ Kadın ☐ Erkek
Eğitim Durumunuz*	☐ İlköğretim ☐ Lise	☐Yüksekokul/ Üniversite ☐Lisansüstü/ Doktora	Mesleğiniz*	☐ Öğrenci ☐ Belirtiniz: ……..……………… ………...........
Gelir Düzeyiniz*	☐ 1000 TL altı ☐ 1000-2000 TL	☐ 2000-3000 TL ☐ 3000-4000 TL	☐ 4000 TL ve üstü	

Katılımcının İncelediği Web Siteleri	
A)	**B)**

İncelediğiniz web sitelerini aşağıdaki kriterlere göre Kesinlikle katılmıyorum (1) – Kesinlikle katılıyorum (5) ölçütüne göre değerlendiriniz.

1) Web Sitesinin Ulaşılabilirliği ve Elverişliliği	**A**						**B**					
	Kesinlikle Katılmıyorum	**Katılmıyorum**	**Nötr**	**Katılıyorum**	**Kesinlikle Katılıyorum**	**NA**	**Kesinlikle Katılmıyorum**	**Katılmıyorum**	**Nötr**	**Katılıyorum**	**Kesinlikle Katılıyorum**	**NA**
	1	**2**	**3**	**4**	**5**	**0**	**1**	**2**	**3**	**4**	**5**	**0**
Web sitesinin yüklenmesi yeterince hızlı.												
Ürünleri uluslararası olarak sipariş edip istediğim yere gönderilmesini sağlıyorum.												

2) Web Sitesi içinde Arama Yapma	**A**						**B**					
	Kesinlikle Katılmıyorum	**Katılmıyorum**	**Nötr**	**Katılıyorum**	**Kesinlikle Katılıyorum**	**NA**	**Kesinlikle Katılmıyorum**	**Katılmıyorum**	**Nötr**	**Katılıyorum**	**Kesinlikle Katılıyorum**	**NA**
	1	**2**	**3**	**4**	**5**	**0**	**1**	**2**	**3**	**4**	**5**	**0**
Anlaşılması kolay bir web sitesi olduğunu düşünüyorum.												

2) Web Sitesi içinde Arama Yapma	A						B					
	Kesinlikle Katılmıyorum	Katılmıyorum	Nötr	Katılıyorum	Kesinlikle Katılıyorum	NA	Kesinlikle Katılmıyorum	Katılmıyorum	Nötr	Katılıyorum	Kesinlikle Katılıyorum	NA
	1	2	3	4	5	0	1	2	3	4	5	0
Bu web sitesinde ürünleri daha kolay bulmamı sağlayan detaylı bir filtreleme sistemi bulunuyor.												
Ürün kategorizasyonunun takibinin kolay olduğunu düşünüyorum.												
Ürün görsellerinin yüklenme hızı uygundur.												
Sıkça sorulan sorular kısmına erişmek kolay.												
Sıkça sorulan sorular kısmı kullanıcıya gerekli bilgileri sağlıyor.												
Kişiselleştirme (örn. *A ürününü alanlar B ürününü de aldı*) özelliği, kullanıcıya zevkine uygun farklı ürünler de önermektedir.												
Ürünlerin fiyatlarını aynı anda görüp fiyat karşılaştırması yapabiliyorum.												
Kargo ve nakliyat bilgileri web sitesinde açık bir şekilde verilmiştir.												
Menü başlıklarının (header) istediğim ürünü kolaylıkla bulabilmem için düzgün bir şekilde kategorize edildiğini düşünüyorum.												
Bu web sitesi içinde gezinmenin kolay olduğunu düşünüyorum.												

3) Görsel Düzen	A						B					
	Kesinlikle Katılmıyorum	Katılmıyorum	Nötr	Katılıyorum	Kesinlikle Katılıyorum	NA	Kesinlikle Katılmıyorum	Katılmıyorum	Nötr	Katılıyorum	Kesinlikle Katılıyorum	NA
	1	2	3	4	5	0	1	2	3	4	5	0
Ana sayfa, web sitesinin amacı hakkında gerekli bilgiyi vermektedir.												

	A						B					
Ana sayfa slider görselleri, ürünler hakkında bilgi vermek konusunda kullanışlıdır.												
Font seçimleri ve büyüklükleri uygundur.												
Görseller ve kampanyaların hiyerarşisi düzgün bir şekilde yerleştirilmiş olup, takibi kolaydır.												
Menü başlıkları yeterince vurgulanmıştır.												

3) Görsel Düzen	**A**						**B**					
	Kesinlikle Katılmıyorum 1	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**	**Kesinlikle Katılmıyorum 1**	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**
Görsellerin ebatları uygundur.												
Ürünleri hem küçük hem büyük ebatlarda görmek, ürünü daha kolay algılamamı sağlıyor.												
Kaydırma (scroll) özelliğini ürün özelliklerini görmek açısından faydalı buluyorum.												
Genel düzendeki renk kullanımları web sitesi için uygundur.												
Web sitesini görsel olarak ilgi çekici buldum.												

4) Web sitesinde Verilen Ürün Bilgilerinin Değerlendirilmesi	**A**						**B**					
	Kesinlikle Katılmıyorum 1	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**	**Kesinlikle Katılmıyorum 1**	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**
Web sitesi, ürünle ilgili yeterli bilgiyi (ürünün hacmi, rengi, ağırlığı, ebatı, ekstra özellikleri vb.) sağlamaktadır.												

