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Mass Customization in Footwear Industry: Setting-up a Web-Based Configurator

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SUMMARY

Customer interest on offers more tailored to their needs and their fascination in co-creation process makes manufacturing to move from mass production to mass customization. Moreover, advancement of new technology enables manufacturing to take this opportunity and create close relationship with customer. Configurators as one of the main enablers of mass customization has been used recently quiet often by many industries.

This study is going to focus on web-based configurators which allow customers act as co-designers and specify their preference online over a software, and try to analyze how a manufacturer can define its customization based on its production capabilities in a competitive and highly customized industry like footwear. Firstly mass customization history, definitions, from customer perspective, success factors and its enablers such as developing solution space, production technologies, choice navigation, configurators, and supplier integration, mass customization in footwear industry, its application challenges and benefits were searched trough literature review. Thanks to literature examination, preliminary knowledge was created, technical terms were recognized and possible future research directions were discovered. Next, configurators of selected brands are examined and a case study is carried out to support findings of analysis, finally a guidelines is created for the companies which are interested in setting up their own configurator. To reach this goal it was necessary to perform internal and external analysis at the same time.

External analysis: Analysis upon footwear sector was carried out on manufacturers that use web-configurator and was tried to understand the current situation of the market. This level of analysis indicates that shoes on configurators are divided into two; athletic shoes and non-athletic shoes and the market share of the non-athletic shoes is higher in comparison to athletic shoes. In contrast it is seen that footwear market is highly fragmented and the top places belong to athletic brands such as Nike, Adidas and Puma. Although athletic brands make the most income non-athletic shoes placed in the rest of the companies which is small and concentrated compose a bigger market share. There is a positive trend in the sales of shoes since 2004 and it is expected to keep this positive trend also in 2013. The footwear sector is highly affected by changing fashion trends and customer preferences and everyday competition is getting higher because even the companies which do not make footwear as core business started to publish their shoe collections. Moreover countries such as Italy, Portugal, Brazil which were known as their footwear craftsmanship are losing this reputation due to shift of production to Asian countries thanks to their low labor cost policy. Therefore high competition, low prices, high levels of inventory risk for companies, unsatisfied customers brought mass customization also in footwear industry. It is observed that mainly mass customization in footwear industry is applied in two ways; with foot-scanners at specialized shops and without foot-scanners by doing online customization at home. Generally non-athletic men shoe customizers prefer using foot-scanning technologies. Also

the number of mass customizers which do only online customization via web-based product configurators is not low.

The exploration of the brands which apply footwear customization online was done through search engines, evaluating previous studies and literature. 21 different brands were found which offer mass customization online after dedicated research. Then the brands were separated into two according to their origin; Innovative shoe makers for the companies already inside footwear business and establish mass customization and Appealed outsiders for the companies launch the footwear sector with customized shoes. Afterwards the exploration of the companies it was understood that they were not all suitable to analyze according to objective of the study and a series of criteria was applied to choose brands to bring forward with the analysis. Firstly brands were evaluated as being "Pure Click Seller" which means companies adopted only web-based approach for their sales and "Click & Brick Sellers" which means companies with more physical than virtual approach to customization by being in direct communication with the customers (generally they use foot scanners). Addition to this, the variety of customizable offer was taken into consideration. A company which produces only flip-flops had been put to same analysis with the company which offers fifteen models of shoes. Second elimination was done according to companies' product positioning. In order to belong mass customization level products should not exceed certain level of price therefore three price categories are defined: "True Customizers" for the companies targeting the mass market where they can find customer potential with normal purchasing power but willing to pay a price up for customized shoes, "Affordable Luxury"for offers by bespoke shoe makers with affordable prices for mass consumers and "Digital Tailoring" for the companies targeting wealthy clients who can spend much more than normal mass product shopper on fine, high quality products. After the eliminations, 13 companies Adidas, Nike, Reebok, Converse, Vans, New Balance, K-Swiss, Timberland as True Mass Customizers and Milk & Honey shoes, Shoes of Prey, Nina Shoes, Shoe Design Studio, Atelier Shoes as Affordable Luxury were chosen to bring forward for further analysis.

In order to collect necessary data about configurators they examined individually and 98 different shoe types were customized. The data is collected regard to fitting, aesthetics and function dimensions of the customizable shoes. Fitting is defined by size range, width range and option to choose different sizes for left and right foot consequently about the last of the shoe, style is about aesthetic design of the shoe such as choosing materials, colors of customizable parts, functionality is about sockliner, outsole type, insole type, heel padding and ankle type to add function to the shoes in order to meet specific needs of customers. In each configurator the data related to fitting, aesthetics and design are noted for different types of shoes, additionally the price and delivery period and area of the shoes were tracked. The data related to Athletic Shoes and Non-Athletic Shoes are collected in same manner however there were lack of data in some cases (ex: Heel Height in Athletic Shoes) due to nature of the product. Moreover user-friendliness of the configurator, visual realism of the shoes and availability of help options were investigated. Companies' customization levels are classified as: Style Customization; for a customization meeting only aesthetic preferences of customers,

Mismatched Pairs; addition to style customization option to choose shoes in different sizes for left and right foot, Function Fit; preference of desired function of the shoe is added on the top of style customization and mismatched pairs.

Profiles of the selected brands were created according to origin of the company product positioning, product types and customization level; and their passage/start to mass customization was described briefly. According to profiles only Adidas and Nike were suitable to all customization levels. Additionally, Reebok does Style and Function customization, Shoe Design Studio does Style and Mismatched Pairs, the rest of the companies only do Style Customization. Next, role of configurators in footwear industry was analyzed. Challenges of using product configurator in footwear industry are; firstly according to nature of the product it is difficult to buy without trying, there is a waiting period up to couple of weeks and consumers have doubt about paying for a product they have never seen and touched which are also valid for all the online mass customized products. However configurators are accepted as enabler of the mass customization because they create a connection between company and customer ay time and anywhere in the world. Besides thanks to interactive product visual in configurator, users can visualize immediately the changes they have made on the shoes which is not possible in real life.

Second analysis related to brands was made on their configurators. The customizable offer related to fitting, aesthetics and function, assistance options, interface of the software and delivery conditions of 13 brands were examined in detail. According to cross wise analysis it is found that almost all the companies apply pre-elimination between models before starting to real customization. Most of them do not provide ulterior information about the product however all of them let users examine previous designs/suggested designs in order to get inspiration. Less than half of the companies let consumers see reviews, suggestions from previous users. Mostly there is option for saving the progress. In terms of customizable dimensions, less than half provides different size charts/size guide when it is time to customize fit; only three of thirteen allow choosing different sizes for left and right foot and half of them present width as an option. Considering customizing aesthetics, it is observed that all of the brands have variety of options for colors but for materials it is seen that non-athletic bands have more options comparison to athletic ones. Generally customizing function is not an option, only three of thirteen brands have function options. Nearly all the brands examined try to keep product visual as real as possible, however there are two of them who need to improve visual quality. They are all different than each other even the brands such as Nike and Converse, Adidas and Reebok are from same group their configurators make difference among each other and have unique and creative features. Usability of the configurators is a subjective evaluation but in my opinion most of them can be used by averagely informed internet user. None of the companies obliges registration for check out and mostly they use flat pricing. All the companies specify delivery period, delivery conditions, delivery area and return issue.

Internal Analysis: It is the analysis carried out internally in order to discover how a company carries out its mass customization processes. The external part which everyone can see via configurators was examined afterwards the areas related to realization of mass customization processes where there was lack of information were discovered. These were; solution space development, production method of the company, level of supplier integration to mass customization processes and choice navigation that company provide to customers. The questionnaire was structured over these four main themes in a way that output of the questionnaire would help to understand; how the company chose the attributes customer needs to diverge, which technique the company use for production in order to produce customized shoes in an acceptable time period and quality, how they created their relationship with the suppliers and if it helped to improve timing of production and consequently delivery of the products and how they manage the offerings can be seen by toolkit that they can succeed to navigate customers between options while minimizing the burden of the choice. The questionnaire was built up of 13 open and close questions and the interview was made via Skype therefore questions were asked in semi-structured way in order to get more information from the company. The company was from non-athletic women shoes sector and the findings were; they were doing style customization and they did not have different offerings about size and function. They employed more human resources in order to meet the demand for customized products. They are in collaboration with the suppliers in case of emergency they have some privilege by them. Additionally they assemble all the parts in the house and they prefer not keeping high level of stocks. The customizable parts, materials and colors of the shoes are decided according to designer's perception.

After putting together the findings from online product configurators and the case study, as it is stated in objective a guidelines is created for the new comers to footwear industry where they want to set up their own configurator and the ones who want to improve their current offering. It is found that assistance in terms of company help, navigation help, previous customer comments should be supplied to users by configurators. Customizable dimensions of the shoe should be organized as fitting, aesthetics and function. For fitting, size, width, size guide, option to choose different sizes for each foot can be offered. In aesthetics, customizable parts should be defined in a way that can answer customer needs and variety of material and color options should present. Related to type of shoe different functional technologies can be presented to users. Supplying reliable product visual is one of the indispensable features of the configurator. Moreover the software should be user friendly and let people get pleasure from the customization process. Flat pricing for the product is preferable, delivery and return should be defined well in the end of customization process.

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1. INTRODUCTION

Manufacturing has been changed a lot from the 1800s, where craft production and tailored products were favorable, trough end of last century where economies was depending on mass production, mass distribution, mass marketing and mass media. Nowadays again consumers are in pursuit of differentiation from the standard and at this point combination of advances in information and technology related to production and supply chain makes possible to mass customize products in order to meet customer preferences at mass production prices.

The term 'Mass customization' was brought to existence by writer Stan Davis in his book "Future Perfect" but the term was popularized by writer Joe Pine. Mass customization has different applications for different products and in variety of sectors. There are also different methods and strategies to achieve it in a successful way. Some products can be tailored or customized at the retail outlet, some of them may adapt to the user, or some of them can be customized just cosmetically and even sometimes customers can interact with the design at manufacturing phase so that he can alter the total design of the core product. The customer involvement point to customization, customer's freedom and transparency of the company to the customers are important issues for the applicators of mass customization.

Mass customization presents in many different sectors such as accessories; as an example to create valuable or invaluable jewels; automobile and vehicles to style outer part of the car or to choose engine features; beauty and healthy for instance to design a lipstick; electronics and media to design a computer, security systems; food as an example choosing ice-cream flavors, muesli ingredients, chocolate mixes; footwear to design shoes; sports equipment to design golf putters; entertainment as an example to create own comic book and many examples similar to these and many other ideas waiting to be discovered.

There are some enablers in mass customization analyzed in this study; appropriate solutions space development, using advanced production techniques or combining existing production capabilities with the more flexible ones, choice navigation in order to help customers find their ideal product, supplier integration & collaboration and online product configurators. My focus is especially on online product configurator which is a software tool used in e-commerce that manages the part of the sales system. Configurators help customers to do their co-design function by allowing them to combine their preferences online anytime, anywhere in the world.

In this study as a subject configurator in footwear industry is chosen to examine due to three main reasons; nowadays consumers are in pursuit of differentiation from the standard therefore there is upward interest to mass customization, secondly it is not easy survive in mass customization area, many firms fail during their startup phase, however there are successful examples from fashion industry especially among apparel and footwear customizers and finally configurators are the only link of the companies with the rest of the

world and it is easiest way for customers to express their preferences therefore they have a huge importance in mass customization especially in this era of information technology systems.

My target is the footwear brands which apply mass customization via configurators. During the study firstly the footwear sector was analyzed with the numbers then the brands which do mass customization in footwear industry were discovered. However all the brands do not have configurators therefore there had been elimination among the findings according to existence of configurators and their customizable offer level. Finally brands which cannot be considered as "mass" customizers due to their price policy were eliminated. Afterwards, refined brands are examined in terms of their history, passage to customization, customization offers and then detailed study about their configurators were carried out. Comparative analysis of the examined configurators was made and according to this examination. Addition to analysis a semi-structured interview was accomplished with a company present in non-athletic women shoes sector in order to discover their logic behind the configurator therefore it is understood how they make the proposition that consumers see o configurator. The interview is placed as a case after the analysis of the configurators. After all guidelines for setting up a configurator in footwear industry was created for the companies which are interested in doing customized shoe online and for the ones already inside business but want to improve their current offer.

2. LITERATURE REVIEW

2.1. Mass Customization Definitions and Classifications

Mass customization as a production strategy is using personalized products and services realized by modularized product/service design, flexible processes, and integration between supply chain members. The most important sectors applying mass customized products are; clothing/footwear, automobile, nutrition and computer manufacturing (Fogliatto et al., 2012). Although the idea of mass customization has been defined firstly in visionary terms by Davis in 1987 (Kumar et al., 2008) related studies on it have evolved significantly over the last decade (Fogliatto et al., 2012). Especially the years between 2001 and 2010 there is a significant focus on the subject thanks to heavy use of web-based configurators, the emergence of rapid manufacturing technologies, and the implementation of more structured customer- interaction methods (Fogliatto et al., 2012). Next paragraphs there is history review of mass customization.

At the very beginning of the concept mass customization the related idea of the business was so much broader than the situation held today. Indeed the business strategy built on similarities of customer preferences has been spoken since 1950s then this business strategy models were appeared also in marketing literature since 1960s. The concepts as flat organizational structures, fast and high volume of information flows, modularity and reusable components which are always consistent with mass customization have been imaged in 1970s then became reality in 1960s. For the first time in 1984 in literature Toffler has foreseen the customization as fundamental for the success of the business and he defended the customer would integrate so much to business that it would be difficult to understand who the real producer is (Kumar at al., 2008).

As it is mentioned before, Davis created the first formal mass customization publication in 1987 and he described the following terms which are key elements of mass customization:

• Any time: Products and services should become available the instant a customer develops a need.

• Any place: Products and services should travel to customers, not vice versa.

• No matter: Manufacturers should separate the information contained in a product from the physical matter that gives it form.

• Mass customization: Production processes should generate an infinite variety of goods and services, uniquely tailored to customers.

There is no doubt that he had great vision of the future and he built the first bricks of mass customization strategy. The first marketing dimension to mass customization is provided by Kotler in 1989 and he observed that ''Segmentation now has progressed to the era of mass customization, but even segmented markets are too broad. That level of analysis does not permit the development of niche strategies''. In the beginning of the 1990s Pine implied the sustained competitive and financial advantage of mass customization by his book. Moreover he supplied a detailed path to pass from cost-based mass production to a cost and customization based strategy. Addition to the path, logical reasons for implementing mass customization is provided by him and this increased the credence of mass customization as a business strategy and also in literature it found a promising place in academic research fields. Instead Kotha in 1995 argued that the mass customization is not an alternative way to mass production but instead it co-exists inside any production facilities only with different degrees and furthermore he made studies to determine the balance of mass customization and mass production degree of the companies which brings both strategic and financial advantage(Kumar at al., 2008).

Mass customization as a business strategy has been studied after 90s by Pine analyzing the failure of the Japanese car makers, after some discussion about the reasons of failure some researcher pointer out the subject variety of the options and it was discovered that after a certain level of customization customer is not willing to respond the increased customization. That's why in the literature the balance between optimal levels of customization options, the price premium that customer is willing to pay and willingness to receive delayed product were started to be discussed however there is not sill one formula that is able to balance all these aspects (Kumar at al., 2008). As well as mass customization defenders there have been also some researchers who think mass customization not as a unique strategy but it should be an optimal strategy between mass customization and mass production.

In 2004 Piller suggested 12 propositions to explain why mass customization cannot find its value. He explained the problems as terminological confusion, the insufficiency of technologies to implement mass customization, inadequate configurators, reliability of the concept, not value-added propositions to existing products by companies, risk taken by the customer while buying a product he has never seen before and marketing related issues. However by this paper he presented new areas to be searched to researchers and developers (Piller, 2004). According to Kumar, 2008 in the last decade IT capabilities (using customers as co-designers), flexible manufacturing processes, agile manufacturing systems and ad-hoc supply chain structures are developed in order to deliver customized products with many but at the same time limited options to customers and all these factors enabled the producers build higher customization levels by time at low prices.

Recently Kaplan and Haenlein were defending that mass customization needs clearer boundaries and together with Salvador ad Mclntosh they shared the idea that mass customization should be more customer centric rather than using particular production technologies or product mix (Fogliatto et al.,2012).

During the last decade a great focus occurred on mass customization and there have been studies in this field including operations management, marketing, innovation management, engineering management, science management, management information systems. However these studies are done in a modular way rather than a structured way. Over a decade on mass customization we can see some examples of classification of it.

- *Lampel and Mintzberg (1996):* They divided the value chain into four steps design, fabrication, assembly and distribution and they defended that it flows trough customer to supply chain. They defined five strategies for mass customization; pure standardization, segmented standardization, customized standardization, tailored standardization and pure customization (MacCarthy et al. 2003)

- *Ross (1996):* He defines five approaches according to degree of customization. Core customization, where customers can modify the core elements, post-product customization, where standard product can be tuned into customized one, mass retail customization, which customization can be done in retailers, self-customizing products as mobile phones software and finally variety push where also variety of options for the products are presented (MacCarthy et al. 2003).

- *Spira (1996):* He developed a framework to distinct the types of mass customization. According to his framework there are four types of mass customization, customized packaging, customized services, additional custom work and modular assembly (Da Silviera et al., 2000)

- *Gilmore and Pine (1997):* They divided the approaches to mass customization as collaborative where customer is active to design the products, adaptive in which customers can change the products during its use, cosmetic in which standard products are packed ad-hoc to each customer without changing the product itself, and finally transparent where individual needs are thought while products are being adapted (Da Silviera et al., 2000) (MacCarthy et al. 2003).

- *Piller (1998):* He divided the customization according to initial customer involvement point, customized additional services, adaptive products, modular products and tailor-made products (Jan Salem et al., 2002)

- *Alford et al. (2000):* Considering the value chain separated into three, core, optimal and form customization. Form customization made customers have limited changes or enhancements on actual product, in optimal customization customers have larger variety of options to customize the products instead in

core customization customers are involved also to design process (MacCarthy et al. 2003).

- *Duray et al. (2000):* According to type of modularity and point of customer involvement the mass customization are divided into four groups, fabricators, involvers, modularizes and assemblers. In the case of fabricators, customization includes the customers to the process in early step of design so that customers can realize their unique design. This type is close to pure customization strategy however there is application of modularity to have some components in common. Customers are involved in design and fabrication stage of the production cycle. Involvers are involved to process during fabrication and design stages however they realize their customization while combining already existing standard models during assembly and delivery. Modularizes they do not specify their unique requirements until the assembly and us stage. Component commonality is the way to realize such customization type. It does not supply involvement as much as fabricators and involvers however for example a customer can choose the finish of the product. Assemblers provide a chance to the customers choose their preferences among wide range of choices that has specified set of features. The customer involves to process in assembly and use stage and it shows difference from mass producers because in any case customers are involved the process by specifying the product.

- *Da Silviera et al. (2000):* After a detailed literature review they combined different works of Gilmore&Pine, Lampel&Mintzberg and Spira to create eight ranges of mass customization from pure customization to pure standardization (Table 1). Design is the eightieth level and it means collaborative project, manufacturing and distribution of the products upon specific customer requests. Seventh is fabrication and it point outs the customer-tailored products. Level 6 is about assembling modular components upon different requests. In fifth and forth level customization realized by adding custom work. Third is presenting or delivering the same products using different ways. In second level customization is after purchase so customers can adapt them to different situations and first level is pure standardization without customizing.

Table 2. 1. Generic levels of mass customization (Da Silviera et al., 2000)

MC generic levels	MC approaches	MC strategies	Stages of MC	Types of customization
8.Design	Collaborative; transparent	Pure Customization		
7.Fabrication		Tailored customization		
6.Assembly		Customized standardization	Modular production	Assembling standard components into unique configurations
5.Additional custom work			Point of delivery customization	Performing additional custom work
4.Additional services			Customized services; providing quick response	Providing additional services
3.Package and distribution	Cosmetic	Segmented standardization		Customizing packaging
2.Usage	Adaptive		Embedded customization	
1.Standardization		Pure standardization		

All in all, the concept of mass customization is in our lives over two decade time period however still there are many aspects of it needed to be discovered and real life cases to be analyzed in order to enlighten the future of mass customization operations. Piller (2005) described the term as a buzzword and implied the importance of putting borders to mass customization description; otherwise he defended that it will never become academic discipline nor a strategic concept which is accepted by managers. So he made his definition of mass customization after revising it several times as "Customer co-design process of products and services, which meet the needs of each individual customer with regard to certain product features where all operations are performed within a fixed solution space, characterized by stable but still flexible and responsive processes and as a result, the costs associated with customization allow for a price level that does not imply a switch in an upper market segment" (Piller, 2005).

2.2. Market Perspective in Mass Customization

In the core of mass customization there are customers as co-designers and customers can be integrated to customization processes in terms of value creation by defining, configuring, matching, or modifying individual solution. In a customization process customers take an active role in design and this makes a unique link between the customer and the product which customer value more (Franke et al., 2010). There is also special customer-supplier relationship in the case of mass customization and once customer is confident about the result, high barriers built against switching suppliers (Piller, 2005). However designing and freedom in choosing may not attract some people although it gives them many type of products and services (Franke et al., 2009).

In recent years it is found that when a customer does not have proper preferences about the products or if they do not know what they really want it is difficult to attract them to customized products. According to the study that Franke et al., (2009) carried out, samples were chosen from random Austrian residents, and they underlined this point of the study because it is not like recent studies just on students which cannot be the representative of the public, the empirical study showed that benefits of the customization depend on customer characteristics, their insight to their own preferences and being able to convey these preferences. However this does not mean that customers who have less insight to their preferences cannot customize, they can also involve to customization types which require less involvement and less customer effort. Addition to this, the role of the customization configurator is very important to guide/help customers. Therefore overall finding is that, it is most suited for the customers who have precise and fixed preferences. Moreover another research shows that preference insight varies considerably from person to person and this can change the obtained benefits from customization experience (Franke et al., 2009) and consumer's base category consumption affects positively his motivation to buy a customized product (Franke et al., 2010). Piller (2004) stated that "The heterogeneity of customer preferences influences the likelihood that customers are attracted by a mass customization offering". The greater heterogeneity brings higher additional value of mass customization.

Many customers in recent studies reported that they are not happy with current products which they have and they are willing to pay price premium for further details which can satisfy them. Behind the discontent of the customer there can be missing ability of mass production's answering to individual needs and it is reported that some customer even can change their privacy to obtain the products matched to their design. Moreover it is observed that there is higher and higher demand for the products and services specialized for the individuals (Piller 2005).

Franke et al., (2010) made a study on 186 participants to understand the factors arising the value given to self-designed products by customers and make them willing to pay for these products. They presented two hypotheses which are, effort spent on customizing process affects negatively the value given to product and process enjoyment obtained contributes positively to the value given to self-designed product. After an empirical work carried on a configurator to customize scarves they have reached the following results.

According to results of the study first hypothesis about the effort was wrong. No direct relationship between the effort spent on customizing and its negative effect on perceived value of the self-designed product could not found. This finding can be due to participants didn't have pre-concept of the amount of effort should spend on customization process and addition to this if the participant likes the product in the end he thinks that the effort he spent worth to have such a product. Therefore contribution of the effort can be linked with the result customer obtains; if the product as he desires, there is positive of the perception if not the effort can be evaluated negatively Franke et al., (2010). Also for the second hypothesis similar results were found but this time it is justifying the hypothesis. The enjoyment of the participant is highly related with the result of the customization process. If the participant obtains a product closer to his desire enjoyment level is higher or vice versa. As a result the value given to the self-designed product is affected by the process enjoyment the customer has received, interaction of preference fit and process enjoyment and the interaction of preference fit and perceived process effort.

In the literature there are three perceived benefits of the MC: utilitarian, uniqueness and self-expressiveness. The utilitarian benefit is the most analyzed one between others and it combines both aesthetic and functional fit which response to customer needs. Uniqueness of the mass customized product is expressed by having product done according to every single customers' preferences. It is proven that there is positive link between perception of the uniqueness of the product and the value given to the product. For self-expressiveness; given that consumers can choose their preferences among variety of options this is a way let them express themselves so it increases the perceived value of self-expressiveness. However it is important not to confuse self-expressiveness and uniqueness because self-expressiveness is the way that consumer express his image by creating a self-oriented product (Merle et al. 2010).

However apart from benefits and value given to customer there are some negative sides of the mass customization in customer perspective. Until now customers have very limited experience with customization and they cannot predict if it is reliable way of shopping. Moreover sometimes even mass customized products do not create any plus value to the product more than the ones existing in the market because they mainly the customization part is focused on aesthetics and a customer who wants to follow the trends can find the trendy products on shelves. There are some customers who really can create his fashion and uniqueness but this case is not often. Nevertheless the co-design process stimulates many customers in a way to create link to product and eventually realize the purchase (Piller, 2005).

It is years that the discussion about willingness to pay for the products fit better to customers' needs. According to empirical studies it is proven that customers are willing to pay up to 150% more for the products which fit better their needs than the second best solution available. In mass customization customers can create products fit better to their needs however in customization process apart from the direct cost which is spent to material, service etc. there is indirect cost which can be linked to uncertainty of the product will be obtained in the end. While customers are acting as co-designer they take a risk to pay a product which they never see before and may not match with the needs of the customers. Piller (2005) called this situation as "mass confusion" and this phenomenon can grow out from two issues burden of choice and information gap regarding the behavior of manufacturer. Burden of choice is not only a subject of mass customization but also it is an issue for all shopping experiences. The researches has shown that when consumers are subjected to many options they can use these option as freedom for themselves to show their preferences or they can find it too difficult to manage and give up. Especially when the subject is "fitting" of the self-designed product many customers are confused to express their personal needs and have difficulties to realize the final product. Regarding to information gap between customer and the behavior of the manufacturer there are question marks for the customer. Firstly customer should pay for something he has never seen before and even to get this product will last days, generally weeks. Secondly, he may not like the self-designed product in this case returns and the limits of the returns are so variable. Moreover it is difficult to decide also for company in which aspect the decision of return should be accepted. Such uncertainties can be considered as transaction costs and they naturally affect the decision of the customer. Consequently customers will continue to buy self-designed products only if they have positive perceived value. That's why it is so important to create optimal range of customizing options within the solution space for the companies. Related to these two aspects there is another issue may affect the customization experience, low customer trust for the transactions. Many mass customized product manufacturers miss establishing trust building activities for the issues of mass confusion and consequently customers choose standard products without such risks over customized products (Piller, 2005).

2.3. Enablers of Mass Customization

There are market based (external) and organizational based (internal) factors that affect enabling of mass customization application. External factors are customer demand and market conditions. Customer demand should exist for customized products and the balance between customer's willingness to pay and wait for self-designed products and producer's capacity to produce and deliver the self-designed product in acceptable time period (Da Silveira et al., 2001). Moreover, as previously mentioned the greater customer insight to his preferences affect positively the customization process (Fogliatto et al., 2012). Another external factor is market conditions should be adequate which means it is important the timing to launch mass customization. A first-mover company will be received as innovative and customer-driven (Da Silveira et al., 2001). Furthermore in any case companies should improve their mass customized products in terms of cost and quality comparison to existing mass products like that they can stay competitive in front of the mass customization applicators and mass producers (Fogliatto et al., 2012).

Readiness of value chain, availability of technology, customizable offer and knowledge studies are the internal factors that influence mass customization implementation. Mass customization should be evaluated as team work, suppliers, distributors and retailers play an important role to produce and deliver the self-designed product in acceptable time period that's why it is important to have well-organized value chain for mass customization operations. Manufacturers, retailers, suppliers and distributors should work together efficiently in an information shared web (Da Silveira et al., 2001). Recent studies show that there is proven effect of implementation of mass customization across value chain and integrating the supplier to processes (Fogliatto et al., 2012). Availability of technology is another important internal factor to implement mass customization processes. Advanced manufacturing technologies, flexible manufacturing and rapid manufacturing have enabled the application of mass customization systems and information technology across value chain is also fundamental to implement mass customization successfully (Da Silveira et al., 2001). Especially, considering today's mass customization implementations many of them based on web-sites and it is important to have capable information technology (Fogliatto et al., 2012).

Frutos et al., (2004) stated that: "mass customization information system should support following points; registering projects changes, assessing manageability of changes depending on production program and design, computing the price of a customizable product, recording the information in production program and design documentation and screening real information about production program." There are some requirements of the information technology system of the mass customization implementations. Firstly, companies should offer friendly, flexible and open system to the customers to ease product development for the customers. The infromation system of the company should be able to record customers' needs and attractions and transfer them into a knowledge to be used for the future products. Regardless of geographical location and time-zone product design process should be reacheable and any suggestion, idea by the customer should be taken into consideration.

Lastly, a supplier or a customer should be free to participate mass customization manufacturing network (Frutos et al., 2004).

2.3.1. Produt Characteristics

Products should be flexible, adaptable, modularized and constantly renewed (Da Silveira et al., 2001). Addition to customizability of the products recent studies focus on activities to facilitate customer choice and enable delivery. Examples for facilitate customer choice can be; presenting choice by feature, pricing for full configuration instead of module by module and supplying more information to increase the demand and satisfaction of the customers. In order to guarantee delivery there should be sales and support power by producer and also configuration tolls can be used to optimize customer preferences (Fogliatto et al., 2012).

Producers should not forget that mass customization is evolving quickly by time and they have to keep themselves up-to-date. New customer demands should be transformed into new services, new products and product features and in order to succeed this goal companies should create knowledge trough customers. Dynamic networks with the support of manufacturing and engineering knowledge and production and development of new products inside the company will help creating and distributing the knowledge (Da Silveira et al., 2001; Fogliatto et al., 2012).

Knowing these aspects would be a good start for a company which wants to start mass customization implementation. Mass customization cannot be a best strategy for all the companies, markets and customer types. There is complexity inside mass customization application which contains product arrangement, value chain network, information technologies and creation of knowledge-based organization (Da Silveira et al., 2001).

2.3.2. Production System Capabilities

There are some special manufacturing strategies that allow producing mass customized products in an acceptable time period and with quality. There are four main business practices about mass customization: agile manufacturing, supply chain management, customer-driven design and manufacture and lean manufacturing (Da Silveira et al., 2001).

Agile manufacturing is a manufacturing system which can respond changing, unexpected customer preferences quickly. It depends on usage of changing environment in a efficient way. Agile manufacturing focuses on delivering value, collaborates to improve competitiveness, created up to manage change and unexpected. It has two dimensions internal and external, where internal means answering market and customer demands quickly which needs re-programmable, re-configurable, changeable production systems that also are able to produce small lot sizes; instead external agility linked with virtual enterprises which have features as product orientation, team-collaboration, short term relationships between

individuals, speed and flexibility. Flexible manufacturing is able to adapt itself to changes, the adaption occurs after the change instead in agile manufacturing the system is already ready for the change (Da Silveira et al., 2001). Lean manufacturing is another important strategy for mass customization which consist of four elements according to mass customization literature; product development, the chain of supply, shop floor management and after sales services. In mass customization processes it is important to understand value creating processes and make them as efficient as possible (Da Silveira et al., 2001). Recently also it is discussed to mix the lean and agile manufacturing in order to serve customers timely and efficiently (Fogliatto et al., 2012).

2.3.3. Supply Chain Readiness

As it was stated before, besides product structure and production capabilities, supply chain configuration and characteristics has an important role in successful implementation of mass customization. Supply chain management is about co-ordination of resources across the value chain in order to supply competitive advantages. It can be obtained by developing interconnected information network with suppliers, having low stocks but at the same time high delivery, adding suppliers to design of innovative products, achieving cost efficiency by delivering right products to right customers in correct time (Da Silveira et al., 2001).

In mass customization execution mainly there are three actors; company, customers and suppliers. Naturally all these actors have specific roles trough value chain. Customization process starts with customer who expresses his preferences and while customer is in decision phase there is important role of the company who has defined before the solution space according to its capabilities and how supply chain is managed by company. In some cases supply chain can be involved to determination of the feasibility of the product requested by customer. The price of the product can come or each step of customization or after customization is completed. After this point company should assure the customer about delivery time and cost of the product and related services. Following determination of conditions customer can accept or reject doing the transaction (Frutos et al., 2003).

According to recent studies the role of supply chain is getting more and more important in mass customization. Companies started to focus on their core capabilities rather than majoring on owing upstream suppliers and downstream buyers consequently supply chain is evolving into more important point of mass customization. When a company decides to switch mass customization it affects also the external relations of the company such as its collaborators in supply chain since the company needs collaboration of strategic suppliers to provide customized products in an acceptable time period and quality. Moreover the mass customization network should be considered dynamic according to fact that the processes should be quick enough to respond highly variable customer demands therefore in this point there is high meaning of supply chain. (Blecker et al., 2006)
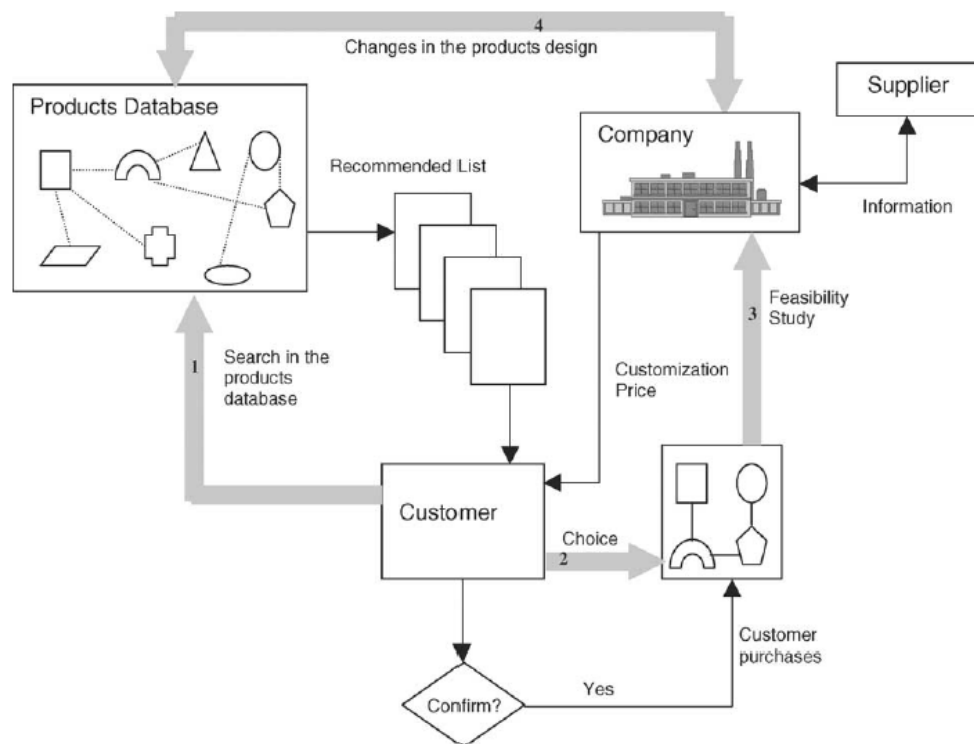
Figure 2. 1. Customization Process (Frutos et al., 2003)

The strategic decision of moving to mass customization is generally made thanks to supply chain capabilities. The change affects internal operations as design of the product such as figuring them according to customizability level and process flexibility which gives chance to produce products in a mass scale and as quick as possible but at the same time certain operational adjustments should be done in order to have materials which depend on variable customer-chosen preferences (Blecker et al., 2006).

