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Mass Customization

An Exploration of European Characteristics



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Mass Customization

An Exploration of European Characteristics

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Paolo Coletti
School of Economics and Management
Free University of Bolzano Bozen
Piazza dell'Univerità 1
39100 Bolzano
Italy
Paolo.Coletti@unibz.it

Thomas Aichner
Mezzavia Sarentino 13/B
39050 San Genesio Atesino
Italy
t.aichner@gmail.com

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Preface

Mass customization excites both researchers and practitioners because of the possibility to produce customized products with mass production efficiency. This book gives an overview on the need for personalisation from a customer perspective, analyses mass customization theories and assesses relevant best practices of European and International markets. The results of a survey among more than 500 European customers show a declining willingness of customers to compromise on the issue of suitability of products to their personal needs and preferences, the possibility for companies to break brand loyalty and the influence of immediate availability, delivery time and price to the customer's willingness to take part in the co-creation process.

Mass customization has become important to business because of the difficulties of customers to find what they want despite an increase in product variety for many products over the past decades. The emergence of modern technologies in production and communication, however, allows companies to produce customized products without relinquishing economies of scale. With only few companies having taken this promising path, the authors believe that mass customization and mass customization related marketing strategies will play an essential role in the future and prompt both market leaders and their competitors to offer customization on a large scale for a vast variety of products.

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Paolo Coletti
Thomas Aichner

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Chapter 1

The Need for Personalisation

Abstract Mass customization finds its roots in the basic human needs. As soon as mankind, or at least a part of it, has found a way to satisfy the basic physical needs, the attention has been redirected towards personalizing products in order to improve the personal utility of a product and to show personal status and power. However, only with the use of mass production and assembly line technology for personalisation purposes made personalised products available to a growing number of customers for a reasonable price. It is possible to offer customization at different stages of the manufacturing process: distribution, assembly, fabrication or design. According to the stage where it is introduced, the result and the difficulties faced for the effective implementation vary. Therefore, companies adopt different business models with different scopes when starting to insert a mass customization strategy in their production and products' offer.

Keywords Personalization needs · Hierarchy of needs · History of personalization · Mass customization strategies · Products variety

1.1 The Evolution of Needs

Human motivation is the force that pushes the customer to act when faced with the possibility of buying a good. According to a general consensus¹ in psychology, motivation is an internal state or condition that activates or energizes behaviour, that gives it a direction, that directs already goal-oriented behaviour and that influences the intensity of this behaviour. Sources of motivation can be divided into intrinsic or extrinsic categories, with the former further subdivided into physical, mental or spiritual. These sources of motivation are often referred to as needs.

In current scientific literature needs are thus viewed as dispositions towards action and therefore in marketing literature they are studied in order to understand

¹ Kleinginna and Kleinginna (1981).

when and for which scope a human being is pushed to act, in our case to buy. There are various sources of motivation²:

- external or behavioural, arisen from a direct stimulus or from pleasant/unpleasant consequences;
- social, arisen from the imitation of models or group's behaviours;
- biological, arisen from senses and physical stimulation;
- cognitive, arisen from interests or curiosity, problem solving or decision making;
- affective, arisen from personal feelings, self-esteem or enthusiasm;
- conative, arisen from long term goals or control over owns destiny;
- spiritual, arisen from personal purposes or relation with the unknown.

Many theories have been developed to address the identification of human needs. The most famous and used for marketing purposes is the pyramid of needs, presented by Abraham Maslow in 1954³ and subsequently modified by the author himself. Maslow was the first to synthesize human needs together, without focusing on single factors only. He postulated that human needs are hierarchical, based on two groupings: deficiency needs and growth needs. To the first group belong

- physiological needs: breathing, nutrition, sex, body's comfort;
- safety needs: security of body, resources, morality, family, property;
- belonging and love needs: family, relations with others;
- esteem: self-esteem, approval, recognition from others.

Once the needs of the first group are satisfied, the individual looks towards growth needs. According to Maslow's later review,⁴ they are composed of

- cognitive needs: knowing, understanding;
- aesthetic needs: beauty, balance, form;
- self-actualization: self-fulfilment, personal growth;
- transcendence: help others realize self-actualization, relation with the unknown.

Maslow's hierarchy of needs has become one of the most popular and cited theories on human motivations. However, other similar theories have been proposed, often supported by studies. James and Mathes⁵ proposed a theory based on three levels of needs: material, social and spiritual. Alderfer⁶ developed the ERG theory, based on Existence, Relatedness and Growth levels. Existence needs include Maslow's first two levels, relatedness needs are Maslow's third and fourth levels, while growth needs are cognitive and aesthetic needs. However, according to Alderfer, needs do not have a hierarchy and their importance is determined only by the individual. Moreover, when needs remains unfulfilled, the subject regresses

² Huitt (2001).

³ Maslow (1943).

⁴ Maslow and Lowery (1998).

⁵ James (1962); Mathes (1981).

⁶ Alderfer (1972).

Table 1.1 ERG theory with introversion/extroversion dimension

Level	Introversion	Extroversion
Growth	Self-actualization	Transcendence
Relatedness	Belongingness	Esteem
Existence	Physiological	Security

Source Huitt (2001)

to another need that appears easier to satisfy, as postulated by the frustration-regression principle.

A possible variant of Maslow's hierarchy is the introduction of another dimension, the introversion and extroversion. Using ERG theory with this variant leads to a two dimensional structure which is more suitable to describe the relation of people towards needs (Table 1.1).

Other attempts have been done to develop a comprehensive theory of motivation, for example by Leonard, Beauvais and Scholl⁷ who proposed five factors: instrumental motivation (rewards and punishments), intrinsic process (enjoyment), goals (self-determined values), internal self concept (behaving according to ideal self) and external self concept. The first and last factors are external, with instrumental motivation being a short term motivation and external self concept a long term one. The other three factors are internally oriented.

At its origin, mankind was without any doubt focused on physiological needs, with survival as major and often unique objective. Man was barely able to produce goods for self consumption. With the development of early tools some men found it profitable to produce goods for others exchanging them for food or other safety needs. This step marks the switch from production for self consumption to production for selling, which imposes to producers a complete change of thinking. At this point they had to try to satisfy other people's needs rather than their own, requiring investigation and adaptation to their customers' needs.

Up to this time, however, buying of produced goods was limited to survival and goods' requests were driven mainly by their practical utility. With further development, a very limited number of men turned out to be able to allow themselves more than simple survival. These lucky few could afford luxury goods such as, for example, a suit of armour in medieval times. If they had sufficient funds they could place a detailed order and the suit of armour was manufactured according to their specifications. There are different aspects which could be personalised:

- aesthetic, to show social power and richness. In our example it could be engravings or precious add-ons;
- technology, to improve object's utility. In our example stronger materials or more flexible joints;
- personal utility, to improve object's utility only for the owner, such as in our example a suit tailored exactly on the owner's body or to its combat style;
- personal aesthetic, to show social power and richness and, at the same time, being recognized. In our example it could be engraving of initials or family crest;

⁷ Leonard et al. (1995).