Web sitesi, aynı kategorideki ürünleri ayırt etmemi sağlayacak ürün bilgilerini sağlamaktadır.												
Web sitesi, hem görsel hem metin olarak ürün özellikleri konusunda detaylı bilgi vermektedir.												
Web sitesi, farklı ürünleri aynı anda kıyaslayabilmemi sağlamaktadır.												
Web sitesi, farklı ürünlerin fiyatlarını aynı anda kıyaslayabilmemi sağlamaktadır.												

5) Kitlesel Özelleştirme Araçları (Mass Customization Toolkit)	**A**						**B**					
	Kesinlikle Katılmıyorum 1	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**	**Kesinlikle Katılmıyorum 1**	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**
Ürün												
Özelleştirilebilir ürünlerin sanal görselleri gerçekçidir.												
Ürünlerin özelleştirilebilir parçaları hakkında bilgiler yeterince açıklanmıştır.												
Özelleştirilebilir ürünlerin çeşitliliği tatmin edicidir.												
Ürün görsellerinin döndürülebilmesi, ürünü farklı açılardan görebilmem için faydalıdır.												
Ürün görsellerinin döndürülebilmesi, ürünün son görüntüsünü anlamak açısından gereklidir.												
Ürünlerin özelleştirilebilir parçaları açıkça belirtilmektedir.												
Özellikler												
Özelleştirilebilir özelliklerin sınıflandırılması kolay takip etmeyi sağlamaktadır.												
Özelleştirilebilir ürün özellikleri kolaylıkla görüntülenmektedir.												

	A						B					
Belirli bir üründe, özelleştirilebilir özelliklerin çeşitliliği tatmin edicidir.												
Özelliklerin mini boy (thumbnail) görsel büyüklükleri uygundur.												
Estetik özelleştirme özellikleri tatmin edicidir.												
Fonksiyonel özelleştirme özellikleri tatmin edicidir.												
Ölçü özelleştirme özellikleri tatmin edicidir.												

5) Kitlesel Özelleştirme Araçları (Mass Customization Toolkit)	**A**						**B**					
	Kesinlikle Katılmıyorum 1	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**	**Kesinlikle Katılmıyorum 1**	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**
Kullanılabilirlik												
Özelleştirme sayfasına yönlendiren buton/imaj/link, kullanıcının dikkatini çekmektedir.												
Online özelleştirme sürecini anlatan talimatlar yeterlidir.												
Online özelleştirilebilir ürünleri keşfetmesi kolaydır.												
Web sitesinde özelleştirme için sağlanan alan yeterlidir.												
“Geri al” butonu, özelleştirme sürecinde zaman kazandırmaktadır.												
Özelleştirme aracının kullanımı, süreci tamamlayabilmek için fazla zaman almaktadır.												
Geri alma fonksiyonu olmadığından süreç gereğinden fazla uzamaktadır.												
Kitlesel özelleştirme aracı ürün özellikleri hakkında ekstra bilgiler sunmaktadır.												

	A						B					
Kitlesel özelleştirme aracındaki menü ikon ebatları uygundur.												
Kitlesel özelleştirme aracının web sitesi içindeki yerleşimi uygundur.												
Ürün özelliklerini özelleştirdikçe ürün fiyatının anında değişmesini kullanışlı buluyorum.												
Kitlesel özelleştirme aracında yapılan yönlendirmeler, özelleştirme sürecinin daha etkili geçmesini sağlamaktadır.												

6) Ödeme İşlemi	**A**						**B**					
	Kesinlikle Katılmıyorum 1	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**	**Kesinlikle Katılmıyorum 1**	**Katılmıyorum 2**	**Nötr 3**	**Katılıyorum 4**	**Kesinlikle Katılıyorum 5**	**NA 0**
Online ödeme işlemi kolay ve uygun görünüyor.												
Online ödeme süreci pratik görünmektedir.												
Online ödeme süreci gerekli yönlendirme ve geribildirimler ile devam etmeyi kolaylaştırmaktadır.												
Online ödeme süreci çok fazla aşama gerektirmektedir.												
Web sitesi, çeşitli ödeme yöntemleri sunmaktadır.												
Ödeme yöntemlerinin logolarının bulunması kullanışlıdır.												
Web sitesi online alışveriş yapmak için güvenilir bir his vermektedir.												

Online kitlesel özelleştirme yapılan bir web sitesinin kullanımı konusunda yanda belirtilen kategorileri önem sırasına göre 1'den 6'ya kadar sıralandırınız.	☐ Erişilebilirlik ☐ Görsel Düzen ☐ Arama	☐ Değerlendirme ☐ Özelleştirme Aracı ☐ Ödeme İşlemi

Online alışverişlerinizde, bir alışveriş sitesini tercih etmenizdeki etkenleri önem sırasına göre 1'den 6'ya kadar sıralandırınız.	☐ Erişilebilirlik ☐ Görsel Düzen ☐ Arama	☐ Değerlendirme ☐ Özelleştirme Aracı ☐ Ödeme İşlemi
Özelleştirme aracı kategorilerini önem sırasına göre sıralandırınız.	☐ Ürün ☐ Özellik	☐ Kullanılabilirlik

Aşağıdaki soruları A ve B web siteleri için ayrı ayrı yanıtlayınız.