Effective selection of supplier selection for mass customization is a must because supply chain adjusts and optimizes performance of upstream, middle stream and downstream supply chain. Supplier selection is varying according to the way companies apply mass customization (Mukherjee et al., 2009). According to Cheraghi et al., (2004) the most important factors to choose supplier are; price, quality, technical knowledge, e-commerce, performance history, service, adaptability, financial stability, reliability, size, reputation, flexibility, environmental responsibility, lead time, specialization, customer service, quality standards, communication, technology and long term relationship. Mukherjee et al., (2009) carried out a study exactly how to choose supplier in mass customization industry. They evaluated the supplier selection criteria according to four different supply chain strategies; Make to Stock (MTS), Assembly to Order (ATO), Make to Order (MTO) and Engineer to Order (ETO). Degree of customization level is getting lower in following sequence; ETO, MTO, ATO and MTS. In the case of ETO and MTO where mass customization degree is high it is found that technical capability, delivery, capacity and cost issues are the most important priorities to choose supplier (Mukherjee et al., 2009).

Another important point about supply chain in mass customization is trust between manufacturer and supplier. According to empirical studies in the literature information share between manufacturer and supplier has positive effect in mass customization industry. It is necessary to create information flow in ongoing coordination of information between associated operations and knowledge sharing in product development and quality improvement. Information flow in mass customization helps reducing inventory costs, improving product variety and improving responsiveness. Moreover financial information sharing increases manufacturer's strategic integration with the suppliers. Liao et al., (2011) made an empirical study on the two hypothesis they constructed trough literature research "(i) Freer information sharing between manufacturers and suppliers leads to greater mass customization" and "(ii) The greater the mutual trust between manufacturers and suppliers, the greater the freedom of information sharing between manufacturers and suppliers". For the empirical study they contacted 208 USA and China based companies working on product design, manufacturing process, logistics, quality and finance. In the study always the bidirectional trust is considered and it is found that the more information share in design, processes, logistics and quality management the better mass customization capabilities. However it is proved that high trust in financial information share is not valid for all the companies. Still companies tend to not share financial information due to pricing issues (Liao et al. 2011).

In order to make advantages in delivery time, product quality, reduction in costs and successful product launches supply chain integration has an important role. The stage of supplier integration and its responsibility, from simple consultations to full responsibility of suppliers, can vary from strategy to strategy. However early supplier involvement to new product development is considered as key point for robust supply chain, product and process design (Peterson et al., 2005).
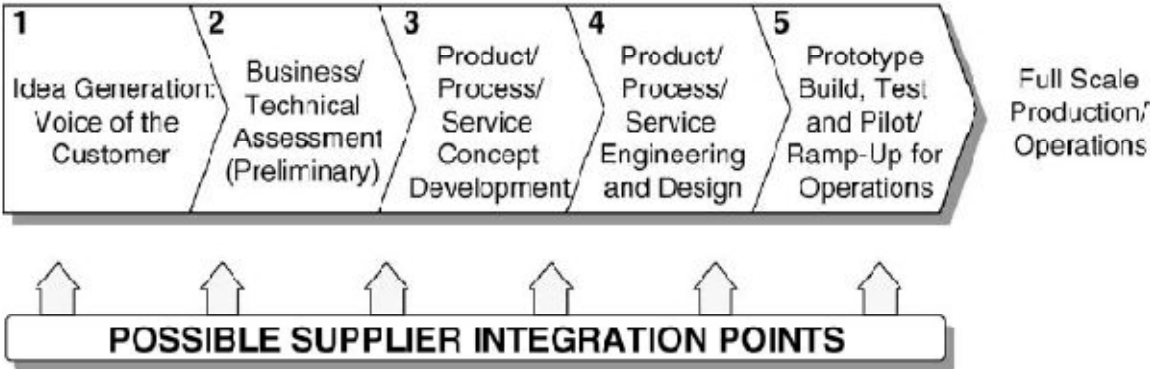
Figure 2. 2. New Product development process (Peterson et al., 2005)

None	"White Box"	"Gray Box"	"Black Box"
No supplier involvement. Supplier "makes to print."	Informal supplier integration. Buyer "consults" with supplier on buyer's design.	Formalized supplier integration. Joint development activity between buyer and supplier.	Design is primarily supplier driven, based on buyer's performance specifications.

Increasing Supplier Responsibility

Figure 2. 3. Spectrum of supplier responsibility (Peterson et al., 2005)

According to empirical study of Peterson et al. (2005) following findings are obtained respecting to supplier integration to new product development and its level of responsibility. Regardless of the stage where supplier integrates and its responsibility trough value chain to new product development, choosing right supplier with enough capabilities and right cultural match affect positively whole team work and product development process. When it is time to manage technical performance objectives there is positive effect of involving supplier regardless of the integration stage but considering higher levels of responsibility. Therefore it is important to choose suppliers according to their product and process knowledge. Thanks to improved team effectiveness obtained by choosing most suitable supplier with necessary technical background improves financial and design performance of the firm. Additionally it is proven that the early stage integration of the supplier to product development increases the effectiveness of the team (Peterson et al., 2005).

As it is mentioned before in mass customization creating product family consists of products which are sharing the same components/parts is an important strategy. There are some characteristics of the supply chain for the product family. Firstly components with similar functions, structure or technology flow together. Standardized parts are made to inventory instead customized parts are made to order. Standardized component demand can be calculated for long term in order to balance the uncertainty coming from demand for customized parts and product differentiation should be done as late as possible. Parts should be ordered in small lot sizes and re-order period should be shorter. It is necessary to have great cooperation between manufacturer, first and second level suppliers in a way to give quick response to orders and guarantee customer satisfaction (Wang et al., 2007).

Supply chain of mass customization firm requires high flexibility due to unpredictable customer demands and this makes complicated the relation of supply chain cooperators and causes disagreements, at this point supply chain scheduling should be optimized in order to obtain maximum capacity and quality. Yao et al., (2009) developed a dynamic, multi-objective mathematical optimization model based on optimizing contradictions such as satisfying variety of customer demands by organizing orders as general, special and rush based on time threshold and diagnostic profit preference decision of supply chain cooperators in order to solve the problem between production time and cost and burden of extra inventory in the supply chain (Yao et al., 2009).

Fogliatto et al., (2012) divides mass customization processes into four stages; order elicitation, design, manufacturing and supply chain coordination. Order elicitation stage is to support customer involvement to mass customization process. In order to ease customer involvement to design, several studies carried on decision support systems, artificial intelligence, data mining techniques, clustering and dependency analysis. Under design stage there are postponement and product platforms. The point which customer can affect design process is called the order penetration or decoupling point. This point can occur in demand and supply chain in five points, customer, retailer, assembler, manufacturer and supplier. Decoupling point due to manufacturer and assembler stage can be performed trough product platforms and modularization. The component commonality and variety is fundamental when the product platforms are designed. In retailer level decoupling can be managed trough postponement. There are two types of postponement in the literature, time postponement which implies make to order approach and form postponement which shifts the differentiation to downstream of supply chain. In terms of manufacturing, mass customization enabling points are still under construction. In literature studies related to process planning, cost minimization procedures and pricing are still in the discovery phase. Moreover also supplier integration to mass customization processes another important subject which is started to be analyzed in recent articles. There are some ways to improve supply chain integration to mass customization such as decoupling, postponement and supply chain scheduling. Especially location of the decoupling point inside the supply chain is really important for the mass customization realization (Fogliatto et al., 2012).

2.3.4. Knowledge Management and Information Technologies

The manufacturing technologies facilitate mass customization are advanced manufacturing technologies such as computer numeric control and flexible manufacturing systems, and communication and network technologies such as computer-aided design, computer-aided manufacturing, computer integrated manufacturing and electronic data interchange. Such technologies are indispensable from mass customization because they bring agility and flexibility. Wide usage of such technologies supplies a connection between work-groups such as design, analysis, manufacturing and testing and moreover reduces the time to respond the customer (Da Silveira et al., 2001). Additionally, recently there are studies on 3D

laser scan with computer-aided design systems especially in the sectors clothing, garment and shoes for virtual design and/or fit testing (Fogliatto et al., 2012).

Finally information technologies are also one of the must-haves of mass customization. Information flow between customers and manufacturers shapes the self-designed products. The manufacturer characterizes the extent of customization and customers chose their preferences in order to realize the product. The link between manufacturers and customers follows this sequence; defining a catalogue of options available to customers, collecting and storing information on customer choices, transferring data from retail to manufacturer and converting customer choices into product design features and manufacturing instructions (Da Silveira et al., 2001). Almost all sectors applying mass customization adopted information systems during the last decade. The function of information technology in mass customization can be explained in two points; firstly it lets customer make their orders correctly, second it collect information about customer preferences and construct a database for future uses. Information technologies in mass customization allow manufacturers to create a platform where they can integrate customers to design process. In last decade mainly product configurators are used to make customers collaboratives/co-designers (Fogliatto et al., 2012).

Salvador et al., (2009) stated that "There are three capabilities are required for mass customization realization: identifying the product attributes along which customer needs diverge, reusing or recombining existing resources and helping customers determine or build their solutions.". Together with supplier integration, in next sections there is close look to these points.

Implementers of mass customization need to know exactly the customer preferences, catch the balance between product variety and performance, work out on the offerings proposed to customers and try to keep the prices of customized products in the level of mass products. A mass customizer's ideal state is highly depend on the balance between three criteria; solution space development, robust process design and choice navigation. All these three capabilities are needed to develop together. A firm presents variety of options without capable production technologies goes failure easily, moreover offering more and more components and eventually products cause increase also in processes and consequently negative effect in economies of scale (Salvador et al., 2009).

Companies should try to get over the problems sourcing from following areas: (i) Marketing Focus; traditional marketing approach is not about spotting the difference but catching the similarities however marketing in mass customization should be about finding the points make difference between customer preferences. In this section the most common error is presenting variety of choices without examining deeply what should be real offering and imitating offers of competitors. (ii)Design Culture; in mass production the important point is creating differences between the products but minimizing the cost of ad-hoc parts however in mass customization it is important to create synergy between products at the same time

keeping the differences without forgetting coherence with solution space. (iii) Accounting Procedures; the cost of different components and processes should be taken into account because it is easy to lose control while providing variety. (iv) Investment Criteria; manage should understand that the fixed assets they have invested in the past may not work in mass customization. (v) Value-Chain Constraints; existing value chain, current relationship with suppliers and distributors may not work for mass customization so they are needed to be revised for mass customization processes (Salvador et al., 2009).

In mass customization there is no magic rule that every company could follow. Instead every firm should "customize" their mass customization strategy according their customers' preferences with continuous improvement in three points mentioned before, solution space, robust design and choice navigation. Solution space should be in line with production system and options introduced to customers need to meet their real preferences (Salvador et al., 2009).

2.4. Success Factors of Mass Customization

2.4.1. Solution Space Development

According to Piller et al., (2009) the most important building stone for a company that wants to apply mass customization is to identify what are the distinctive needs of the customers which is a issue completely opposite of mass production thinking. In mass production producers want to target the customers according to their similarities instead in mass customization the product features which customers want to differ most are important. When the points of diverge are determined the firm could define its borders clearly (Piller et al., 2009).

However, solution space development is not easy to develop because it is directly related with customer perception of convenience of the self-designed product and also it affects the downstream processes in the implementation system. Although solution space development has high importance in literature there are still scarce sources. The recent researches show that companies started to mass customization past this phase without planning detailed (Salvador et al., 2009).

In terms of product/service development customization value can be created trough three options; the fit (measurements), the functionality and the form (style and aesthetic design) of the offer. Customer match his demands trough these three general dimensions and via these dimensions different customer demands should be obtained. Here is where solution space important because solution space should express these dimension in which differences between customer preferences show importance (Salvador et al., 2009).

The fit option can be evaluated as the starting point of customization because in mass production the offerings are general and customer should fit to offering instead in mass

customization the customer define his preferences. Examples to fit can be body measurements or dimensions of a room or other physical objects. Although the fit option of customization is the one which is most difficult to manage, better fit is the one of the strongest offering of mass customization. The reason why the fit dimension is the most difficult aspect of customization to achieve is that the product should be changed completely according to new measures which require redesign of the product and flexible product architecture which can be expensive (Salvador et al., 2009).

Functionality dimension of mass customization allows customers to choose the performance they want from the product. It can be speed, precision, power, cushioning, interfaces or similar other similar technical characteristics that are easier to provide option due to evolving software content of many products nowadays (Salvador et al., 2009).

Form dimension of mass customization refers to style and aesthetic design of the products such as selecting colors, cuts, flavors which many customization applications rely on. This dimension of the customization is relatively easier to apply because there are more developed manufacturing technologies regarding the outer design of the products (Salvador et al., 2009).

After analyzing the dimensions of the customized product the most important scope of the company is to understand which of these dimensions are most important for their target customers. There are three ways of understanding where customers are differentiating, and eventually create solution space. The first method is market research, second is using configurators for customer co-design and the third is learning from past experience. The market research is a widely used way to understand customer needs however in literature there is not an ad-hoc mass customization market research method yet. The market research for self-designed products can be done traditionally among the representatives of the targeted market via surveys about needs for the new product. Addition to the surveys, focus groups, analysis of customer complaints and conjoint analysis are used to classify customer preferences and purchasing decisions. Another option to create solution space for the companies is using configurator to let customers express their preferences. A company can collect a great data by allowing customers to express their preferences via configurators and can create its solution space from the submissions by customers. The results obtained by this method are accepted as very reliable since uses information from very heterogeneous customer group. Third method is using customer experience intelligence which means following data on customer transactions, behaviors and experiences. Such information can be collected by log files produced by customers who use online configurators and a company can learn much information about customer preferences. Moreover a company can direct this information to redefine the solution space, develop or delete some options (Salvador et al., 2009).

Although creating solution space time consuming and expensive it is very important to validate customer preferences also in the long run company's solution space. It is important to

consider data from current and potential customers and solution space development should not be a single step instead it should evolve by time since customer needs/preferences change by time company should keep its solution space up-to-date (Salvador et al., 2009).

2.4.2. Robust Process Design

Mass customization implementers need advanced production capabilities in order to produce self-designed products in an efficient and reliable way. There are two important cost drivers in mass customization, applying high flexibility in manufacturing and differentiating customer preferences. The factor of having high flexibility of manufacturing system is an important issue however if a firm cannot balance the trade-off between variety of the products and the productivity there is no meaning of using advanced manufacturing technologies. The preferable manufacturing system in mass customization should be able to translate customer preferences into product cheaply and quick. After fixing a solution space the next and important step is creating adequate manufacturing facilities where elicitation process of mass customization takes place. In mass customization it is important to have both capable manufacturing system and sufficient information system to convert customer preferences to real products (Piller, 2009). In literature there are studies about production technologies and strategies in order to realize mass customization processes such as flexible manufacturing systems, process and product modularity, postponement and adaptive human resources.

Flexible manufacturing system is a manufacturing technology which is able to change in work orders, production schedules and tooling. Regarding to these characteristics of flexible manufacturing system is considered as effective and it can produce different kind of products in mass volumes with convenient economies of scale. Nevertheless it is not possible to do structural modification in flexible manufacturing systems (Dong et al., 2012). Recently, flexible manufacturing is largely used in automotive industry which let manufacturers produce products with high level of versatility and customization. Moreover even process industries such as pharmaceuticals and food also use flexible manufacturing where they can take advantage of small batches and flexibility. In addition to tangible good also intangible products are fit to flexible manufacturing solutions mainly based on internet (Salvador et al., 2009).

There are two types of production system for mass customization differentiated according to source of flexibility; first flexibility in processes trough process modularity and second flexibility in product design trough product modularity (Blecker et al., 2006). Process modularity is a production technology which can be achieved by re-combining process segments which is connected to specific source of variability in customers' preferences therefore ad-hoc solutions to customers or changing customer needs can be provided (Salvador et al., 2009). One other close approach to process modularity is reconfigurable machining system where manufacturers can obtain quick responses in cost-efficient way. Reconfigurable machining system can be adapted quickly to changing capacity requirements and product changes and moreover this is system is suitable to upgrades. There are some

distinctive features of reconfigurable machining system; (i) modularity, can be separated into three types slot-modular, bus-modular, sectional-modular architectures, (ii) integrability which implies system's openness to new technologies, (iii) convertibility, easiness to adaption, (iv) diagnosability, system can identify sources of problems easily and (v) customization, ability of matching with applications (Dong et al., 2012). Modular product architecture is achieved by increasing the common levels among products but at the same time maintaining the product variety (Watcharapanyawang et al., 2011). The use of the same component more than one product in a product family is called as component commonality. Such type of product architectures make an advantage as offering high variety of products in the market but using low variety of products in operations (Blecker, 2007). In this type of production designers should determine common production components both in same and different modules. Common platform and modularity can be deployed to decrease the production complexity in mass customization processes. Moreover by applying this method helps decrease in inventory (Watcharapanyawang et al., 2011). Becker (2007) defines component commonality as "The extent to which the variations of a product family can be produced around the same components, it is more appropriate to assign commonality level to a product family than to try to distinguish between common and uncommon components on the basis of subjective criteria". He separates the commonality into two; in product level commonality and between the products commonality. Use of common components affects the cost, quality, economies of scale and lead time of product development in a positive way and at the same time decreases the complexity (Becker, 2007).

Another approach in mass customization processes is postponement which means the delayed product differentiation. This approach can be achieved by producing standard products until a pre-determined point then differentiating them according to different customer preferences. This method is also related with component commonality because first part of the products is generally sharing the same components. The same benefits than component commonality also obtained in postponement, it improves quality, economies of scale and reduces inventory costs and lead time (Salvador et al., 2009).

Finally it should be mentioned that even the most flexible technology cannot give the flexibility obtained by human resources. Just an adaptive human capital can respond sudden, unexpected changes or failures. As a result mass customization firms should invest to adaptive human resources. Not only the current problems also for the future predictions human resources are needed because the machines cannot be planned simply for the future there is need of managerial planning. Moreover the workers in mass customization firm should be trained and flexible, they need to concentrate themselves analyzing customer needs and delivering tailored solutions (Salvador et al., 2009).

All in all, realization of mass customization is only possible with the support of suitable systems enabling customers as co-designers (Piller, 2009) in next section there will be choice navigation and following product configurators.

2.4.3. Choice Navigation

A mass customization firm must be able to support customers in creating their preferences by reducing the complexity and burden of choice. When a customer finds so many options it can create a problem such as evaluating these choices could destroy the benefit of having options and eventually there can be problem of paradox of choice which causes reduced perceived value by the customers due to complexity of decision. Moreover this situation may lead that even customer can categorize the firm as difficult and inconvenient for further shopping experiences. In order not to create such an undesirable customizing/shopping experience mass customizers should optimize their choice navigation (Salvador et al., 2009)

Piller (2007) explains the variety paradox with a simple empirical test: In a supermarket customers are exposed to two baskets of fruit, one of which has 6 different kinds of fruit and the other 24. Customers are allowed to taste the fruits and 30% of the customers who are offered the box with 6 different fruits made the purchase on the other hand only 3% of the customers who are offered 24 variety made the purchase. Often excess variety results in external complexity and customers can be confused Piller et al., (2004) made an example of Chinese restaurant with the menu includes 500 options and they evaluate this approach overly positive if they expect to satisfy high numbers of customers with this menu. The higher the burden of choice the lower processing of human mind and finally lead to longer customization time.

In order to avoid creating complexity in choice navigation there are some approaches which mass customizers can apply. One of them called "assortment matching" which software automatically presents configurations for customers by evaluating their preferences that they inserted to their solution spaces. So that customers can have the options by saving considerable time and effort. However this method may not work all the time due to customers' real preferences ma not match the recommendation by the automatic system. Therefore there is another approach which consists of trial and error that consumers can try some combinations and check if they match with their preferences. This method is preferable when a customer does not have clear idea of the need. There is another case which can be evaluated more advanced comparison to previous options; products equipped with so-called embedded configuration capability. Such products can analyze actual needs by sensors, body scans, lasers etc and they can meet directly with the customer needs (Salvador et al., 2009).

However Dellaert et al., (2005) presented an opposite opinion with an empirical study about the number and levels of product modules which customers can customize. They explain the configuration terms as "the outline or arrangement of the different product components that can be customized." In the empirical study they carried out, the main focus is the product utility that they can obtain by using configuration of customizable products and the complexity that the customers receives in mass customization configuration in short how the mass customization configuration affects product utility and complexity. For the empirical

test they subjected the consumers to experimental mass customization interface for computer customizing. They presented following hypothesis; "(i)The product utility that a consumer can achieve by using a mass customization configuration has a positive effect on mass customization utility, whereas the complexity of using a mass customization configuration has a negative effect on mass customization utility" where it is expected that consumers give higher utility to configurator when it lets consumers to make higher product utility and give higher utility to simple configurator which reduce the decision effort. "(ii) The complexity of using a mass customization configuration has a negative effect on the product utility that a consumer can achieve by using a mass customization configuration" which explains complexity of configuration causes customers make worse choices. "(iii) The extent to which consumers can mass customize products increases the product utility that can be achieved by using a mass customization configuration and the complexity of using a mass customization configuration" Four factors that have different effect on product utility and complexity of configurator are determined. First, the extent of mass customization which can be fewer or higher which higher modules allow customers have higher different product composition possibilities but at the same time make customers move away from the real desired product. Second, heterogeneity of the levels where low heterogeneity offers similar module level as an example 18 or 19 inch screens or vice-versa. Third, individual pricing of customizable modules, which can be explained by option of showing the price of each module or the option presenting a total price for a product. Forth, availability of default version in such configurations where there are preselected options. "(iv) Increasing heterogeneity in mass customizable module levels decreases the product utility that a consumer can achieve by using a mass customization configuration and increasing heterogeneity in mass customizable module levels increases the complexity of using a mass customization configuration." Increasing level of heterogeneity affects product utility negatively and makes the decision process more complex. "(v) Individual pricing of mass customizable modules decreases the product utility that consumers achieve when using a mass customization configuration and individual pricing of mass customizable modules increases the complexity of using a mass customization configuration" Individual pricing makes consumers have clearer understanding of the prices of the each module but at the same time make them feel that they are losing money in every step and finally lead them choose with low quality components with low prices. Moreover it creates complexity in each step. "(vi) Offering a base default version leads to a higher product utility when using a mass customization configuration than does offering an advanced default version" Based on empirical studies when customers meet a configuration with base pre-selected values they tend to change them with the higher ones. "(vii) Consumer expertise decreases the complexity of using a mass customization configuration" Consumer with higher experience is expected have less complexity in mass customization experience. "(viii) The negative effect of complexity on product utility in using a mass customization configuration is weaker for consumers with high expertise than for consumers with low expertise" A consumer with higher experience has less probability to experience difficulties with complex configurations (Dellaert et al., 2005).

In order to validate these eight hypothesis Dellaert et al., (2005) developed a model which is capable to determine how mass customization configuration and customer

experience affect product utility and complexity and how they create mass customization utility. Key findings of the study are; first consumers did not give high reaction to elevated modules and module levels it means elevation did not create complexity. As it is expected high experienced consumers succeeded higher product utility with more complex configurators. However the study suggest mass customization applicators take care three points about options; level of heterogeneity should not be kept just in popular range otherwise it prevents product utility, second pricing should not be presented in module level and finally default version should be presented with base options (Dellaert et al., 2005).

All in all choice complexity should be shaped in a meaningful way in order to create new profit opportunities. According to recent studies it is found that customers are willing to pay more for positive perception of co-design process itself. Moreover even take a part in such a problem solving process may result a pride in customer perception. The co-designing process should be joyful and satisfactory by keeping the right balance between customer skills and the challenge he faces during the customization process. It should be considered by mass customization applicators that a successful self-designed product will create customer loyalty (Salvador et al., 2009).

There some ways to collaborate with the customers based on internet. According to nature of collaboration it can be broad or deep and according to stage of new product development it can be front-end which means ideation and concept and black-end which means product design and testing. Online surveys, market intelligence services and web-based conjoint analysis are in terms of collaboration high and used for ideation and concept product development. Deep collaboration for front-end stage includes suggestion box, advisory panels, virtual communities and web –based idea markets. Configurators for users' innovation, open-source mechanisms and web-based patent markets are back-end deep collaboration mechanisms. Finally mass customization of the product, web-based prototyping, virtual product testing and virtual product testing are broad collaboration and black-end mechanisms (Sawhney et al., 2005).

The role of information management in mass customization is divided into two types; it allows customers create their orders and it collects customer data continuously. Information technologies allow customers express their preferences (Fogliatto et al., 2012). The main method used in industries to navigate customer's choice in mass customization process is product configuration systems and in literature names such as choice boards, design systems, toolkits or co-design platforms can be found however they generally refer to software which guides user to elicitation process. Although the configurators do not have to be based on software, recently all known successful mass customization applications use software tools (Franke et al., 2002).

Thanks to mass customization now customers are integrated to design process, however it would be difficult to treat customers as design specialist in an industry where mass customizer operates. Therefore firms should offer a way to transfer design capability to users

and in this field there are two important points to be considered, the manufacturers repartition their main product from need-related tasks and they present design tool to let customers be part of customizing process. Developing a configurator is costly and difficult, once it is developed it will be used by thousands of people so it should be qualified enough to answer many different people's needs. Manufacturers should define their main product very well and convey only the need-related tasks to the customers (Von Hippel, 2001).

After setting a solution space of the production facilities, the design of the kit that customers will utilize in co-designing process is very important. This instrument will be the first touch of customers' to the mass customizer. Importance of the configurators for the mass customization processes can be explained in following points: Firstly if the customization process evaluated as successful by customers, it will create customer loyalty. Secondly it will be the instrument which is going to be able to reduce costs sourced from the co-designing nature. While participating the design process customers take the risk of paying a product which they have never seen and they will receive after days or weeks. This issue perceived as additional costs by the customers therefore in this case responsibility of the firms is create configurators which give description/images of the products as much as close to reality (Franke et al., 2002).

According to Franke et al., (2002), the configurator should carry these three characteristics: Configuration software where the customer can find the possible product combinations and guidelines trough configuration process with different design options. Feedback tool, which is representation of configuration tool it can be description as information, price, functionality etc or visualization of the product itself. Analyzing tools, which customer preferences are transferred to other departments such as manufacturing by means of specific order list, construction plans and work schedules (Franke et al., 2002).

There is a wide range of configurators in the market today. Some of them offer just simple changes as color, size and some of them offer higher degree of customization. According to degree of offerings the possible innovativeness of co-designers changes as well (Franke et al., 2002). Franke et al., (2003) made an empirical study on satisfying heterogeneous needs of customer with innovation configurators. There is a great heterogeneity in customer needs and with the current products in the market it is difficult to satisfy every customer. That's why manufacturers tend to assist the customers design their own products with configurators for innovation. They carried out a test over a web server software which responds the security needs of the users. Their key finding after an empirical work that heterogeneity of the user need raises the willingness to pay for the products fit better individual needs. Moreover user with higher technical skills showed more satisfaction while modifying the software (Franke et al., 2003).

Von Hippel (2001) proposed five main objectives that can be obtained by usage of effective innovation configurators. Firstly, "learning by doing via trial-and-error", studies show that trial and error is a method of learning by doing. In an effective innovation tool

should let customers try it before buying it and the best modifications could be done by only the end users. However this option could be offered easily by for example software customization companies however it is almost impossible a customized car provider allow test the car before buying it. Second is the "appropriate solution space", mass customization providers should offer products only that they are able to produce with their existing production system in an acceptable time and price range. Their solution space can be large generally if they are the producers of basic and general-purpose building blocks and operations; however solution space of the firms is relatively smaller when they are the provider of special purpose products. Furthermore the solution space is highly depends on the product that for example in case of eye glasses there is no more option other than frame, glasses and hinges. Next is being "user-friendly" of the configurators, which can affect the success of the customization process directly. It should be clear enough without any requirements of learning computer languages etc. Naturally there can be some programs which are directed to expert usage can require some specific expertise in using it. Afterwards, existence of "module library" which means presence of some pre-made parts of the products that allow users choose directly without developing them or different pre-combined components which customer take as an example or starting point. Final objective is "translating user designs for production", mass customizers must have a configurator that can convert customer needs to real products without any errors and problems (Von Hippel, 2001).

There are some points in configurators that eventually lead to customer satisfaction. There is high relationship of product quality and its retail outlet therefore configurators can be considered as outlet of the self-designed products so it needs to provide experience that meet customer expectations. Other important factor is mass customization firm does not offer a final product but offers a solution capability that's why successful customization process is important for the customer satisfaction. Furthermore it is found that skill and challenge experience during customization has positive on customer satisfaction. Franke et al., (2002) hypothesizes personal characteristics like creativity, innovativeness, need for individuality have effect on satisfaction but there are still not answered question about customer satisfaction and configurators (Franke et al., 2002).

All in all the issue that configurators are not for all the users should be taken into consideration. In order to attempt using configurators customers needed to be innovative enough and they need to differentiate their preferences. Users are satisfied with the default version of the products will not tend to use configurators. The customers who have benefits from configurators are lead customers and they do not represent majority of the consumers. Finally mass customizers should take advantage of these lead users and they can use their preferences in developing mass products (Von Hippel, 2001).

2.5. Mass Customization in Footwear Industry

Footwear industry in general do not pay attention the real needs of customers, the shoes are made to stock then be sold to customers, just in some cases there can be minimal

extensions in variety however always group of customers are targeted rather than individuals. However in the last decade the examples of mass customization applicators are increased in footwear industry and different types of applications are observed. Soft customization when customer gets in touch with the company in retail point and this is an example of match to order/locate to order/bundle to order, where different products are clustered regarding to different usage purposes. Hard customization is the case of assemble to order which is matching the pre-produced parts of the shoes according to customer preferences but also there can be made to order and development to order styles which are; components are manufactured up to customer's specifications and involving customers from the very first step to let them be co-designers relatively (Boer et al., 2007)

The customizable dimensions of the shoes are (i) style/aesthetics, (ii)fit/comfort and (iii)function/performance.

- Style/aesthetics: Comparison to other dimensions managing style/aesthetics are easier to customize. Customers choose their preferences among the company's pre-defined offerings. This is the basic shoes design.
- Fit/comfort: This dimension is more difficult to manage it can involve size width, design of upper insole and outsole and the materials used in fabrication. It depends on individual needs of consumers that they can wear comfortably it does not depend on simply the sizes available in the shop.
- Function/performance: It is about optimizing shoes' dimensional parameters, construction technique and materials in order to be in line with customers' shoes usage intensions such as walking, driving etc. Furthermore for professional athletes there can be further options related to function. (Boer et al., 2007).
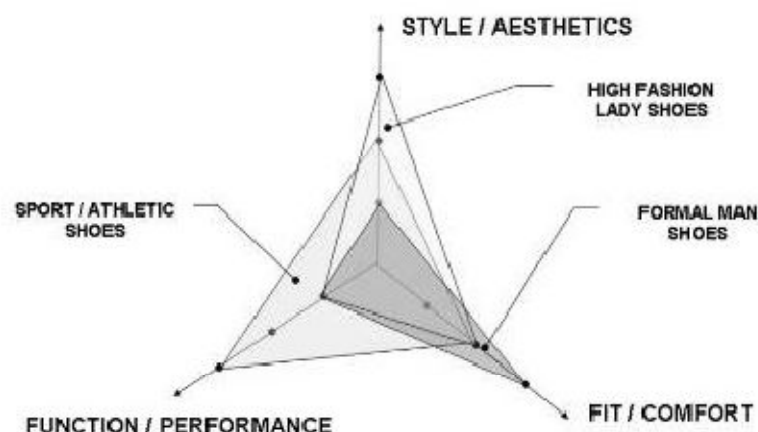
Figure 2. 4. . Three vectors of mass customization in footwear industry (Boer et al., 2007).

Evaluating these aspects customization level of the shoe can vary as style customization; choosing options such as colors fabrics, accessories offered by manufacturer with standard sizes and widths, best-matched fit; feet of a customer are examined with the special devices and production of the shoe according to exact fit with standard style offerings or also with style customization, custom fit; producing the shoe according to customers' specific habits. All these levels have specific cost effect on sale, design and manufacturing. Style customization has low effect on manufacturing because only aesthetic of the parts of the shoes are changing, however the increase in variety and consequently combinations brings extra cost on design and sales. In the case of best-matched fit to style customization all the aspects get affected. Design department needs to work on not only the aesthetic aspects of the shoe but also new sizes and lasts. Moreover manufacturing gets more complicate due to ore variants and finally also sale side has more work to do as managing foot scanners or training retail personnel about the devices and different customer needs. Custom fit in combination with style customization has also dramatic effect on all the areas. The more complex gets the shoe, the higher technology needed. Design will be affected by the need of designing new functions, the manufacturing needs to provide new technologies with enough flexibility to deal with almost endless virtual offerings. Moreover high technology requirement will affect sales outlets. All these variables bring cost changes and finally higher price comparison to mass production shoes. However according to market researches, there is a group of customer who is willing to pay up to 20% more for the shoes which fit their preferences. In addition, careful analysis of the value chain, the customer needs and the company's appropriate solution space could bring cost save-ups eventually higher margins or more suitable prices for the customers (Boer et al., 2007).

There are four main motivations to push mass producers to mass customization application. Firstly day by day competition between textile and fashion brands are increasing, also it is possible find low cost products everywhere coming from Far East. Second, demands coming from customers are so different than each other. Next, customers are seeking for combinable products and services. Finally globalization increases the competition. Nowadays it is easier to enter new markets thanks to developing technology and low trade barriers (Redaelli et al., 2006).

Moreover there are some evolving trends related to footwear industry which make manufacturers think mass customization is a good solution for the future of the company. Customers are generally not satisfied about the fitting problems of the shoes, especially the number of the customers who search for custom sizes are really high. Also there are complaining about quick worsening of the some parts of the shoes. Especially regard to aesthetic aspects customer preferences are changing a lot, good fit, availability and high quality of raw materials are in the first place of characteristics that are looked for. Not only people who are trying to create difference, be marginal but also people with serious feet problems are interested in shoe customization. However still mass customization applicators should solve efficiency and effectiveness problems related to production, flexibility, poor customer services and work on marketing tools. Main barriers in implementation of mass

customization in footwear industry are; lack of technology and retailer cooperation, unpredictable customer behaviors and their different purchasing habits (Redaelli et al., 2006).

Pandremenos et al., (2011) developed a model which enables many actors such as customers, suppliers, shoe designers, retailers, engineers etc. to collaborate designing a new shoe. It is an online facility that let all the actors meet and add something from themselves consequently do business together. Such a program allows participants do comments, introduce new materials or patterns and create 3D models of the shoes. Additionally it calculates cost and time for all the new shoes models. Undoubtedly, these technologies will evolve and create new opportunities for the future of mass customization.

Finally, during the last decade, international sports shoe industry got affected by innovative variant management. The biggest brands as Adidas, Nike, Reebok and Puma do not do their own manufacturing but they use outsourcing and more interesting also from same suppliers. They are all good at following/presenting market trends, supply chain management, lean manufacturing but all these capabilities in today's world are not enough. New low cost brands are threatening them to take their throne. Furthermore increased purchase power of the customers makes them ask for more individual products. As a result firms faced to the risk of planning and producing more up-to-date products but at the same time have the risk of overstock of products which are not sold up to fast changing trends. At this point it is really sensible to change production from made-to-stock to made-to-order. Adidas management board has decided to implement mass customization relying on this logic. Now they are one of the most successful mass customization implementer in footwear industry in all over the world (Berger et al., 2003).

2.6. Benefits and Challenges of Implying Mass Customization

Fundamental benefit of the mass customization implication is that it differentiates the company from its competitors. It integrates customers to design process in early stage therefore company react changing customer preferences quicker. A firm can replace the traditional fashion cycle with continuous flow of new products and models. Customer participation to design process brings innovation. Instead of getting lost with market researches, surveys company can get what exactly customer wants directly from customer itself. Given that customers design by their own company will have minimum risk of failure regarding to fashion (Berger et al., 2003).