- research, in case some technological requests could not be satisfied with standard solutions and require to the producer further study to develop new competences.

These aspects are still now the typical offered personalisation possibilities of a product, and still today they have different impacts on the price, the production steps and a probable reselling or reuse of the product. In particular, while aesthetic and technology clearly improve the object for everybody, which therefore can be easily resold and the gained competences and production methods can be applied to many other similar objects, personal utility and personal aesthetic improve the product only for the specific customer and decrease its value for all the other customers. Therefore, while applying the former two personalisation leads to a valuable product for everybody which can be also produced without a prior order, the latter two personalisation options require an explicit order.



www.boarddesigner.com

Gaspo Sportartikel GmbH is an Austrian sporting goods company. The company was founded in 1963 and introduced mass customization in 2002.

The company offers its customers a choice of 23 customizable snowboards, skiboards and skateboards. The customer can design the selected board without any restrictions. He/she may upload a picture or a complete design or use the available painting tools (pencil, brush, airbrush) and provided graphics.

Prices for customized snowboards range from 239 to 299 € and are as costly as non-customized snowboards (Fig. 1.1).

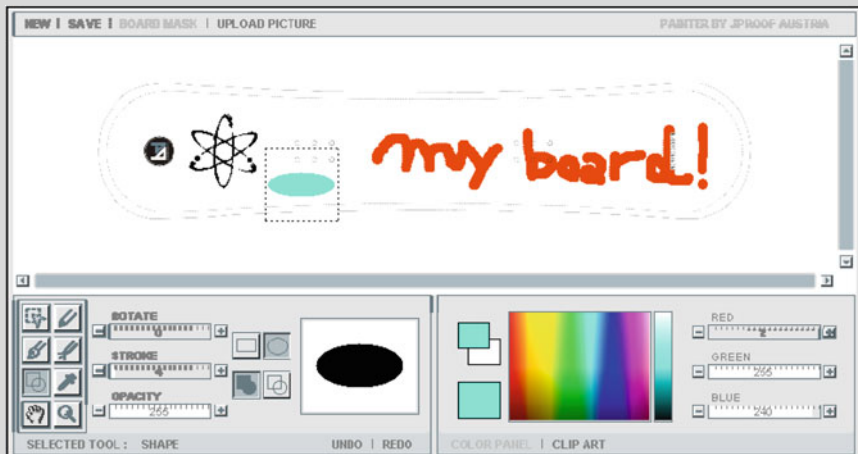


Fig. 1.1 <http://www.boarddesigner.com> Customization process (screenshot)


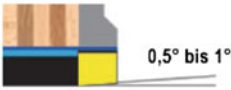
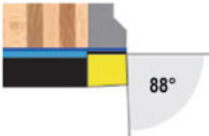
This is a typical example of aesthetic only personalisation which can either be done through a generic drawing which embellishes the snowboard or through a personalised picture, such as the face of the owner, which increases the value for the original buyer but drastically restrict the possibility of selling. On the other hand, this web site does not offer any real technological personalisation, since the only technical features which can be personalised are basic choices of length and model.

www.edelwiser.com



Edelwiser ski (Einzelfirma Nicola Werdenigg) is an Austrian company which produces skis and offers customizable ski boots. The company was founded in 2004 and offered mass customization right from the start.

The company offers its customers a choice of five customizable skis. The customer may also choose his/her binding and other details. The customer can choose the colour of the skis and use personal pictures and graphics to design the skis and ski boots. The price depends on the customer-status, which either is *greenhorn* (new customer), *newbie* (new customer with recommendation from an existing customer) or *member* if he/she already bought something in the past. The prices for customized skis range from 490 to 690 € and are priced approximately the same as non-customizable skis (Fig. 1.2).

Tuning & Service

edelwiser skis are handmade. Only the best materials are used in our skis and they are processed by every trick in the book. But even the best ski can not unfold it's characteristics fully if the tuning is not done properly. That is why we make sure that every pair of edelwiser skis gets the optimal treatment before it leaves our facilities.

Recommended Edge Bevel

Base edge: 0,5° to 1°
 Makes your ski smooth without reducing the grip.

Side edge: 88°
 If the ski is on it's edge this angle will increase grip.

Fig. 1.2 <http://www.edelwiser.com> Personal customization process (screenshot)

This is an example of aesthetic and technical personalisation which improves the ski quality only for the owner who can choose its favourite shape, bindings and even fine tunings of edges. Reselling these skis will require retuning and bindings change.

This book deals with these first four aspects of personalisation, since the first two are the easiest to practically implement and the second two are absolutely necessary for some products. The last personalisation option, research, has the great advantage to produce knowledge as a by-product which can be reused for later production. Anyway, it is still so expensive, slow and without guarantee of success that it is very rarely customer-driven. As it is bound to producer's choice it rarely appears as a possibility even in current mass personalisation offers.

As we have seen before, some products, even with aesthetical or technological personalisation, can be produced not for immediate selling but for stocking. This happened when more funds became available to producers to let them accumulate goods without immediate selling. While it presented an initially unproductive use of resources and a big potential risk since the goods could be destroyed, spoiled or simply not sold, it had several other advantages which strongly depend on the kind of product. Firstly, goods which had a large variance of demand could be produced at a constant rate, which is organizationally more efficient, and sold at a profitable price when demand was high. Secondly, these products could be produced in series, with optimized techniques and use of resources, or in predetermined variants, giving thus the customers the possibility to see exactly what he was going to buy. Lastly, it let the customer buy and take immediately the object without any waiting time. Early products which were standardized and stock produced were famous manuscripts such as the Bible and tools used on a large scale, such as farming tools. Anyway, for many centuries, even those products could not be afforded by the majority of people who built, what they could, by themselves. Stock production, while reducing the personalisation to none, allowed a strong reduction of prices and opened the era of mass production. In fact the printing press, the first example of mass production in the mid-1400s, dramatically reduced the price of books. This obviously raised the demand and therefore printer's profits.



www.personalnovel.net

PersonalNOVEL is a German company which produces customized books. The company was founded in 2003 and offered mass customization right from the start.

The company offers its customers more than 70 customizable novels in German and English language. The customer can select the individual details (first name, second name, nickname, eye colour, hair colour) of one to 58 personalities of the novel and other details such as the location of the action, a pet's name or the name of a football team. Customers may use their own or fantasy names. In addition, the customer can add a personal dedication with up to 400 characters on one page of the book. Furthermore, it is possible to choose whether to print the book as paperback, hardback, linen- or leather-cover (blue, red, black). Lastly, the customer has the possibility to choose the font and to design the cover of the book with a personal title and picture. The basic version is priced at 24.95 €. The price of similar non-customized products starts at approximately 5.00 € (Fig. 1.3).