Bu web sitesini kullanıcı dostu buldunuz mu?	
A ☐ Evet ☐ Hayır	**B** ☐ Evet ☐ Hayır
Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	
A	**B**
Bu web sitesi için **online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu** konusunda size en **OLUMLU** gelen özellik nedir?	
A	**B**
Bu web sitesi için **online kitlesel ürün özelleştirmede ürün ve özelliklerinin** konusunda size en **OLUMSUZ** gelen özellik nedir?	
A	**B**

Ankete katıldığınız için teşekkür ederim.

APPENDIX C

THE SURVEY (TRANSLATED IN ENGLISH)

Please fill the information below.

Personal Information					
Age Range*	□ 18-20 □ 21-25 □ 26-30 □ 31-35	□ 36-40 □ 41-45 □ 46-50 □ 51 and older	Gender*	□ Female □ Male	
Educational Background*	□Primary Education □ Highschool	□University □Post Graduate	Profession*	□ Student □Other: ……..…………… …………...........	
Level of Income*	□ 1000 TL and below □ 1000-2000 TL		□ 2000-3000 TL □ 3000-4000 TL		□ 4000 TL and above

The Web Sites That the Participant is Examining	
A)	B)

According to the web sites that you are examining, please evaluate the following statements in a scale between Strongly Disagree (1) to Strongly Agree (5). If the statement is not applicable for the particular web site, please fill NA (0).

1) Accessibility and Convenience of the Website	A						B					
	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0
Website downloading speed is fast enough.												
I can order products internationally and have them shipped to anywhere I want.												

2) Searching in the Website	A						B					
	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0
The website is easy to understand.												
The website has detailed filtering which makes it quicker to find the products I am searching for.												
Product categorization is easy to follow.												
The speed of the product image loading time is favorable.												
It is easy to access the FAQ section.												
The FAQ section provides necessary information to the user.												
Personalization feature - recommending product substitutes- offers congenial products that is available in the website (e.g. *customers who bought product X also bought Y*).												
I can simultaneously see the products' prices and compare them.												
Shipment and delivery information is clearly given in the web site.												
The menu bar (header) is properly categorized to seek for the desired product easily.												
It is easy to navigate in the website.												

3) Visual Layout	A						B					
	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0
The home page gives the necessary information about its purpose.												

	A						B					
The home page slider images are useful for providing information about the products.												
The font choices and sizes are favorable.												
The hierarchy of the images and campaigns are properly placed to follow.												
The menu bar (header) is adequately emphasized.												
Image sizes are favorable.												
Having the product images in both thumbnail and large formats helps me comprehend the product easier.												
Scrolling is helpful to see the features of the website.												
The use of colors in the general layout are appropriate for the website.												
I find the website visually attractive.												

4) Evaluation of the product information provided in the Website	**A**						**B**					
	Stongly Disagree 1	**Disagree 2**	**Neutral 3**	**Agree 4**	**Strongly Agree 5**	**NA 0**	**Stongly Disagree 1**	**Disagree 2**	**Neutral 3**	**Agree 4**	**Strongly Agree 5**	**NA 0**
The website provides adequate information on the product such as volume, weight, size, additional features and so forth.												
The website provides adequate information on the products so that I can distinguish different products within the same category.												
The website presents both visuals and text to give in-depth information about the product.												
The website provides the opportunity to compare different products simultaneously.												
The website allows me to simulatenously compare the prices of different products.												

5) Mass Customization Toolkit	A						B					
	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0
Product												
The virtual models of customizable products are realistic.												
The information about customizable components is clearly identified.												
The variety of customizable products is satisfactory.												
Image rotation is useful for viewing this product from different angles.												
Image rotation is necessary to understand the finalized product.												
The customizable components of the products are clearly identified.												
Attributes												
The categorization of customizable product attributes is easy to follow.												
The customizable products attributes are easily seen.												
The variety of attributes that can be customized in a particular product is satisfactory.												
Thumbnail sizes of the attributes are favorable.												
Aesthetic customization attributes are satisfactory.												
Functional customization attributes are satisfactory.												

Fit and measurement customization attributes are satisfactory.												

5) Mass Customization Toolkit	**A**						**B**					
	Stongly Disagree 1	**Disagree 2**	**Neutral 3**	**Agree 4**	**Strongly Agree 5**	**NA 0**	**Stongly Disagree 1**	**Disagree 2**	**Neutral 3**	**Agree 4**	**Strongly Agree 5**	**NA 0**
Utility												
The button/image/link that leads to mass customization toolkit catches the attention.												
The instructions that explain the online customization process are adequate.												
Finding mass customizable products are easy.												
The size of the area provided for customization is sufficient.												
The “undo” button saves time during the customization process.												
The usage of the toolkit takes a long time to complete the customization process.												
The lack of “undo” function causes unnecessary extension of the process.												
The mass customization toolkit gives additional information about product specifications.												
The mass customization toolkit menu icons sizes are favorable.												
The placement of mass customization toolkit within the website is favorable.												
I find the instant price change useful as I customize the product attributes.												
The instructions given in the toolkit helps the customization process to be more effective.												