Mass customization strategy offers complete product differentiation so that a mass customization implementer can race better on price, quality, flexibility, delivery and service. Especially when the production system is modular there is improved quality and agility moreover cost advantage trough order processing. Order communication is not time consuming and direct touch of customers gives very reliable data of them for the future applications (Kumar, 2004).

In mass production firstly company needs to do product pay for the cost and then when they sell, they are paid for it. Instead in mass customization there is negative cash flow, postponement in the cash flow, which there is chance to delay some activities until the order s set. Firstly customer pays for the item then company produces the item which is also benefit of cost of inventories. Mass customization minimizes the risk of forecasting errors (Berger et al., 2003).

Wind et al., (2001) analyzed the potential benefits of mass customization in customer and firm aspect. For the customers mass customized products mean better fit for their needs and solution of their problems. Additionally they create difference trough their self-designed products. For the firms additional to the points above, it is the best way to protect their products' rights. The companies can organize the operations and logistics in a better, faster and more economic way. In the case of they hold right economies of scale they can obtain higher margins. Once a customer is happy about the customized product it creates loyal relationship with the brand/company. It stimulates continuous innovation thanks to continuous market information flow.

Undoubtedly, the benefits of mass customization enable firms to race with the competitors. However every organization does not benefit from mass customization. There are still great challenges in front of mass customizers. The challenges came from two channels; internal which is about to company's operations, problems related to increased product options and external challenges which is up to uncertainty coming from customers' actions. Internal problems are generally caused from variety of the products and related production difficulties. It affects negatively the cost of operations and causes slow production of the customized products. Externally, customers are not well-informed about their preferences, they have little information about the products and moreover little processing capacity to configure them out (Blecker et al., 2006).

Some firms have had problems with identifying intangible dimensions of the products. Sometimes providing an option like size of the shoe could require also providing the option of width. A firm who is promoting their products with perfect cannot ignore the tight or loose fit options. Moreover high customer expectation from self-designed products can bring the firm to failure. If company lacks a problem solving centre or customer assisting option customer can get confused. Moreover in mass customization customers are paying for the products that they have never seen before while accepting relatively longer waiting time also this point can make expectations higher. Additionally companies should manage very well the variety of options, excess of variety can cause "shut-down" in human psychology. Another important issue is pricing; customers may not be always willing to pay price premiums (Wind, 2001).

2.7. Critical Analysis

In mass customization literature still there is a lot of confusion and not answered questions. Firstly there are many definitions of levels and approaches of mass customization.

Lampel and Mintzberg (1996) defined five strategies for mass customization according to customization degree, Ross (1996) also defined five approaches according to degree of customization but with different names, Spira (1996) divided into four according to distinct types, Gilmore and Pine (1997) separated into four levels according to customization degree of the products, Piller (1998) classified mass customization levels according to where customer involvement happens, Alfrod et al., (2000) evaluated according to changeable parts of the products and divided into three, Duray et al. (2000) evaluated mass customization according to point of customer involvement and there are four groups, finally Da Silviera et al. (2000) analyzed all the works and created eight levels of mass customization. Moreover about definition of mass customization also there are still many proposals and these proposals are not helping to define borders of the mass customization term. In my opinion the definition, levels, approaches, customer involvement points and strategies of mass customization should be created in unique way in order to make future works more comprehensible.

While examining mass customization in customer perspective there are still missing parts especially in the subject of targeting consumers. There are empirical studies which are done to measure value given to the product by customer and customer's willingness to pay for the price premiums. However the results of such studies cannot be generalized. There are examples of successful mass customization applicators from years such as Adidas, however even they changed a lot their customization offers by time and I believe now there is lack of current data about customer behavior in mass customization.

More or less there is clearer frame about enablers of mass customization. Examining the literature it can be concluded that adequate solution space, flexible, agile, robust manufacturing technologies, information technology infrastructure, supplier integration/collaboration and proper choice navigation are the main enablers. Nonetheless there is lack of source variety considering the solution space development and choice navigation. Generally current studies are carried by few authors such as Piller, Franke and Salvador and this is not giving chance to make comparison between different studies. Moreover for the issues such as solution space and choice navigation a proper guideline is missing. The current information is not enough to create mass customization application from zero. Different production technologies are examined by many authors. Flexible manufacturing systems, process and product modularity, component commonality and postponement are current mass customization enablers in terms of production. In this area there is lack of real case application reviews. The role of supplier in mass customization is a popular subject. Mukherjee et al. (2009) proposed a detail study about supplier selection in mass customization while examining the fundamental works as by Cheraghi et al. (2004). Liao et al. (2011) evaluated the subject trust between supplier and manufacturer however I believe that samples are not enough to validate their conclusions. Peterson et al. (2005) examined the responsibility level and the integration point of the supplier into mass customization which is a subject needed to be validated by also other sources. In general supply chain integration in mass customization examined part by part, there is lack of a guide which will explain whole role of supply chain in mass customization.

Configurator definition is well-done in the literature, almost everybody is agreed that it is a software program (generally internet based) which let customers interact with the companies and be part of customizing process. However there is confusion related to term. Configuration can be evaluated as the way the product is developed, its parts and its customizable components instead the web-based product configurators, which is the focus of this study, is a broader issue given that it includes both the configuration of the product but at the same time interface of the program, details such as customer help, save up options pricing etc. Again on this subject there is lack of variety of sources therefore there is no comparison chance. There are some questions related to configurators that is not easy to find answers from literature such as; interface characteristics, its target consumer, the best path to follow while doing customization, pricing method, its placement inside the website, customer assisting in configurators, best graphic implementations, the customer perception of the product, importance.

Exceptionally the subject footwear in mass customization is examined broadly in the literature by Boer. It is natural that there are not so many sources related to this specific subject however the real case examinations such as Euroshoe by Redaelli and MiAdidas by Berger added reliable information to literature. However the research is still needed to be clearer about the timing of the processes, the solution space development and choice navigation in footwear industry.

3. RESEARCH OBJECTIVES

Manufacturing is changing over a time; it started as making a unique product for each customer mostly using artistic skills and delivering exactly what customer wants. After an Industrial Revolution mass production became the ruler to manufacturing. However nowadays the more the desire of expressing preferences is getting higher, the more mass produced products do not satisfy customers. Therefore the market of mass production started to move one phase between mass production and craft production which is mass customization. Mass customization is a modern way of craft production which combines technology and advanced manufacturing systems with value-added, product differentiating details desired by customers.

While offering goods and services tailored to customer needs one of the most important success factor for a firm is creating correct communication with customers and today's trends requires being global, everywhere and anytime consequently being online. Exactly in this point configurators which enable customers express their preferences and guides user to elicitation process online are getting their importance. Many firms which apply mass customization use websites and online product configuration kits to allow customer be co-designer of the product. These configurators show many differences among each other in terms of configuration of the product, user friendliness of the software, steps of customization and naturally offerings such as fit, aesthetics and function by company.

The goal of the study is to build up guidelines for constructing a web-based configurator that enables customers to choose different components and options when making a footwear purchase. To reach this goal, there are two main research questions:

1. What to offer to be competitive in footwear industry?
2. How efficiently customized the offers?

To answer first research question, this study analyzed state of the art of the configurators in footwear industry where it is possible to find innovative, creative, successful, new and ongoing examples of mass customizers. This phase has been done in external analysis of this document. While for answering second question a framework based on literature analysis and analysis of configurators has been developed to recognize how a solution space behind the offers are developed and managed. This part of our analysis is given by internal analysis. It has to be mentioned that this part of analysis has been undertaken by a single case study and it has to be mentioned that it is needed to be validated by other future case studies.

4. RESEARCH METHODOLOGY

Footwear is mainly separated into two types; athletic footwear and non-athletic footwear. Athletic one includes shoes designed for athletic, sport and active usage purposes for men, women and children. The major brands in this area are; Nike, Adidas, Puma, Reebok, Converse, Asics, Fila, K-Swiss, New Balance and Saucony. The shoes in this segment are not necessarily designed for sport purposes but they can be for performance inspired activities. Non-Athletic footwear covers casual and dress shoes for men women and children. The segment includes pumps, sandals, loafers, slippers, boots and etc. Market share of non-athletic footwear is 55,3% and it is more than athletic footwear which is 44,7%.

According to Figure 4.1 in US footwear retail sails the biggest pie of the shoes sold belongs to women's dress and casual footwear (non-athletic) and second is men's athletic footwear. For the period 2004-2008 men's athletic footwear reached annual growth at a CAGR of 3%, $10.2 billion and women's non-athletic footwear grew at a CAGR of 2% and reached $16.5 billion.
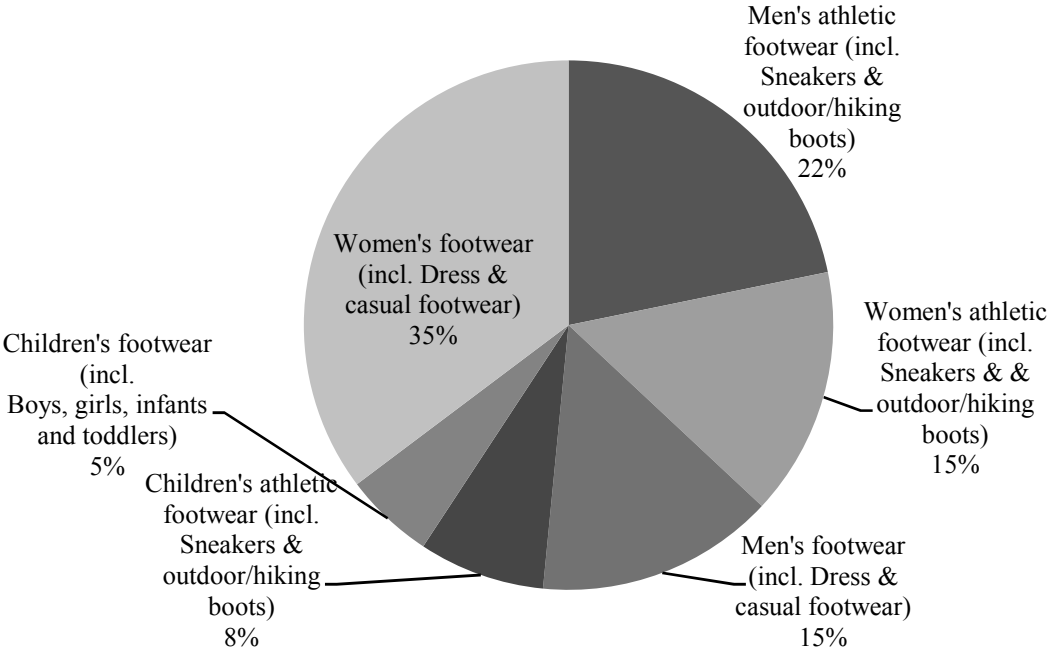
Figure 4. 1. Share of US Footwear Retail Sales by Consumer Group and Major Product Category 2008 (Packaged Facts, 2009)

There is a positive trend in value in footwear market between 2004 and 2008, 2008 is closed with $192.3 billion with +2% in value and 10.3 billion pairs with -2% in volume. US market is in slightly decrease both in value and volume over a period 2004-2008. Almost all the shoes sold in US are produced in overseas mostly from China, Vietnam, Brazil and the others (Figure 4.2). According to Packaged Facts report 2009, the global footwear market will reach $238 billion by 2013 with +7% and 12.1 billion in volume with +6%.
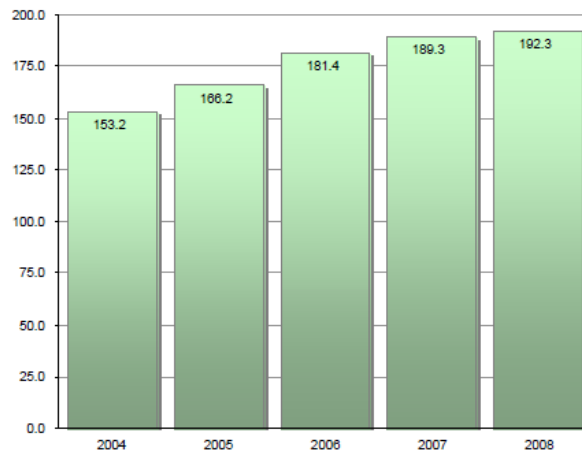
Figure 4. 2. Global Footwear Retail in billion $

There is variety of retail formats changing from national chains to non-clothing and apparel stores. Alternative to retail stores there are options such as shopping from internet or buying from catalogs can be listed. Footwear retail options are, shoe stores where customers can find family of products or single brand, discount shoe stores where there reduced price products, sporting good and athletic shoe stores such as Foot Locker where customers can find staff with knowledge to choose specialized shoes, mass discounters for self-service selection of relatively cheaper shoes and national chains such as La Rinascente in Italy, Macy's in US, Harrods in UK where there are variety of goods such as clothing, accessories, cosmetics, house wares etc. Additionally apparel stores such as Zara, H&M, Levi's also have footwear offerings and they started to have small pies from footwear industry. Regarding to internet sales in footwear, it becomes popular slowly because it is a good that is needed to be tried however since 2002 companies are increasing their sales trough internet. The most used way to shop footwear is specialty apparel, discount store and department store. (Figure 4.2)
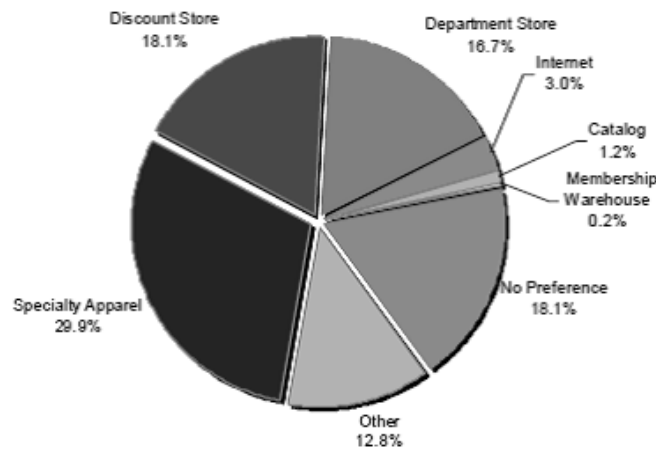
Figure 4. 3. Consumer Penetration Levels for Type of Retail Stores, 2008 (Packaged Facts, 2009)**.**

In terms of global competitive landscape footwear market is highly fragmnted, there are major and few players and the rest is all small players. Among big players there are Nike, Adidas, Puma and Asics, however just Adidas and Nike succeeded to make sales over $5 billion (Table C.1). Nike s the leader of the sector with $10.9 billion the company includes brands such as Cole Haan, Converse, Hurley and Umbro. The next is Adidas which have purchased Reebok in 2006 and increased its sales 6% thanks to this acquisition. Beyond Adidas and Nike the competition is not concentrated. (Figure 4.3)

Table 4. 1. Footwear Marketers with Sales greater than $1 billion (Packaged Facts, 2009)

Company	2004	2005	2006	2007	2008	04–08 CAGR
Nike, Inc.	$7,580.4	$8,387.1	$9,025.1	$10,472.9	$10,894.2	9.5%
Adidas AG	5,689.2	5,956.9	5,945.7	6,512.4	7,237.5	6.2
Puma AG	1,258.0	1,463.3	1,783.8	1,902.5	2,110.3	13.8
Asics Corporation	824.3	1,023.8	1,162.6	1,419.1	1,728.6	20.3
Geox SpA	423.0	566.6	769.1	1,055.7	1,313.2	32.7
Skechers USA Inc.	738.7	797.8	956.6	1,098.9	1,139.6	11.4
Wolverine Worldwide Inc.	903.6	964.5	1,036.9	1,099.2	1,106.1	5.2
Ecco Sko A/S	523.6	589.6	707.6	911.3	1,012.2	17.9
The Timberland Company	1,153.2	1,200.1	1,126.9	1,004.8	974.3	-4.1
Jones Apparel Group	1,002.4	978.6	941.1	955.8	938.3	-1.6
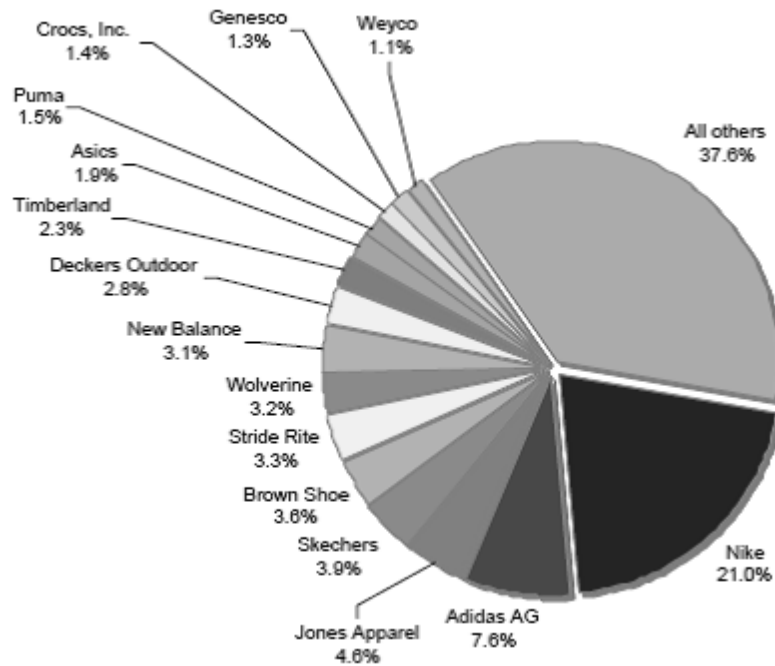
Figure 4. 4. US Shares of Footwear Wholesale Market, 2008 (Packaged Facts, 2009)

Footwear industry also is affected by economic crisis. It is observed that consumers firstly prefer repairing the products before trying to buy new one. Recently, ethical, eco-friendly and brand supporting charities such as Toms are exposed to more interest. Green, sustainable projects especially becoming more important for the youth.

Regarding to style and innovation trends, also footwear industry got affected by different functional and emotional desires of the shoppers who want to diversify themselves from the "mainstream" and therefore personalized footwear is becoming more and more popular. Although the customization issue has existed from years in small special shops where shoes get done hand-made they were generally expensive. Nonetheless today "mass" customization makes customization more affordable. Additionally there are many customers who suffer from feet or have different sizes of feet so the functional part of the footwear customization can be the only solution for some part.

Mass customization aims to provide products tailored in order to meet different customer needs and preferences but at the same time producing these items with efficiency and proper economies of scale of mass production with small batches for diversified and customized products. These aspects are also valid for customized shoes, a production system organized for mass production should be re-organized in order to catch small batches to respond variety coming from customer preferences and small delivery times.

Once upon a time top shoe producers were Italy, Spain, Portugal and Brazil however due to high difference of labor costs between Europe-US and Asia, mainly China, India and Vietnam, now most of shoe production, around 70% of the shoes produced all over the world,

is done by Asia. Moreover excessive presence of shoe firms makes the competition harder every day. As a result of these reasons it can be said that after new millennium footwear enterprises are running strenuous and complicated. Therefore there is a question of why footwear companies should choose to do mass customization? Firstly, in traditional mass production system manufacturer lose the customer in sense of taking feedback. Once pair of shoe sold company does not have anything else than credit card number of the customer. Instead in mass customization there is continuous feedback from customer, they directly receive customer preferences, expectations and needs via customization. Therefore possibility of serving the same customer again is getting higher. Additionally, customer becomes value creator for the company both in terms monetary value and knowledge. Secondly, mass customization brings many advantages to shoe manufacturers; due to make to order strategy there will be fewer stocks, no risk of unsold quantities, the sales will be over costs, there will not be need of physical sores and related direct and indirect costs. Finally it will create direct communication with the market. Thanks to mass customization there will be direct contact with the targeted segment therefore marketing approach will turn into direct from indirect because as it is mentioned above the feedback collected from customers will become input for company as design drivers.

There are some solutions for applying mass customization in footwear industry. Many firms are using foot scanner which is a device that measures foot dimensions and supply to customers lasts that exactly match with the foot. Using foot scanners is not a must in footwear there many firms are using standard sizes in a large scale and even let customers choose different sizes for the feet. Another important enabler of mass customization in footwear industry is shoe configurators; which customers can express their preferences online. Thanks to configurators, customers can choose materials, colors, design of the shoes and add some personal details such as names, numbers, logos or accessories. Configurators are generally available online, accompanied by visual realization of the shoe and mainly they are used to change aesthetics of the shoes. Shoe customization virtually via configurators does not let customers have the last exactly tailored for their feet however they can choose sizes and sometimes also width between large scale of options.

Currently it doesn't exist a specific application for configurators that is available on the market and mass customizers can buy. Instead shoe customizers develop their own product configurators with similar common software engines but different user interfaces. Therefore configurator construction can be considered as serious investment for the companies which want to present their customization approach online and reach all over the world.

Exploration of Footwear Companies which Apply Online Mass Customization

In line with the purpose of this study the mass customizers present in footwear industry were explored. In order to find brands/companies/individuals which are suitable to purpose of the study all possible mass customization companies' websites, *in English*, are

examined. Trough exploration process, firstly search engines are utilized. Next, the Customization 500 List 2012 Edition which is a broad study on mass customization by Piller, Salvador and Holan with the claim says "the world's most comprehensive benchmark study" is used. Between 500 companies the ones who do footwear customization are chosen. Moreover trough published articles in literature some examples of the mass customization companies in footwear industry are explored. All in all after exploration period, 21 different companies/websites/brands are found. (Table C.2)

The brands explored are divided into two according to company's origin; Innovative shoe makers and Appealed outsiders. Innovative shoe makers are the companies already performing footwear business and because they believed the market potential of mass customization they started to offer customized products addition to their usual products. Instead Appealed outsiders are generally start-ups, companies are created on designing purpose. They are aiming to generate income by offering customizable, designable products.

Table 4. 2. Collected Mass Customization Performers in Footwear Industry

	Company Name	Logo	Customization Project	Origin of Company
1	Adidas		mi Adidas	Innovative Shoe Maker
2	Nike		Nike ID	Innovative Shoe Maker
3	Reebok		Your Reebok	Innovative Shoe Maker
4	Converse		Converse	Innovative Shoe Maker
5	Vans		Vans Custom Shoes	Innovative Shoe Maker
6	New Balance		New Balance Custom Shoes	Innovative Shoe Maker
7	My K-Swiss		My K-Swiss	Innovative Shoe Maker
8	Milk & Honey		Milk & Honey	Appealed Outsiders
9	Shoes of Prey		Shoes of Prey	Appealed Outsiders
10	Nina Shoes		Nina Shoes Design Your Own	Innovative Shoe Maker
11	Shoe Design Studio		The Shoe Design Studio	Appealed Outsiders
12	Ateiler Shoes		Ateiler Shoes	Appealed Outsiders
13	Timberland		Timberland Deisgn Your Own	Innovative Shoe Maker
14	The Left Shoe		The Left Shoe	Appealed Outsiders
15	Foot Joy		My Joys	Innovative Shoe Maker
16	Maguba		Maguba	Appealed Outsiders
17	my Vale		My Vale	Appealed Outsiders
18	Selve		Selve	Appealed Outsiders
19	Soft Star Shoes		Soft Star	Innovative Shoe Maker
20	Otabo		Otabo	Innovative Shoe Maker
21	Viavor		Viavor	Appealed Outsiders

Criteria to Select Configurators to Analyze in Footwear Industry

Subsequent to exploration of the websites, they are filtered according to purpose of the study. The first rule is to choose the brands to do empirical analysis is that the customization should be performed trough "web based configurator" available in the website. Since mass customizers in footwear industry often utilize "foot scanning", a technology to take relevant dimensions of the consumers' foot both in a shop or at home, it would be relevant with the aim of the study which focuses on configurators and their offerings. Therefore first filtration is performed according to operational approach of the company: Pure Click or Click and Brick.

Pure Click sellers of customized shoes are the ones who adopted only web-based (pure click) approach for their sales (however it shouldn't be forgotten that this statement is valid only for the customized products). They do not interact physically with the customer and perform their customization activities only virtually. Click and Brick sellers are generally also manufacturer of their shoes. Their approach to customization is more physical than virtual and they have direct communication with the customers and they use web-based channel as complementary (Boer et al., 2007).

After separating the websites/brands as Pure Click and Click & Brick another important point is the variety of customizable offers. In the analysis to lump a brand/website who offers from basketball shoes to fitness shoes and a brand/website who offers only flip-flops does not have logic. Therefore in the study the brands which make more or less same level of offers are aimed to put together. Finally the categorization is seen in Figure 4.5 is obtained.
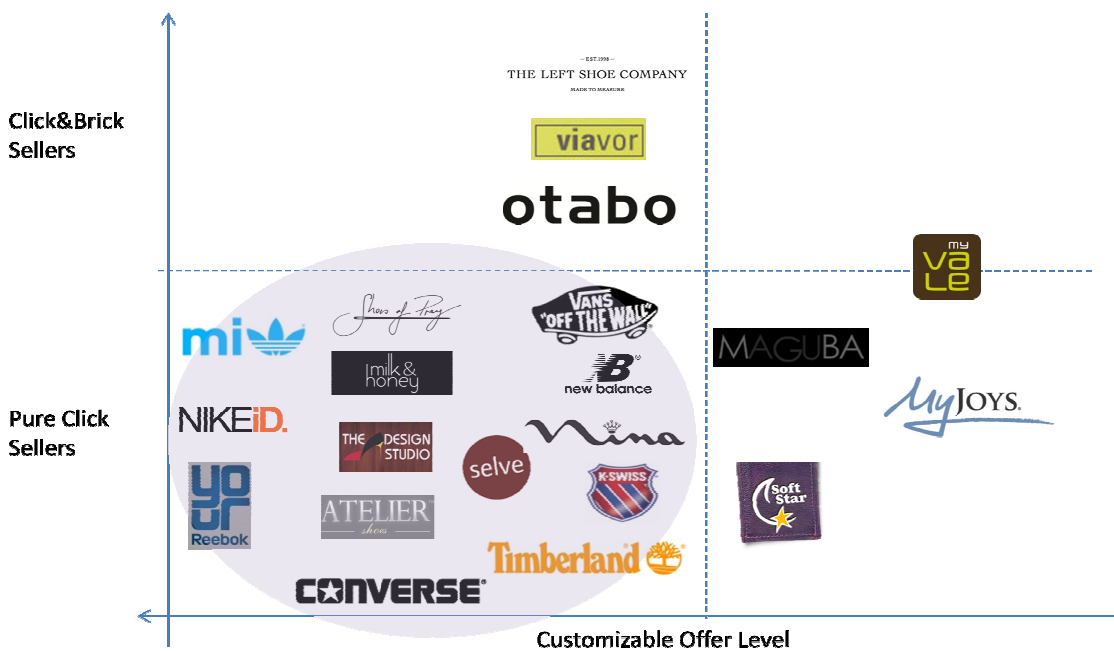
Figure 4. 5. The categorization of the brands according to first criteria of configurator analysis

Brands are firstly separated according to being Click & Brick and Pure Click. Brands such as The Left Shoe, Viavor and Otabo do customized shoes however their business relies foot scanning / foot measurement technologies and they do not have configurators for product configuration online in their websites. MyVale has configurator for product configuration and also it is possible to collaborate with them to do physical foot scanning for best fitting. On the other hand evaluating the customizable offer of athletic shoe producers such as NikeID, miAdidas, Vans, New Balance, Converse and Reebok offer different type of shoes according to their purpose (basketball, baseball, tennis etc) or just in different shapes (Converse with double tongue, without collar etc) with many color and material options. The same issue for non-athletic shoes the brands Timberland, Nina Shoes, Selve, Shoe Design Studio, Milk and Honey, Shoes of Prey and Atelier Shoes present many customizable shoe and their different parts options. However MyVale offers only flip-flops, Maguba clogs and MyJoys only golf shoes to customize. Given that this is their nature of business it cannot be evaluated as wrong or insufficient however they are not broad enough to enter to the analysis. Furthermore Soft Star shoes is really another case which they produce only sheepskin handmade shoes and the configurator they utilize on their website helps customer to choose colors, parts however there is no visual translation of the choices. Therefore according to first criteria The Left Shoe Company, Otabo, Viavor, Soft Star Shoes, Maguba and MyJoys are excluded from the analysis.

Secondly, brands can be evaluated according to product positioning. Customizability of the shoe is not enough for being "mass customized". In order to belong to mass customization section products should not exceed one level of price. True customizers can be defined as the companies targeting the mass market where they can find customer potential with normal purchasing power but willing to pay a price up for customized shoes. Affordable luxury is different than true mass customizers they want to do products generally offered by bespoke shoe makers affordable for mass consumers. They target the wealthiest between purchasers of mass shoes who cannot afford digital tailoring but able to pay extra for high quality-fitting products. However Digital tailors cannot be evaluated inside mass customization. They are on the top of price pyramid and they target wealthy clients who can spend much more than normal mass product shopper on products. Moreover the technology they use, their shoes' level of fit and quality of the materials bring them far away from mass customization. In Figure 4.6 there is price pyramid and after the evaluation of the brands it is decided that Selve belongs to Digital tailors group and it is excluded. Selve is a brand which utilizes finest materials and materials to shape their unique designs, all the shoes are handmade and the prices are starting from 355£.
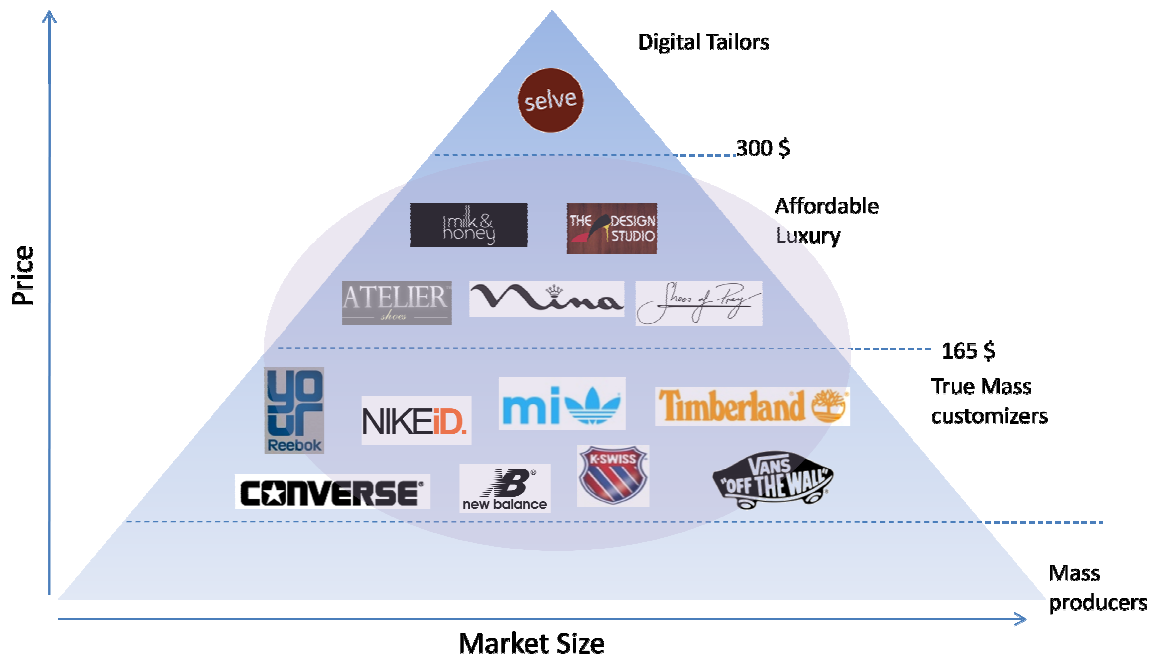
Figure 4. 6. Price – Market Size Pyramid of the Explored Mass Customizers in Footwear Industry

Taken into consideration these two limitations, 13 brands out of 21 brands explored are chosen to do further analysis. These are; Milk & Honey, The Shoe Design Studio, Atelier Shoes, Nina Shoes, Shoes of Prey, Reebok, NikeID, miAdidas, Timberland, Converse, New Balance, My K-Swiss and Vans.

Criteria to Collect Data about Configurators

Piller, (2005) stated that "from a managerial point of view customization can be carried out with regard to *fit, style* and *functionality*." These dimensions match exactly to shoe customization; fit is defined by size range, width range and option to choose different sizes for left and right foot consequently about the last of the shoe, style is about aesthetic design of the shoe such as choosing materials, colors of customizable parts, functionality is about sockliner, outsole type, insole type, heel padding and ankle type to add function to the shoes in order to meet specific needs of customers. In each configurator the data related to fitting, aesthetics and design are noted for different types of shoes, additionally the price and delivery period and area of the shoes are tracked. The data related to Athletic Shoes and Non-Athletic Shoes are collected in same manner however there were lack of data in some cases (ex: Heel Height in Athletic Shoes) due to nature of the product (Table C.3.). Moreover user-friendliness of the configurator, visual realism of the shoes and availability of options such as "share on Facebook", "publish on website", "save before purchase" are examined. The detailed data related to configurators can be found in Appendix I- II - III.

Furthermore according to data collected from the configurators customization level is examined as following in this study:

Style Customization: Customization type which customer receives a pair of shoe fits perfectly aesthetic preferences of him with the size specified by the customer.

Mismatched Pairs: Addition to style customization customer has option to choose shoes in different sizes for left and right foot.

Function Fit: Preference of desired function of the shoe is added on the top of style customization and mismatched pairs.