<i>Weibliche Hauptrolle (mehr Informationen)</i>	
First name of heroine	<i>Hannah</i>
Hair colour of heroine	<i>brunette</i>
Colour of heroine's eyes	<i>green</i>
Favourite colour of heroine	<i>red</i>
Favourite scent of heroine	<i>Romance</i>
Pet name for the heroine	<i>Baby</i>
<i>Männliche Hauptrolle (mehr Informationen)</i>	
First name of hero	<i>Daniel</i>
Hair colour of hero	<i>black</i>
Colour of hero's eyes	<i>blue</i>
Favourite scent of hero	<i>CK One</i>
Pet name for the hero	<i>Honey</i>
<i>Bester Freund der männlichen Hauptrolle (mehr Informationen)</i>	

Fig. 1.3 <http://www.personalnovel.net> Customization process (screenshot)

Printing press with movable types is the first example of large scale personalisation. Even though primarily used simply to reproduce handwritten books, this technology can also be used to easily replace words and sentences with others. [personalnovel.net](http://www.personalnovel.net) takes up this idea and, obviously using more modern desktop publishing software, rearranges already existent books and reprints them with minor changes. This idea unfortunately works mostly with names and only in some languages, while for a major personalisation, such as changing the ending or personalities of characters, a non automatic intervention would be necessary. Another drawback of this technology is evidently the high price for a single copy, since the advantage of printing press has always been the cost cut due to large amounts which here clearly are not what many customers need.



www.mymms.com

Mars, Inc. is a multinational confectionery company. The company was founded in 1911 and introduced mass customization in 2006.

The company offers its customers a choice of 17 different colours of M&M's candies as a base for the customization process.

The customization process involves adding a short personal message or an uploaded logo on one side of the customizable M&M's candies. The price for 600 g of customized M&M's candies starts at US \$11.99 (messages only) and US \$12.99 (photos and messages), respectively. The same quantity of the identical non-customized product is priced approximately the same (Fig. 1.4).

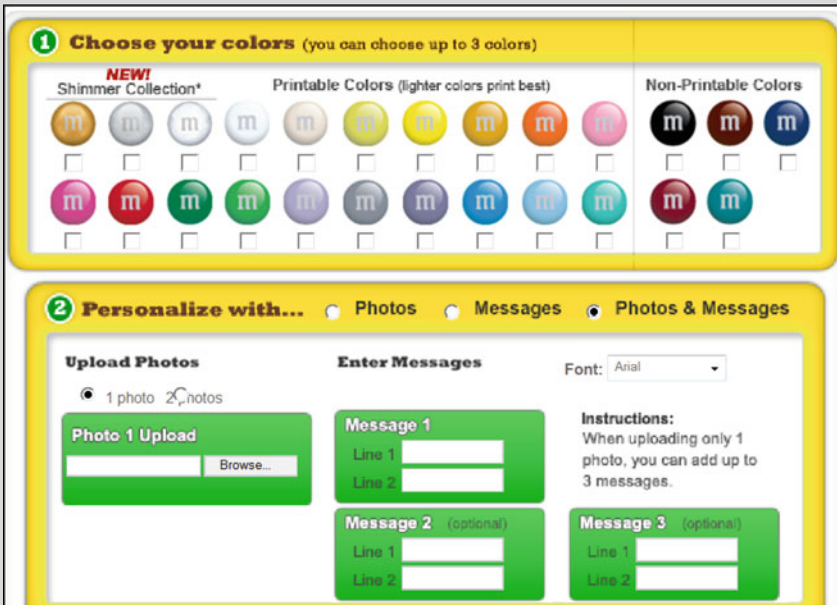


Fig. 1.4 <http://www.mymms.com> Customization process (screenshot)

Even though this web site offers personalisation, it clearly relies on stock productions. Candies are pre-produced in the 25 available colours and stocked. When the customer forwards a request, they are simply printed and mixed as desired. It is clear that in this case the degree of personalisation is minimal, even though personalised messages have a great marketing impact.

However, technological improvements able to start other mass productions lacked in the next centuries and it was only in the late eighteenth century that steam engines launched mass production in textile and metallurgic factories. Many goods, in particular textiles, were then available to everybody, even through the income of the vast majority of people let them only buy the most basic goods, i.e. using Maslow's hierarchy satisfy still only physiological and some safety needs, and therefore there was no request for a large scale personalisation. The second industrial revolution in the mid-nineteenth century definitely promoted mass production as the common production technique against personalised production, which traditionally was relegated to luxury goods.

With the improvements of working conditions, especially in Great Britain and the United States, and with the birth of assembly lines, customers started to have more funds and to be able to afford previously more expensive products, provided they were offered at low enough prices. Assembly line technology was developed at the turn of the century to make the same product in large quantities which required also less production-time per unit, in order to reduce its price and make it affordable to the masses. The implementation of assembly lines enabled, during the twentieth century, almost every industry to produce standardized products. A not mass produced good slowly turned now from being considered a low quality product to a sign of luxury, due to its price, its uniqueness and, for some products which can be highly personalised, its special bond between producer and customer. However, on the other hand, assembly lines opened a small technological gap in the rigid mass production protocol, since a part of the object could be changed according to customers' needs simply by introducing a switch in the line, even though there was still no request for personalisation from customers.

www.dell.com

Dell, Inc. is a multinational personal computer company listed on the NASDAQ stock exchange. The company was founded in 1984 and introduced mass customization in 1996.




The company offers its customers a wide variety of customizable personal computers for private use, small and medium companies, the public sector or large enterprises. The customer can select a base model and customize it by choosing the single units (memory, hard drive, optical drive, processor, etc.) according to his/her individual needs. The prices range from less than US \$400 to more than US \$1,200. The identical non-customized product is the same price as the customizable product (Fig. 1.5).