6) Transaction	A						B					
	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0	Stongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	NA 0
Online payment seems easy and convenient.												
Online payment process looks practical.												
Online payment process provides necessary prompting and feedback to easily proceed.												
The online payment procedure involves too many stages.												
The website provides a variety of payment methods.												
It is useful to have the payment methods represented using icons/logos.												
The website gives a secure feeling to make a purchase.												

Please prioritise the factors according to the usage of a website that provides online mass customization.	☐ Convenience ☐ Visual Layout ☐ Searching	☐ Evaluation ☐ MC Toolkit ☐ Transaction
Please rank the factors that affect your preferences to choose an online shopping website from 1-6.	☐ Convenience ☐ Visual Layout ☐ Searching	☐ Evaluation ☐ MC Toolkit ☐ Transaction
Please prioritise the mass customization toolkit categories.	☐ Product ☐ Attribute	☐ Utility

Please answer the following questions separately for Websites A and B.

Did you find the website user-friendly?	
A ☐ Yes ☐ No	**B** ☐ Yes ☐ No

<table>
<tr><td colspan="2">What are the factors that maket his website user-friendly in terms of online mass customization?</td></tr>
<tr><td>A</td><td>B</td></tr>
<tr><td colspan="2">What are the POSITIVE features of this website in terms of online mass product customization and the representation of the attributes?</td></tr>
<tr><td>A</td><td>B</td></tr>
<tr><td colspan="2">What are the NEGATIVE features of this website in terms of online mass product customization and the representation of the attributes?</td></tr>
<tr><td>A</td><td>B</td></tr>
</table>

Thank you for your participation.

APPENDIX D

PARTICIPANTS' RESPONSES TO THE OPEN-ENDED QUESTIONS

Table D.1. Participants' responses to the open-ended questions about Nike ID.

121 Time	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P7	Evet	Özelleştirme aracı diğer siteden ve ortalamadan çok daha iyi	Flash tabanlı gelişkin özelleştirme aracı ve anında görselleştirme	Yok.
P13	Evet	Saatin her bir parçasını kişinin kendi isteğine göre seçmesi	Seçenek özgürlüğü	Geri dönme tuşunun olmaması ve satın alma sayfasına geçmede sorun yaşanması
P20	Hayır	Yok.	Hepsinin sırayla açılarak ilerlemesi	Bir özelliği seçmeden diğerine geçememek.
P22	Hayır	Geri alma yaptığımız zaman özelleştirdiğim saatin silinmiş olması zaman kaybı bence. Sitenin görünümünün daha çok erkeklere yönelik oluşu. Fontlar küçük ve çok resmi.	Özellikler kısmı gayet bilgilendirici ve yönlendirmeler alıcıyı yormuyor, yönlendiriyor. Özellikler yeteri kadar detaylı.	Ürünü 360 derece döndürme butonu bulamadım. Bu da gözümde daha gerçekçi canlandırmamama sebep oldu
P24	Hayır	Özelleştirme menüsünün genel eğilim üzerine sağda yer alması, arka fon renklerinin daha az göz yorması ve font ebatlarının daha makul düzeylerde olması.	Ürün temsili resmi üzerinde yapılan değişikliğin daha gerçekçilik hissi içerisinde yansıtılabilmesi.	Yeterli dinamik yapı içerisinde sunulamaması
P34	Hayır	Basmakalıp saat seçeneği dışına çıkma şansı vermesi	Custom saat yüretebilen bir firma olması	Her şeyi. Site arayüzü anlaşılır değil. Çok yavaş ve karmaşık.
P37	Hayır	Kategorizasyon	Gerçekci görselleştirme	Tek açıdan ürünün görülmesi ve güncelliğini yitirmiş tasarım elemanlarının kullanımı
P40	Evet	Görselleri ve uygulama kolaylığı	Renk ve görselin anında yansıması pozitif özellik	Fiyat konusunda online bilgilendirme daha güzel olabilirdi

Table D.2. Participants' responses to the open-ended questions about Bo Concept.