Table 4. 3. Data Collection Method for Configurators

Data Tracked		Athletic Shoes		Non-Athletic Shoes	
		Women	Men	Women	Men
Fitting	Size Range	+	+	+	+
	Width Range	+	+	+	+
	L/R foot option	+	+	+	+
	Heel Height			+	
Aesthetics	Customizable Parts	+	+	+	+
	Material	+	+	+	+
	Color	+	+	+	+
Function	Outsole Type	+	+		+
	Midsole Type	+	+		+
	Other Function	+	+		
Price		+	+	+	+
Delivery Time		+	+	+	+

For the data collected related to customizable parts of the shoes, Figure 4.7 for athletic shoes, Figure 4.8 for the non-athletic women shoes, Figure 4.9 for the non-athletic men shoes can be taken as point of reference.
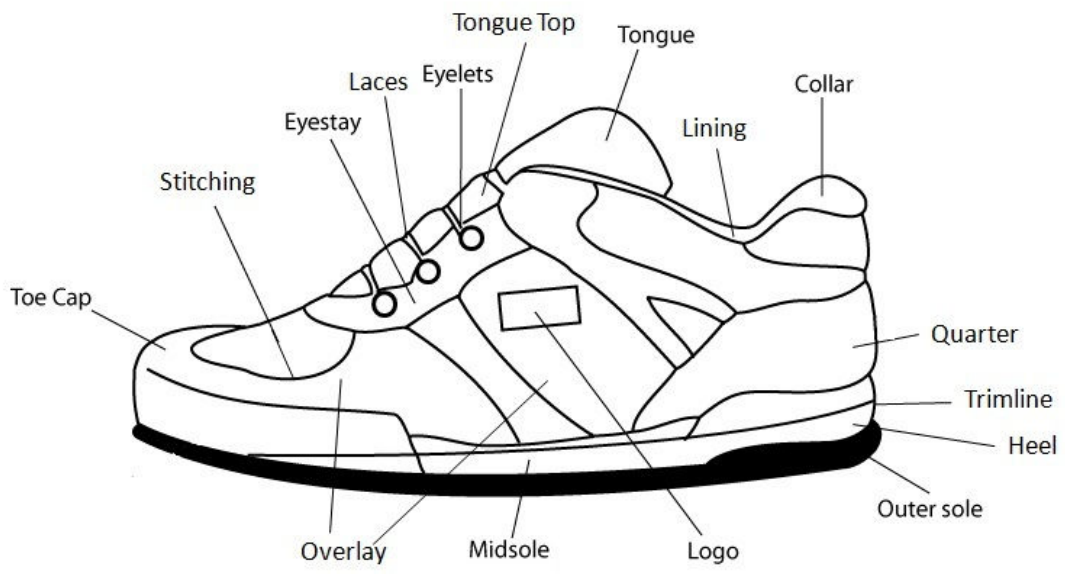
Figure 4. 7. Parts of Athletic Shoe
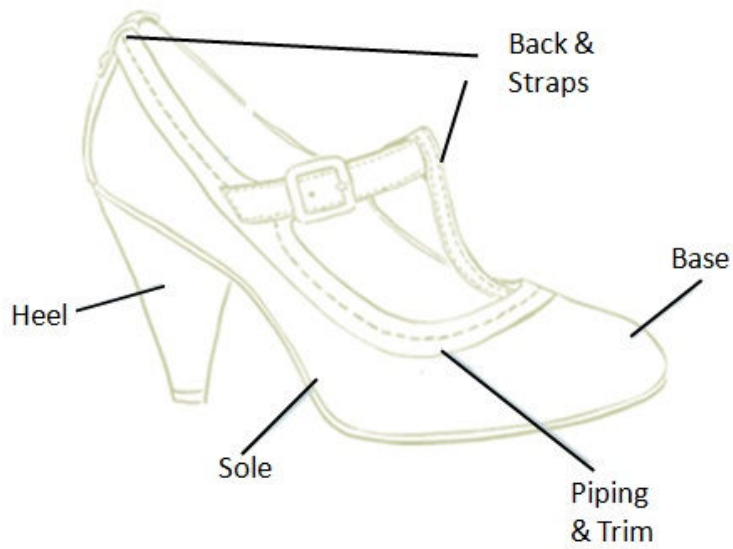
Figure 4. 8. Parts of Non-Athletic Shoe for Women
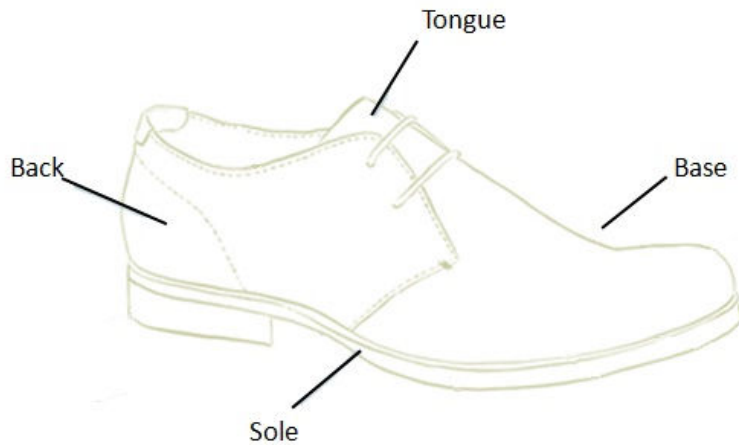
Figure 4. 9. Parts of Non-Athletic Shoe for Men

Questionnaire

Following to the collection data on configurators a questionnaire is prepared to direct a company in order to understand the logic behind the proposition of the configurator. The questionnaire is built up of 13 open and close questions in order to understand value proposition is defined and how it is possible to deliver customized shoes to the customers.

The questionnaire starts with the question when the company started to apply mass customization; next question consists of three sub questions to understand how they created their solution space, how come they identified the points that customers need to diverge most. Afterwards there are questions about customer information tracking tools and production systems. Another important group of questions are about the relationship between manufacturer and supplier. Finally last three questions with sub-question are to criticize the choice navigation. (see Appendix IV)

The questionnaire is prepared on the way as it is mentioned above however given that the interview is made by Skype they are asked without answers and when it is necessary examples of possible answer are given to partner. In conclusion the questionnaire aims to understand selected company's solution space development logic, how they manage to produce and deliver customized shoes and how the options available in configurators are limited. The results of the interview are presented as a case study.

5. MASS CUSTOMIZATION IN FOOTWEAR INDUSTRY: SETTING - UP A WEB-BASED CONFIGURATOR

5.1. External Analysis

In the first part of the focus of the study there are profiles of the companies selected to analyze, role of configurators in footwear industry and individual analysis of the each configurator take place in order to make a final comparative analysis between the mass customizer in footwear industry and their configurators.
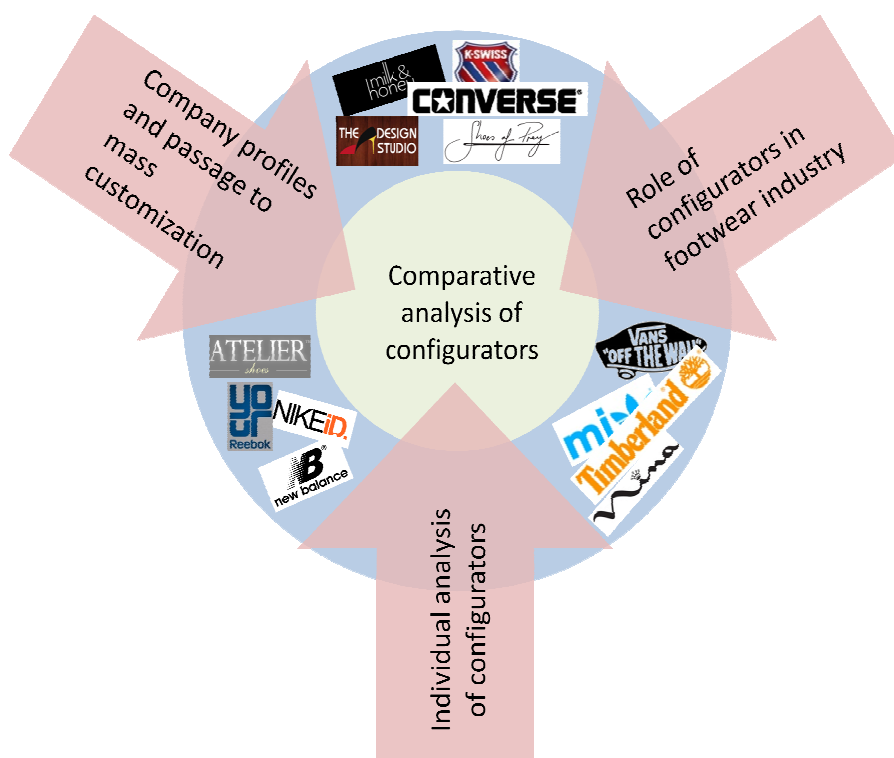
Figure 5. 1. Framework of the external analysis

5.1.1. Role of Web-Based Configurators in Footwear Industry

The online product configurators have a role as a bridge between the company and the customer. Customers can create their desired models inside the pre-fixed solution space of the company by combining different colors, materials types of the components. Visualizing the shoe itself has a great contribution to shape the idea of the customer.

According to findings of the Euroshoe Project (2002), for successful launch of customization concept customers need correct fulfillment such as product configuration, money back guarantee, delivery time. Especially they want to be guided carefully with

innovative configuration systems in order to get reliable look of the final product. Next, it is found that mostly young customers are interested in customization or really mature customers for orthopedic problems. The young target group is generally considering the expression of the individual preferences. Moreover it is discovered that customers do not want to spend more time with configurators than normal footwear shopping process, timing between 20-30 minutes is acceptable for customizing. Finally most of the complaining about available shoes in the market is that customers cannot find the balance between fit, comfort and aesthetics. Especially female customers want more variety in order to express their individuality and they are in search of a pair of shoe can satisfy their needs encountered to design.

Therefore evaluating the empirical study it can be said that there is attention to customized footwear by customers. As technology improves s are becoming more and more realistic everyday and equipped with the features which can help customers in decision process. Especially nowadays we are living a consumption style anywhere anytime exactly in this point configurators are enabler of footwear customization as being accessible anywhere anytime.

In a traditional tailored customization, customers do not have chance to see prototype of the products before buying, instead via configurators they can have idea about the final look. Naturally contact with the shoe is missing however once a company creates loyalty with the customer, in further purchases customer will know the quality of the work and material. Thanks to configurators customers are interactive and see instant results of their co-creations. Also it is so important that companies should design their configurators so carefully that they can navigate customer choices without making them confused and lost between the choices.

Moreover configurators enable companies collect data about changing customer preferences and this leads firms react quicker comparison to traditional sales methods. Following the customer actions between choices and the shoe types firms can better design both their products for customization and mass market.

In the following title there is analysis of the configurators of the chosen brands since configurators are the only communication of the brands with the customers that is available worldwide; issues such as the way configurators are structured; the offerings such as online help, save, publish the creation; choice navigation; visual of the product; customizable components of the shoes are critically important for the future of the customization and also for the new starters in this industry.

5.1.2. Comparative Analysis of the Web-Based Configurators

Adidas – MiAdidas

Adidas via MiAdidas, customization channel of the brand, is one of the most innovative, developed, unique, enjoyable configurators available in the market. The simplest example to the dedicated and continuous development of the customized shoes of the Adidas is since the beginning of the study (March 2012) has changed twice their interface, customization process and moreover customizable shoes. Therefore please pay attention to the fact that the customized shoes tables (Appendix I) were organized according to data retrieved from website in May 2012.

Identification Tag	
Models	28
Price (avg)	$147
Delivery area	United States
Delivery time	3-4 weeks

Customization webpage is welcoming customers with the main shoe type options such as originals, basketball, running, soccer, tennis, golf and football, after choosing a main shoe type and gender there are different models related to category. The website allows customers to sort the products according to newest arrivals, name (for more informed customers), price high to low, price low to high and most popular. Moreover on the left column there are options as following: Color in order to check the color desired available for which shoes; size in order to validate the size desired available for what kind of shoes because size range shows differences according to models; customer ratings in order to see comments from previous buyers; best for to understand which shoe has the competencies related to sport branch; technology in order to eliminate shoes according to the technology they have (such as Climacool, geofit, adilite etc.); and finally collection in order to differentiate shoes according to special Adidas collection. A user can make these pre-choices before going through the customization process in order to create his shoe quicker and more precise. These options before configurator is a big plus for customization process and navigate customers' options and they can be considered as customer help.

There are two options to start customizing first from scratch, second start with inspiration and make changes over a pair of shoe already with selection. For every kind of shoe there are certain parts that can be customizable and customization can be start from any part of the shoe. Therefore there is no problem of turn back or follow a sequence while customizing when there are unmatched or undesired combinations. Customizable parts are listed on a column and when there is change in the part it can be followed from the list and addition, customizable parts also written on the shoes when they are chosen consequently there is no confusion over parts. After clicking the desired part of the shoes; in order to customize there are options for the colors and if available for materials. Colors can show differences according to materials.
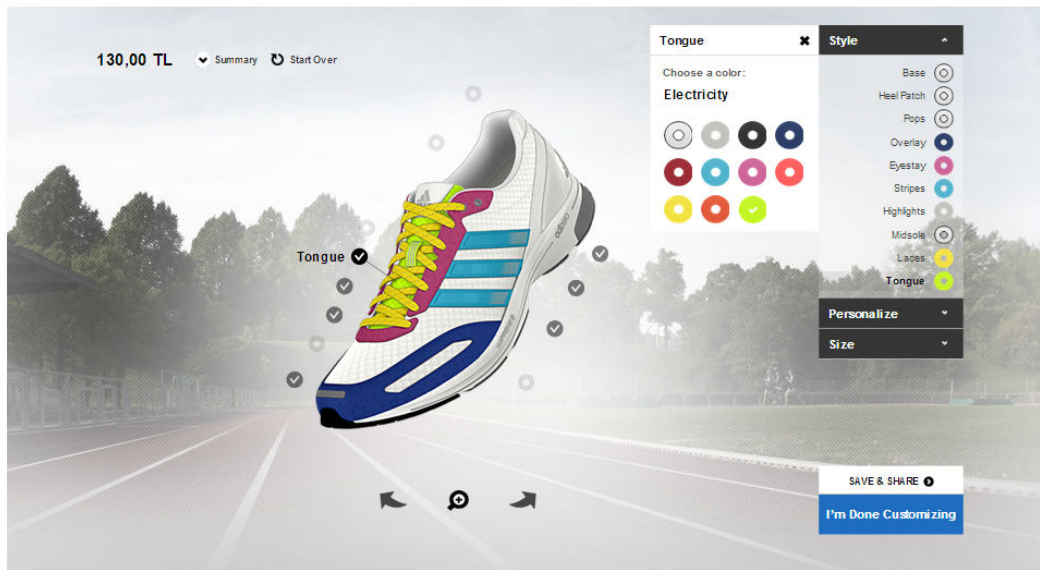
Figure 5. 2. Online product configuration of Adidas**.**

Consequent to color and material options there are options of "personalize" and "size". In personalize option there is adding name and number on the shoe valid for all customizable Adidas shoes and there can be add jewel and add logo options for the certain shoes (for the details see Appendix I) Arrangement of the size issue is well-done. They are separated according to countries (Unites States, France, Japan and United Kingdom) where different measures are used. Options of width and option to choose different sizes for left and right shoe exist but not for all the shoes that's why it cannot be said that Adidas is doing totally "Mismatched Pairs" customizing but it contains as an option for the majority of the customizable shoes. Also there is size guide available under the window of size options in order to supply quick information to customers. Option for performance which is related to the function is not always available. It is applicable for some models of Adidas that's why again it cannot be evaluated as "Function Fit" but for certain models yes they have level of Function Fit. When performance is customizable the option for performance can be found between style and personalize.

Visual realism obtained by software is really close to reality. The image gives very close idea of what the product will look like in a real world and it is adjusted immediately according to color and material preferences. Also during the customization configurator allows 360° visualization of the shoe by rotate option. However apart from writing name & number and options as adding logo or jewel the level of creativity is not high. Customers can change only the colors over certain models which are available in shops. The configurator is absolutely user friendly, it is usable and another important point is all the options are placed in a rectangle that there is no need scroll down/up to catch other points.

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Additionally, just under configurator it is possible to find the product information which is really helpful for customers to make decisions. Apart from information supplied by the brand the information related to customization experience, fitting, width, quality coming from the previous users can be found. This shows that the company is really transparent and they try hard to make improvements on the customized products.

All in all while finishing there can be found two options; one of them allows user "save & share" other one is "I'm done customizing". Save & share option let users save the design for further improvements, editing or buy another time also let them share their unique design via email, Facebook, Twitter, personal blog or simply print it. In the case of finishing customization and desire of purchase I'm done with customizing option leads customers to payment process without need of membership to the page or account. The price of the shoe is always available during the customization and in the phase of check-out the shipping price (approximately $12) is added top. Orders are shipped only in business days and they are delivered in 3-4 weeks. The returns for customized shoes are not accepted and they do not ship internationally means they used to ship only inside US.

Nike – NikeID

NikeID, customized shoe collection of Nike, has its dedicated website and it starts with suggested shoe to customize. It is confusing because a customer who does not have any idea about NikeID or customization can suppose that it is the only shoe for customizing or it may take time to discover other customizable shoes. However on the column which is placed left side of the website there are options for NikeID products as; gender, category, sport, collections and spotlight. The best way to start shoe customizing is under category option between shoes, clothing and gear choosing shoes.

Identification Tag	
Models	32
Price (avg)	$153
Delivery area	Worldwide
Delivery time	3-5 weeks

In customizable shoe webpage again on the left column there are options to refine choices. Firstly there is gender option then sport option in order to divide shoes into branches such as running, basketball, training, football, soccer, skateboarding, tennis track & field, baseball, following type in order to choose shoes according to spikes, court, training, styling, after them surface in order to eliminate for the place of usage and finally color and width. Therefore as Adidas, also Nike supplies some pre-information in order to navigate customers better and save time in customization process.

After doing first elimination, the products can be eliminated according to newest, highest rated by the previous users, price (low), price (high) or view all of them at the same time. Again this option saves time and navigates better the customer.

Configurator is organized as; on the left column customizable parts, in the middle product visual and on the right options to share the design via Twitter, Facebook, Pinterest and email. For the customization of the shoe there is no need to follow an order. Customizable parts can be chosen from the menu on the left-hand side or by passing mouse over the product visual the customizable parts can be changed. Customization can be followed by changing the materials (if available) and the colors of the customizable parts (for detail see Appendix I). The options for functions are not separated also they are found while customizing the parts. For example while customizing midsole there is option to choose "responsive for quicker reaction" or "cushioned for softer ride". Following the style and function customization as a last option personalization option can be found. Personalization can be done trough inserting name, numbers for all the types of customizable Nike shoes and for some shoes adding logo, flag can be option (for details see Appendix I).
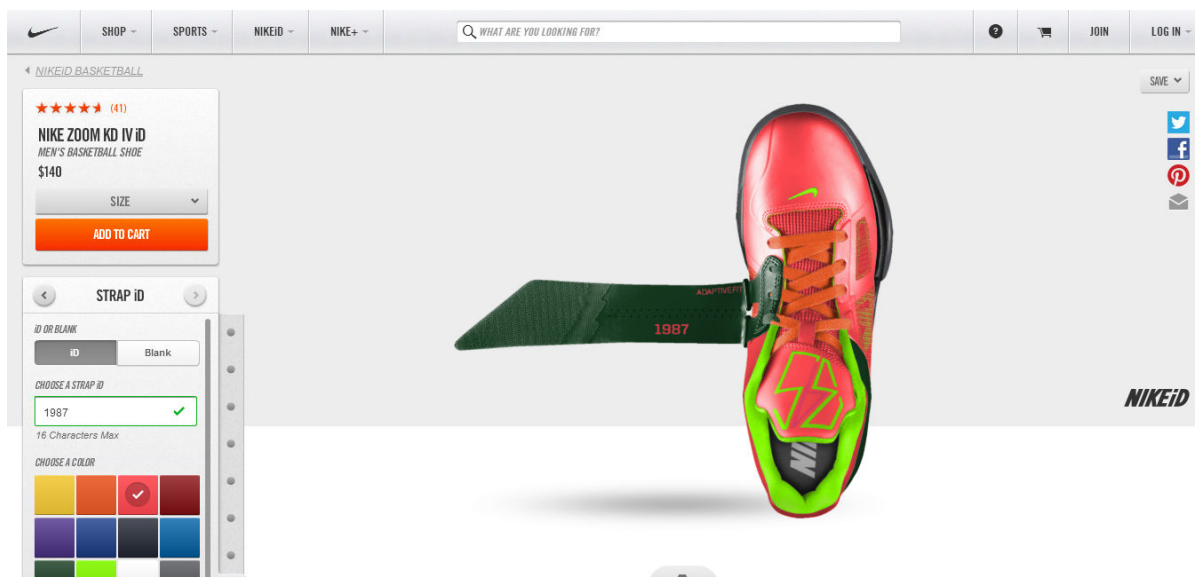
Figure 5. 3. Online product configuration of Nike

The product visual is pretty close to real shoe, it gives great idea of the final product. Also there is always option to turn the shoe in order to see other sides of it during customization. Moreover there are options such as capture a photo, zoom and four images of the shoe from back, top, left and right are available anytime during the customization. There is an option to save for the ones who wants to continue customization another time. Once the product desired to customize is found it is easy to follow customization process. The software is user-friendly and gives quick responses to choices. However in terms creativity there is no so many options customers can create new models however they can change colors and add their personal id.

Check-out can be reached after choosing the size. For the size there is no special treatment, customers should choose their country size measure. For some shoes width options and choosing different sizes for right and left foot are available. The price can be always monitored during the customization and it rarely changes in some models up to selection of

some materials (see Appendix I for the details). The delivery cost is about $14 (for US) and the payment can be done as member of Nike, member of Paypal or from guest account without need of registration. There is delivery to worldwide however the customization process should be done in country's website. Their return policy states that the merchandise can be returned for refund within 30 days from the ship date, provided that it is compliant to their guidelines and the order can be cancelled before it leaves the production plant.

Reebok – Design Your Own

Reebok welcomes the users with a unique webpage which counts the unique designs of the shoes everyday which about 3 million by November 2012. There is a short summary of the customization process to give the first impression to the customers. They simply explain it by writing choose, create and personalize by related images and then there is option as start designing with men, women, boys , girls options which is very easy and welcoming introduction to customization.

Identification Tag	
Models	10
Price (avg)	$113
Delivery area	United States
Delivery time	2-3 weeks

After selection of gender there are shoes available for the customization however this is a negative aspect because not as previous examples there is no diversification between customizable shoes. Having no diversification can be due to the fact that Reebok does not have shoes for so many different sport branches they are for running, walking, tennis or training.

There are two options to start customizing start from scratch and start with inspiration the same style of shoe but with selected colors. Apart from inspiration there is always available gallery of the shoes which is created by users by publishing the self-designed shoe which makes thousands of choices for the new users. The customization starts with choosing the size, and when it is available the width (for details refer to Appendix I). The sizes are in classic US measures. There are mainly four steps for design, main part, sole, top and back and they are not needed to be in sequence, a user can start from wherever he wants. According to style of the shoe the options in these parts show differences. The customizable parts can be chosen or directly from the visual demonstration of the shoe or from the menu on the right-hand side of the webpage. This makes easy customer comprehension over the product. Customizable parts of the shoe can be customized by choosing material (when it is available and color. When function option for certain shoes is available it appears also in the menu without specifying. This detail is important because it loses its importance, customers who look for function cannot find it easily without going through all the shoes and their steps. Addition to color and material customization as a final step name or numbers can be added to personalize the shoe.
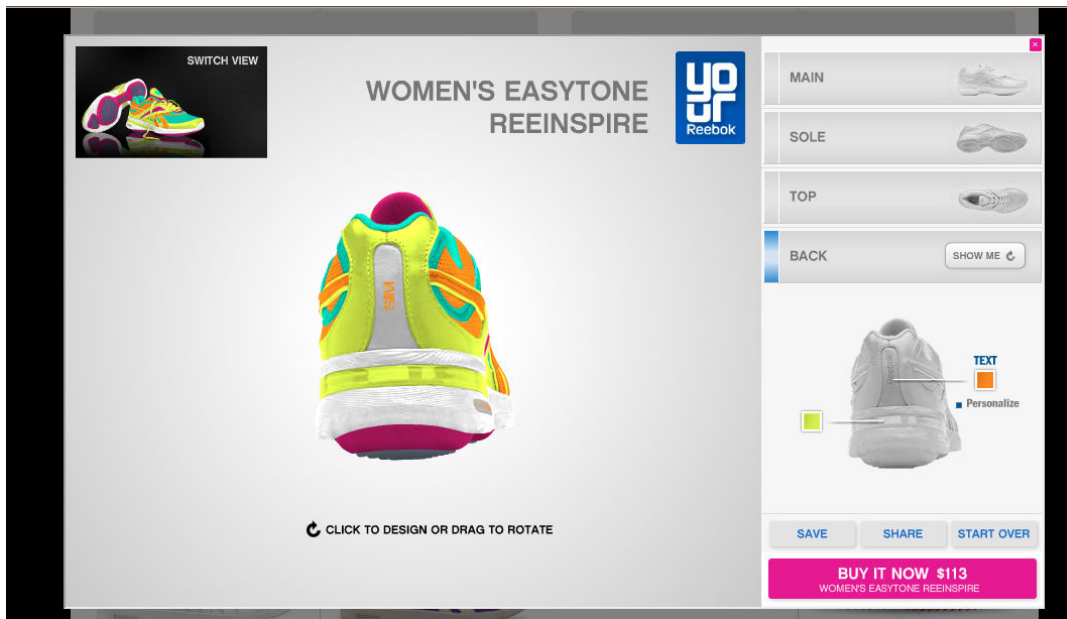
Figure 5. 4. Online product configuration of Reebok

The image of the shoe is so realistic and captures the changes done in style customization quickly. Anytime during the customization the improvements can be saved to finish later. Image can be rotated in order to see 360° visualization. Moreover the design can be shared in Facebook, Twitter and via email. Additionally, creations can be showcased and shared inside webpage or "Like" designs by other users. The usage of the system is very easy even for the first-time users.

The price is always available on the down part of the options however it can show difference according to usage of some special materials and functions. For example the shoe shown in Figure 5.4 gets a additional cost due to function option. Nevertheless creativity is limited with choosing colors and materials.

Custom orders are excluded from free shipping and returns. There is $7,95 delivery cost inside US and they do not ship internationally.

Converse – Design Your Own

Converse is known with its popular, cult sneakers and naturally the brand offers customers many types of sneakers to customize. The design process starts with choosing the icon "create" and then it is up to customer preference start with inspiration or blank.

There are many options of sneakers to design because they can have tongues up to six and multi uppers (out layer), there are different styles as All Star, Jack Purcell, Chuck Taylor, moreover sneakers can have high ankle or low ankle. In customization of Converse sneakers the material is chosen in the beginning with the model of the Converse, also this makes customizable options higher.

Identification Tag	
Models	29
Price (avg)	$68
Delivery area	United States
Delivery time	2-3 weeks

Once the sneaker to customize is chosen there are fifteen steps to complete customization and it can be started from any step. The image of the shoe is placed in the middle of the screen, on the right-hand side there are color options, on the top there is list f customizable parts and also customizable parts can be seen when the mouse is over the shoe. There is no function option in customizable Converse shoes the customization is only about choosing colors and adding personal id such as name and number. In the end of customization process the size is asked in US measures without specifying any width or different numbers for feet.

Figure 5. 5. Online product configuration of Converse

The customization process is so easy, the software is user-friendly and customers are very well navigated. The changes done on the colors are immediately appearing on the visual of the shoe and it can be said that the visual of the shoe is so realistic. On the right-hand side of the page it is possible find options such as save, share in Facebook, Twitter, Blogspot, Google+ and Tumblr or via email and get image that makes image of the design in high resolution. The customization of Converse sneakers is really creative and all the parts of the shoe is open to customization without changing its original shape. There are many print and color options exists for customization (for details see Appendix I).

When add to cart option is chosen to process check out there are four images of the shoe from outside body, heel, top and inside body for last confirmation if the customer desires to change with the edit option can turn back to customizing. The price is always on the right-hand side of the page during the customization and no change happens over it. When it is proceeded to check out there is delivery cost of $9,95 inside US and there is no shipping outside of US. The brand states that they start immediately to customization process therefore cancellations and modifications are not possible however the product can be returned for a refund with any reason in 30 days from ship date.

Vans – Custom Shoes

Vans has very simple and modest introduction for customs shoes. There are four different models of Vans sneakers available to customize and they do not have neither function nor different sizes for left and right foot options for the customized shoes.

Identification Tag	
Models	4
Price (avg)	$70
Delivery area	United States
Delivery time	5-7 weeks

The customization begins with the selection of one model then selection of gender and size in US measures. For the style customization part it can be started as black, white or with an inspiration (colors already selected). The configurator has on the left-hand side the shoe visual and on the right hand-side customizable parts and color available. Material is not come as an option, it is fixed with the model. A user can customize the shoe by choosing desired colors for the customizable parts. There are pretty much an option of colors and almost every piece of the shoes is customizable.

During the customization there are always three images of the shoes from side, top and back are available however 360° visualization is not possible. The customization is simple and the software is user-friendly. The visual realism of the product is pretty close to reality. On the top of the page there is price of the shoe and it does not show difference according to colors chosen. Options for sharing the design are limited with sms and email. Check-out can

be proceeded without logging in to the system and the shipment is done only inside US. The brands states that if the buying is not as expected they can be returned.
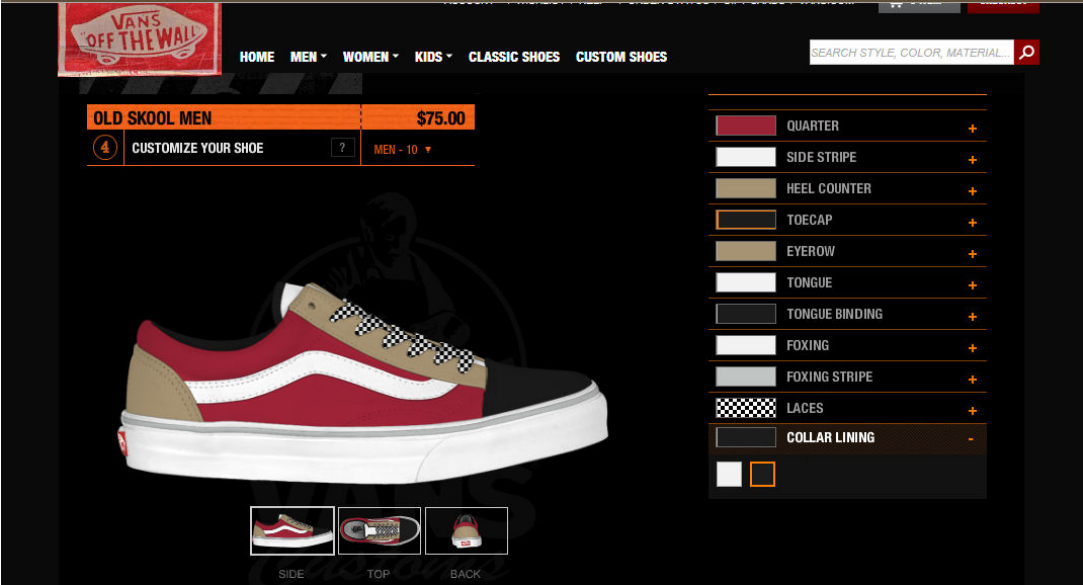
Figure 5. 6. Online product configuration of Vans

New Balance – Custom Shoes

New Balance offers to their customers two types of shoes for customizing; US993 and US574 consequently their manipulation of customers to customized shoe options is so simple. In order to start customization it is needed to choose either US993 or US574.

Inside the online product configurator on the left there is shoe visual, on the right it is possible to find customizable parts of the shoe in five steps ending with personalize option. It is possible start from any step and when mouse is dragged over the shoe the customizable parts can be chosen which makes easier the customization process and help customers use it better. Moreover downside of the product visual it is possible to find information about the shoe, its features and guide for width choice. Addition to information provided by the brand about the product, it is possible watch a video about the technology they use for that shoe and reviews from previous purchasers. Once customizable parts are done a message consists of 8 characters can be added to shoe.

Identification Tag	
Models	2
Price (avg)	$145
Delivery area	United States
Delivery time	6-10 days

Figure 5. 7. Online product configuration of New Balance

The image of the shoe is very close to reality. There are always 6 images of the shoe are available in order to see the shoe from different sides. Shoe visual takes the changes immediately and shows the process. The creativity to design the shoe is limited with the choosing the colors however every part of the shoe is customizable up to style customization. The navigation is clear, even for the first time users the usage of configurator is not complicated.

The design can be saved any time during the customization in order to continue later. In order to buy the self-designed shoe there is option "buy this" and after there is need to hoose gender, size according to US measure and width. The shipping is inside US only and shipping price is calculated according to address.

K·Swiss – My K·Swiss

My K·Swiss has its dedicated webpage for customization and there only two types of footwear customizable. The customization can be started simply clicking one of these shoes and choosing a gender. There are two options to go inside configurator start blank or with inspiration.

The interface of configurator is so clean and simple, on the left hand-side there customizable parts of the shoe with the colors chosen, in the middle there is product visual and on the right hand-side it is possible to follow customizable parts and choose the colors. Choosing a material is not option, when the style of the shoe is chosen the material is coming without change. After choosing colors for the customizable parts, users can insert their personal ID on the shoe.

Identification Tag	
Models	2
Price (avg)	$94
Delivery area	United States
Delivery time	6-10 days
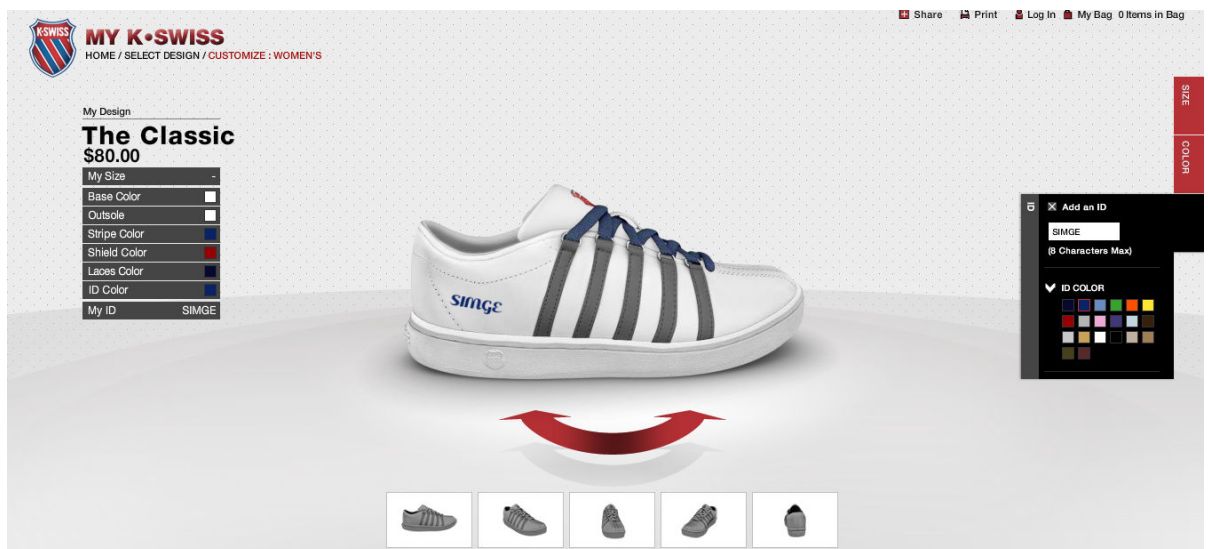
Figure 5. 8. Online product configuration of My K·Swiss

The product visual is pretty close to reality and applies changes spontaneously. The visual can be seen 360° by rotating it. Moreover there are five images of the product available anytime during the customization and the design can be saved. The design can be shared with its url and printed out.

The price of the shoe is always available during the customization. In order to proceed to check out the size should be chosen according to US standards and there is add to cart

option to buy the shoe. Shipping is not free and calculated up to place, there is worldwide shipping and they state that shipment takes place in the same day if the order is received before 11.30 pm and shipping can take 7-10 days depending on the place. However the brand is not responsible from the additional taxes and custom fees applied by countries.

Milk and Honey Shoes

Milk and Honey Shoes is originally custom shoes company therefore teir website is directly designed as shoe design website. In the introduction page it is possible to find already designed real shoe images in order to get inspiration. Design your own shoes section is an access to configurator. Once it is clicked, a user can start from five main models pumps, flats, wedges, sandals and boots.

Inside the configurator on the left side there is product visual and on the right side there are customizable parts, materials and according to material its colors. The customization can be started from any part of the shoe. Moreover this configurator presents infinite solutions because apart from material and colors the shape of the shoe can be changed. For example when "boot" is chosen as main shoe type "toe shape" of the boot can be changed between three models. Therefore very different designs from the initial shoe can be obtained according to desired preferences. There is variety of colors and materials available inside the configurator which allows customers use their creativity very high by combining materials, color and changing the shape of the shoe. The steps for toe, piping and trim, embellishment, heels and platform customizing should be followed (not in sequence) in order to finish style customization. After all, the heel height and size of the shoe can be chosen in order to finish the configuration. Narrow or wide can be specified as an option however for the shoes designed narrow or wide they do not accept returns.