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- PERC 6/i Internal Controller for Cabled HD Configuration [add £239.00]
- PERC S300 Internal Software Controller for Cabled HD Configuration 3Gb/s [add £84.00]
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- PERC H700, RAID Controller, 512MB Cache, PCIe [add £320.00]



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<input type="checkbox"/>	1	450GB, SAS, 3.5-inch, 15K RPM Hard Drive (Cabled) [£440.00]
<input type="checkbox"/>	1	600GB, SAS, 3.5-inch, 10K RPM Hard Drive (Cabled) [£510.00]
<input type="checkbox"/>	1	500GB, Near-Line SAS, 3.5-inch, 7.2K RPM Hard Drive (Cabled) [£170.00]
<input type="checkbox"/>	1	1TB, Near-Line SAS, 3.5-inch, 7.2K RPM Hard Drive (Cabled) [£350.00]
<input checked="" type="checkbox"/>	1	160GB, SATA, 3.5-inch, 7.2K RPM Hard Drive (Cabled) [£59.00]
<input type="checkbox"/>	1	250GB, SATA, 3.5-inch, 7.2K RPM Hard Drive (Cabled) [£79.00]
<input type="checkbox"/>	1	500GB, SATA, 3.5-inch, 7.2K RPM Hard Drive (Cabled) [£150.00]
<input type="checkbox"/>	1	1TB, SATA, 3.5-inch, 7.2K RPM Hard Drive (Cabled) [£330.00]
<input type="checkbox"/>	1	300GB, SAS, 6Gbps, 3.5-inch, 15K RPM Hard Drive (Cabled) [£380.00]
<input type="checkbox"/>	1	450GB, SAS, 6Gbps, 3.5-inch, 15K RPM Hard Drive (Cabled) [£440.00]
<input type="checkbox"/>	1	600GB, SAS, 6Gbps, 3.5-inch, 10K RPM Hard Drive (Cabled) [£510.00]
<input type="checkbox"/>	1	600GB, SAS, 6Gbps, 3.5-inch, 15K RPM Hard Drive (Cabled) [£610.00]

Fig. 1.5 <http://www.dell.com> Customization process (screenshot)

Dell is an implementation of personalisation which clearly relies on assembly line technology. Computer parts are pre-produced and are later assembled automatically according to customer’s choices and according to technical compatibility which is checked by the personalisation’s interface.

At present days, lower levels of Maslow’s hierarchy of needs for many people of Western economies are satisfied because of increasing wealth and higher living standards as well as lower prices. Therefore esteem needs become more important. Whilst the low price of a product is an advantage which is certainly valued by the customers, the restricted choice of standardized finished goods is now seen as an emerging disadvantage, combined with a rising request for individual objects. The constantly increasing number of product variety (see Sect. 1.2) is a good indicator to prove this development in customer’s needs: the need for personalisation.

“Personalisation” and the verb “to personalise” are defined, by different dictionaries, as follows:

“To attribute human or personal qualities.”⁸

“Endowment with personal or individual qualities or characteristics.”⁹

“Creation of custom tailored services (such as news pages on the web or specialized newsletters) that meet the individual customer’s particular needs or preferences.”¹⁰

“To mark something with someone’s name or initials, or with a special decoration, in order to show who owns it.”¹¹

“To have printed, engraved, or monogrammed with one’s name or initials: personalised the stationery; personalised the bath towels.”¹²

“To make or change something so that it is especially suitable for a particular person.”¹³

Personalisation can therefore be associated both to psychological well being¹⁴ and to usability. For example, when a customer does not like his car to be single-coloured but prefers a specific design, this will not have an impact on the quality or application possibility of the single-coloured car but might decrease the owner’s psychological condition. On the other hand, when a pair of scissors is adjusted to the customer’s fingers, it influences the suitability in terms of both the customer’s particular needs and his individual preference.

The industrial revolution’s view of personalisation was Henry Ford’s view of personalisation: “Any customer can have a car painted any colour that he wants so long as it is black.” Over time, using modern computerisation and robotics, assembly line technology has been improved and has become more flexible in many ways. Computers and information systems are crucial and a necessary prerequisite for mass customization which enables the customer to take part in one or more steps in the creation of a product.

Table 1.2 gives an overview of the production revolution.

As can be seen in Table 1.2, customized products were made in handicraft stores (~1850) according to the customer’s specifications. However, the costs of such a personalised product were remarkably high compared to the prices of the same product produced through mass production (1913). Today’s many customized products are mass produced and customized, which means that customers get the advantages of economies of scale together with the level of personalisation, possibly with the craft technology of a personal tailor, for example. Cars are the typical example of a product which has undergone all these steps. The first pioneer cars built during the nineteenth century were almost entirely craft made, with large possibilities for personalisation due to very small volumes. Then, at the turn of the

⁸ <http://www.thefreedictionary.com>, accessed January 2010.

⁹ <http://dictionary.reverso.net>, accessed January 2010.

¹⁰ <http://www.businessdictionary.com>, accessed January 2010.

¹¹ <http://www.macmillandictionary.com>, accessed January 2010.

¹² <http://www.dictionary.com>, accessed January 2010.

¹³ <http://www.macmillandictionary.com>, accessed January 2010.

¹⁴ Wells et al. (2007).

Table 1.2 Evolution of production paradigms

Paradigm	Craft production	Mass production	Flexible production	Mass customization
Started in	~1850	1913	~1980	2000
Society needs	Customized products	Low cost products	Variety of products	Customized products
Market	Small volume per product	Demand > supply Steady demand	Supply > demand Smaller volume per product	Globalization Fluctuating demand
Business model	PULL (sell-design-make-assemble)	PUSH (design-make-assemble-sell)	PUSH-PULL (design-make-sell-assemble)	PULL (design-sell-make-assemble)
Technology enabler	Electricity	Interchangeable parts	Computers	Information technology
Process enabler	Machine tools	Moving assembly line	FMS robots	RMS

Source Boër and Dulio (2007)

FMS flexible manufacturing system, RMS reconfigurable manufacturing system

century, mass produced cars appeared such as the famous Ford Model T and Model A, with costs going constantly down and demand going up. However, the most remarkable feature of these cars was their omnipresent black colour or colour which depends on the model without any possible customer's choice. Slowly production became more flexible and, starting from colours already in the 1960s and engines in the 1970s, in the 1980s a lot of customization options were available to buyers. Now a vast set of add-ons, variants and engines is available to every potential buyer, even though customized cars are usually slightly more expensive and their production still requires more time.



www.mini.com

*Mini*TM cars were produced by British Motor Corporation from 1959 to 2000. In 2001 BMW launched the old car design with new engines and technologies, calling it *MINI*TM.

*MINI*TM web site claims to have more that 10 millions possible variants, starting from the usual basic choices of the body and engine and going deeply into single parts colours and the new technological add-ons. Prices range from US \$18,000 to over US \$40,000 depending on how many add-ons are ordered and waiting time is 2–3 months.¹⁵ Buying a non customized car has the advantage of immediate availability and possible discounts based on the individual seller (Fig. 1.6).

¹⁵ for Italy in January 2010.



Fig. 1.6 <http://www.mini.com> Body customization process (screenshot)

Automobile customization is really at the top of the number of possibilities and details, since it completely relies on the most recent assembly line technologies and since it has to deal with very exigent customers. However, even though web interfaces are the best ones in terms of convenience and are able to render the product in all its details, it still lacks the possibility of an order via Internet and the extra time needed can easily extend up to 3 months.

1.2 Trend in Product Variety

One of the main characteristics of modern economic systems is the rise of product variety offered by enterprises. Analysing the US market from 1970 to 1998, for example, the increase in product variety can be seen in (Table 1.3).