Bo Concept	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P5	Evet	Tv ünitesine modül ekleyip beğenmediğinde seçili modulü çıkarabilme özelliği güzel.	Tasarımın anlaşılabilir olması	Kullanılan Flash teknolojisi eski, çok fazla bug var ve tam olarak çalışmıyor. Satın alma seçeneği yok.
P8	Hayır	Özelleştirme aracı eğlenceli ve 3 boyutlu görünüm veriyor.	3 boyutlu olarak tasasrım yapıyor olduğum için ürünün gerçek manada neye benzeyeceğini anlayabildim.	Özelleştirme aracı çok daha detaylı yapılabilirmiş. Önce sitenin içinde bir 10 dakika aradım bulduktan sonra da "bu muymuş" dedim. Koca sandalye kuş gibi görünüyor, bir fikir veriyor ve kullanması eğlenceli ama "bunu da yaptık böyle yarım yamalak, attık buraya bu da burda dursun zaten yollamıyoruz da bunu" gibi bir his verdi.
P15	Hayır	Ürün çeşitliliği ve kalite.	Ürün çeşitliliği	Özelleştirme sayfasına erişim zorluğu
P17	Evet	Görsel düzen başarılı ve arama kolay	Arama rahat ve görsel düzen başarılı	Ürünle ilgili fazla detay var
P26	Hayır	Grid sistem kullanıyor oluşu olumluydu	Koltuk kumaş ve ayak seçimi	Kesinlikle açıklayıcı değildi. Kullanırken kayboldum.
P27	Hayır	Ürün özelliklerinin yazılı olarak da detaylı verilmesi.	En son mobilya ölçülerini görtermesi (ikon anlaşılırsa)	Butonların (fonksiyonların) gizlenmiş/küçük olması (örn: "döndürme modunu etkinleştir"?) ve özelleştirme araçlarının sırasız olması (örn: modülleri en son seçiyorsun).
P32	Hayır	Site oldukça yavaş ilerliyor. Özellikle özelleştirme aşamasında çok sınırlı bir kullanım sunuyor. Sürece müdahale etmek oldukça zor ve sıkıntılı.	Oturma grupları için anlamlı olabilecek kumaş ve aksesuar çeşitliliği	Süreç sonunda satın alamayacağım ve illa ki mağazaya gitmek zorunda kalacağım için, bu kadar zor bir süreci boşa harcamak çok mantıksız.
P39	Evet	Site düzenliydi. Ürünlere erişimi kolaydı.	Ürün ve özelliklerinin görselle sunumu olumlu bir özellikti.	Kitlesel özelleştirme seçeneği azdı. Daha fazla özellik olabilirdi. Kullanılan görseller daha büyük olabilirdi ve özellikler hakkında yazılı bilgi de verilebilirdi.

Table D.3. Participants' responses to the open-ended questions about Dell.

Dell	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P1	Hayır	Pek artı bir yanını görmediğimi söylemeliyim, çok karışık.	Yok.	Hangi ürünün özelleştirilebileceğini bulmak zor. Ayrıca ürünün özelliklerini seçerken başlıklar yeterince açıklayıcı değil. Özellik seçerken çok fazla scroll yapmak gerekiyor.
P3	Evet	Detaylı anlatımı. Ek ürünler hakkında seçenek sunması	Ek ürünler hakkında bol seçenek sunması.	Görsel anlamda ürünler konusunda yeterli bilgi sunmamaktadır.
P4	Hayır	Ürün özelliklerinin açık bir biçimde belirtilmiş olması. Fiyatların açıkça verilmesi. Markanın kendisi.	Özelleştirilebilen parçaların önem sırasına göre dizilmiş olması	Küçük yazı boyutu, özelleştirilmek istenen şey seçildiğinde vurgulanmaması
P8	Evet	Büyük bir marka olarak bu hizmeti sunan en önemli firma olması, neyin özelleştirilebilir olduğunu bilmem	Kompleks bir ürünü kolay bir şekilde adım adım özelleştirmemi sağladı. Fiyatı anında görebildim.	Çok karışık ve fazlaca yazı içeriyor. İstediğim herşeyi ancak belirli bir boyuta kadar özelleştirebiliyorum ama daha fazlasını da yapmak istiyorum, yapamıyorum. Bir laptop ile Pc'yi yanyana karşılaştırmak istedim ancak yapamadım. Sitenin özelliğinin her ürünün customize edilmesi olduğunu bilmesem yolumu kaybedebilirdim.
P9	Evet	Teknik özelliklerin kapsamlı belirtilmesi ve satın alma işleminin aşama aşama olması	Teknoloji meraklıları için tatmin edici açıklamalar	Arayüz eski moda
P21	Hayır	Ürün bilgileri ve özellikleri	Ürün ile ilgili net ve anlaşılır bilgileri, özellikleri	Ürünlere ulaşmada sıkıntılar yaşanıyor, erişilebilirlik açısından uygun görünmüyor.
P23	Evet	Kategori ağacındaki gruplandırma işimi kolaylaştırdı Kolaylıkla özelliklere göre ürünümü tamamladım.	Hız	Bilgisayarı estetik olarak da özelleştirebilmek isterdim.
P40	Hayır	Sayfa çok karışık, bulamadım sadece fiyat konusunda takibi kolaylaştırması güzel.	Ürün özelliklerinin takibi çok zor, olumlu bir yön görmedim.	Takibi çok zor. Ürün özellikleri bir arada görüntülenemiyor.

Table D.4. Participants’ responses to the open-ended questions about Lewis & Taylor Shirts.