Identification Tag	
Models	5
Price (avg)	$260
Delivery area	Worldwide
Delivery time	6-8 weeks

During the customization there are always tips and messages to navigate customers between choices. Additionally there is option as "chat with stylist" between certain hours again to help customers and make suggestions to them or supply information about materials and their combinations. However the product visual is so poor, it is far away from reality and it does not give idea about the last version of the product. Milk and Honey Shoes created a section "inspiration" in order to compensate their poor product visual with the images of the shoes they have already produced before. From the gallery one can understand they produce good-looking shoes unlike product visual however thinking that customization is their main goal they have to improve their configurator's product visual. Moreover there is helpful information about material types and heel types under inspiration section in order to make

easier decision about them. Creativity and enjoyment is higher in Milk and Honey Shoes since as I stated above customers have very large limits to design their shoes.
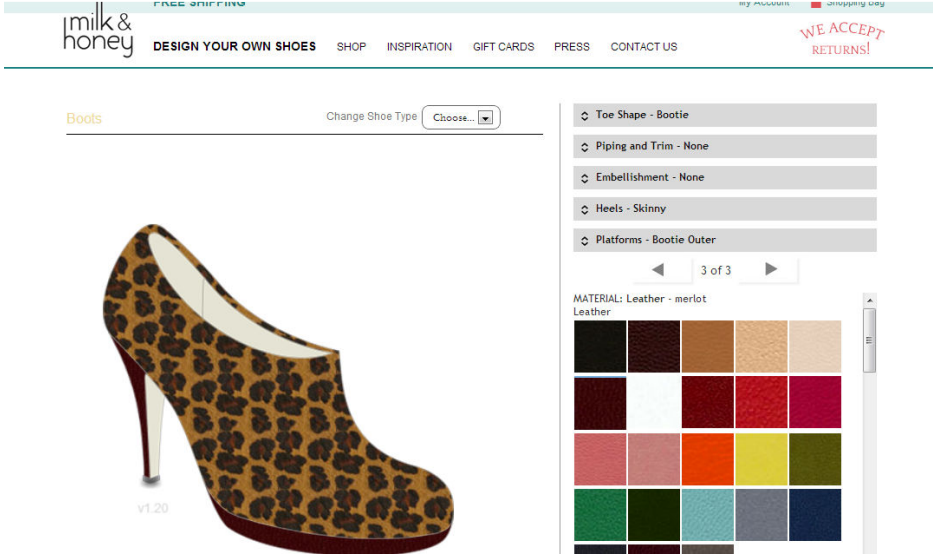
Figure 5. 9. Online product configuration of Milk and Honey Shoes

For each five main kind of shoe there is a base price however this price is changing due to materials, embellishment and platform/heel type chosen. The change in the price can be observed during the customization and different currencies are available to see the price. When it is proceeded to check-out there is no need to log-in. They accept return within 30 days with any reason and if there is something they can fix after they fix they turned it back again. Shipment is worldwide, free inside US and international shipping is $30. They ship approximately in 6-8 weeks after order is placed this means their production time is more or less 6-8 weeks.

Shoes of Prey

Shoes of Prey another custom shoes brand has very welcoming webpage intro. They suggest ideas for the designs, customers can browse ultimate popular designs, explore leathers and materials and how shoes are made. Online customization is started by clicking "start designing" icon and there are 12 different types of shoes flat sandals, flats, heeled sandals, mid heels, high heels, extra high heels , gladiators, flat oxford, party heels, heeled oxfords, wedge, ankle boots as a base to start customization.

Identification Tag	
Models	7
Price (avg)	$235
Delivery area	Worldwide
Delivery time	4 weeks

After choosing a base design the configurator appears as on the middle visual of the shoe on the right hand-side materials to choose. Customizable

parts are not specified as a list however they are available on product visual which makes easy the customization process. On the left part it is possible to et inspirations from previous designs and if it is needed every material has its explanation when the mouse is over them so this is helping customers who cannot see the real material recognize the material they will choose. Moreover it is possible to see the material in a larger view when mouse is dragged over them. Customization can be finished by choosing materials and colors for the customizable parts moreover if it is desired the base designed can be modified from toe, back or heel therefore many different kinds of designs can be created independently.
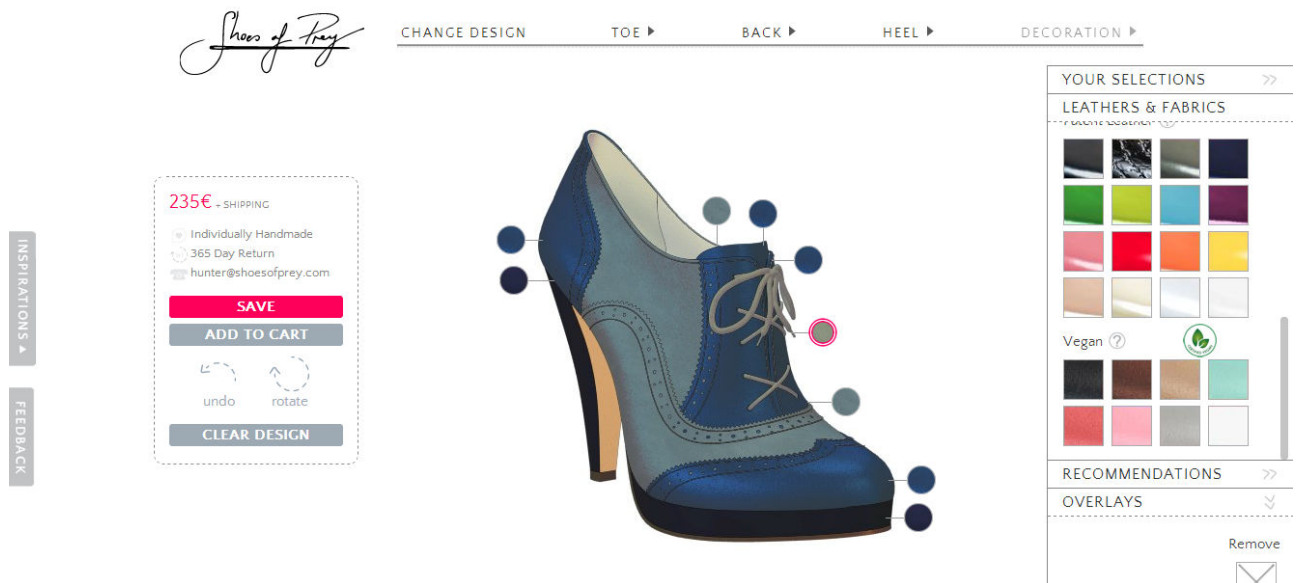
Figure 5. 10. Online product configuration of Shoes of Prey

The product visual is pretty realistic and they have improved their visual last 6 months. It changes quickly when the shoe is modified. It is possible to see real designs in gallery which gives idea what will look like the final product. Moreover it is possible to get contact with stylists via chat for further information and help. However at first sight software interface seems confusing due to high choice of materials and colors. The creativity level is high given that shape, color and material can be customized. The product visual can be rotated in order to have complete vision of the product and the improvements can be saved any time during the customization. The size can be chosen according to Europe, US, Japan, UK and Australian measure systems moreover as a very big plus customers can specify their size if it is not listed. They can make special shoes for small, narrow, wide, big and odd feet.

The price is always visible during the customization and it makes changes according to shape and material chosen. After adding the shoe to cart it is possible to check out. The currency can be changed, there is shipment worldwide and costs €15. If in the end customer is not happy about the product they accept returns and refund them or they can remake the shoes upon request. They state that shoes are individually hand-made.

Nina Shoes

Nina Shoes is not a only customizing company unlike other women shoes producers they their collection and at the same time they give service of custom shoes. Their customization level is low, there are 9 models however over them only color and heel height can be changed, and otherwise material is always satin.

Identification Tag	
Models	9
Price (avg)	$200
Delivery area	United States and Canada
Delivery time	3 weeks

Once the desired model chosen, on the left there are customizable parts which are different for each kind of model and available colors for the material satin.

The visual of the shoe is so close to reality, there is not rotate options but there are always six images of the shoe available to see from different sides. It gives quick responses to changes, when the color is changed from the panel on the left hand-side it is possible to observe changes over the shoe visual. It is pretty easy to use the software however creativity is low up to limited customization options.

Figure 5. 11. Online product configuration of Nina Shoes

When the customization is completed, with "add to bag option" check out can be done. The price is always available on the right and it does not change. Returns are not accepted for custom shoes and they have only US and Canada shipment.

Shoe Design Studio

Shoe Design Studio is also only focused on custom shoes. On the introduction page there are different modes and information related to how customization process works. Clicking the design section it is possible to launch online product configurator.

Identification Tag	
Models	4
Price (avg)	$290
Delivery area	Worldwide
Delivery time	3 weeks

There are two options to start customizing playing with colors or creating from scratch. There is possibility to have chat with the stylist (in a certain time period of the day) in order to take ideas about designs or information about the materials. There are four basic designs to start customization pump, sandal, t-strap and mule. Nonetheless their shape can be changed so much because addition to material and color the parts are also customizable. To start customization one of main designs should be selected and after selection configurator asks modification about front design and then back design afterwards heel height and style should be chosen.

Figure 5. 12. Online product configuration of Shoe Design Studio selection of front design

Figure 5. 13. Online product configuration of Shoe Design Studio selection of back design, heel height and style

After the shoe is constructed the material and the colors available to that material can be chosen from the menu on the right hand-side with the numbers of shoe parts which can be customizable. On the upper side of the shoe visual there is "tip" window which makes suggestions about materials and colors. Nevertheless product visual is not close to reality, it gives an idea how the shoe will look like in the end but for a brand which only does custom shoes such a product visual is not satisfying. Also it is complicated to use, there are tips, chat with the stylist option but structuring shoe and choosing materials and colors are not well organized. For the first time users it can be difficult to follow such software. For the sizing they have special guidelines on their website and all the shoes are produced special to customer's fit.

Price starts from zero and changes by choosing different models and materials. They state that all the shoes are hand-made and they are shipped from Singapore internationally. The brand does not accept returns.

Atelier Shoes

The last brand which is doing non-athletic women shoes is Atelier Shoes. They have very simple introduction page and by clicking "design your shoes" on the left up side of the webpage it is possible to choose the base shoe between seven types of shoes to customize.

Before starting to customizing, there is a warning which recommends consulting size chart before choosing the size. Size chart is available on the top of the page and it explains how to measure the foot and gives different conversions for European,, UK and US measures in inches and centimeters. The interface of the configurator is simple and clean. On the left side there is shoe visual on the right there are customizable parts exterior, interior, heel and sole. Their models are simple so these customizable parts cover all the shoes. Customization is made by choosing materials and available colors to that material. It is confusing that they did not group the materials so it is needed to choose in order to see what kind of material is it. After selection of size the self-designed shoe can be added to cart.

Identification Tag	
Models	7
Price (avg)	$220
Delivery area	United States
Delivery time	6-8 weeks
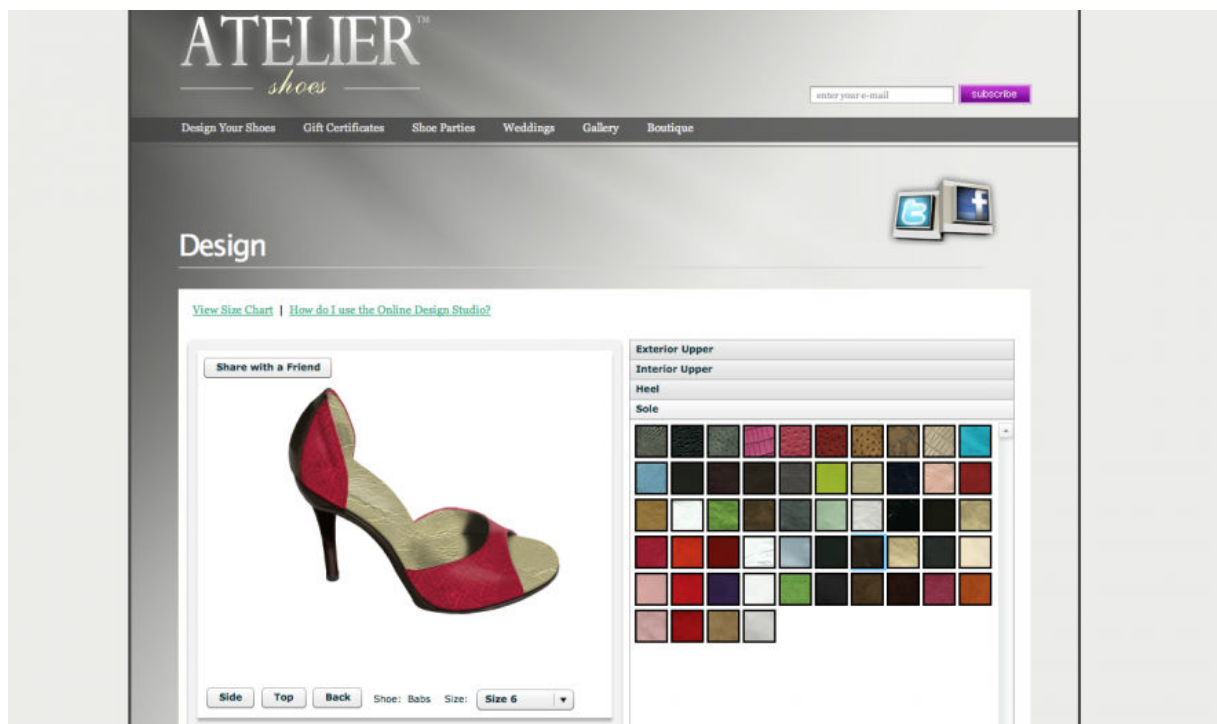
Figure 5. 14. Online product configuration of Atelier Shoes

The product visual is close to reality and it can be seen from side, top and back. The design can be shared via Facebook and Twitter. The customization process is easy, software is simple but it does not give so much creativity to customers. They can only choose materials and the colors related to materials.

Some materials are subject to a markup therefore the price of the shoe can change if animal prints, fur materials and suedes are used. The brand accepts returns and they only serve inside US, shipping price changes according to region.

Timberland

Timberland is the only non-athletic shoes brand in this study which produces for men and women. Generally the custom shoe makers in the market produce for men use foot scannaer therefore they do not have online configurator or they have a system together with configurator and foot scanner which is not focus of this study.

Timberland has very professional website introduction for customized shoes. They have links explaining how they produce custom shoes and they state that they are produced by hand in old fashioned craftmanship style. There are two main type of shoe style for customization boots and shoes. Boots have three and shoes have two models for men and women to customize. Both onlinne product configurators are built up in a similar way.

Identification Tag	
Models	5
Price (avg)	$142
Delivery area	United States
Delivery time	2-3 weeks

Customization can be started with inspiration, blank or with the original style of the shoe. Both boot customization and shoe customization have the same sections; monogram it, color it, detail it, finish it. In "monogram it" part size and emroidery color are chosen. Size chart guide is supplied just near size option and there are conversions between UK, Europe, US and Japan sizes and sizes can be chosen with wide option. Under "monogram it" section initials can be added to two parts of the boots and the shoes. "Color it" section allows to choose material and colors available to that material of the customizable parts. "Detail it" part is about customizing details such as collar, stitching, outsole, midsole and laces. Finally to "finish it" the footbed for shoes, hardware for boots can be customized.

The configurator is easy to use, it is simple and guiding the users very well. The product visual is highly realistic there is option to rotate it to see from every angle. There is description of the product under the online configurator. The design ca be send a friend via email or can be printed. All the parts of the boots and shoes are customizable but there is no need to have highly creative imagination to customize due to the fact that customization is limited only with choosing colors and one of the two materials. However the simple design of

the configurator makes the customization process enjoyable. Adding name and number could satisfy the customers.
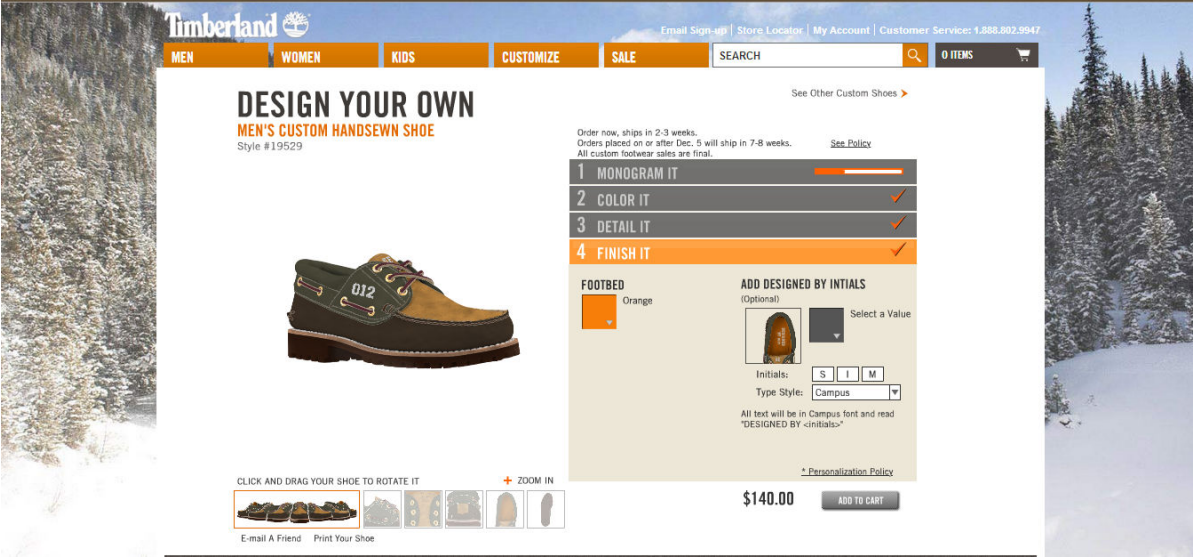
Figure 5. 15. Online product configuration of Timberland – Shoes
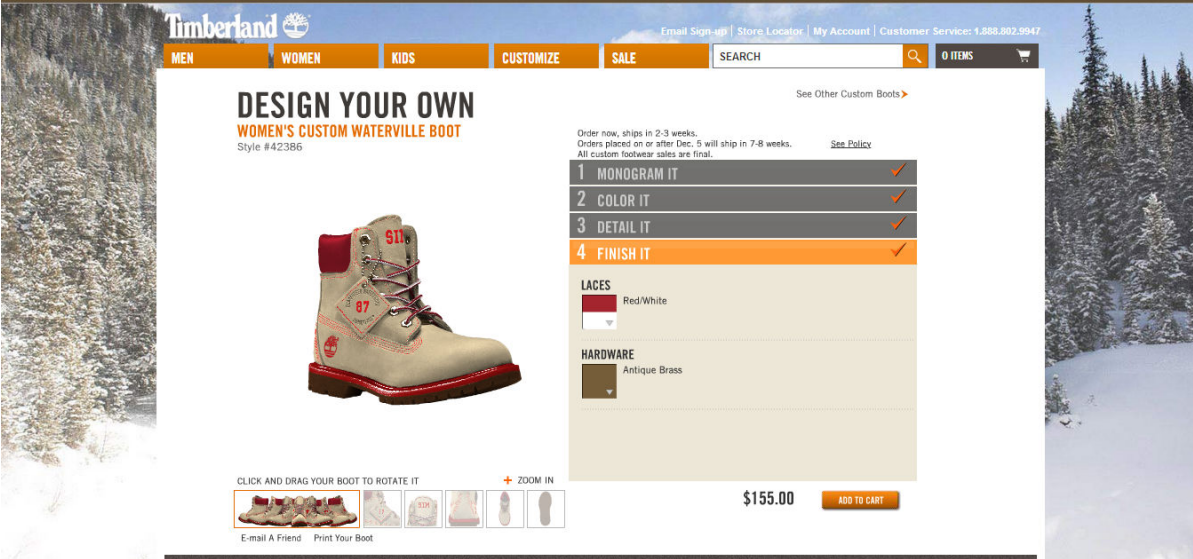
Figure 5. 16. Online product configuration of Timberland – Boots

In order to buy the shoe "add to cart" option should be clicked. The price of the shoe is always available during the customization. There is only US shipment and additional charge of $13,95 is applied for the shipment. They do not accept returns of customized shoes and custom footwear orders are non-refundable.

Previously the configurators were examined individually, now there is comparative analysis of the selected and individually examined configurators. The comparison is accomplished in terms of, navigation help, company help, customer help, choice options, customization dimensions (fitting, aesthetics and function), visual realism, usability, uniqueness, creativity, enjoyment, check-out process, delivery and returns. It is important to imply that; all the configurators examined in this study use trial and error learning logic which allows customers to build their models according to their preferences and visualize them interactively.

It is already mentioned that when customer is exposed to too many options it decreases perceived value by customer instead of giving positive effect. Choice options and help to customer in terms of navigation, customer and company are important to direct customer a product with desired preferences. Firstly all the brands except Shoe Design Studio apply pre-elimination from different kind of models. Apart from shoe Design Studio, all the brands separate basic models to choose before going inside configurator. Instead Shoe Design Studio present main models as options inside online product configurator which makes decision process more complicated. Big athletic shoe brands such as Adidas, Nike and Reebok which have many models belong to many different sport branches prefer to apply more detailed pre-elimination model in order to reach desired shoe. As an example, shoes can be categorized according to price, popularity, reviews and colors. Other athletic shoe brands have relatively less models to customize therefore they choice just putting their different models as non-athletic shoe brands make which is reasonable. All the brands have two options to start customization with inspiration, a model already with colors and materials selected, or from scratch which means without any pre-selection; this helps customers especially who do not have insight to their preferences or who are not very skilled about designing. Brands such as Adidas, Nike, New Balance and Timberland have information related to the shoe just under configurator. This helps customers to gain further information about the product and make robust choices. Many non-athletic women shoes brands have such information in other section inside website but not in the same page then configurator. In my opinion writing product features, characteristics and specialties down of the online product configurator is more useful. Milk & Honey and Shoe Design Studio offer "live chat" option to the customers in order to give further information about designs, materials and the colors to help them build their product better. Less than a half of the brands have save option for the unfinished products to continue later. All non-athletic shoe brands have gallery to publish other customers' or their own self-designed shoes in order to give idea to customers. Moreover four brands, Adidas, Nike, Reebok and New Balance give chance to customers post their reviews about the shoes and that enable future customers have neutral advises about the products.

While evaluating number of the options, although the athletic brands such as Adidas, Nike, Reebok and Converse have many models and colors of shoes, the current model cannot be changed. In non-athletic brands such as Milk & Honey Shoes, Shoes of Prey and Shoe Design Studio give possibility to design color, material and parts of the shoe itself therefore their design possibilities seem infinite. Instead Vans, New Balance, K-Swiss, Nina Shoes and Atelier Shoes have limited choice of options; their models and materials are limited but they have as much color offers as the other brands.

As it is mentioned before, while examining the customization level of the brands three dimensions are taken into consideration; fitting, aesthetics and function. Among 13 brands examined only 3 of them, Adidas, Nike and Reebok, give option to customize function in "some" models. All the brands have style customization and naturally they have fitting options which are examined detailed in next paragraphs.

Examining the fitting dimension; only 5 of the 13 brands provide size chart/size guide, other brands have options only either in US or European measurement system. 8 of them give possibility to choose different widths and only 3 brands (Adidas, Nike and Shoe Design Studio) allow customers to choose different sizes for the left and right feet. Size range shows high variation according to models and it is difficult to do generalization (See Appendix I).

In aesthetic dimension, offer for material, color and customizable parts were examined. 84 shoes are customized separately from 7 different athletic brands and non-athletic brands are examined as a whole given that they have almost infinite combination of models. Customizable parts are as following for athletic shoes: base, collar, eyelets, heel, laces, lining, overlay, quarter, stitching, toe cap, tongue, tongue top, trimline, midsole and outsole. Addition to customizable parts of the shoes the option of print (writing name/number, adding logo) and adding jewels on shoe options are examined. For non-athletic women shoes the customizable parts are determined as; base, backs & straps, piping & trim, embellishment, sole and heel. For Timberland shoes base, sole and straps are customizable, for Timberland boots base and sole are customizable. For the rest of women non-athletic shoes all the parts are customizable for all the bands except that Shoe Design Studio does not offer embellishment as customizable part. Unfortunately for the non-athletic men shoes only brand Timberland is found therefore there is no comparison for it.
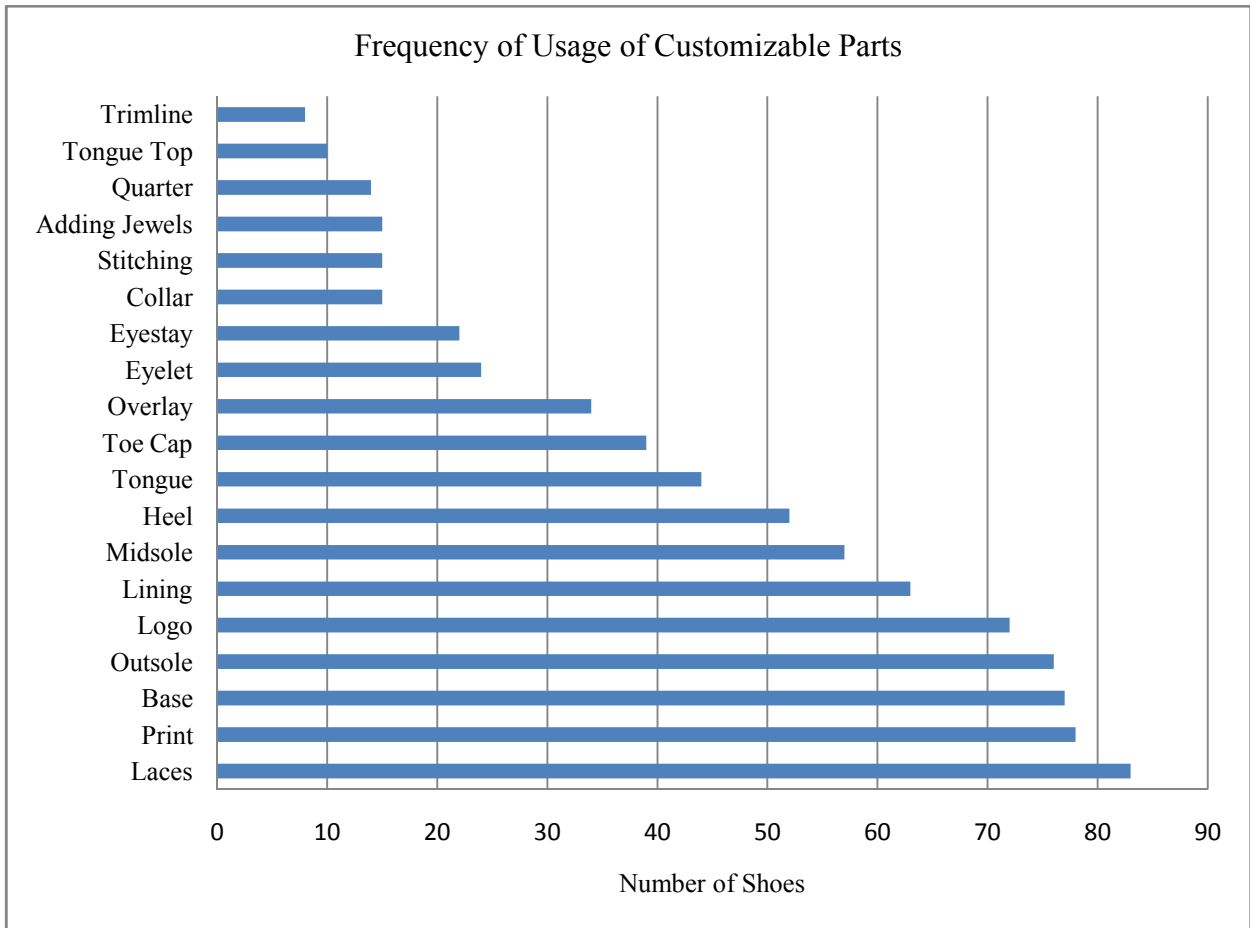
Figure 5. 17. Customizable parts for Athletic shoes and their usage frequency

Other aesthetic aspects are color and material of the customizable parts. Figure 5.18 shows that the maximum number of the colors used by the brands. It can be said that the colors are used generously by all brands also it is because they do generally style customization. Moreover when the material is point at issue it can be said that the athletic brands do not alter the material often. However non-athletic women shoes producers give many possibilities of materials to choose to the customers.
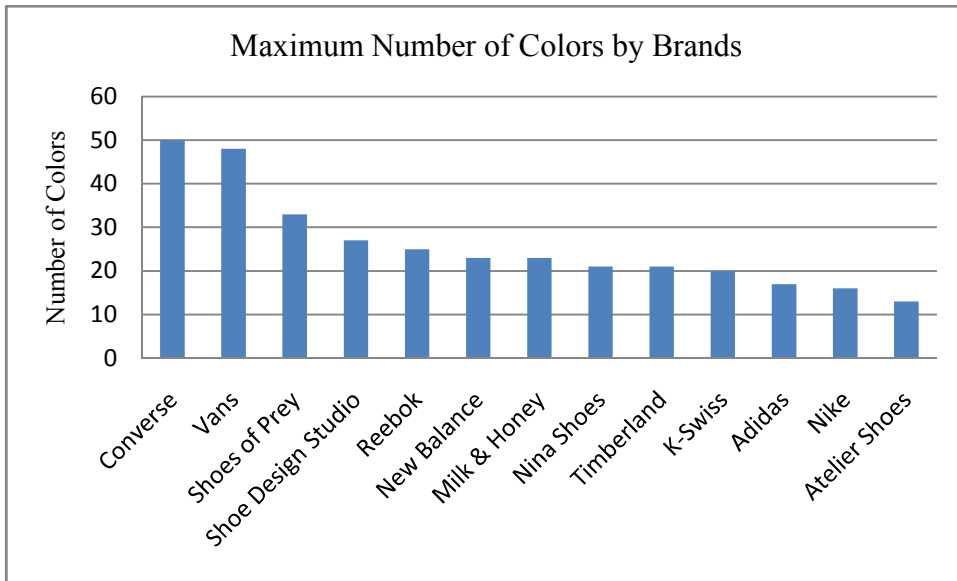
Figure 5. 18. Maximum number of colors used by brands for their different models
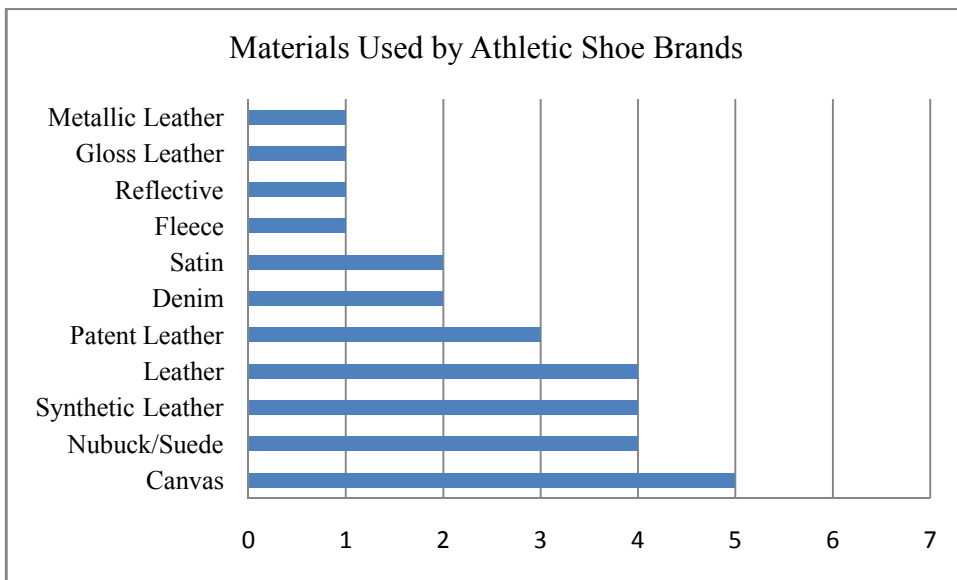
Figure 5. 19. Materials used by Athletic Shoe Brands (7 brands total)
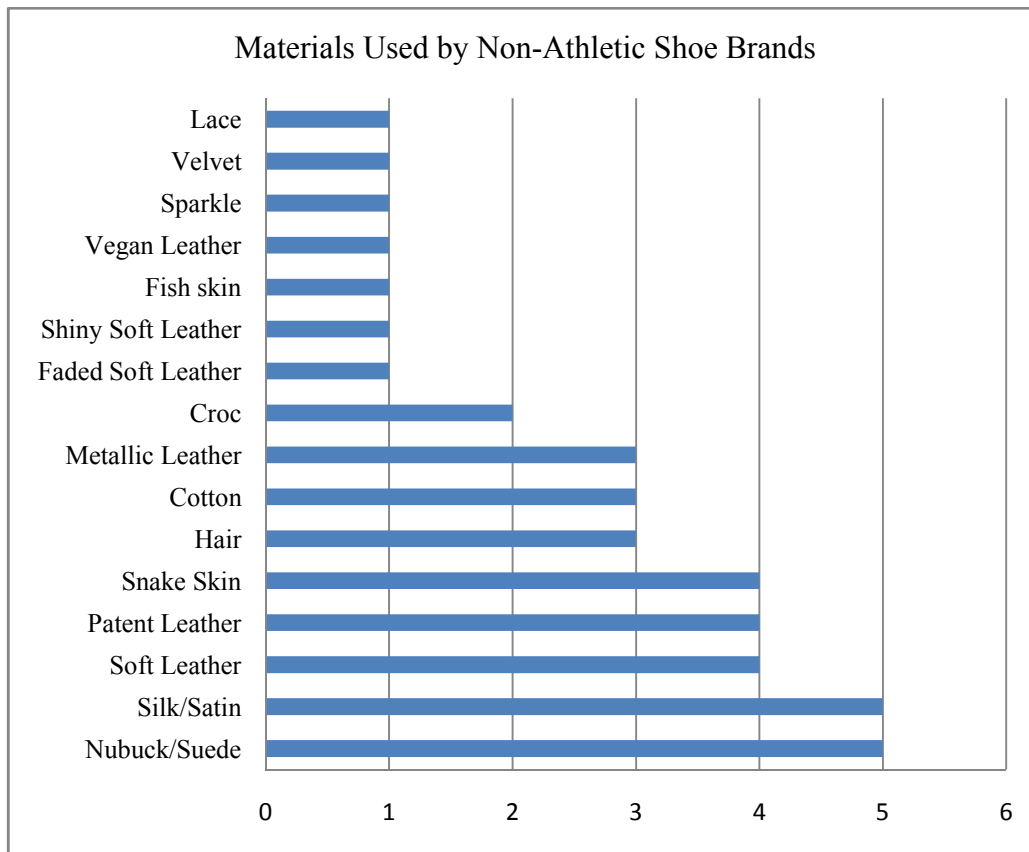
Figure 5. 20. Materials used by Athletic Shoe Brands (6 brands total)

The last dimension of the footwear customization is function. Function is not used by non-athletic at all and just few brands, Adidas, Nike and Reebok offer customer function as a customizable feature. Adidas offers to customize sockliner and gives possibility to choose performance, cushion and light types, additionally midsole to be managed as stable or cushioned for some types of running shoes. Furthermore Adidas offers standard, clima and comfort ankle types; omni, hard clay and clay court types of outsole for some models of tennis shoes. Addition to Adidas, also Nike has hard court, grass and clay outsole options for some models of tennis shoes. Moreover Nike presents attack fast, attack strong, responsive, cushioned, fly over, fly around, fly trough, phylon, max air outsole types and mid or low ankle types for some types of basketball shoes. For soccer shoes Nike give possibility to design function of outsole for wet grass, wet sloppy conditions, artificial grass and extra grip. Outsole of football shoes of Nike can be customized for the traction on dry surface and wet surface. Also function of baseball shoes of Nike can be customized as; for outsole, strong and gripping traction spikes and for midsole air to give comfortable ride, max air to have maximum impact and shox to have responsive cushioning. For action sports of Nike, standard rubber, hard rubber, grip outsole for razor tread pattern and flex outsole for flexible feel; regular and fat ankle types; capsule midsole to support and cushioning and flex wrap midsole for extra grip can be chosen. Among these three brands, Reebok is the most modest one, there are flat, ripple, arctic, balance pods and pod perimeter options of outsoles for some models of tennis and lifestyle shoes.