This increase in number of models is both an increase in the variety of products offered by different companies as well as in the products made by each single enterprise. Defining variety as possible variations for every model, e.g. changing the shape or colour of the rear-view mirror of a car, the trend in product variety for

Table 1.3 Trend in product variety (number of models) for some products in the USA

Types of product	1970	1998
Automobile models	140	260
Newspapers	339	790
TV screens (size)	5	15
Movies (at the cinema)	267	458
Breakfast cereals	160	340
Types of milk	4	19
Mouthwash	15	66
Sports shoes	5	285
Brands of mineral water	16	50
Types of tights	5	90

Source Cox and Alm (1998)

Table 1.4 Trend in product variety (total variations) for some car models in Europe

	Model	Year	Total variations
Vauxhall/Opel	Viva I-HA	1965	59
	Viva II-HB	1967	728
	Viva III-HC	1970	15.848
	Astra I	1983	1.495.104
	Astra II	1984	53.575.680
	Astra III	1993	76.972
Ford	Astra IV	1998	55.425.024
	Cortina II	1968	2.880
	Cortina III	1972	702.464
	Cortina IV/V	1982	219.576.000
Volkswagen	Sierra	1983	1.278.852.000
	Golf I	1980	7.216
	Golf II	1985	2.192
	Golf III	1995	16.968
	Golf IV	1999	154.964

some car models is exponentially increasing (see Table 1.4). The customization options which lead to this numbers are colours, engines and other details which vary from model to model and from car manufacturer to car manufacturer.

The more the number of total variations increases, the less likely it is that the potential customer is able to find the preferred variation on stock. This becomes more evident looking at the numbers of total variations in Table 1.4: it is simply impossible to offer such a number of cars on stock, and therefore the customer who wants a personalised product must be willing to wait more. On the other hand, it increases the possibility to be able to offer a product which meets best the customer's specific preferences and needs.

1.3 Emergence of Mass Customization

However, a large variety offered to potential buyers is still not mass customization. Only when the customer does not only have the possibility to choose among many variants but has also the chance to individually customize a product, mass customization is achieved. The concept of customization can be explained by considering the operational activities of a generic manufacturing enterprise: design, fabrication, assembly and distribution.

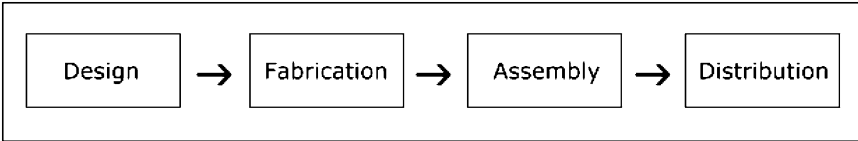


Fig. 1.7 Generic sequence of operational activities for a manufacturing company

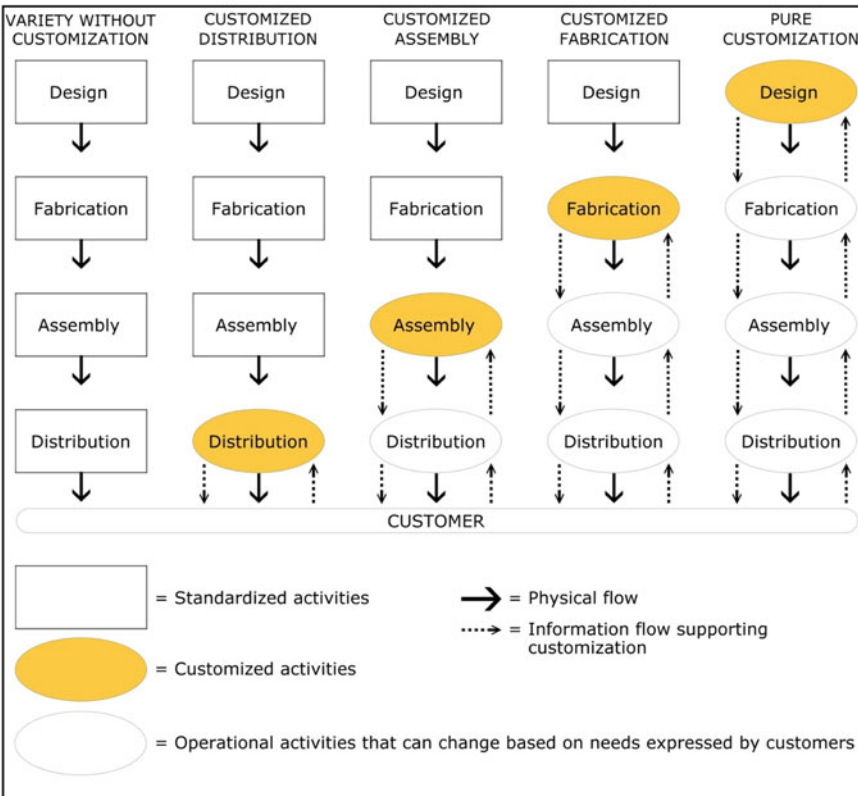


Fig. 1.8 Scope of product configuration. Source Lampel and Mintzberg (1996)

A product can be defined as customized when at least one of the operational activities of design, fabrication, assembly or distribution is carried out according to the customer's specifications. The level of customization depends on the technology used by the enterprise (see Fig. 1.7).

The classification of the five different types of customization shown in Fig. 1.8 underlines the difference between product customization and product variety. The concept of customization is based on direct influence by the customer on one or more operational activities.

Variety without customization means that the customer does not have the possibility to influence any of the operational activities design, fabrication, assembly or distribution. This means that the choice of the customer is limited and that he/she has to choose a given product of a defined variety offered by the companies. However, this fact does not imply that the customer has no or little choice. This is the case with large sporting goods stores such as Foot Locker, for example, where hundreds of similar sneakers and t-shirts are offered, but the range of products is limited to what is displayed in the shop.

Customized distribution means that the customer can only influence the distribution of the product. Design, fabrication and assembly are neither customized nor customizable. An online bookshop such as Amazon is a typical example, because it offers standardized products without offering the customer the possibility to design them or to have any influence on fabrication or assembly. Distribution becomes customizable when the customer can specify several details such as type of dispatch (by air, express or ordinary mail), packing material (such as gift wrapping), insurance options and reference address.



www.myjones.com

Jones soda Co. is an American beverage company. The company was

founded in 1987 and introduced mass customization in 1999.

The company offers customization of a 12-pack of bottles and allows the customer to choose from eight different soda flavours. The customer can design the label by uploading a picture and by adding a photo credit (up to 50 characters) as well as to write a customized text (up to 280 characters on 7 lines) on the back of the bottle. A 12-pack of customized soda bottles is priced at US \$29.99 whereas a 12-pack of non-customized soda bottles of the same company is priced at US \$18.99 (Fig. 1.9).