Lewis & Taylor Shirts	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P2	Evet	Özelliklerin çeşitliliği	Kişiselleştirme çeşitliliği	Görsel olarak yetersiz.
P6	Evet	Kişiselleştirilmesi daha kompleks bir ürünü adım adım parçalara ayırarak her parçayı tek tek kişiselleştirebilmemi ve son ürünü oluşturmamı sağladı.	Detayların fazla olması, düşünürken atlayabileceğim adımları tek tek göstermesi.	Oluşturduğum ürün kargo ile kapıma geldiğinde ve/veya kullanmaya başladığımda neyle karşılacağımdan emin değilim.
P7	Evet	Özelleştirme aracı tablo şeklinde ve basit ancak görselliği yok(son ütünün görüntülenmesi vb.) Sitenin geri kalanı çok daha kolay kullanılabilir.	Basit tablo şeklinde özelleştirme	Son ürünü anlık görselleştirerek görememe.
P10	Evet	Ürün özelliklerinin sıralanması	Kullanımı kolay	Ürünün son hali görünmüyor
P12	Evet	Kolay erişilebilir, temiz tasarım web sayfası, seçenek çeşitliliği ve aşamaların açık ve net olarak belirtilmesi	Tek ürün çeşidiyle detaylı ve konsantre bir özelleştirme yapılabilmesi	İlk aşamadaki kumaş seçiminde çok fazla seçeneğe rağmen ayırt etmeye yarayabilecek görsel ve bilgilerin yetersiz olması
P19	Hayır	Çok fazla özelleştirilebilir seçenek var. Bu çok güzel.	Çeşitlilik	Gömlek özelleştirerek alabileceğim bir aksesuar benim için değil.
P23	Hayır	Gömleği özelleştirdiğimde onun gerçekçi görüntüsünü görmek isterdim ancak site bu olanağı sunmuyor. Bu nedenle siteyi kullanıcı dostu bulmuyorum.	Ölçüyü yanlış girdiğimde anında uyarması ve ölçüyü metrik sistemde yazmamı sağlaması.	Özelleştirdiğim ürünü gerçekçi bir şekilde görüntüleyememem
P25	Evet	Ürün ve eklenebilir özellikler hakkında bilgi vermesi. İstediğin noktada seçimini değiştirebilmen (özellik kategorizasyonu butonları)	Ürün ve eklenebilir özellikler hakkında bilgi vermesi	Ürün tasarımının en son halinin görüntülenememesi

Table D.5. Participants’ responses to the open-ended questions about miAdidas.

miAdidas	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P4	Evet	Görsel tasarımın kullanıcı üzerinde bıraktığı etki. Özelleştirmenin basit bir biçimde yapılabiliyor oluşu.	Özelleştirilebilen bölgelerde renklerin görsel olarak hemen uygulanabilmesi	Özelleştirme esnasında verilen renk sayısının azlığı. Rengin kendisinin özelleştirilebilir olmaması (standart renkler dışına çıkılamıyor)
P28	Evet	Erişim. Ürünü kolayca bulma. Pratik ve hızlı olması.	Hızlı ve pratik	Yok.
P30	Evet	Global olması. Kişisel olması, tasarımı, hızı, güvenilirliği	Ürünün neye benzediğini anında görebilmek	TR siparişi olmaması
P32	Evet	Anlaşılır, sade, hızlı yüklenmek ve hızlı tepki almak mümkün. Keyifli.	Satın alabileceğim için, harcadığım emek mantıklı geliyor.	Renkler ve desenler sınırlı
P33	Evet	Kullanımı kolay özelleştime toolu.	Yaptığım özelleştirmeyi eş zamanlı görebilmem ve ürün parçalarını ilgili yazının üzerine geldiğimde anlayabilmem.	Özelleştirme alanlarının drop-down menüde verilmesi. Hepsini aynı anda açık görebilsem daha anlaşılır olurdu. Ve sürecin neresinde olduğumu anlatan stepleri görebildiğim bir alan yine süreç yönetimim konusunda yardımcı olabilirdi.
P34	Evet	Hızlı ve kullanışlı olması	Seçenek imkanı	Sadece ABD içinde kullnılabilir olması
P35	Evet	Görsel dil, genel anlamda olumlu bir deneyim sunması	Her işlemin net bir şekilde ifade edilmesi	Yok.
P38	Evet	Simplicity. Az çeşitlilik kafa karışıklığını azaltıyor (shoes of preye kıyasla daha basit) Ödemede paypal olması	Ürün görsellerini eğimli açılardan görmek faydalıydı	Ürün görselleri gerçeklikten uzak. Customizable çeşitlilik az.

Table D.6. Participants’ responses to the open-ended questions about Nike ID.

Nike ID	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P2	Evet	Fotoğrafların büyüklüğü	Görsel yönlendirmeler Ürünlerin gerçekçi görselleri	Ürünü Türkiye'ye göndermemesi
P9	Evet	Adeta bir görsel şov var, yeterli başlı başına	Görsel efektler ve 3D sunum	Bu kadar çok özelleştirme gerekli mi tartışılır :)
P10	Evet	Görseller ve kullanım rahatlığı	Kolay	Takılma ve kaybolma ihtimali
P11	Evet	Hızlı olması, görselin anlaşılır ve gerçekçi olması, custom toollarının imaj üzerine mouse hareketiyle anında cevap vererek kullanıcıyı kolaylıkla yönlendirebilmesi	Kullanıcıyla eş zamanda hareket eden hızlı bir sisteminin olması	Uluslararası shipping’in olmayışı
P12	Evet	Kolay erişilebilir, ürün ve seçenek çeşitliliği, arama yapılabilmesi ve bilgilendiriciliği, sayfa tasarımı	Özelleştirme sırasındaki görsellerin gerçeğe yakın olması	Özelleştirilebilir kısımların ve bunları için verilen renk, doku, desen vb. gibi seçeneklerin çok az olması
P22	Evet	Hızlı yüklenmesi, yönlendirmelerin açık olması, sitenin renk ve tema bakımından çekici olması	360 derece döndürebiliyorum ürünü. Renk seçenekleri yeterli, ürün görsel anlamda gerçekçi, sitede alışveriş yapmak keyifli	Biraz daha açıklama eklenmeli.
P27	Evet	Görsel düzen, font ve buton büyüklüğünün doğru seçimi, gerçekçi ürün görseli, kolay rotate.	Gerçekçi görsel ve kolay rotate edebilmek	Ürün hakkında az bilgi veriyor.
P28	Evet	Erişimi ,ürün detaylandırması, pratik ve hızlı.	Çeşitlilik	Fazla seçenek sunması biraz karışıklığa sebep oluyor

Table D.7. Participants' responses to the open-ended questions about Shoes of Prey..