Visual realism is one of the most important features that a online product configurator should have since the customers cannot see the products with eyes it is needed to help them imagine the real product. The more realistic picture the website provides, the more customer expectation would meet. Additionally when a customer receives self-designed product very close to the visual he has seen on the webpage the possibility to shop again from the same place would get higher. Among 13 brands in footwear which provide online shoe configurator more than half supply highly realistic visuals. Especially athletic shoe brands, these are big brands with years of experience and capital, have more realistic visuals comparison to non-athletic shoes brands. The quality of the visual of the product is top in New Balance, Timberland and Nike. Also Adidas, Reebok Vans, Converse and K-Swiss have notably realistic visuals for the shoes being customized. However regarding to non-athletic brands such as Milk & Honey Shoes and Shoe Design Studio have very poor visuals, very far from reality. Nina Shoes, Shoes of Prey and Atelier Shoes have relatively better product visuals but not as professional as athletic shoe brands'. All the configurators supply visual and changes on visual trough steps of customization.

Another important issue in configurators is its usability, a good projected online product configurator should be user-friendly and simple enough to compass majority of users. All the configurators of all the brands allow customers to go a sequence they want. There is no obligation to start from upper to down or vice-versa. Everybody can start to customize which part they want however there is a detail shouldn't be forgotten that the first sequence the applicator put to software is always more logic therefore since the beginning customers follow a logic way to design the shoes but at the same time they have chance to turn back/go further. The best structured configurators are New Balance's, Atelier Shoe's, Reebok's and Timberland's due to their simplicity, well-structured and easy to follow constitution. It is reasonable that brands such as Nike and Adidas cannot publish a configurator as simple as the others since they have many models, customizable parts and function features however also they are quite successful to navigate customers between choices. The most complicated configurator is Shoe Design Studio's configurator because they put all the customizable models, parts of the shoes, colors and materials together and such organization brings burden of choice and incertitude.

Almost all the brands examined do style customization therefore they need to create uniqueness via aesthetical aspects but which of them really succeed to allow customer create unique product? From athletic brands Nike, Adidas and Reebok offer also function in addition to aesthetics and fitting, moreover adding, name, number, logo, flag and jewels help customers to create unique product. 7 out of 13 brands allow customers to personalize their shoes by writing name/number which is an important issue. Otherwise it is difficult to say that Converse, New Balance and Timberland shoes can be designed so unique due to their product nature. Non-athletic shoes brands such as Milk & Honey, Shoes of Prey and Shoe Design Studio offers millions of possibilities of shoes thanks to many material and color choices but more important from them completely designable shoes. Unlike athletic shoe brands their models are not fixed, toe cap, backs, straps, sides, heels are combinable between each other

therefore customers are most free and creative with these brands. The less creativity and uniqueness belong to Nina Shoes and Vans because Vans shoes do not have many customizable parts and their material is fixed, the same issue valid for Nina Shoes as well. Enjoyment of the customization process is highly variable from customer to customer, who likes do it yourself staff would like also customization of the shoes however who does not have insight their preferences would find it bothersome. Another way of enjoyment for the ones who are already interested in customization could be sharing their design with the others. 7 out of 13 brands give possibility to users share their design via social media Facebook, Twitter, Blog, Tumblr, Google+ or email and sms.

All in all as a supplementary to configurators, check-out options, delivery and return issue are significant for online customization. All of the brands' check-out process does not require any registration and log-in. 7 out of the brands use flat prices which means prices are stable during the customization process they do not change according to materials, parts, colors etc, instead 6 of them use changing prices. In Figure 5.21 there are delivery (production period also included) time of the shoes according to different brands. It is important to underline that only Nike, Milk & Honey Shoes, Shoes of Prey and Shoe Design Studio deliver worldwide, all the rest of 9 brands ships only inside US. Finally 8 of the brands accept returns of customized shoes and 5 of them do not accept returns.
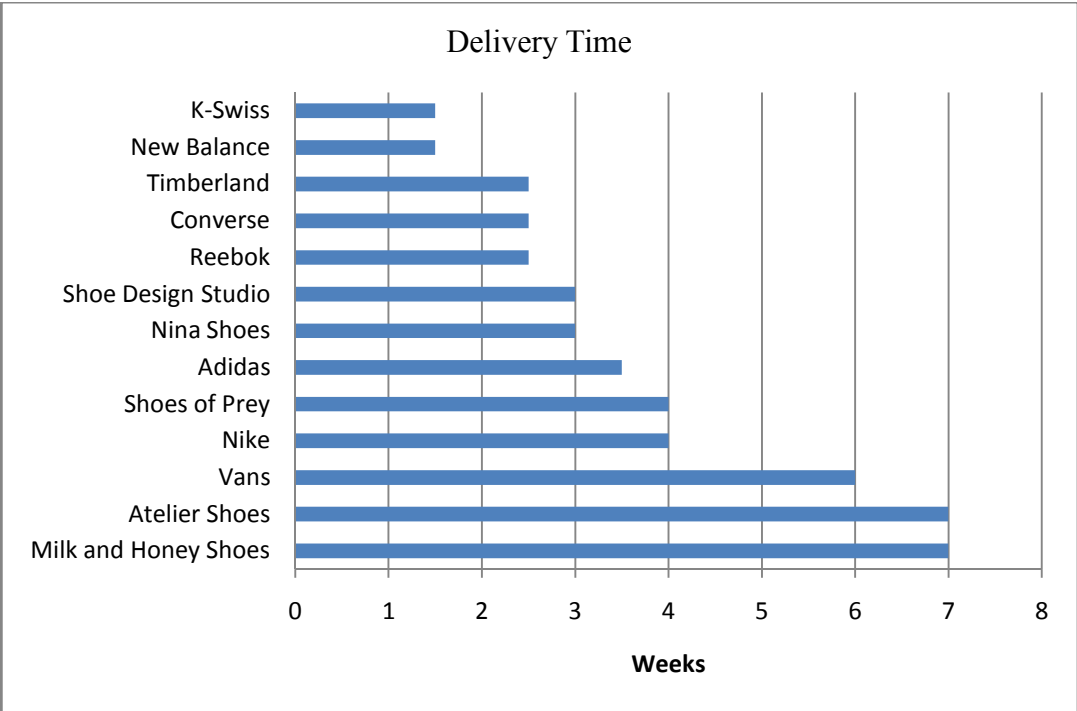
Figure 5. 21. Delivery time of the shoes according to brands

5.2. Internal Analysis

In the second section of the focus of the study there is the framework of developing the questionnaire and output of the questionnaire which is performed as a semi-structured phone interview with the company at point of interest.

5.2.1. Development of Framework

The visible part of the configurators that can be reached by everyone is examined analyzing almost all the brands' online product configurators in footwear industry by evaluating many aspects of them. However analysis of the configurators is only "external" observation that's why a framework is structured based on literature review and configurator analysis in order to understand what kind of information is missing. Consequently the questionnaire is developed according to framework.
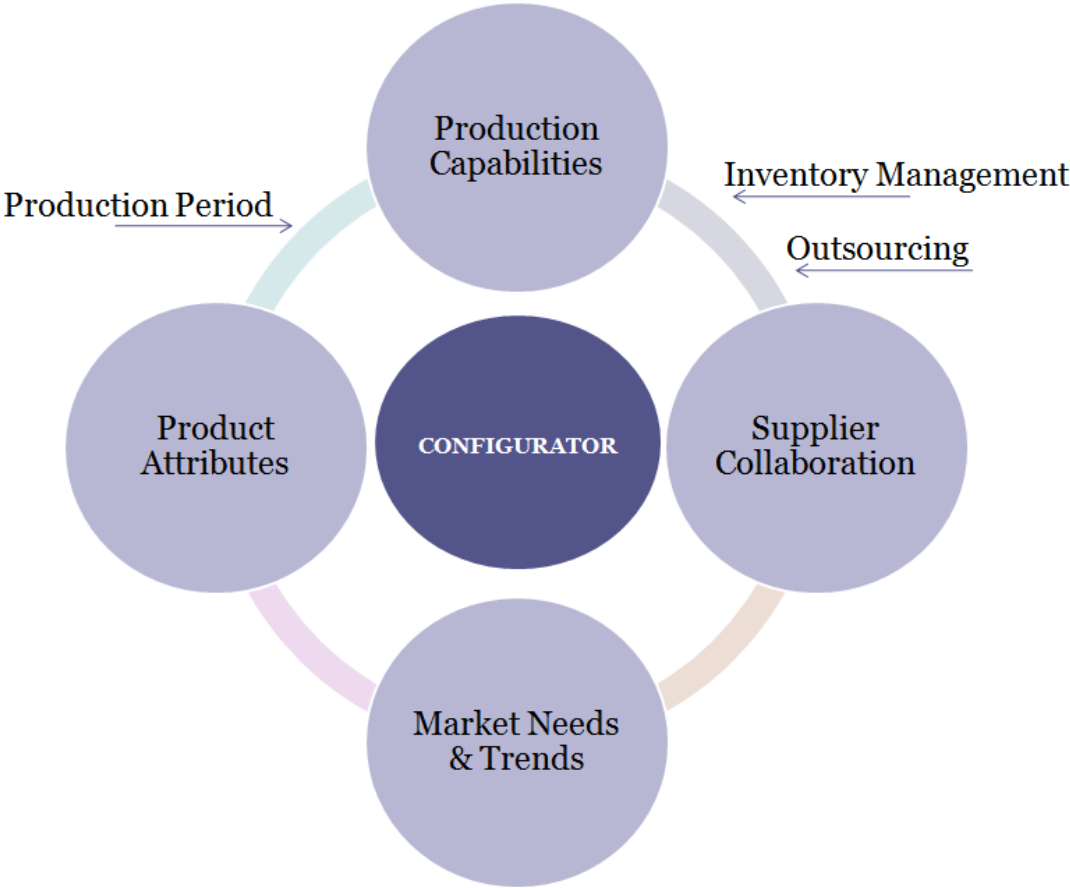
Figure 5. 22. Development of framework

Detailed analysis of the configurators brought many questions and unrevealed parts with them. Firstly four main groups of subjects are organized in order to shape the framework well, these are; creation of solution space, production method used, supplier relationship and

choice navigation. Inescapably given that these four themes belong to one aim they have also commonalities between each other.

The solution space development is the starting point for a company when they are creating their business over mass customization, in other words the product attributes which the company believes that customers need to diverge, consequently "customize", are the first things to be defined. Since the footwear industry is being analyzed and according to analysis has done before on configurators, product attributes are already known as fitting, design and function but the important question "how" they are chosen is undefined. Therefore question related to product attributes is prepared with multiple choices in order to understand how the company chose these attributes. The possible answers are prepared as; ad-hoc market research, knowledge from mass production, demand by existing customers. However always an option "other" is put afterwards possible answers to allow the company explain their unique way if there is.

Next, another significant theme is that how come the company carries out its production in order to deliver qualified products in an acceptable time period for the customers. Possible answers are designed as, using; process modularity, human resources and flexible manufacturing systems. As it is always the option "other" is added for possible different answer can come from company. Moreover their production period, which is related with their solution space considering possibilities of different combinations and their achievability, is asked. The output of this question also helps in twofold, first in order to understand how they organize themselves to produce a pair of shoe which came out from their solution space and to have idea timing about to customization processes in general since externally users can only reach information of delivery period. Related with production period it is asked if there is any improvement (reduction) about it in order to reveal performing mass customization over a time contributes positively to time management.

Third subject is relationship with the suppliers, it is important to know if they have specific collaboration agreements with the suppliers or if suppliers are available to supply small batches. Another possibility can be free information flow with the suppliers which enable suppliers see the orders or even deeper information. The output of this question helps to discover how they manage timing of delivery of the shoes and how they manage production program. Three questions related to production and supplier relationship themes are the outsourcing of components, inventory management and assembling of the products. Finding out the percentage of the components outsourced reveals again how they manage to realize the products since it is time-consuming producing all the parts in the house. Inventory management policy is related with supplier relation and production time, if they keep stock of raw materials it would be quicker to realize production but at the same it would create a cost moreover a company in collaboration with supplier would not need to keep stocks of raw materials therefore outcome of the question contributes to understanding of timing of the mass customization process. Lastly the location of assembly is important to know how it contributes timing.

Finally it is missing how market needs and trends are affecting options taken place in the configurator. Throughout the configurator analysis it is seen that all the brands use fast cycle trial and error logic configurators which enable customers build models of their needs and test the output interactively which is created by choosing different options therefore presenting options in a logical way is important. However it is unknown that according to what kind of a logic the options are chosen. Related fitting there are three sub-categories created after analysis of the brands' configurators; size, width and different sizes for left and right shoe. The possible answers are prepared ad-hoc to each sub-category (see Appendix IV for the details). For the function and aesthetic dimension the logic than fitting is followed. The output of this question helps to find out how they succeed to help customers to identify their own solutions.

5.2.2. The Case Study

Although questionnaire is prepared with possible answers a semi-structured interview was carried out with the company of interest and when it is needed examples of possible answers were given in order to analyze better their logic behind the configurator in terms of how they created their solution space, how production process works out, their relationship with their suppliers and how they manage the choice navigation. It is a small size company particularly from non-athletic women shoes sector and it is appealed outsider. In the following paragraphs there is outcome of the phone interview which was done with the owner of the company on Skype on 12th November 2012.

The company started mass customization in 2007 as pure mass customization company and the owner is inspired from a shop which produces custom bags and shoes in Chicago, she made her preliminary research in that store after she started to build up her ideas with a dedicated team. According to their customization concept attributes which customers are interested to customize are about only aesthetics. They do not use any specific sizing or function features in order to differentiate customer needs. The idea to let customers design aesthetics of the shoes was not customer-driven but it was coming from her innovative entrepreneur approach. Nonetheless in order to start business they made a survey directed to 300-400 people and they got 100 responses but she claimed that it helped to define some of the attributes related to outer design of the shoe.

They use a tool to collect data over customers' actions, this tool can tell them which phase customer stop customizing but they cannot get information what kind of features are selected until that phase. She underlined that "share" button on webpage gives possibility to users share their designs with the friends is helping them and thanks to this feature they can see customized but not purchased designs. Although they follow customer actions, until now such information did not make them change something on customization process.

Adaptive human resources are used to produce customized shoes. She emphasized that they are especially master about wedding shoes which requires a lot of handwork and special

treatment upon customer request therefore they work with craftsman. They produce a pair of shoe about a week period and with the delivery it takes 4 to 6 weeks from the time that they receive order until customer takes it. The production time has not improved over a time because the items they produce need careful design, attention and details are really important. She emphasized that instead of producing more shoes with certain period of time with less quality, they prefer producing less shoes but keeping their quality standards. According to how business goes in the future, they may think change their production style.

They produce most of the components at home, only some pieces as outsole are outsourced. The relationship with the suppliers is based on mutual collaboration. Also suppliers are working with small companies and even the company point at issue is a big collaborator for the suppliers. They can get discounts upon agreements and in emergency conditions they are available to supply materials. Some stock of materials are kept but generally they do in house production so they do not have high levels of stocks they prefer working on order. All the parts of shoes are assembled in the house.

The offers they make via configurator are related to fitting and aesthetics. As it is mentioned before the fitting options are standard, directly taken from standard measurement systems and choosing width is not an option. The offerings related to aesthetic design of the shoe by configurator are determined according fashion trends and designer's (owner) intuition. They have variety of materials especially animal prints and natural colors are popular. In any case she prefers being trend-setter instead of following trends therefore there is no change of models, materials and colors depending on seasonality; they are updated when there are new ideas and designs coming from company inside. Finally, choosing material and colors may change according to suppliers' willingness to supply or their availability. Additionally two questions about data tracking of the customer actions are organized under solution space development and choice navigation. Firstly it is asked to the company if they track the data of the customer while they are in customizing process and secondly it asked if the output of the data tracking causes some changes in their mass customization processes especially in terms of eliminating/creating some options related to configurators. Result of this question implies the importance of data tracking and its contribution to mass customization processes.

5.3. Guidelines for Setting-up a Web-Based Configurator in Footwear Industry

This study examined 13 footwear companies which do mass customization through web-configurators. According to cross wise analysis it is found that almost all the companies apply pre-elimination between models before starting to real customization. Most of them do not provide ulterior information about the product however all of them let users examine previous designs/suggested designs in order to get inspiration. Less than half of the companies let consumers see reviews, suggestions from previous users. Mostly there is option for saving the progress. In terms of customizable dimensions, less than half provides different size charts/size guide when it is time to customize fit; only three of thirteen allow choosing

different sizes for left and right foot and half of them present width as an option. Considering customizing aesthetics, it is observed that all of the brands have variety of options for colors but for materials it is seen that non-athletic bands have more options comparison to athletic ones. Generally customizing function is not an option, only three of thirteen brands have function options. Nearly all the brands examined try to keep product visual as real as possible, however there are two of them who need to improve visual quality. They are all different than each other even the brands such as Nike and Converse, Adidas and Reebok are from same group their configurators make difference among each other and have unique and creative features. Usability of the configurators is a subjective evaluation but it is believed that most of them can be used by averagely informed internet user. None of the companies obliges registration for check out and mostly they use flat pricing. All the companies specify delivery period, delivery conditions, delivery area and return issue.

Addition to the information obtained via analyzing web-based configurators; a case interview has accomplished in order to understand selected company's approach to mass customization processes and their logic behind developing the configurator. After the detailed examination of the online product configurators and their features a guidelines is generated for the new comers and the ones want to improve their system:

1. Assist choice navigation in order not to give a space to any confusion
2. Give inspiration to users by providing some additional visual/information
3. Try to offer at least 2 of 3 customizable dimensions (Fitting, Aesthetic, Function)
4. Provide options for special needs (very big/very small sizes, variety of colors, different materials, special technological function in order to differentiate from market)
5. Visualize the offer with high quality
6. Create a user-friendly software
7. Provide easy purchase experience
8. Define precise cost, delivery and return conditions

In the table below there are key points that are learned from the study and suggestions for the configurator applicators.

Table 5. 1. Guidelines for developing web-based footwear configurator

Guidelines for Developing Web-based Footwear Configurator			
I. Provide User Assistance	**II. Organize Customizable Dimensions**	**III. Adjust the Interface of the Configurator**	**IV. Organize the Conditions of Purchase and After Purchase**
1. Provide navigation help • Options for pre-classification of the shoes • Option for starting from scratch or with inspiration	**4. Options for fitting** •Provide size guide ✓Options to choose between different international size charts ✓Provide a guideline to let customers find their measure at home •Provide as possible as wide range of size options •Option to choose left/right foot size differently	**7. Make realistic the product visual** •Provide a shoe visual as possible as close to real one •Support customization process with a product visual all the time	**9. Options for check-out** •Provide users options to purchase self-designed product with registration and without registration for time saving •Provide flat pricing during the customization •Allow users to visualize price in different currencies
2. Provide company assistance •Provide information about the shoe ✓Material information ✓Usage information ✓Technical information •Option to chat with stylist •Option to save the progress	**5. Options for aesthetics** •Define customizable parts •Provide options to choose different colors and materials •Provide additional details such as; ✓Printing option ✓Adding jewels/embellishment option	**8. Optimize features of configurator** • Create a software which is; ✓ User-friendly ✓ Creative ✓ Innovative ✓ Unique ✓ Simple	**10. Organize policies for delivery** •Specify delivery area •Define delivery conditions clearly •Specify delivery period
3. Provide assistance from previous customers • Provide designs by previous customers • Provide list of most popular shoes • Provide user reviews	**6. Options for function** •Provide functional options according to type of the shoe		**11. Provide information about acceptance of returns**

First of all, online product configurator applicators should help customers to navigate their choices. Configurators with many models to offer should create preliminary elimination between models according to their usage area or distinctive features. Another pre-help before starting customization can be suggesting some inspiration to the users. Some models already designed by other users or the one company itself. Pre-selected features and combination of different parts of the shoes would give an idea to users especially the ones who does not have insight to their preferences would benefit from inspirations. The users with co-designer feeling inside can prefer starting from scratch.

In the study it is observed that some companies give extra information about the products and materials. Providing information would help users to do better choices. Moreover additional information about materials and tips about combination of pieces will be appreciated. Besides previous customer reviews can be found trustworthy so there can be section on the page of configurator which gives space to comments obtained by real users. Some companies provide live chat option with the stylist and this is a great solution for the consumers who hesitate about their designs. There should be save option in all the

configurators, because once design is abandoned it is difficult put the same pieces together again especially in the situations where there are many options of materials and colors. Save option would be benefit of the mass customization applicator so that they will not lose possible purchases.

Number of choices while designing the product depends on the solution space company creates itself. Current applicators in footwear industry generally offer style customization therefore there is a big gap to fill out in terms of function offerings. In order to convince customers to purchase a product they have never seen and touched, also with a waiting period there should be an offer which can be considered as plus. This offer can come in terms of broad size range, adjustable widths, availability to supply different sizes for each foot when fitting is considered; for aesthetics dimension there are already many offer by the current brands so for the new comers at least their level should be caught moreover especially in athletic shoes it is not possible to make changes over parts' of the shoes there can be more flexible designs letting customers use their imagination. Also material variety should be managed in order to meet expectations of majority. As it is mentioned before function is still important issue to work on it. Especially from non-athletic shoe brands there is no one doing function customization. There firms exist in this area for classic men shoes however they do not have online kit. It is acceptable that foot scanning and online product configurator together are not logical because once customer in shoe store can easily choose its material and the design also there. In my opinion function issues which can be customizable online should be added. For instance, non-athletic women shoe brands can offer gel cushions for high heel shoes in order to make them more comfortable.

The visual of the configurator should be as close as possible to reality. Given that users do not have chance to see real product the image online should be convincing. Once customer is satisfied about the trustworthiness of the product, repurchase possibility would get higher. Additionally visual presentation of the product should be available in every step of the customization. Another significant issue is that the user-friendliness of the software. It should be simple enough to let wide range of users understand it and use it at the same time it should give enjoyment. More or less all the configurators examined in this study do not require more than 10-15 minutes finishing customization. It is important to present logical links between customization steps in order to save time.

As it is in current configurators there shouldn't be any requirement of registration to website for buying a customized product. This helps firms to collect information about the customers but make customers lose time and even maybe change their ideas to buy the product. According to empirical study mentioned in previous sections it is better to use flat prices instead of changing prices; applying changing prices can create confusion and lead customer change his idea about the purchase. Companies can calculate most proper prices in a way that they can make profit with the usage of different kind of materials. Moreover availability of different currencies would make customer decision process about purchase easier.

It is not about configurator but as a complementary that many brands currently do not ship outside of US. Therefore there is opportunity to develop supply chains and production systems which will be able to serve also outside of the US. Delivery time is another issue that should be improved again with the collaboration of supply chain and advanced production systems. Currently the shortest waiting time is 6-10 days. Also according to empirical research mentioned before customers want a guarantee of the shoes, they expect that firms accept returns when they do not like or it doesn't fit.

It shouldn't be forgotten that there is no unique way of developing configurators. As it can be seen from the case study that everybody has his own way to customize and link these activities with the configurator. Addition to the characteristics specified above, the configurator should be innovative, in line with the brand image, creative and let customer take pleasure from customizing.

According to considerations that are explained above a guidelines is prepared in order to help companies in footwear industry which want to set-up their own configurator and also it can help to the companies which need to improve their current configurator (Table E.1) As it can be seen from the table there are four decisional categories for a successful configurator; user assistance, customizable dimensions, interface of the configurator and purchase - after purchase operations. Firstly assistance to users which enclose all types of help and support to customers in order to direct them a product which meet their needs. All the options belong to user assistance are discretionary; however it is useful to provide all of them. Naturally option "chat with stylist" may not be possible for big brands with thousands of users, nonetheless it could be an option for a starter company also to get known and understand customer needs and weak parts of the configurator while chatting with the users.

Secondly, customizable dimensions and related options to them are the heart of the configurator. Firstly companies should define their solution space by identifying the product attributes which customers need to diverge then in line with their solution space they need to present customizable dimensions. As it is defined before there are three customizable dimensions for footwear customizing; fitting, aesthetics and function. Once more all the options under organizing customizable dimensions don't have to be necessarily present however in order to keep up with current competitors it useful to follow the path suggested in the table as much as possible.

Another important point related to configurator development is interface of it. All the possible features such as realistic visual, user-friendliness, creativity, simplicity of the configurator should be planned in order to supply a delightful shopping experience to the users.Finally the last step is checking-out so the purchase process. It is not part of configurator however they are highly linked. Purchase of the product should be quick and simple without any obligation for registration. The delivery area, delivery conditions, delivery period and acceptance of returns information should be well-defined.

6. CONCLUSION

This study is focusing on mass customization in footwear industry. Companies which apply mass customization are searched trough internet, databases, previous studies and 21 companies are found worldwide. Among them a selection made according to their being "Click & Brick Sellers" and "Pure Click Sellers" and customizable offer. Moreover they are examined according to their product positioning and the one which does "Digital Tailoring", pricing over acceptable mass customization range. After all there have been 13 companies to analyze and 98 shoes from 13 different brands are customized and trough this way data related to configurators is collected. The brands individually are analyzed; their origin, product positioning, product types and customization level are set. Moreover all the configurators are examined in terms of their customizable offer, *fitting, aesthetics and function*, help options for customization, software interface and delivery conditions. After individual examination bias analysis is made in order to compare current footwear configurators. It is found that currently brands offer pre-elimination of models before starting customization, some of them provide further information about product, material and technology for the shoes and they allow previous users to publish their comments about their customized products, most of them provide save option to record customization progress. Size chart and width options are provided only by some of them and generally function customization is not offered. All current brands offer variety of colors and materials but just some of them allow adding jewels and embellishment to the shoes. Additionally athletic shoe brands offer printing as an option. Generally product visual is close to reality and in terms of design of the software they are different than each other. All of the brands specify delivery conditions well and they do not require registration for purchases.

Addition to state of art examination of configurators for the internal analysis a case study with a company from non-athletic women shoes sector is accomplished in order to discover how they found out which attributes customer needs to diverge, how is their production system, their relationship with the suppliers and how they manage the offerings can be seen by configurator. The findings are; they are doing style customization and they do not have different offerings about size and function. They employed more human resources in order to meet the demand for customized products. They are in collaboration with the suppliers in case of emergency they have some privilege by them. Additionally they assemble all the parts in the house and they prefer not keeping high level of stocks. The customizable parts, materials and colors of the shoes are decided according to designer's perception.

After putting together external and internal analysis, as it is stated in objective a guidelines is created for the new comers to footwear industry where they want to set up their own configurator and the ones who want to improve their current offering. In order to catch and even exceed the current market offerings related to configurators there are some points:

- They need to provide well-structured customer assisting not to let customers have any confusion.

- Some examples should be supplied for the customers who do not have very-well shaped ideas.
- It is needed to study on customizable dimensions well and preferably offer something more than current offerings such as odd sized lasts, functional features, different materials and colors, customized non-athletic shoes for men which do not require foot scanning, printing on non-athletic shoes, giving possibility to customers to upload their patterns etc.
- Keeping product visual very close to reality is in benefit of both customers and company in order not to give any disappointment and lose customer.
- The conditions related to delivery period, delivery area and return should be defined well and as an opportunity to catch delivering all over the world, shorter delivery periods can be considered.
- Payment should be done in a smooth way without registration and different availability to pay in different currencies can be supplied.
- Social media tools should be used efficiently addition to current offerings publishing in Pinterest, Instagram, Tumblr can be considered. This would create enjoyment even for the customers do no purchase and it will be benefit of company in order to do free-advertisement.
- Mass customizers should customize their configurators following the points stated above and they should create an online shopping experience unique, creative and innovative always in line with brand's offerings.

The study is focused more to the value that can be transferred via configurators. How efficiently deliver these offerings is studied with a single case however as a future study area more cases needed to be accomplished in order to deliver proper suggestion to the new comers to customized footwear sector, how to supply these offerings conveniently by arranging solution space, production methods, supplier collaboration and choice navigation.

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APPENDIX

Appendix I. Customized Athletic Shoes

		mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Main Brand	mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Shoe Family	Basketball	Basketball	Golf	Outdoor
	Shoe Name	Adizero Basketball	Adizero Basketball 2	mi Powered Golf	mi Boat CC
	Price	165 $	145 $	180 $	85 $
	Picture				
Fitting	**Available Genders**	F/M	F/M	M	F/M
	Size Range (M)	19 option(6.5-19)	19 option(6.5-19)	17 option (7.0-15.0)	21 option (4.0-14.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)		13 options (5.0-11.0)
	Width Range	Medium	Medium	Medium, Wide	Medium
	L/R Foot option to choose	Yes	Yes	Yes	Yes
Aesthetics	**Base**				
	material				Summer Mesh/Winter Ripstop
	colors	8	8	2	12/6
	Collar				
	material		Nubuck/Patent Leather		
	colors		8		
	Eyelets				
	material				
	colors	15	13		
	Eyestay			Saddle style	
	material				
	colors			17	
	Heel				
	material				
	colors				11
	Laces				
	material				Regular Lacing/ Speed Lacing
	colors	15	13	10	21/2
	Lining				
	material				
	colors	15	4	10	15
	Logo				
	material				
	colors	15	7	17	12
	Overlay				
	material				
	colors				
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors	8	8		12
	Tongue				
	material				
	colors	8			
	Tongue Top				
	material				
	colors				12
	Trimline				
	material				
	colors				
	Midsole				
	material				
	colors	4	2	2	2
	Outsole				
	material				Open Watere/ Street Version
	colors	4	8	8	3
	Print				
	Printing		2 (fixed, wooden,smoke)		
	Writing Name	Yes	Yes (10 chrts)	Yes (14 chrts)	Yes (15 chrts)
	Writing Number	Yes	Yes (2 chrts) additionally	Yes (14 chrts)	Yes (15 chrts)
	Adding Logo	40 basketball teams	40 basketball teams	41 teams, 34 country flags	
	Adding Accessories				
Function	**Heel padding**				
	Sockliner				
	Ankle				
	Outsole type				
	Midsole type				

		mi Adizero adios 2	mi EQT Support	mi Supernova Sequence 4	mi Supernova Sequnce 4W
	Main Brand	mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Shoe Family	Running	Running	Running	Running
	Shoe Name	mi Adizero adios 2	mi EQT Support	mi Supernova Sequence 4	mi Supernova Sequnce 4W
	Price	130 $	150 $	130 $	130 $
	Picture				
Fitting	**Available Genders**	F/M	F/M	M	F
	Size Range (M)	21 option(4.0-14)	16 option(6.5-15.5)	17 option(6.5-16)	19 option(5.0-14.0)
	Size Range (F)	13 options (5.0-110)	13 options (5.0-11.0)		13 options (5.0-11.0)
	Width Range	Medium, Wide, Extra Wide	Medium	Narrow, Medium, Wide	Narrow, Medium, Wide
	L/R Foot option to choose	Yes	Yes	Yes	Yes
Aesthetics	**Base**				
	material	Summer Mesh / Winter Mesh		Summer Mesh/Winter Mesh	Summer Mesh/Winter Mesh
	colors	11	12	11	11
	Collar				
	material				
	colors			11	
	Eyelets				
	material				
	colors				
	Eyestay				
	material				
	colors	7			
	Heel				
	material				
	colors	11	5	11	5
	Laces				
	material				
	colors	14	12	15	14
	Lining				
	material				
	colors	11	12		
	Logo			Stripes + Stripe Base	Stripe cutlines+Stripes
	material				
	colors	14	12	15+11	11 + 14
	Overlay				
	material				
	colors	7	12	11	11
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors		12		
	Tongue				
	material				
	colors	11			11
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				5
	Midsole				
	material				
	colors	2	2	2	2
	Outsole				
	material				
	colors		2	2	2
	Print				
	Printing				
	Writing Name	Yes (10 chrts)	Yes (12 chrts)	Yes (10 chrt)	Yes(8 chrts)
	Writing Number	Yes (10 chrts)	Yes (12 chrts)	Yes (10 chrt)	Yes(8 chrts)
	Adding Logo			10 team flags	10 team flags
	Adding Accesories	Lace jewel-36 country flags	Lace jewels 34 country flags	Lace jewels 36 country flag	Lace jewels (36 country flags)
Function	**Heel padding**			Yes, GeoFit	Yes, GeoFit
	Sockliner			Performance, cushion, light	Performance, cushion, light
	Ankle				
	Outsole type				
	Midsole type				stability, cushion

		mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Main Brand	mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Shoe Family	Soccer	Soccer	Soccer	Tennis
	Shoe Name	mi F50 adzero	mi Adipure 11Pro	mi Adipower Predator	mi Barricade 7 M
	Price	270 $	180 $	260 $	170 $
	Picture				
Fitting	Available Genders	F/M	F/M	F/M	M
	Size Range (M)	21 options (4.0-14.0)	21 options (4.0-14.0)	17 options (6.5-14.5)	19 options (6.5-16.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)
	Width Range	Medium	Medium	Medium	Narrow Medium
	L/R Foot option to choose	Yes	Yes	Yes	Yes
Aesthetics	Base				
	material				
	colors	9	5	8	11
	Collar				
	material				
	colors				
	Eyelets				
	material				
	colors				13
	Eyestay				
	material				
	colors				11
	Heel				
	material				
	colors	10	11	8	11
	Laces				
	material			Short (100cm) / Long (140cm)	
	colors	13	11	14	13
	Lining				
	material				
	colors	10	11	8	11
	Logo			Stripe outlines+Stripes	
	material				
	colors	13	11	14	13
	Overlay				
	material				
	colors	9			
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors		11		
	Toe Cap				
	material				
	colors				
	Tongue				
	material				
	colors		11	8	11
	Tongue Top				
	material				
	colors	10	11		
	Trimline				
	material				
	colors				
	Midsole				
	material				
	colors				3
	Outsole				
	material				
	colors	3	black, white	2	3
	Print				
	Printing				
	Writing Name	Yes (10 chrts)	Yes (8 chrts)	Yes (10 chrts)	Yes (8 chrts)
	Writing Number	Yes (10 chrts)	Yes (2 chrts) additional	Yes (2 chrts) additional	Yes (8 chrts)
	Adding Logo	45 country flags, 21 team flags	44 country flags, 21 team flags	43 country flags, 20 team flags	37 country flags, 10 team flags
	Adding Accesories				
Function	Heel padding				
	Sockliner	Comfort, Ultralight		Ultralight, comfort	
	Ankle				Standard, Clima, Comfort
	Outsole type				Omni courts, Hard court
	Midsole type				

		mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Main Brand	mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Shoe Family	Tennis	Training	Training	Training
	Shoe Name	mi Barricade 7 W	mi Fluid Trainer W	mi Fluid Trainer Light II	mi Clima Generation V
	Price	160 $	105 $	100 $	115 $
	Picture				
Fitting	**Available Genders**	F	F	M	F
	Size Range (M)			17 options (6.5-16.0)	
	Size Range (F)	14 options (5.0-11.5)	12 options (5.0-10.5)	12 options (5.0-10.5)	12 options (5.0-10.5)
	Width Range	Medium, Wide	Medium	Medium	Medium
	L/R Foot option to choose	Yes	Yes	Yes	Yes
Aesthetics	**Base**				Bottom + Top + Mono
	material				
	colors	7	8	15	8 + 8 + 2
	Collar				
	material				
	colors	10			
	Eyelets				
	material				
	colors	10			13
	Eyestay				
	material				
	colors				
	Heel				
	material				
	colors			15	8
	Laces				
	material				
	colors	15	11	16	13
	Lining				
	material				
	colors	10	9	15	8
	Logo				
	material				
	colors	15	7	16	13
	Overlay				
	material				
	colors			15	
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors			15	
	Tongue				
	material				
	colors	10			8
	Tongue Top				
	material				
	colors		8	15	
	Trimline				
	material				
	colors				
	Midsole				
	material				
	colors	3			3
	Outsole				
	material				
	colors	2	4	5	
	Print				
	Printing				
	Writing Name	Yes (10 chrts)	Yes (10 chrts)	Yes (10 chrts)	Yes (8 chrts)
	Writing Number	Yes (10 chrts)	Yes (10 chrts)	Yes (10 chrts)	Yes (8 chrts)
	Adding Logo	36 country flags, 10 team Flags	10 team flags	10 team flags	10 team flags
	Adding Accesories		Lace jewels 35 country flags	Lace jewel (35 country flag)	Lace jewels (34 country flags)
Function	**Heel padding**				
	Sockliner				
	Ankle	Standard, Clima, Comfort			
	Outsole type	Clay court, Hard court			
	Midsole type				

		mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Main Brand				
	Shoe Family	Originals	Originals	Originals	Originals
	Shoe Name	mi Superstar II	mi Samba	mi Gazelle	mi Forum Mid
	Price	105 $	90 $	95 $	125 $
	Picture				
Fitting	**Available Genders**	F/M	F/M	F/M	F/M
	Size Range (M)	21 options (4.0-14.0)	21 options (4.0-14.5)	21 options (4.0-14.0)	20 options (6.0-15.5)
	Size Range (F)	12 options (5.0-10.5)	12 options (5.0-10.5)	12 options (5.0-10.5)	12 options (5.0-10.5)
	Width Range	Medium	Medium	Medium	Medium
	L/R Foot option to choose				
Aesthetics	**Base**	4 lateral sides			
	material	Fino Leather/ Suede/Fleece/	Smooth Matt Leather, Suede	Nubuck Leather /	
	colors	12/10/1/2	11 / 11 / 6 / 1 / 1	11 / 12	
	Collar				
	material				
	colors				
	Eyelets				
	material				Smooth Leather/Patent Leather
	colors	11	13		12 / 14
	Eyestay				
	material	Fino Leather / Suede		Nubuck Leather /	
	colors	12 / 10		11 / 12	
	Heel				
	material		Smooth Matt Leather / Suede	Nubuck Leather /	Smooth Leather / Patent Leather
	colors		11	11 / 12	12 / 14
	Laces				
	material			Display lacing / Straight Lacing	
	colors	16	14	12	14
	Lining				
	material				
	colors	16	13	12	14
	Logo	Standard / Ultrastar	1. / 2. / 3. Stripes	1. / 2. / 3. Stripes	
	material	Fino Leather/ Suede	Smooth Matt Leather, Suede		
	colors	16	14	black, white, fairway green,	14
	Overlay				
	material				Smooth Leather / Patent
	colors				12 / 14
	Quarter				
	material				Smooth Leather/Patent Leather
	colors		11		12 / 14
	Stiching				
	material				
	colors	15			13
	Toe Cap				
	material		Smooth Matt Leather/Suede	Nubuck Leather /	Smooth Leather / Patent
	colors	3	11 / 11 / 5	11 / 12	12 / 14
	Tongue				
	material				
	colors	12	11	12	14
	Tongue Top				
	material				Smooth Leather/Patent Leather
	colors		14		12 / 14
	Trimline				
	material				
	colors				
	Midsole				
	material				
	colors			4	2
	Outsole				
	material				
	colors	5	4	4	3
	Print				
	Printing	Polka dot, Street art, Camo, Classic	3 Native Design	(black,white,orange) bold print,	
	Writing Name	Yes (10 chrts)	Yes (10 chrts)	Yes (10 chrts)	Yes (10 chrts)
	Writing Number	Yes (10 chrts)	Yes (10 chrts)	Yes (10 chrts)	Yes (10 chrts)
	Adding Logo	41 team flags		City print (18 city names) + 42 city	Regular Adidas Logo, X-Large
	Adding Accesories	Lace jewel (36 country flags, 1	Lace Jewel (30 country flags)	Lace Jewel (personalized up	Lace Cover
Function	**Heel padding**				
	Sockliner				
	Ankle				
	Outsole type				
	Midsole type				

		mi Forum Lo	mi ZX700	mi Mega Softcell RL	mi Nizza Hi
	Main Brand	mi Adidas	mi Adidas	mi Adidas	mi Adidas
	Shoe Family	Originals	Originals	Originals	Originals
	Shoe Name	mi Forum Lo	mi ZX700	mi Mega Softcell RL	mi Nizza Hi
	Price	120 $	120 $	130 $	90 $
	Picture				
Fitting	Available Genders	F/M	F/M	F/M	F/M
	Size Range (M)	20 options (6.0-15.5)	21 options (4.0-14.0)	21 options (4.0-14.0)	21 options (4.0-14.0)
	Size Range (F)	12 options (5.0-10.5)	12 options (5.0-10.5)	12 options (5.0-10.5)	12 options (5.0-10.5)
	Width Range	Medium	Medium	Medium	Medium
	L/R Foot option to choose				
Aesthetics	**Base**				
	material				Smooth leather / Summer Mesh /
	colors			12	14 / 14 / 1 / 1
	Collar				
	material				
	colors				
	Eyelets				
	material				
	colors				14
	Eyestay				
	material	Patent Leather / Smooth	Smooth synthetic / Synthetic Animal		Smooth leather / Summer Mesh /
	colors	14 /12	12		14 / 14 / 1 / 1
	Heel				
	material	Patent Leather / Smooth Leather	Smooth synthetic / Synthetic		
	colors	14 /12	12	12	14
	Laces				
	material				Display / Straight Bar
	colors	13	12	12	14
	Lining				
	material				
	colors	14		12	
	Logo			Stripe + Stripe Outlines	Stripes + Stripe Outlines
	material		Smooth synthetic / Synthetic Animal		
	colors	14	12	12	14 + 8
	Overlay				
	material	Patent Leather / Smooth	Smooth synthetic / Synthetic		
	colors	14 /12	12		
	Quarter				
	material	Patent Leather / Smooth			
	colors	14 /12	12		
	Stiching				
	material				
	colors	13			
	Toe Cap				
	material	Patent Leather / Smooth	Smooth synthetic / Synthetic Animal		
	colors	14 /12	12	12	
	Tongue				
	material				Smooth leather / Summer Mesh /
	colors	14	11	12	14 / 14 / 1 / 1
	Tongue Top				
	material	Patent Leather / Smooth Leather			
	colors	14 /12			
	Trimline				
	material				
	colors				14
	Midsole				
	material				
	colors	black, white	4	6	2
	Outsole				
	material				
	colors	3	4	3	4
	Print				
	Printing		Classic trefoil monogram, Bold		19 City Names + city view, 4 print
	Writing Name	Yes (10 chrts)	Yes (10 chrts)	Yes (8 chrts)	Yes (10 chrts)
	Writing Number	Yes (10 chrts)	Yes (10 chrts)	Yes (8 chrts)	Yes (10 chrts)
	Adding Logo	Regular Adidas Logo, X-Large			9 team logos
	Adding Accesories	Lace Cover	Lace jewel 29 country flags	Yes(personalized up to	
Function	Heel padding				
	Sockliner				
	Ankle				
	Outsole type				
	Midsole type				

		mi Adidas	mi Adidas	Nike ID	Nike ID
	Main Brand	mi Adidas	mi Adidas	Nike ID	Nike ID
	Shoe Family	Originals	Originals	Running	Running
	Shoe Name	mi Midiru 2	mi Mega Easy Run	Free Run+ 2011 Shield ID	Air Max + 2011
	Price	105 $	120 $	135 $	200 $
	Picture				
Fitting	**Available Genders**	F	F/M	F/M	F/M
	Size Range (M)		21 options (4.0-14.0)	19 options (5.0-15.0)	19 options (5.0-15.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)
	Width Range	Medium	Medium	Regular, Wide	Regular, Wide
	L/R Foot option to choose				
Aesthetics	**Base**				
	material	Fullgrain Leather /	Mesh / Smooth Leather /		
	colors	12 / 9	14 / 14 / 12	7	5
	Collar				
	material				
	colors				
	Eyelets				
	material				
	colors		6		
	Eyestay				
	material		Smooth leather / Nubuck Letaher		
	colors	12	14 / 12		
	Heel				
	material		Smooth leather / Nubuck Letaher		
	colors	12	14 / 12		
	Laces			second lace option for free	second lace option for free
	material				
	colors	12	14	12	13
	Lining				
	material				
	colors	12	14	7	
	Logo				
	material				
	colors	12	14	12	13
	Overlay				
	material			Matte Nubuck/Reflective Synthetic	
	colors			8/4	9
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors				
	Toe Cap				
	material		Smooth leather / Nubuck		
	colors	12	14 / 12		
	Tongue				
	material				
	colors	12	14		
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				
	Midsole			Midsole Rim+Midsole	paint splatter option
	material				
	colors	2		12+4	3
	Outsole				
	material				
	colors	5			10
	Print				
	Printing	4 Printing types (Star Clouds,			
	Writing Name	Yes (10 chrts)	Yes (10 chrts)	Yes (6 chrts)	Yes, 7 characters
	Writing Number	Yes (10 chrts)	Yes (10 chrts)	Yes (6 chrts)	Yes, 7 characters
	Adding Logo				Yes, shoes name
	Adding Accesories		Lace jewel (Adidas logo 12		
Function	**Heel padding**				
	Sockliner				Responsive/Cushioned
	Ankle				
	Outsole type				
	Midsole type				

		Nike ID	Nike ID	Nike ID	Nike ID
	Main Brand	Nike ID	Nike ID	Nike ID	Nike ID
	Shoe Family	Running	Running	Running	Tennis
	Shoe Name	Lunarguide + 3 Shield	Shox Turbo + VI ID	Free 5.0 ID SHOE	Breathe 2K11
	Price	155 $	150 $	125 $	150 $
	Picture				
Fitting	**Available Genders**	F/M	F/M	F/M	F/M
	Size Range (M)	19 options (5.0-15.0)	19 options (5.0-15.0)	19 options (5.0-15.0)	22 options (3.5-15.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)
	Width Range	Regular, Wide, Narrow	Regular, Wide, Narrow		True Fit - EE / Tour Fit - D
	L/R Foot option to choose		yes		
Aesthetics	**Base**				Option standard/Bootie
	material				
	colors	6	10	9	6
	Collar				
	material				
	colors			12	
	Eyelets				
	material				
	colors				
	Eyestay				
	material				
	colors			9	
	Heel				
	material				
	colors				11
	Laces	second lace option	second option lace		second lace option
	material				
	colors	13	13	12	16
	Lining				
	material				
	colors	13	13	11	12
	Logo			Possibility to choose border colour	
	material				
	colors	13	7	12	16
	Overlay		Upper+lower		one layer/two layer
	material	Matte Nubuck/Reflective synthetic			
	colors	8/6	7		10
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors				
	Tongue				
	material				
	colors				
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				
	Midsole			midsole paint / midsole	
	material				
	colors	13		11 / 2	2
	Outsole				
	material				
	colors	8			8
	Print				
	Printing				
	Writing Name	Yes, 5 characters	Yes, 8 characters	Yes, 8 characters	yes, 6 characters
	Writing Number	Yes, 5 characters	Yes, 8 characters	Yes, 8 characters	yes, 6 characters
	Adding Logo	Yes, brand and shoes name	No		Fixed shoes's logo
	Adding Accesories				
Function	**Heel padding**				
	Sockliner	Responsive/Cushioned	Responsive/cushioned		
	Ankle				
	Outsole type				Hard court/Grass/Clay
	Midsole type				

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		Nike ID	Nike ID	Nike ID	Nike ID
	Main Brand	Nike ID	Nike ID	Nike ID	Nike ID
	Shoe Family	Basketball	Basketball	Basketball	Basketball
	Shoe Name	Kobe VII SYSTEM	Lebron 9 Limited	Jordan spizike	Zoom KD IV
	Price	185 $	215 $	210 $	140 $
	Picture				
Fitting	Available Genders:	F/M	F/M	M	F/M
	Size Range (M)	17 options (7.0-16.0)	17 options (7.0-16.0)	18 options (7.0-18.0)	18 options (7.0-18.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)		13 options (5.0-11.0)
	Width Range				
	L/R Foot option to choose				
Aesthetics	Base	Solid/Fade/Dart Frog/Two Tone			Reflective camo/Year of dragon
	material				
	colors	10	5	3	6
	Collar				
	material				
	colors				
	Eyelets				
	material				
	colors				
	Eyestay				
	material				
	colors				
	Heel				
	material				
	colors	9	7	6	
	Laces	second lace option	second option lace	solid/elephant print - second	second lace option free of charge
	material				
	colors	14	5	10	13
	Lining			solid/elephant print	
	material				
	colors		7	10	
	Logo				
	material				
	colors	14	8		13
	Overlay				
	material				
	colors		7		
	Quarter				
	material				
	colors		5		
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors				
	Tongue				
	material				
	colors				
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				
	Midsole			topline/midsole	
	material				
	colors	7	3	7	4
	Outsole				Solid/translucent/XDR outdoor
	material			solid/translucent	
	colors	10	5	7	7
	Print				
	Printing		Option to add paint splatter		
	Writing Name	yes, long id (6 characters)	yes, 5 characters	yes, 4 characters	Yes, 16 characters
	Writing Number	yes, long id (6 characters) / short id	yes, 5 characters	yes, 4 characters	Yes, 16 characters
	Adding Logo		Fixed shoes's logo	Fixed shoes's logo	
	Adding Accesories				
Function	Heel padding				
	Sockliner				
	Ankle	Mid (for more support) / Low (for			
	Outsole type				
	Midsole type	Attack fast/Attack strong			Responsive/Cushioned

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		Product 1	Product 2	Product 3	Product 4
	Main Brand	Nike ID	Nike ID	Nike ID	Nike ID
	Shoe Family	Basketball	Basketball	Basketball	Basketball
	Shoe Name	Air Jordan 2012	Zoom Hyperenforcer	Air jordan Alpha 1	Zoom Sharkley
	Price	215 $	150 $	165 $	115 $
	Picture				
Fitting	Available Genders	M	F/M	F/M	F/M
	Size Range (M)	18 options (7.0-18.0)	21 options(6.0-18.0)	20 options (7.0-18.0)	21 options(6.0-18.0)
	Size Range (F)		13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)
	Width Range				Regular Fit/Wide Fit
	L/R Foot option to choose				
Aesthetics	Base				
	material				
	colors	14	7	11	
	Collar				
	material				
	colors		12	14	
	Eyelets				
	material				
	colors				
	Eyestay				
	material				
	colors				
	Heel				
	material				
	colors		12		9
	Laces	2. lace free of charge	Second Lace is free of charge		
	material		Solid/Speckled		
	colors	14	14	17	14
	Lining				
	material				
	colors		14	14	9
	Logo				
	material				
	colors	14	13	14	13
	Overlay				
	material	Leather/Nubuck/Anodized			Full-Grain/Patent/Nubuck
	colors	7/5/5	7	14	7/7/5
	Quarter				
	material				Denim/Lentincular/Perf.
	colors				4/9/10
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors			11	
	Tongue	Insert (changable not connected to			
	material				
	colors	8			
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				
	Midsole				
	material	Add paint splitter/No	Phylon/Max Air		
	colors	8	4/2+5(airbag color)	3	10
	Outsole				
	material	Solid/Translucent	Solid/Translucent	Translucent/Solid	
	colors	Fine red, military blue, university	6/6	8/15	10
	Print				
	Printing				
	Writing Name	Yes, 3 chrts	Yes, 8 chrts	Yes, 8chrts	Yes, 8 chrts
	Writing Number	Yes, 3 chrts	Yes, 8 chrts+Heel ID 2 chrts	Yes, 8chrts	Yes, 2 chrts
	Adding Logo	Jumpman logo	Name of the shoe		Nike Air logo (fixed)
	Adding Accesories				
Function	Heel padding				
	Sockliner		Responsive/Cushioned		
	Ankle				
	Outsole type				
	Midsole type	Fly Over/Fly Around/Fly Trough	Phylon/Max Air(+10$)		

		Zoom Hyperfuse Low	Air Zoom Flight Five	Mercurial Glide III	Mercurial Vapor VII
	Main Brand	Nike ID	Nike ID	Nike ID	Nike ID
	Shoe Family	Basketball	Basketball	Soccer	Soccer
	Shoe Name	Zoom Hyperfuse Low	Air Zoom Flight Five	Mercurial Glide III	Mercurial Vapor VII
	Price	130 $	160 $	130 $	255 $
	Picture				
Fitting	**Available Genders**	F/M	F/M	F/M	M
	Size Range (M)	15 options(7.0-15.0)	20 options (6.0-17.0)	15 options(6.0-14.0)	12 options(6.0-13.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)
	Width Range			Regular Fit/Wide Fit	
	L/R Foot option to choose				
Aesthetics	**Base**				
	material		Textured Synthetiic/ Smooth		
	colors	11	8/7	6	6
	Collar				
	material				
	colors		12		
	Eyelets				
	material				
	colors				
	Eyestay				
	material				
	colors				
	Heel				
	material				
	colors				
	Laces				
	material				
	colors	12	12	13	13
	Lining				
	material				
	colors	7	12	6	6
	Logo			Outer+Inner	Inner+Outer
	material				
	colors	7	12	13	13
	Overlay				
	material		Patent/Smooth Synthetic Leather		
	colors	7	8/7		
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors				
	Toe Cap				
	material				
	colors		12		
	Tongue				
	material				
	colors				
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				
	Midsole				
	material				
	colors	2			
	Outsole				
	material			FG/SG/Indoor/Turf	
	colors	2	12	Fixed color/Fixed color/Fixed	
	Print				
	Printing				Solid Color/Safari
	Writing Name	Yes, 8 chrts	Yes, 8 chrts	Yes, 8 chrts	Yes, 8 chrts
	Writing Number	Yes, 8 chrts+2 numbers	Yes, 8 chrts	Yes, 8 chrts	Yes, 8 chrts+2 chrts
	Adding Logo		9 Inspirationall Kanii Phareses		Yes, 17 country flags
	Adding Accesories				
Function	**Heel padding**				
	Sockliner				Responsive/Cushioned
	Ankle				
	Outsole type			FG/SG(+5€)/Indoor/Turf	FG/SG
	Midsole type				

			Nike ID	Nike ID	Nike ID	Nike ID
	Main Brand		Nike ID	Nike ID	Nike ID	Nike ID
	Shoe Family		Soccer	Soccer	Soccer	Football
	Shoe Name		Cortez	Total 90 Strike IV	Tiempo Legend IV	Nike Alpha Speed
	Price		115 $	145 $	145 $	125 $
	Picture					
Fitting	**Available Genders**		F/M	M	F/M	M
	Size Range (M)		19 options (5.0-15.0)	15 options (6.0-13.0)	15 options (6.0-13.0)	19 options (6.0-16.0)
	Size Range (F)		13 options (5.0-11.0)		13 options (5.0-11.0)	
	Width Range			Regular fit/wide fit	Regular Fit/Wide Fit	
	L/R Foot option to choose					
Aesthetics	**Base**			Base+Inner Line		
		material	All suede/Nylon-Suede			
		colors	7/8	6	5	14
	Collar					
		material				
		colors				
	Eyelets					
		material				
		colors				
	Eyestay					
		material				
		colors				
	Heel				Heel + heel accent color	
		material				
		colors			10	2
	Laces					
		material				
		colors	12	11	12	13
	Lining					
		material				
		colors	12	6	11	10
	Logo					
		material	Synthetic Leather/Suede		Solid/Reflective Synthetic	
		colors	11/7	11	9/4	12
	Overlay					
		material				
		colors		11		
	Quarter					
		material				
		colors				
	Stiching					
		material				
		colors				
	Toe Cap					
		material				
		colors				
	Tongue					
		material				
		colors				10
	Tongue Top					
		material				
		colors				
	Trimline					
		material				
		colors				
	Midsole		Midsole+Midsole Accent			
		material				
		colors	8			
	Outsole					
		material		FGB/SG/AG/Hybrid	FGB/SG/AG/Hybrid	
		colors	8	2/2/1/1	Black,white/bilack,white/fixed	3
	Print					
		Printing				
		Writing Name	Yes, 8 chrts	Yes, 8 chrts	Yes, 8 chrts	Yes, 5 chrts
		Writing Number	Yes, 8 chrts	Yes, 8 chrts+2 chrts	Yes, 8 chrts+2 chrts	Yes, 5 chrts+2 chrts
		Adding Logo	Yes. 16 country flags / 6 Club logo/			Nike Alpha Speed
	Adding Accesories					
Function	**Heel padding**					
	Sockliner					
	Ankle					
	Outsole type			FGB/SG/AG/Hybrid	FGB/SG/AG/Hybrid	
	Midsole type					TD/D

Section	Attribute		Nike Vapor Talon	Zoom Vapor Fly	Air Max Gamer	Air Diamond Elite
	Main Brand		Nike ID	Nike ID	Nike ID	Nike ID
	Shoe Family		Football	Football	Baseball	Baseball
	Shoe Name		Nike Vapor Talon	Zoom Vapor Fly	Air Max Gamer	Air Diamond Elite
	Price		190 $	165 $	140 $	140 $ (+30 $ glove option)
	Picture					
Fitting	Available Genders		M	M	M	M
	Size Range (M)		16 options (8.0-16.0)	20 options (6.0-16.0)	23 options (4.0-16.0)	15 options (8.0-16.0)
	Size Range (F)					
	Width Range					Regular/Wide Fit
	L/R Foot option to choose					
Aesthetics	Base			Original/Graphic option		
		material				Flywire/Performance
		colors	13	12	8	4/7/6
	Collar					
		material				
		colors				3
	Eyelets					
		material				
		colors				
	Eyestay					
		material				Performance Synthetic/Diamond
		colors				7/8
	Heel					
		material				
		colors			8	
	Laces		Second lacce free of charge			
		material				
		colors	13	12	11	11
	Lining					
		material				
		colors		12	8	8
	Logo				Swosh+Swoah border	
		material				
		colors	13	13	11	11
	Overlay		Overlay+Graphic option			
		material				
		colors	3/13	12		
	Quarter					
		material				
		colors				
	Stiching					
		material				
		colors				
	Toe Cap					
		material				Performance Synthetic/Diamond
		colors			8	7/8
	Tongue					
		material				
		colors				
	Tongue Top					
		material				
		colors				
	Trimline					
		material				
		colors				
	Midsole					Midsole color+Accent color
		material			Air/Max Air/Shox	Air/Max Air/Shox
		colors	5		8	2/8
	Outsole					
		material		TD/D	MCS/Metal	MCS/Metal
		colors		3	2	2
	Print					
		Printing		3 options		
		Writing Name	Yes, 6 chrts	Yes, 8 chrts	Yes, 8 chrts	Yes, 8 chrts
		Writing Number	Yes, 6 chrts+2 chrts	Yes, 8 chrts+2 chrts	Yes, 8 chrts+2 chrts	Yes, 8 chrts+2 chrts
		Adding Logo		Vapor logo		
	Adding Accesories					
Function	Heel padding					
	Sockliner					
	Ankle					
	Outsole type				MCS/Metal (spikes)	MCS/Metal (spikes)
	Midsole type			TD/D	Air/Max Air/Shox	Air/Max Air/Shox

		Nike ID	Nike ID	Nike ID	Nike ID
	Main Brand / **Shoe Family**	Nike ID / Training	Nike ID / Training	Nike ID / Action Sports	Nike ID / Action Sports
	Shoe Name / **Price**	Free Trainer 5.0 / 130 $	Nike Trainer 1.3 / 145 $ (+45 $ for cushion option)	Nike Mogan / 125 $ (+10 $ for strap option)	Primo / 115 $
	Picture				

Fitting		Free Trainer 5.0	Nike Trainer 1.3	Nike Mogan	Primo
	Available Genders	M	M	M	F/M
	Size Range (M)	17 options (6.0-15.0)	18 options (6.0-15.0)	14 options (6.0-13.0)	15 options (6.0-13.0)
	Size Range (F)				
	Width Range	Regular/Wide Fit	Regular/Wide Fit		
	L/R Foot option to choose				

Aesthetics		Free Trainer 5.0	Nike Trainer 1.3	Nike Mogan	Primo
	Base			Mid/Low Profile	
	material			Suede/Smooth Leather	Suede/Coated Leather/Mesh
	colors	9	6	5/7	6/7/14
	Collar				
	material				
	colors				14
	Eyelets				
	material				
	colors				
	Eyestay				
	material			Suede/Smooth Leather/Textured	Suede/Coated Leather/Reflective
	colors			5/9/8	6/7/6
	Heel				
	material				
	colors				
	Laces	Second lace free of charge	Second lace free of charge	Second lace is free of charge	Second lace free of charge
	material				
	colors	14	13	11	14
	Lining				
	material				
	colors			11	
	Logo				
	material			Suede/Smooth Leather/Textured	Suede/Coated Leather/Reflective
	colors	14	13	5/9/8	6/7/6
	Overlay				
	material				Suede/Coated Leather
	colors		7/8		6/7
	Quarter				
	material			Suede/Smooth Leather/Breathable	
	colors			5/9/5	
	Stiching				
	material				
	colors				
	Toe Cap				
	material			Suede/Smooth Leather/Textured	
	colors			5/9/8	6
	Tongue				
	material				Suede/Coated Leather
	colors				6/7
	Tongue Top				
	material		Matte/Andonized Patent		
	colors		7/8		
	Trimline				
	material				
	colors				6/7
	Midsole	Misole Rim+Midsole			
	material			Capsule/Flex Wrap	Cupsole/Flex Wrap
	colors	14/3	2	6/2	White,black
	Outsole				
	material	Indoor/Outdoor	Responsive/Cushioned	Flex/Grid	
	colors	11/1	9/8	9	Caution yellow, redwood, mega
	Print				
	Printing				
	Writing Name	Yes, 8 chrts	Yes, 8 chrts	Yes, 6 chrts (2 font option)	Yes, 8 chrts
	Writing Number	Yes, 8 chrts	Yes, 8 chrts	Yes, 6 chrts (2 font option)	Yes, 8 chrts
	Adding Logo	Nike free logo			
	Adding Accesories				

Function		Free Trainer 5.0	Nike Trainer 1.3	Nike Mogan	Primo
	Heel padding				
	Sockliner				
	Ankle			Regular/Fat padding	Regular/Fat
	Outsole type	Indoor/Outdoor	Responsive/Cushioned	Grip/Flex	Grip/Flex
	Midsole type			Capsule/Flex Wrap	Capsule/Flex Wrap

Category	Attribute		Nike ID	Nike ID	Reebok	Reebok
	Main Brand		Nike ID	Nike ID	Reebok	Reebok
	Shoe Family		Action Sports	Action Sports	Fitness	Fitness/Running
	Shoe Name		Brata	Paul Rodriguez	Crossfit Nano 2.0	Realflex run
	Price		110 $ (+10 $ with high collar)	125 $ (+ 10 $ with high collar)	144 $	123 $
	Picture					
Fitting	Available Genders		F/M	F/M	M/F	M/F
	Size Range (M)		18 options (4.0-15.0)	15 options (6.0-13.0)	16 options (6.5-15)	16 options (6.5-15)
	Size Range (F)				15 options (5-12)	14 options (5-12)
	Width Range					
	L/R Foot option to choose					
Aesthetics	Base			Original/Gradient Breath		
		material	Suede/Canvas	Suede/Leather		Mesh / Suede / Mesh with pattern
		colors	9/8	6/3	Mesh / Graphics (+10 $)	17
	Collar					
		material				
		colors				
	Eyelets					
		material				
		colors			16	
	Eyestay					
		material				
		colors				
	Heel					
		material	Suede/Canvas/Wave Leather			
		colors	9/8		16	
	Laces		Second lae free of charge	Second lace is free of charge	extra laces 3$	extra laces 3$
		material				
		colors	13	12	16	17
	Lining					
		material				
		colors		12	Mesh / Graphics (+10 $)+Bl37	
	Logo					
		material		Solid/Reflective synthetic		
		colors	13	11/3	16	17
	Overlay					
		material				suwde light colors / suede dark
		colors			16	9
	Quarter					
		material	Suede/Canvas	Suede/Leather/Elephant		
		colors	9/8	6/3/8		
	Stiching					(+5$)
		material				
		colors				17
	Toe Cap					
		material				
		colors		12	16	
	Tongue					
		material		Suede/Leather/Elephant		
		colors		6/3/8		17
	Tongue Top					
		material				
		colors				
	Trimline					
		material				
		colors				
	Midsole					Speckles +7$ / realflex accent +7$
		material				
		colors		2	6	17
	Outsole					
		material		Standard Rubber/Hard Black		
		colors	9	12/1	16	17
	Print					
		Printing				
		Writing Name	Yes, 5 chrts (2 font option)	Yes, 8 chrts (2 font options)	Yes, 6 chrts	Yes, 6 chrts
		Writing Number	Yes, 5 chrts (2 font option)	Yes, 8 chrts (2 font options)	Yes, 6 chrts	Yes, 6 chrts
		Adding Logo				
	Adding Accesories					
Function	Heel padding					
	Sockliner		Lunarlon/Zoom		extra sockliner for 5$	
	Ankle					
	Outsole type			Standard Rubber/Hard Black		
	Midsole type					

			Reebok	Reebok	Reebok	Reebok
	Main Brand		Reebok	Reebok	Reebok	Reebok
	Shoe Family		Fitness/Running	Fitness/Running	Fitness/Running	Lifestyle
	Shoe Name		Zigfly	Zigslash	Zig pulse	Classic leather low
	Price		137 $	135 $	135 $	84 $
	Picture					
Fitting	**Available Genders**		M/F	M	M/F	M/F
	Size Range (M)		13 options (7-13)	20 options (6.5 - 18)	15 options (6.5-15)	15 options (6.5-15)
	Size Range (F)		13 options (5-11)		14 options (5-12)	13 options (5-12)
	Width Range					
	L/R Foot option to choose					
Aesthetics	**Base**				possibility to block mesh to black	
		material		synthetic leather / synthetic patent		
		colors	17	17	17	25
	Collar					
		material				
		colors			17	
	Eyelets					colored +5$ / chrome +5$
		material				
		colors				26
	Eyestay					
		material				
		colors	17		17	
	Heel					possibility to add heel clip 5$
		material		synthetic leather / synthetic patent		
		colors	16	17	17	25
	Laces		extra laces +3$ / possibility to	extra laces +3$	extra laces +3$	narrow/wide
		material				
		colors	17	17	17	24
	Lining					
		material				
		colors	17	17	17	25
	Logo		possibility to select accent color		2 other options: glow in the dark	All white / All black / Select text
		material				
		colors	17	17	17	25
	Overlay					
		material		synthetic leather / synthetic patent		
		colors	16	17		25
	Quarter					
		material		synthetic leather / synthetic patent		
		colors		17		
	Stiching		(+5$)		(+5$)	
		material				
		colors	17		17	
	Toe Cap				possibility to add accent colors	
		material				
		colors	17		17	
	Tongue		possibility to select tongue logo	possibility to select tongue logo	possibility to select tongue logo	possibility to select tongue logo
		material				
		colors	16	17	17	25
	Tongue Top					
		material				
		colors				
	Trimline					
		material				
		colors				
	Midsole					
		material				
		colors		4	4	23
	Outsole		possibility to select accent colors	speckles +7$ / fade +7$ /	speckles +7$ / fade +7$ /	possibility to select accent colors
		material				
		colors	16	17	17	23
	Print					
		Printing		Possibility to get large chrts +5$		
		Writing Name	Yes, 6 chrts	yes, 12 chrts	yes, 6 chrts	yes, 8 chrts
		Writing Number	Yes, 6 chrts	yes, 12 chrts	yes, 6 chrts	yes, 8 chrts
		Adding Logo				
	Adding Accesories					
Function	**Heel padding**					
	Sockliner					
	Ankle					
	Outsole type					Flat, ripple i, ripple iii, Arctic V
	Midsole type					

			Reebok	Reebok	Reebok	Reebok
		Main Brand	Reebok	Reebok	Reebok	Reebok
		Shoe Family	Tennis/Lifestyle	Fitness/Running	Fitness/Lifestyle	Fitness/Lifestyle
		Shoe Name	Supercourt	Easytone reeinspire	Top down	Ventilator
		Price	80 $	105 $	79 $	112 $
		Picture				
Fitting		**Available Genders**	M/F	F	F	M
		Size Range (M)	15 options (6.5-15)			16 options (6,5-15)
		Size Range (F)	13 options (5-12)	14 options (5-12)	15 options (5-12)	
		Width Range		Wide		
		L/R Foot option to choose				
Aesthetics	**Base**			lux applied to front of shoe 10$		
		material	leather / suede	mesh / soft leather / metallic foil	Leather / suede/ patent leather,	leather, nylon
		colors	25	14	18	19
	Collar			lux applied to back of shoe 10$		
		material		mesh / soft leather / metallic foil	Leather / suede/ patent leather,	
		colors		14	18	
	Eyelets					
		material				
		colors		18	20	19
	Eyestay					
		material				leather, suede
		colors				19
	Heel					
		material	leather / suede		Leather / suede/ patent leather,	
		colors	25	18	18	
	Laces		narrow/wide	extra laces +3$	extra laces +3$	extra laces +3$
		material				
		colors	25	16	18	
	Lining					
		material				
		colors	25	16		19
	Logo		All white / All black / Select text	possibility to add accent color		
		material	leather / suede	shiny synthetic/ soft leather /	Leather / suede/ patent leather,	leather, suede, patent leather
		colors	25	14	18	19
	Overlay					
		material	leather / suede			Special materials +5$ / leather /
		colors	25			9
	Quarter					
		material				leather, suede
		colors				19
	Stiching				(+5$)	
		material				
		colors			20	
	Toe Cap			lux applied to front of shoe 10$		
		material	leather / suede	synthetic leather / soft leather /	Leather / suede/ patent leather,	
		colors	25	14	18	
	Tongue		possibility to select tongue logo	possibility to select tongue logo		possibility to select tongue logo
		material	leather / suede	mesh / soft leather / metallic foil		leather, nylon
		colors	25	14	6	19
	Tongue Top				possibility to select tongue logo	
		material			Leather / suede/ patent leather,	
		colors			18	
	Trimline					
		material				
		colors				
	Midsole					
		material				
		colors	23	6		2
	Outsole		possibility to select accent colors/	color A1 Ice +5$		possibility to select accent colors
		material				
		colors	23	16	18	17
	Print					
		Printing		Possibility to get pink ribbon		
		Writing Name	yes, 6 chrts	yes, 6 chrts		yes, 7 chrts
		Writing Number	yes, 6 chrts	yes, 6 chrts		yes, 7 chrts
		Adding Logo				
		Adding Accesories				
Function		**Heel padding**				
		Sockliner				
		Ankle				
		Outsole type		Balance pods, pod perimeter		
		Midsole type				