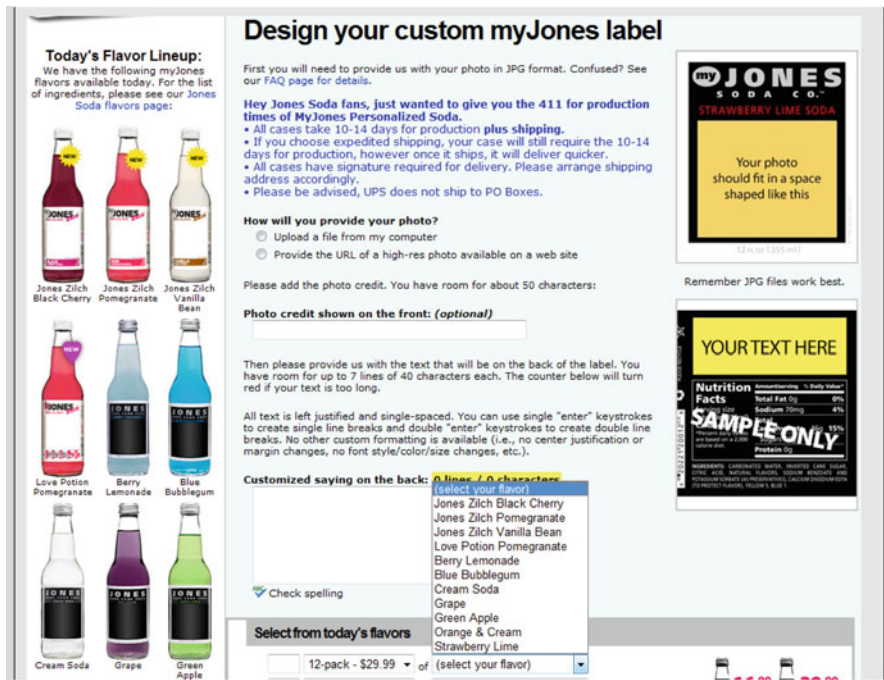


Fig. 1.9 <http://www.myjones.com> Customization process (screenshot)

Even though the drink taste can be chosen from a list, the list is fixed and the customer cannot combine existing flavours into the same bottle nor invent any flavour. The only permitted personalisation is the label, which is part of the packaging. The only aspect which can put this case into mass customization is the fact that the label graphics is freely up to the customer and not limited to a set of possible choices.

In *customized assembly* customers influence the assembly activities. A perfect example is Dell, which offers its customers the opportunity to personalise a computer using prefabricated components. Hence, the customer has no possibility to design the single parts or to influence the fabrication process, because at the moment when the customer customizes and orders his product, the single parts are already fabricated.

If a company offers *customized fabrication* then the customer's requirements directly influence the manufacturing activities. At present, the degree of personalisation at the fabrication stage is limited because of technical and technological restrictions and only allow the customer to choose from a given list of options. This can be the length or height of a piece of furniture, for example. The basic design is not modified at this level of personalisation.

Pure customization is where the optimal level of personalisation is achieved and the customer can build the product according to his individual specifications in matters of design, fabrication, assembly and distribution. The customer has a direct influence on the design of the single parts of a product and the product itself, the fabrication of its parts, the assembly and the distribution. Examples of pure customization are offered by enterprises that design and manufacture industrial machinery, building companies or clothing factories.

Moreover, an effective mass customization means that the customer can not merely personalise the product but also gain the advantages of economies of scale where price and delivery times are possibly identical to those of a mass produced product.

1.3.1 Competencies

In 2007 Moser¹⁶ performed an in-depth case study analysis on 13 selected companies using an industry research group of 40 people and group interview techniques in order to identify dominant competencies for mass customization. This research effort showed eight firm competencies:

- I. Customer integration
- II. Application of product configuration systems
- III. Employment of product modularity
- IV. Product variant management
- V. Central production and logistics planning
- VI. Management of mass and individual production
- VII. Management of flexible organization and processes
- VIII. Process documentation and IT support.

With “competence” Moser means the central considerations around which a firm builds its strategy and attains its profitability.

Customer integration is clearly the first and basic competence, since the customer becomes part of all the productive stages of a mass customized environment. It is essential for the company to deeply comprehend what the customers want, possibly starting from the early design stages.

The firm must manage full technical and content knowledge of the product configuration, gaining the possibility to increase the offer to customers as well as decrease production costs and complexity.

Product modularity is often the best tool to achieve mass customization, though it is not mandatory. With modularization the customer is offered a lot of choices without overwhelming it with a too large complexity. Moreover, it allows build-to-order strategies: the company can postpone production until an order is received, thus reducing inventory costs.

¹⁶ Moser (2007).

A mass customized firm must be able to manage the number of variants, avoiding a too high complexity which drives the user away from its products, or presenting external variants hiding to the user the internal complexity of the production chain.

Product design and production must be centralized. Even though it is often modularized, in order to have full flexibility the entire process must be centrally planned and controlled.

Economies of scale are one of the two key aspects of mass customization. Wherever possible, the design and production must take benefit of a mass production system, with an organization which efficiently combines it with individualization.

Flexible structures and processes are usually in open contrast with economies of scale, which traditionally take profit of stable standardized processes. However, the standardization must not go beyond a limit which permits enough flexibility for the product customization.

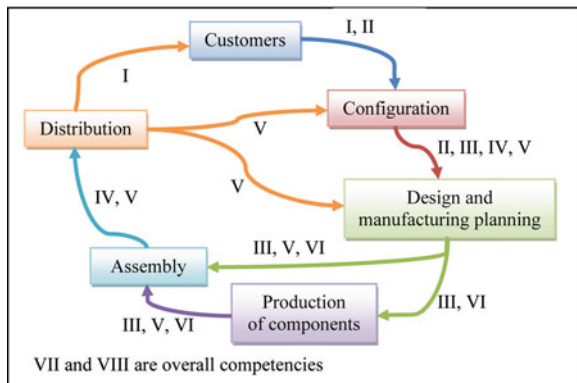
Clearly, the entire value chain must be well documented in order to be adapted to mass customization, which require at the same time introduction of economies of scale and personalisation. Only with a full knowledge of the production chain would it be possible to apply computer technologies, which at the same time automates the personalisation work and lets customer’s needs to enter the information cycle at every stage.

Giving these eight competences, we can build a model for their use in the information cycle of mass customization, as shown in Fig. 1.10.