Shoes of Prey	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P1	Evet	Özelleştirebileceğim ürünleri seçmek çok kolay. Ayrıca ürünler hakkında detaylı bilgi almak güzel. Görsel tasarımı güven verici. Buton ve verilen bilgiler açıklayıcı. Tasarımı dikkat çekici.	Uyarıların yapılması güzel.	Geri al ve döndür butonları daha belirgin olsa iyi olur.
P3	Evet	Yönlendirme konusunda detaylı anlatımı. Görsel anlamda detaylı sunumu.	Tüm seçimlerimizin görsel olarak desteklenmesi	Ürün karşılaştırması yapılamaması (Varsa da erişemedim)
P16	Evet	İstenilen ürünün kolaylıkla oluşturulabilmesi	Sitenin dizaynın, görsellerin ve seçeneklerin yeterli oluşu	Özelleştirilen ürünlerin çok yapay görünüşü
P18	Evet	Kolay, anlaşılır, düzenli, görseller net ve amaca uygun	Görseller sade ve güzel, şık bir site güven uyandırıyor. "Bu işte biz iyiyiz" imajı verilmiş	Olumsuz bir yan bulamadım
P20	Evet	Özelleştirmeyi pratikleştirmesi	Başlamadan önce tek tek açıklaması	Yok.
P29	Evet	Sadelik, düzgün yerleştirilen seçenekler. Eğlenceli ve realistik tasarım yapabilme.	Sitenin kendisinin tasarımı oldukça keyifli	Pahalı.
P37	Evet	Arayüz tasarımı, görsel tasarım elemanlarının uyumu	Görselleştirme, 3B döndürülebilme özelliği	Ürünün ayakta nasıl duracağının gösterilmemesi
P38	Evet	Geri al" opsiyonu. Relevant yönlendirmeler.	Gerçeğe yakın sunum. Değiştirilebilir component fazla.	Shopping bag'e ulaşmak zor. Mc toolkit assistance konusunda geliştirilebilir.

Table D.8. Participants' responses to the open-ended questions about Skin It.

Skin It	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P6	Evet	Alınan ürünün basit olması ve bu yüzden kişiselleştirme servislerinin yeterli, kolay ve kapsamlı olması.	Arayüz, geniş seçim şansı, kolay kullanım.	Site erişilebilirlik açısından iyi değil, çok yavaş.
P11	Hayır	Olumlu bir eleştirim yok, her şeyi aynı anda vermeye çalışmışlar, görsel bir karmaşa var. Son derece yavaş, siteyi terk etme isteği uyandırıyor.	Uluslararası shipping olması	Yavaşlığı
P13	Evet	Çeşitli kategorilerin olması dışında kişiye kendi tasarımını da seçtirmesi.	Ulaşılabilirlik	Her üründe özellik seçimi kısıtlı.
P14	Evet	Kolay anlaşılabilir ve ikonların tanıdık olması	İndirim kodu bulabildim. Register yapmadan direkt alabilmek güzel.	Paypal ödeme olmaması varsa da dikkat çeken bir yerde olmaması.
P18	Hayır	Düzenli, anlaşılır	Aşağıya doğru dizilim güzel ayarlanmış, öne çıkarmak istenen ürünler gerçekten göze çarpıyor	Ürünü çok çeşitlendiremiyor olmak olumsuz. Görseller ve yazı stilleri biraz amatörce geldi
P31	Evet	Yönlendirmelerin açık belirtilmesi. Sitenin sade, kolay, anlaşılır olması.	Ürünü derhal görmem	Görsel pek realistik değil. Ürün malzemesi nedir bilmiyoruz.
P35	Hayır	Siteyi kullanıcı dostu bulmuyorum.	Pek olumlu bir deneyim yaşadığımı söyleyemeyeceğim	Her şey çok karışıktı. "Scale" gibi fonksiyonlar kontrolsüz bir sonuç oluşturacak gibi bir izlenim yarattı. Bu siteden yapacağım kapağı güvenip kullanmazdım sanırım.
P36	Evet	Site arayüzü kullanım amacına uygun ve çekici. Kişiselleştirme kısmının kullanımı kolay	Üzerinde vakit harcanıp daha özel tasarımlar çıkarılabileceği için, mağazadan almak / yaptırmak yerine tercih edilebilir.	Site içi görseller iyi olsa da doğrudan satılan ürüne ait fotoğraf / video yok. Malzeme ve baskı kalitesi konusunda güven vermiyor.

Table D.9. Participants' responses to the open-ended questions about Toshiba.