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		Chuck Taylor All Star	Chuck Taylor All Star Ox Patent	Chuck Taylor All Star Leather	Chuck Taylor All Star Ox Satin
	Main Brand	Converse	Converse	Converse	Converse
	Shoe Family	Lifestyle	Lifestyle	Lifestyle	Lifestyle
	Shoe Name	Chuck Taylor All Star	Chuck Taylor All Star Ox Patent	Chuck Taylor All Star Leather	Chuck Taylor All Star Ox Satin
	Price	67 $	80 $	80 $	80 $
	Picture				
Fitting	**Available Genders**	F/M	F/M	F/M	F
	Size Range (M)	26 options (3.5-19.0)	24 options (3.5-17.5)	20 options (3.5-13.5)	
	Size Range (F)		24 options (5.0-19.0)	20 options (5.0-15.0)	26 options (5.0-11.0)
	Width Range				
	L/R Foot option to choose				
Aesthetics	**Base**	2 sides of the shoes colorable		2 sides of the shoes colorable	
	material	Canvas	Patent leather	Leather	Satin
	colors	24/Designs	6	13	6
	Collar				
	material				
	colors				
	Eyelets	Medial+Lateral			
	material				
	colors	12	12	12	6
	Eyestay				
	material		Patent Leather		
	colors		6		
	Heel				
	material	Canvas	Patent Leather	Leather	Satin
	colors	24/Designs	6	13	6
	Laces				
	material				
	colors	12	12	7	3
	Lining				
	material				
	colors	24/Designs	6	24	7
	Logo				
	material				
	colors				
	Overlay				
	material				
	colors				
	Quarter				
	material				
	colors				
	Stiching				
	material				
	colors	24	29	13	7
	Toe Cap	Toe Cap + Toe bumper	Toe Cap + Toe bumper	Toe Cap + Toe bumper	Toe Cap + Toe Bumper
	material		Patent leather	Patent leather	Satin
	colors	3	6+3	6+3	6
	Tongue				
	material	Canvas	Patent Leather	Leather	Satin
	colors	24/Designs	6	13	6
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors				
	Midsole	Stripe	Stripe	Stripe	Stripe
	material				
	colors	12	12	12	6
	Outsole				
	material	Rubber	Rubber	Rubber	Rubber
	colors	3	3	3	3
	Print				
	Printing				
	Writing Name	Yes, 12 chrts (2 font options)	Yes, 12 chrts (2 font options)	Yes, 12 chrts (2 font options)	Yes, 12 chrts (2 font options)
	Writing Number	Yes, 12 chrts (2 font options)	Yes, 12 chrts (2 font options)	Yes, 12 chrts (2 font options)	Yes, 12 chrts (2 font options)
	Adding Logo				
	Adding Accesories				
Function	**Heel padding**				
	Sockliner				
	Ankle				
	Outsole type				
	Midsole type				

Category	Attribute		Skidgrip CVO	Jack Purcell Ox Leather	Jack Purcell	Star Player EV Ox Canvas
	Main Brand		Converse	Converse	Converse	Converse
	Shoe Family		Lifestyle	Lifestyle	Lifestyle	Lifestyle
	Shoe Name		Skidgrip CVO	Jack Purcell Ox Leather	Jack Purcell	Star Player EV Ox Canvas
	Price		62 $	75 $	70 $	67 $
	Picture					
Fitting	Available Genders		F/M	F/M	F/M	F/M
	Size Range (M)		20 options (3,0-13,0)	20 options (3,0-13,0)	20 options (3,0-13,0)	24 options (3.5-17.5)
	Size Range (F)		20 options (4.5-14.5)	20 options (4.5-14.5)	20 options (4.5-14.5)	24 options (5.0-19.0)
	Width Range					
	L/R Foot option to choose					
Aesthetics	Base		2 sides of the shoes colorable	2 sides of the shoes colorable	2 sides of the shoes colorable	2 sides of the shoes colorable
		material	Canvas	Leather	Canvas	Canvas
		colors	24/Designs	13	24/Designs	24/Designs
	Collar					
		material				
		colors			6	
	Eyelets					
		material				
		colors	12			12
	Eyestay					
		material				Canvas
		colors				24/Designs
	Heel					
		material		Leather		Canvas
		colors		13	24/Designs	24/Designs
	Laces					
		material				
		colors	12	4	4	12
	Lining					
		material				Canvas
		colors	24/Designs			24/Designs
	Logo					
		material				Canvas
		colors				13
	Overlay					
		material				
		colors				
	Quarter					
		material				
		colors				
	Stiching					
		material				
		colors		13	23	24
	Toe Cap					Toe Cap+Toe Bumper
		material				
		colors	24/Designs			3
	Tongue					
		material	Canvas		Canvas	Canvas
		colors	24/Designs	13	24/Designs	24/Designs
	Tongue Top					
		material				
		colors				
	Trimline					
		material				
		colors		3		
	Midsole		Stripe			
		material				
		colors	12			12
	Outsole		Outsole+Toe bumper			
		material	Rubber	Rubber	Rubber	Rubber
		colors	3	3	3	3
	Print					
		Printing				
		Writing Name	Yes, 14 chrts		Yes, 12 chrts	Yes, (3chrts to heel stripe/7
		Writing Number	Yes, 14 chrts		Yes, 12 chrts	Yes, (3chrts to heel stripe/7
		Adding Logo				
	Adding Accesories					
Function	Heel padding					
	Sockliner					
	Ankle					
	Outsole type					
	Midsole type					

		Vans	Vans	Vans	New Balance
	Main Brand	Vans	Vans	Vans	New Balance
	Shoe Family	Lifestyle	Lifestyle	Lifestyle	Running-lifestyle
	Shoe Name	Slip on	Old Skool	106	US 574
	Price	65 $	75 $	75 $	114.95 $
	Picture				
Fitting	Available Genders	F/M	F/M	F/M	F/M
	Size Range (M)	17 options (6.5-17.0)	17 options (6.5-17.0)	17 options (6.5-17.0)	14 options (6.5-15.0)
	Size Range (F)	13 options (5.0-11.0)	13 options (5.0-11.0)	13 options (5.0-11.0)	10 options (5.0-11.0)
	Width Range				B,D,2E
	L/R Foot option to choose				
Aesthetics	Base				
	material	Canvas	Canvas		Suede+Mesh
	colors		20/28 patterns		23
	Collar				
	material				
	colors		2	2	
	Eyelets				
	material				
	colors	2		2	
	Eyestay				Saddle style
	material		Suede		Mesh/Full grain leather
	colors		10		23/2
	Heel				
	material		Suede		Mesh/Full grain leather
	colors	20/28 patterns	10	20/28 patterns	23/2
	Laces				
	material				
	colors		7	7	23
	Lining				
	material				Poly suede
	colors	2			3
	Logo				Logo+Logo Base
	material				Suede/Full Grain Leather/Synthetic
	colors				23/2/1
	Overlay				
	material				
	colors				
	Quarter				
	material				
	colors	20/28 patterns		20/28 patterns	
	Stiching				
	material				
	colors				
	Toe Cap				
	material	Canvas	Suede	Canvas	Mesh/Full grain leather
	colors	20/28 patterns	10	20/28 patterns	23/2
	Tongue				
	material	Canvas	Canvas	Canvas	
	colors	20/28 patterns	20/28 patterns	20/28 patterns	23
	Tongue Top				
	material				
	colors				
	Trimline				
	material				
	colors	20	20	20	
	Midsole		Stripe		
	material				
	colors		2		
	Outsole	Outsole+outsole stripe	Outsole+outsole stripe	Outsole+outsole stripe	
	material				
	colors	2/20	2/20	2/20	2
	Print				
	Printing				
	Writing Name				Yes, 8 chrts
	Writing Number				Yes, 8 chrts
	Adding Logo				
	Adding Accessories				
Function	Heel padding				
	Sockliner				
	Ankle				
	Outsole type				
	Midsole type				

		New Balance	My K-Swiss	My K-Swiss
	Main Brand	New Balance	My K-Swiss	My K-Swiss
	Shoe Family	Running-lifestyle	Lifestyle	Running
	Shoe Name	US 993	The Classic	Tubes Run 100
	Price	174.95 $	80 $ (F)/85 $ (M)	105 $
	Picture			
Fitting	**Available Genders**	F/M	F/M	F/M
	Size Range (M)	16 options (7.0-16.0)	16 options (6.5-15.0)	16 options (6.5-15.0)
	Size Range (F)	15 options (5.0-13.0)	13 options (5.0-12.0)	13 options (5.0-12.0)
	Width Range	B,D,2E	Medium, Wide	
	L/R Foot option to choose			
Aesthetics	**Base**			
	material	Suede+Mesh		Mesh
	colors	23	2	17
	Collar			
	material			
	colors			
	Eyelets			
	material			
	colors			
	Eyestay	Saddle style		
	material	Suede		
	colors	23		
	Heel			
	material	Suede		
	colors	23		
	Laces			
	material			
	colors	24	20	15
	Lining			
	material	Poly suede		
	colors	3		
	Logo			
	material	Syntheic		
	colors	9	20	15
	Overlay			
	material	Suede/Nubuck		
	colors	23/6		
	Quarter			
	material			
	colors			
	Stiching			
	material			
	colors			
	Toe Cap			
	material	Mesh		
	colors	23		
	Tongue			
	material			
	colors			
	Tongue Top			
	material			
	colors			
	Trimline			
	material			
	colors			
	Midsole			
	material			
	colors			3
	Outsole			
	material			
	colors	2	3	15
	Print			
	Printing			
	Writing Name	Yes, 8 chrts	Yes, 8 chrts	Yes, 7 chrts
	Writing Number	Yes, 8 chrts	Yes, 8 chrts	Yes, 7 chrts
	Adding Logo			
	Adding Accesories			
Function	**Heel padding**			
	Sockliner			
	Ankle			
	Outsole type			
	Midsole type			

Appendix II. Customized Non-Athletic Shoes

		Milk&Honey	Shoes of Prey
	Main Brand	Milk&Honey	Shoes of Prey
	Shoe Family	Classic	Classic
	Basic Shoe Types	5 (Flats, Sandals, Pumps, Wedges, Boots)	12 (Flat Sandals, Flats, Heeled Sandals, Mid Heels, High Heels, Extra high Heels , Gladiators, Flat Oxford, Party Heels, Heeled Oxfords, Wedge, Ankle Boots)
	Price	190-300 $	140-330 $
	Picture		
Fitting	**Available Genders**	F	F
	Size Range (F)	14 options (35.0-42.0)	19 options (31.0-49.0)
	Width Range		Narrow/Normal/Wide
	Heel Height	1"/2"/3"/4"	3"/4.5"/6
	L/R Foot option to choose		
Aesthetics	**Base**	Customizable	Customizable
	material	Leather/Patent Leather/Pony/	Faded Soft Leather/Soft Leather/Shiny Soft Leather/Patent
	colors	23/20//5/14/5/13/13/7/13/16/8/5 Black, onyx, grey, equestrien, baby, caramel, antique silver/	7/23/5/16/10/5/14/33/15/8/9/12
	Backs & Straps	Customizable	Customizable
	material	Leather/Patent Leather/Pony/	Faded Soft Leather/Soft Leather/Shiny Soft Leather/Patent
	colors	23/20//5/14/5/13/13/7/13/16/8/5 Black, onyx, grey, equestrien, baby, caramel, antique silver/	7/23/5/16/10/5/14/33/15/8/9/12
	Piping & Trim	Customizable	Customizable
	material	Leather/Patent Leather/Pony/	Faded Soft Leather/Soft Leather/Shiny Soft Leather/Patent
	colors	23/20//5/14/5/13/13/7/13/16/8/5 Black, onyx, grey, equestrien, baby, caramel, antique silver/	7/23/5/16/10/5/14/33/15/8/9/12
	Embellishment	Customizable	Customizable
	material	Leather/Patent Leather/Pony/	Faded Soft Leather/Soft Leather/Shiny Soft Leather/Patent
	colors	23/20//5/14/5/13/13/7/13/16/8/5 Black, onyx, grey, equestrien, baby, caramel, antique silver/	7/23/5/16/10/5/14/33/15/8/9/12
	Sole		
	material		
	colors		
	Heel types	Skinny/Wedge/Chunky	Stiletto/Square/Wedge/Two Tone Wedge
	Adding Name/Number		
Function			

			Nina Shoes	Shoe Design Studio
	Main Brand		Nina Shoes	Shoe Design Studio
	Shoe Family		Classic	Classic
	Basic Shoe Types		9 (Evelixa, Culver, Electra, Granite, Elke, Kyleen, Paladin, Eterna, Elga)	4 (Pump, Sandal, T-strap, Mule)
	Price		200 $	230-350 $
	Picture			
Fitting	**Available Genders**		F	F
	Size Range (F)		15 options (5.0-12.0)	Tailored (Special to Customer Size)
	Width Range			
	Heel Height		2.5"/3.25"/3.5"/4.25"/5"	0.5"/1"/2.5"/3"/3.5"/4"
	L/R Foot option to choose			Yes
Aesthetics	**Base**		Fixed (just color is customizable)	Customizable
		material	Satin	Glazed Leather/Metallic Leather/ Patent
		colors	21	15/15/14/12/11/7/16/27/7
	Backs & Straps		Fixed (just color is customizable)	Customizable
		material	Satin	Glazed Leather/Metallic Leather/ Patent
		colors	21	15/15/14/12/11/7/16/27/7
	Piping & Trim		Fixed (just color is customizable)	Customizable
		material	Satin	Glazed Leather/Metallic Leather/ Patent
		colors	21	15/15/14/12/11/7/16/27/7
	Embellishment		Customizable	
		material	Adding Stones (+20 $)	
		colors	6	
	Sole			
		material		
		colors		
	Heel types		Stiletto/Wedge	Thin Stiletto/Thick Stiletto/Chunky/Block
	Adding Name/Number			
Function				

		Ateiler Shoes	Timberland
	Main Brand	Ateiler Shoes	Timberland
	Shoe Family	Classic	Boot
	Basic Shoe Types	7 (Sally, Millie, Mary Jane, Kate, Grace, Tess, Babs)	14 inch
	Price	135-300 $	190 $
	Picture		
Fitting	Available Genders	F	F
	Size Range (F)	10 options (6.0-10.0)	12 options (5.5-11.0)
	Width Range		Medium
	Heel Height	Fixed	
	L/R Foot option to choose		
Aesthetics	Base	Fixed (just color is customizable)	
	material	Snakeskin/Crocodile/Ostrich/Leather/Metallic/Patent	Nubuck/Smooth
	colors	2/3/4/13/5/7/11/10	12/2
	Backs & Straps	Fixed (just color is customizable)	
	material	Snakeskin/Crocodile/Ostrich/Leather/Metallic/Patent	
	colors	2/3/4/13/5/7/11/10	
	Piping & Trim	Fixed (just color is customizable)	
	material	Snakeskin/Crocodile/Ostrich/Leather/Metallic/Patent	
	colors	2/3/4/13/5/7/11/10	
	Embellishment		
	material		
	colors		
	Sole		
	material		Rubber
	colors		5
	Heel types	Fixed	
	Adding Name/Number		Yes (3 letters/numbers+2 letters/numbers)
Function			

	Main Brand	Timberland	Timberland
	Shoe Family	Boot	Boot
	Basic Shoe Types	Waterville	Nellie
	Price	115 $	125 $
	Picture		
Fitting	Available Genders	F	F
	Size Range (F)	12 options (5.5-11.0)	12 options (5.5-11.0)
	Width Range	Wide/Medium	Medium
	Heel Height		
	L/R Foot option to choose		
Aesthetics	Base		
	material	Nubuck/Smooth	Nubuck/Smooth
	colors	12/2	12/2
	Backs & Straps		
	material		
	colors		
	Piping & Trim		
	material		
	colors		
	Embellishment		
	material		
	colors		
	Sole	Midsole+Outsole	
	material	Rubber	Rubber
	colors	7+5	5
	Heel types		
	Adding Name/Number	Yes (3 letters/numbers+2 letters/numbers)	Yes (3 letters/numbers+2 letters/numbers)
Function			

	Main Brand	Timberland	Timberland
	Shoe Family	Classic	Classic
	Basic Shoe Types	Classic Boat Shoe	Handsewn
	Price	100 $	120 $
	Picture		
Fitting	Available Genders	F	F
	Size Range (F)	12 options (5.5-11.0)	12 options (5.5-11.0)
	Width Range	Medium/Wide	Medium/Wide
	Heel Height		
	L/R Foot option to choose		
Aesthetics	Base	Tongue+Side	Tongue+Side
	material	Nubuck/Smooth	Nubuck/Smooth
	colors	20/1	20/1
	Backs & Straps		
	material	Nubuck	Nubuck
	colors	21	21
	Piping & Trim		
	material		
	colors		
	Embellishment		
	material		
	colors		
	Sole	Mid+out	
	material	Rubber	Rubber
	colors	10+8	10+8
	Heel types		
	Adding Name/Number	Yes (3 letters/numbers+2 letters/numbers)	Yes (3 letters/numbers+2 letters/numbers)
Function			

		Main Brand	Timberland	Timberland	Timberland	Timberland
		Shoe Family	Boot	Boot	Classic Shoe	Classic Shoe
		Basic Shoe Types	6-inch	Varsity	Boat Shoe	Handsewn
		Price	185 $	185 $	110 $	140 $
		Picture				
Fitting		**Available Genders**	M	M	M	M
		Size Range (M)	17 options (6.5-18.0)	17 options (6.5-18.0)	12 options (6.5-15.0)	12 options (6.5-15.0)
		Width Range	Medium/Wide	Medium/Wide	Medium/Wide	Medium/Wide
		L/R Foot option to choose different size and width				
Aesthetics	**Base**					
		material	Nubuck/Smooth	Nubuck/Smooth	Leather, Nubuck	Leather, Nubuck
		colors	12/2 Black, chocolate, wheat, pebble, pink, kelly green, brick red, olive green, light brown, indigo, pewter, white, /distressed wheat, black	12/2 Black, chocolate, wheat, pebble, pink, kelly green, brick red, olive green, light brown, indigo, pewter, white, /distressed wheat, black	21 Wheat, indigo, black, pebble,pink, purple, pewter, chocolate, periwinkle, hot pink, light grey, light brown, kelly green, brick red,olive green, white, burgundy, peanut, black smooth,rootbear, distressed wheat	21 Wheat, indigo, black, pebble,pink, purple, pewter, chocolate, periwinkle, hot pink, light grey, light brown, kelly green, brick red,olive green, white, burgundy, peanut, black smooth,rootbear, distressed wheat
	Tongue					
		material			Leather, Nubuck	Leather, Nubuck
		colors			21 Wheat, indigo, black, pebble,pink, purple, pewter, chocolate, periwinkle, hot pink, light grey, light brown, kelly green, brick red,olive green, white, burgundy, peanut, black smooth,rootbear, distressed wheat	21 Wheat, indigo, black, pebble,pink, purple, pewter, chocolate, periwinkle, hot pink, light grey, light brown, kelly green, brick red,olive green, white, burgundy, peanut, black smooth,rootbear, distressed wheat
	Back					
		material			Leather, Nubuck	Leather, Nubuck
		colors			21 Wheat, indigo, black, pebble,pink, purple, pewter, chocolate, periwinkle, hot pink, light grey, light brown, kelly green, brick red,olive green, white, burgundy, peanut, black smooth,rootbear, distressed wheat	21 Wheat, indigo, black, pebble,pink, purple, pewter, chocolate, periwinkle, hot pink, light grey, light brown, kelly green, brick red,olive green, white, burgundy, peanut, black smooth,rootbear, distressed wheat
	Sole		Mid+Out	Mid+Out	Mid+Out	Mid+Out
		material				
		colors	7+5 Black, grey, white, angora, red, honey, patriot blue Black, grey, nicotine, white, translucent honey	7+5 Black, grey, white, angora, red, honey, patriot blue Black, grey, nicotine, white, translucent honey	10+8 Black,brown, white, tan, cheddar, lemon chrome, india ink, allure, crown jewel, moonstruck Honey, nicotine, black, white, navy, royal, bazaar, windchime	10+8 Black,brown, white, tan, cheddar, lemon chrome, india ink, allure, crown jewel, moonstruck Honey, nicotine, black, white, navy, royal, bazaar, windchime
		Adding Name/Number	Yes (3 letters/numbers+2 letters/numbers)	Yes (3 letters/numbers+2 letters/numbers)	Yes (3 letters/numbers+2 letters/numbers)	Yes (3 letters/numbers+2 letters/numbers)
Function		**Outsole types**				
		material				

Appendix III. Summary of the Customized Shoes

	Mi Adidas							
	Basketball	**Golf**	**Outdoor**	**Running**	**Soccer**	**Tennis**	**Training**	**Originals**
# of shoes inside the category	4	1	1	4	3	2	3	10
Avg. Price	$155	$180	$85	$135	$237	$165	$107	$110
Delivery time	3-4 weeks	3-4 weeks	3-4 weeks	3-4 weeks	3-4 weeks	3-4 weeks	3-4 weeks	3-4 weeks
Fitting								
Size Range (M)	6.5-19.0	7.0-15.0	4.0-14.0	4.0-14.0	4.0-14.0	5.0-16.0	5.0-16.0	4.0-15.5
Size Range (F)	5.0-11.0	-	5.0-11.0	5.0-11.0	5.0-11.0	5.0-11.0	5.0-11.0	5.0-11.0
Width Range	Medium	Medium Wide	Medium	Narrow Medium Wide Extra Wide	Medium	Narrow Medium Wide	Medium	Medium
Aesthetics								
Customizable parts (out of 19)	9(max)*	6	9	12(max)*	10(max)*	10	10(max)*	13(max)*
# of Material choice	1	1	2	2	1	1	1	5
# of Color choice (max)	15	17	15	15	15	14	16	16
Printing on shoe	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo
Adding accesories	Yes	-	-	Yes	-	-	Yes	Yes
Function			-					
Heel padding choice	-	-	-	Yes	-	-	-	-
Sockliner choices	-	-	-	Performance Cushion Light	-	-	-	-
Ankle padding choices	-	-	-	-	-	Standar Clima Comfort	-	-
Outsole choices	-	-	-	-	-	Clay Court Hard Court	-	-
Midsole type choices	-	-	-	Stability Cushion	-	-	-	-

*maximum number of parts that can be customizable for one type of shoe inside the category

	Nike ID							
	Basketball	**Baseball**	**Action Sports**	**Running**	**Soccer**	**Tennis**	**Training**	**Football**
# of shoes inside the category	10	2	4	5	5	1	2	3
Avg. Price	$169	$145	$126	$160	$158	$150	$160	$160
Delivery time	3-4 weeks	3-4 weeks		3-4 weeks	4-5 weeks	3-4 weeks	4-5 weeks	3-4 weeks
Fitting								
Size Range (M)	7.0-16.0	4.0-16.0	4.0-15.0	5.0-15.0	6.0-14.0	3.5-15.5	6.0-15.0	6.0-16.0
Size Range (F)	5.0-12.0	-	-	5.0-12.0	5.0-12.0	5.0-12.0	5.0-12.0	-
Width Range	Regular Wide	Regular Wide	-	Regular Wide Narrow	Regular Wide	True Fit-EE True Fit-D	Regular Wide	-
Aesthetics								
Customizable parts (out of 19)	9(max)*	9(max)*	10(max)*	7(max)*	7(max)*	8	7(max)*	8(max)*
# of Materials	12	2	12	2	6		1	
# of Color choice (max)	16	11	14	13	13	16	14	14
Printing on shoe	Name Number Logo	Name Number	Name Number	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo	Name Number Logo
Adding accesories	-	-	-	-	-	-		-
Function								
Heel padding choice	-	-	-	-		-		-
Sockliner choices	Responsive Cushioned	-	-	Responsive Cushioned	Responsive Cushioned	-		-
Ankle padding choices	Mid Low	-	Regular Fat	-		-		-
Outsole choices	-	MCS Metal	Grip Flex Standard Rubber Hard Black Rubber	-	FGB SG AG Hybrid	-	Indoor Outdoor Responsive Cushioned	TD D
Midsole type choices	Attack fast/strong Responsive Cushioned Fly over/around/on Phylon Max air	Air Max air Shox	Capsule Flex Wrap	-		Hard court Grass Clay	-	-

*maximum number of parts that can be customizable for one type of shoe inside the category

Reebok

	Crossfit Nano 2.0	Realflex Run	Zigfly	Ziglash	Zig Pulse	Classic Leather Low	Supercourt	Easytone Reeinspire	Top Down	Ventilator
# of shoes inside the category	1	1	1	1	1	1	1	1	1	1
Price	$144	$123	$137	$135	$135	$84	$80	$105	$79	$112
Delivery time	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks
Fitting										
Size Range (M)	6.5-15.0	6.5-15.0	7.0-13.0	6.5-18.0	6.5-15.0	6.5-15.0	6.5-15.0	-	-	6.5-15.0
Size Range (F)	5.0-12.0	5.0-12.0	5.0-11.0	-	5.0-12.0	5.0-12.0	5.0-12.0	5.0-12.0	5.0-12.0	-
Width Range	-	-	-	-	-	-	-	Normal Wide	-	-
Aesthetics										
Customizable parts (out of 19)	10	8	11	10	12	10	9	11	11	11
# of Material choice	1	2	1	3	1	1	2	5	10	4
# of Color choice (max)	18	17	17	17	17	25	25	18	20	19
Printing on shoe	Name Number	Name Number	Name Number	Name Number	Name Number	Name Number	Name Number	Name Number Pink Ribbon	-	Name Number
Adding accesories	-	-	-	-	-	-	-	-		-
Function										
Outsole choices						Flat Ripple I Ripple II Arctic V		Balanced Pods Pod Perimeter		

Converse

	Chuck Taylor	Star Player	Skidgrip CVO	Jack Purcell
# of shoes inside the category	24	2	1	2
Avg. Price	$70	$67	$62	$73
Delivery time	2-3 weeks	2-3 weeks	2-3 weeks	2-3 weeks
Fitting				
Size Range (M)	7.0-16.0	3.5-17.5	3.0-13.0	3.0-13.0
Size Range (F)	3.5-17.5	5.0-19.0	4.5-14.5	4.5-14.5
Width Range	-	-	-	
Aesthetics				
Customizable parts (out of 19)	9(max)*+	12	8	7
# of Material choice	4	1	1	2
# of Color choice (max)	50	50	50	50
Printing on shoe	Name Number	Name Number	Name Number	Name Number
Adding accesories	-	-	-	-
Function	No function option			

*maximum number of parts that can be customizable for one type of shoe inside the category

+This model of Converse has choices as double togue and multi tongue (up to 5) which of all can be customizable

	Vans			
	Era	Slip on	Old Skool	106
# of shoes inside the category	1	1	1	1
Avg. Price	$65	$65	$75	$75
Delivery time	5-7 weeks	5-7 weeks	5-7 weeks	5-7 weeks
Fitting				
Size Range (M)	6.5-17.0	6.5-17.0	6.5-17.0	6.5-17.0
Size Range (F)	5.0-11.0	5.0-11.0	5.0-11.0	5.0-11.0
Width Range				
Aesthetics				
Customizable parts (out of 19)	9	8	9	9
# of Material choice	1	1	1	1
# of Color choice (max)	48	48	48	48
Printing on shoe	-	-	-	-
Adding accesories	-	-	-	-
Function				
	No function option			

	New Balance	
	US 574	US 993
# of shoes inside the category	1	1
Avg. Price	$114,95	$174,95
Delivery time	6-10 days	6-10 days
Fitting		
Size Range (M)	6.5-15.0	7.0-16.0
Size Range (F)	5.0-11.0	5.0-13.0
Width Range	B,D,2E	B,D,2E
Aesthetics		
Customizable parts (out of 19)	9	9
# of Material choice	3	2
# of Color choice (max)	23	23
Printing on shoe	Name Number	Name Number
Adding accesories	-	-
Function		
	No function option	

My K-Swiss

	The Classic	Tubes Run 100
# of shoes inside the category	1	1
Avg. Price	$82,50	$105
Delivery time	7-10 days	7-10 days
Fitting		
Size Range (M)	6.5-15.0	6.5-15.0
Size Range (F)	5.0-12.0	5.0-12.0
Width Range	Medium Wide	
Aesthetics		
Customizable parts (out of 19)	4	5
# of Material choice	1	1
# of Color choice (max)	20	17
Printing on shoe	Name Number	Name Number
Adding accesories	-	-
Function		
	No function option	

Classic Shoes W

	Milk&Honey	Shoes of Prey	Nina Shoes	Shoe Design Studio	Ateiler Shoes	Timberland Boots	Timberland Shoes
# of shoes inside the category	5	12	9	4	7	3	2
Avg. Price	$260	$235	$200	$290	$220	$145	$110
Delivery time	6-8 weeks	4 weeks	3 weeks*	3 weeks	6-8 weeks*	2-3 weeks*	2-3 weeks*
Fitting							
Size Range (M)	35.0-42.0	31.0-49.0	5.0-12.0	Tailored	6.0-10.0	5.5-11.0	5.5-11.0
Size Range (F)	-	Narrow Normal Wide	-	Tailored		Medium Wide	Medium Wide
Aesthetics							
Customizable parts (out of 19)	4	3	5	6	1	-	-
# of Material choice	5	5	1	4	3	2	3
# of Color choice (max)	12	12	1	9	8	2	2
	23	33	21	27	13	14	21
Printing on shoe	-	-	-	-	-	Name Number	Name Number
Adding accesories	-	-	-	-	-	-	-
Function	Yes	Yes	Yes	-	-	-	-

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Brand name	Classic Shoes M		
	The Left Shoe Company	Timberland Boots	Timberland Shoes
# of Basic shoe types	4	3	2
Avg. Price	$365	$185	$125
Delivery time	7 weeks	2-3 weeks*	2-3 weeks*
Fitting			
Size Range (M)	Tailored	6.5-18.0	6.5-15.0
Width Range	Tailored	Medium Wide	Medium Wide
Aesthetics			
Customizable parts (out of 4)	2	2	4
# of Material choice	8	2	2
# of Color choice (max)	15	14	21
Printing on shoe	-	Name Number	Name Number
Function			
Outsole type	8	-	-

*Only US shipping

Appendix IV. Questionnaire

Politecnico di Milano - Management Engineering Department 2012

Questionnaire: Mass Customization Operations

The purpose of this questionnaire is to understand how your company realizes mass customization regarding product configurator, production facilities and supply chain. Your responses will be held strictly confidential and any brand, contact name will not be used inside the study.

Please answer the following questions.

1. When did your company start to mass customization?

☐ Less than 2 years ago

☐ 2-4 years ago

☐ 4-7 years ago

☐ More than 7 years ago

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2. How did you discover the product attributes that customers are interested to customize?

Product Attribute	Causes
We decided to let customers customize "Fitting"...	☐ According to ad-hoc market research results. ☐ According to knowledge from mass production. ☐ According to demand by existing customers. ☐ Other, *please specify.*
We decided to let customers customize "Design"...	☐ According to ad-hoc market research results. ☐ According to knowledge from mass production. ☐ According to demand by existing customers. ☐ Other, *please specify*
We decided to let customers customize "Function"...	☐ According to ad-hoc market research results. ☐ According to knowledge from mass production. ☐ According to demand by existing customers. ☐ Other, *please specify*

3. Are you using any tool to collect data over customers' actions?

(Description of possible data collection ways: Tracing the data of unfinished shoes, keeping the track of most used colors..)

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(Please answer the question 4 if the answer of the question 3 is yes.)

4. How did you change/improve your mass customization processes by tracing the customers' actions?

(Examples to possible answers: We deleted the material X that was used only by X% of our customers, we added the option of saving the unfinished shoe before checking out, we offer more number of options for the materials ..)

5. How is your production system to allow you to produce customized shoes for the mass market?

☐ We use process modularity *(engineering technique that builds larger systems by combining smaller subsystems in order to produce a large variety of products at lower costs)* so we can modify the production according to changing customer needs.

☐ We use human resources (most flexible resource).

☐ We use flexible manufacturing system. *(flexible manufacturing system is an automated set of numerically controlled machine tools and material handling systems, capable of performing a wide range manufacturing operations with quick tooling and instruction changeovers and it can give flexibility in terms of machines, products, production, routing and volume flexibility to the system.)*

☐ Other, *please specify.*

6. Could you give us a time for the production period for a single item? (If it makes difference according to different shoe types/families please specify them.)

☐ Less than 3 days

☐ 3-5 days

☐ 5-7 days

☐ 7-10 days

☐ 2 weeks

☐ Other, *please specify.*

7. Did you succeed to reduce production period for a single item over a time? If yes, how many percent did you reduce over a specific period of time and how?

(Examples to possible answers: We reduced the production time from 10 days to 7 days, 30%, in 1 year thanks to introduction of new machines ..)

8. How many percent of the components of the shoes are outsourced and why?

(Example to possible answer: We produce 70% of the components of the shoes in our production facilities and 30% of them we are outsourcing because it is cheaper to outsource when we evaluate overall cost of the shoe..)

9. How is your company's relationship with the suppliers in terms of specific collaboration agreements?

☐ We don't have any specific agreements with suppliers.

☐ Suppliers are agree to provide small batches of raw materials.

☐ We have free information flow with the suppliers to react quickly to customer demands.

☐ We order periodically without any specific collaboration with the suppliers.

☐ We order according to pre-determined volume level without any specific collaboration with the suppliers.

☐ Other, *please specify.*

10. How do you manage the stocks of raw materials/components?

(Examples to possible answers: We keep stock of raw material/components which we had relatively higher demand in past, we have one certain level of all the raw material/components in stock..)

11. Where do you assemble the parts of the shoes?

[ ] We assemble the shoes in the plant.

[ ] We assemble the shoes in retails.

[ ] We assemble the shoes in warehouses.

[ ] Other, *please specify*

12. How the options in the toolkit related to fitting (size, width, different sizes for left and right foot) of shoes are decided?

Fitting	Causes
Size	[ ] Size options are decided via foot scan/measurement individually. [ ] It is decided with dedicated market research about size. [ ] The standard worldwide size options are taken as a model. [ ] Other, *please specify.*
Width	[ ] Width options are decided via foot scan/measurement individually. [ ] It is decided with dedicated market research about width. [ ] We do not have width option. [ ] Other, *please specify.*
Different sizes for left/right foot	[ ] Demand by the customers made us put this option. [ ] It is decided with dedicated market research on it. [ ] We do not have L/R foot option. [ ] Other, *please specify.*

13. How the options in the toolkit related to function (cushioning, outsole type, padding etc) of shoes are decided?

☐ We do not offer function as an option to the customers.

☐ Function options are decided according to information collected by dedicated market research.

☐ Function options are decided according to past experiences/ past demands of the customers / it was starting point to MC.

☐ Other, *please specify.*

14. How the attributes in the toolkit related to design (color, customizable parts, material) are decided?

Design	Causes
Color	☐ The colors are inspired by today's fashion trends, peers. ☐ The colors are chosen according to easiness to obtain from supplier. ☐ Other, *please specify.*
Material	☐ The materials are chosen according to today's fashion trends. ☐ The materials are chosen according to suppliers' willingness to provide / being obtainable. ☐ The materials are chosen because customers are interested in them. ☐ Other, *please specify.*
Customizable parts (Sides of the shoes, laces, heel, logo, outsole etc.)	☐ The customizable parts are chosen based on the possibility to obtain from suppliers ☐ The customizable parts are chosen according to easiness to implement in manufacturing. ☐ The customizable parts are chosen because customers are interested in them. ☐ Other, *please specify.*

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