1.3.2 Transition and Implementation

When a company wants to implement customization in a mass production operating environment a lot of challenges have to be faced. Such a transition involves a radical redesign of the manufacturing core. A simultaneous change of the

Fig. 1.10 Information cycle of mass customization with competencies



manufacturing process, technologies, control systems and supply network configurations¹⁷ can be expected as necessary. Because this product-manufacturing process-supply chain's redesign changes profoundly the manufacturing core, these changes are likely to be met with resistance and, in the worst case, not done.¹⁸

The most apparent factor which could hinder the mass production to mass customization transition is the necessary investment in manufacturing structure dominated by the quest for capturing economies of scale. In a mass production environment, high volumes and relatively stable demand call for a manufacturing structure that relies on efficiency such as automated, special purpose high-yield machinery. In a mass customization environment, product variety and changes require a manufacturing structure that relies on flexibility, for example on flexible, multipurpose machines that implement economies of scope. Past investments in inflexible, highly productive machinery and facilities are likely to become a sunk cost when pursuing mass customization. Decision-makers typically avoid facing this possibility because of risk aversion or requisite responsibility. Even if decision-makers are willing to contemplate the possibility of writing off past investments in rigid manufacturing, they may be willing to postpone the decision itself on the basis that, rationally, the payoff for pursuing mass customization is too uncertain.

Despite some serious challenges, many companies enter the mass customization market. Seven mass customization strategies have been revealed¹⁹:

1. Profit-taker
2. Vehicle for market entry
3. Path to mass producer
4. Build entry barrier and differentiation
5. Symbol to industry and market
6. Vehicle for learning (customer knowledge)
7. Vehicle for increasing operational efficiency

These seven strategies can be divided into two broad categories: a sustainable business strategy for profit-taker, vehicle for market entry, and path to mass producer and a supporting non-mass customized business strategy for build entry barrier and differentiation, symbol to industry and market, vehicle for learning, and vehicle for increasing operational efficiency. These strategies will be analysed in detail in the following chapter.

¹⁷ Forza et al. (2005); Huang and Kusiak (1998); Jiao and Tseng (1999); Swaminathan and Tayur (1998); Su et al. (2005); Krishnan and Chakravarti (1999); Salvador et al. (2002, 2004).

¹⁸ Amburgey et al. (1993).

¹⁹ Moser (2007).

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Chapter 2

Mass Customization

Abstract The lack of consensus about how mass customization is defined results in a number of disagreements: Is it applicable just to products or also to services, which monetary and time prerequisites need to be fulfilled and at which stage of the manufacturing process should customer preferences be integrated. These questions are answered in different ways by researchers, but most of them share the concept that price and time must be comparable to non customized goods in order to define the customization process of a company as mass customization. Moreover, it is evident that customer preferences should ideally be integrated in the entire design and production process, even though this is rarely the case in practice. With the advent of the WWW individual customer's preferences have become easier to know and to be integrated at least at the assembly stage of the product, thus making the production of the customized good possible at a cost similar to products produced in mass production. Production and delivery times, as well as participation of the customer in the product's design, still remains an open issue.

Keywords Mass customization definition • Production costs • Delivery time • Demonstrative model • Bills of materials

2.1 Different Perspective to Mass Customization

Mass customization seeks, as its goal, to develop, produce, market, and deliver "... affordable goods and services with enough variety and customization [such] that nearly everyone finds exactly what [he/she wants] ...".¹

Despite this definition, many researchers have different understandings of the term mass customization. Various authors have defined mass customization as a concept which should be applied only to products.² However, others have applied

¹ Pine (1993).

² Ettlé and Ward (1997) and von Hippel (1998).

Table 2.1 Overview of exemplary definitions of mass customization used in literature

 Is mass customization applicable to products and/or services?

Davis (1994, p. 180): “But mass customization is not restricted to products and services. It also applies to customers and markets.”

Duray (2002, p. 314): “... offering unique products in a mass-produced, low-cost, high volume production environment.”

Ettlie and Ward (1997, p. 56): “Mass customization—providing products that are created to the customers’ specifications.”

Franke and Piller (2004, p. 403): “These ‘mass customization’ methods have enabled custom goods to be produced with near mass production efficiency.”

Hart (1995, p. 36): “... practical definition: the use of flexible processes and organizational structures to produce varied and often individually customized products and services.”

von Hippel (1998), pp. 631–632: “Mass customization generally refers to the manufacturing of one-of-a-kind, ‘custom’ products ... One can also logically extend the concept of mass customization to the production of customized services.”

Zipkin (2001, p. 81): “Mass customization is the capability ... to offer individually tailored products or services on a large scale.”

Source Kaplan and Haenlein (2006)

it both to products and to services.³ For some authors the definition is limited to the manufacturing of goods,⁴ whereas others also have used it to describe other value chain activities, such as distribution⁵ or marketing. Several authors have included considerations of cost⁶ and price⁷ into their definition, whilst many others have not mentioned these characteristics.

Table 2.1 gives an overview of the most cited definitions of mass customization and underlines the many different points of view for three basic questions:

1. Is mass customization applicable to products and/or services?
2. Which prerequisites in terms of production cost and monetary price do need to be fulfilled?
3. At which step of the value creation process should the customer preferences be integrated?

Even through mass customization was originally applied to physical products, it can be argued that a similar procedure can be applied to services, those “products” which bear the feature to be consumed in the production moment and in which the customer is part of the production process. Thanks to this last feature there have been many attempts to adapt services offered to a vast public to individual needs. The most emblematic example are insurance contracts for very common risks, such as car crashes or house fire. These contracts are strongly standardized but require to keep into consideration a lot of customer’s personal features and

³ Hart (1995) and Zipkin (2001).

⁴ Pine et al. (1995) and Rabinovich et al. (2003).

⁵ Åhlström and Westbrook (1999).

⁶ Hart (1995) and Lee et al. (2000).

⁷ Lau (1995) and Ragsdale and Zobel (2004).

Table 2.2 Overview of exemplary definitions of mass customization used in literature

Which prerequisites in terms of production cost and monetary price do need to be fulfilled?

Fogliatto et al. (2003), p. 1817: "... at prices similar to mass-produced items."

Hart (1995, p. 36): "... at the low cost of a standardized, mass production system."

von Hippel (2001), p. 256: "... at near mass-production costs."

Lau (1995, p. 18): "... at the price of the comparable mass-produced items."

Lee et al. (2000), p. 82: "... with mass-production efficiency and cost."

Piller and Schoder (1999), p. 1111: "... at a price which is only marginally higher than that of the standard product."

Ragsdale and Zobel (2004, p. 84): "... at an affordable price."

Da Silveira et al. (2001), p. 1: "... at reasonably low costs."

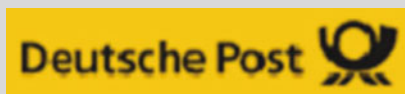
Source Kaplan and Haenlein (2006)

preferences, forcing insurance companies to develop modularized contracts which can be tailored on the buyer.

On the other hand, authors such as Kaplan and Haenlein⁸ argue that the modularization of services is not a technique to increase customization keeping the low cost of mass production but it instead decreases the cost of building an individual contract, which would require expensive risk analysis, given a high personalisation which is mandatory for this kind of products (Table 2.2).