Toshiba	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P5	Hayır	Kullanımı kolay ve işlevsel.	Fiyatın anında güncellenmesi (kişiselleştirme sırasında)	Tasarım anlayışı eski. Özelleştirilebilir parçaların bazı larının kısıtlı olması
P21	Evet	Özelleştirilebilen araçları, görsel düzeni ve erişilebilir olması	Özelleştirilebilen araç seçenekleri ve görsel düzeni	Yeteri kadar ürün özellikleriyle ilgili bilgi verilmemiştir.
P25	Hayır	Ürün görsellerinin farklı açılardan ve ayrıntılı görüntülenebilmesi	Ürün görsellerinin kullanımı. Özellik ekledikçe fiyat değişiminin görülebilmesi	Seçilemeyecek özelliklerin aşapıda belirtilmesi. Aksesuar görsellerinin yeterli büyüklükte olmaması.
P29	Hayır	Çok karışık, kafa karıştırıcı. Bir anda çok fazla mesaj verme kaygısı.	Mahalle Pazarı gibi çok karışık ama her türlü ihtiyacımı bulurum gibi	En başta her türlü ihtiyaca göre seçilmiş olan hedef kitle ayrılmalı
P30	Evet	Hız. Kolay erişim. Marka sitesi gvüvenilirliği. Doğru bilgi edinme.	Ürünün fiyatının aşağı yukarı ne olduğunu ve değişkenliğin nelerden kaynaklandığını bilebilmek	Çok fazla ürün var, bilmeyen bir insan için çok farklı değil.
P31	Hayır	Ürün özelleştirmede özelliklerin iyi açıklanmış olması	Açık ve anlaşılır olması (çok seçeneğe rağmen)	Ürünü satın alırken sitenin hata vermesi. Seçtiğim özelliklerden görülebilir olanları seçerken görememem (klavye led'i vs)
P36	Evet	Özelleştirme sayfasının kolay anlaşılabilir olması, işlem sırasının net olması, özellikle de seçilen her bir ürünün fiyata nasıl yansıdığının açıkça ve eşzamanlı görülebilmesi (Özelleştirmenin gerekli olup olmamasına karar vermede etkili).	Kategorize edilmiş, kademeli ve indirim fırsatlı yan ürün / aksesuar seçeneklerinin sunulması. (Kullanıcıyı aldığı ürünle ilgisi olmayan ek ürünleri de satın almaya teşvik ediyor.)	Özelleştirme sürecinde (konfigüre ettiğim ürünlerin genel olarak çekicilik faktörü düşük olmakla beraber) istediğim özellikleri ve aksesuarları seçtiğimde çıkan maliyetin piyasa değerine göre bir avantajının olmaması. Ödeme sayfasına geldiğimde aynı teknik özelliklere sahip stok (özelleştirilmemiş) bir ürünü ve (ihtiyacım dahilinde) aksesuarları uygun fiyat ve beğenime göre ayrı ayrı almayı tercih ettim. Sonuç olarak bu sitedeki özelleştirme kategorisi bana piyasada bulamayacağım ya da özelleştirmek isteyeceğim seviyede seçenek sunmadı.
P39	Hayır	Bu tarz sitelerin aksine beklenenin üstündeydi. Daha basit ve yönlendiriciydi.	Ürün özelliklerinin çeşitliliği oldukça fazlaydı. Filtreleme özelliği olması iyiydi.	Kişiselleştirme çeşitliliği oldukça uzundu. Çok fazla yazı vardı. Daha çok görsel olmasını tercih ederdim. Özellikler karışıktı, gruplanabilirdi.

Table D.10. Participants' responses to the open-ended questions about Zazzle.

Zazzle	Bu web sitesini kullanıcı dostu buldunuz mu?	Bu web sitesini online kitlesel özelleştirme anlamında kullanıcı dostu yapan unsurlar nelerdir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin sunumu konusunda size en OLUMLU gelen özellik nedir?	Web sitesi için online kitlesel ürün özelleştirmede ürün ve özelliklerinin konusunda size en OLUMSUZ gelen özellik nedir?
P14	Evet	Beyaz arkaplan kullanılmış olması göz karışıklığını engelliyor.	İndirim kodu bulabildim.	Register yapmak zorunda kalıyor olmamız.
P15	Evet	Ürün çeşitliliği. Ödeme kolaylığı. Tasarım özgürlüğü ve kolaylığı.	Tasarım özgürlüğü ve kolaylığı	Ürün açıklamalarının yetersizliği
P16	Evet	Erişimin kolay olması ve ideal yönlendirmeler yapması	Sınıflandırma ve yönledirmenin güzel oluşu	Görsel düzeneğin çok fazla ilgi çekici olmayışı.
P17	Evet	Görsel düzen başarılı, arama kolay ve ödeme düzeni kullanışlı	Net ve anlaşılır olması	Ürünle ilgili fazla detay var
P19	Evet	Görsel olarak düzenli, erişim kolay	Baskı yapılabilen kılıfın modelinin değiştirilebilmesi	Sitenin renklerinin çok soluk olması ve ucuz bir site görünümü vermesi
P24	Hayır	Sadelik dışında kullanıcı dostu bir kullanım algılayamadım.	Ürünün farklı açılardan görülebilmesi.	Resim ve font büyüklükleri, arka plan renkleri.
P26	Evet	Görsellik	Ürünü elime aldığımda neyle karşılaşacağımı biliyordum	İkon ebatları küçük ve açıklayıcı değildi.
P33	Evet	Yaptığım değişiklikleri eş zamanlı görebilmem	Kendim bir tasarım ekleyebilmem	Custimization toolunun başlıklarının net ayrılmadığını düşünüyorum.