Setting now the focus on production cost and monetary price, we must underline that mass customization means producing keeping the cost-efficiency of mass production. This is not only intrinsic in the concept definition, but also a necessary marketing feature because customers are driven toward personalised products by the desire of possessing their own design object without paying the high prices of craftsman's manufacturing. The price is therefore an essential part of the customer's desire, who would turn towards traditional craftsmanship in case of too high prices. Moreover, when the buyer is involved in the production process, either at design or at assembly stage, he/she invests his/her time and competences in this task and this is already an extra cost in terms of time, which would pile up to any other customization extra cost.

www.plusbrief-individuell.de



Deutsche Post AG is a German postal, logistics and courier company listed on the DAX stock exchange.

The company was founded in 1995 and introduced mass customization in 2007. The company offers its customers a choice of 18 customizable envelopes with stamp as base for the customization process. The customer can choose the colour (white, cream white, pearl-effect) and bonding of the envelope and use a predefined picture or upload a picture to design the stamp and an

⁸ Kaplan and Haenlein (2006).

additional area on the envelope. The price for 20 customized envelopes including 0.55 € stamp amounts to 36.23 €. The identical non-customized envelopes including stamp of the same company are priced at 13 € (Fig. 2.1).

Plusbrief gestalten
Hier wählen Sie Format, Farbe, Versandart und Bestellmenge Ihres PLUSBRIEF INDIVIDUELL.

Umschlag

Format
DIN lang ohne Sichtfenster
Breite: 220 mm
Höhe: 110 mm
Papierstärke: 80 g/m²
Hüllengewicht: 4.8 g
Portowert: 55 Cent
Maximalgewicht der Sendung: 20 g
Maximale Dicke der Sendung: 5 mm

Farbe
 cremeweiß perlglänzend weiß

Klebung
 Haftstreifenklebung
 Nassklebung

Ihre zusätzliche individuelle Gestaltungsfläche

Ihr individuelles Markenmotiv 55

➤ Weiter zur Motivauswahl

Fig. 2.1 <http://www.plusbrief-individuell.de> customization interface (screenshot)

In this case the price of the personalised product is 179% higher than the standard product, probably due to the high cost in printing individual envelopes and stamps. This fact has a strong impact on potential customers which may be willing to buy the standard envelope or to look for other cheaper way of personalizing the product after buying it.



www.mytwinn.com

My Twinn, Inc. is an American company which produces customized dolls. The company was

founded in 1994 and introduced mass customization in 1997.

The company offers its customers a choice of four different girl's and one boy's models as base for the customization process. The customer can select the hair length (ear length, chin length, shoulder length, high-back, mid-back, lower-back), hair style (ponytail, pigtails, single braid, double-braids, as shown in uploaded picture), hair texture, skin tone (very fair, fair, olive, light brown, brown), eye colour (nine colours) and hair colour (ten colours). In addition, the customer may request a hand-painted face according to an uploaded picture and give the doll an individual name. The price for a customized doll is equivalent to 129 US\$. Similar, non-customized products are priced at approximately US \$60 (Fig. 2.2).

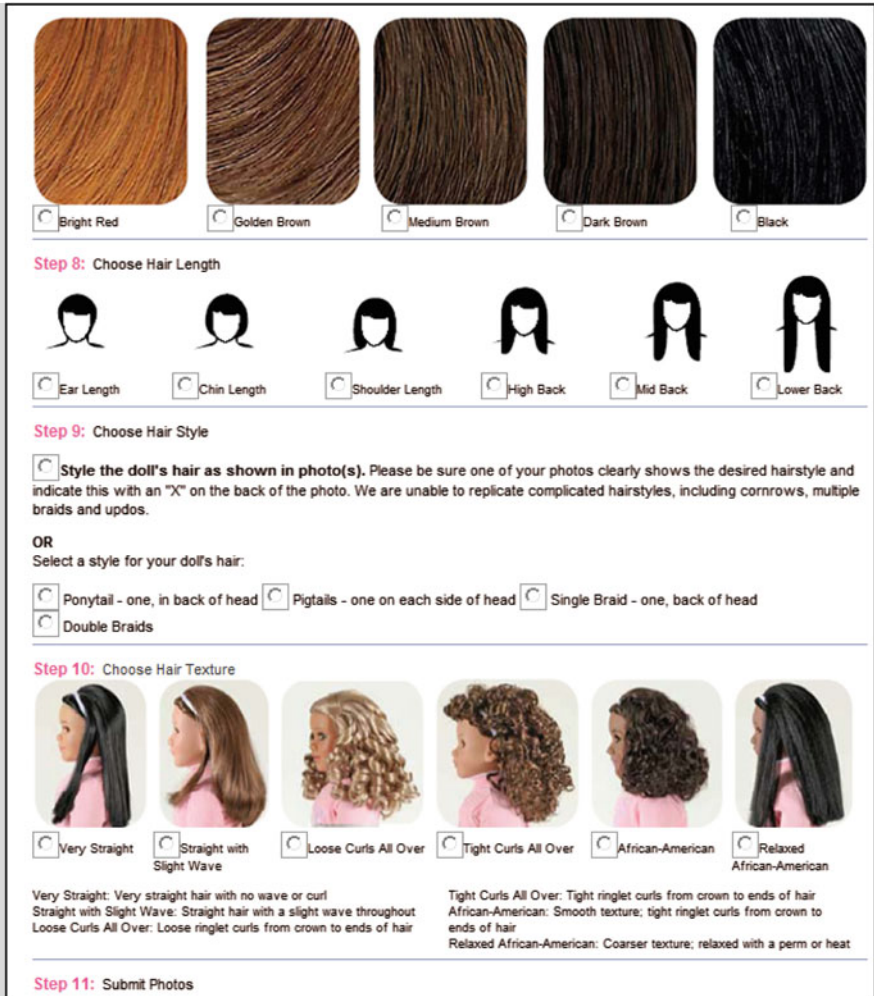


Fig. 2.2 <http://www.mytwinn.com> customization web interface (screenshot)

Also in this case the personalised price is much higher than the standard one, namely 115%, but the customization's added value is not a mere aesthetic change. The core aspect of the product is changed, together with its main use, and it can be adapted to the potential buyer in a way which is impossible to achieve through other tools or with post-buying changes.

We can here easily conclude that costs, and for internal efficiency also production costs, must be kept at the level of standard mass produced goods. There may be even some cases in which costs are even smaller: in markets with high volatility in buyer's preferences it is cheaper to avoid stocking products and

Table 2.3 Overview of exemplary definitions of mass customization used in literature

At which step of the value creation process should the customer preferences be integrated?

Åhlström and Westbrook (1999, p. 262): “Mass customization is a term first coined to describe a trend towards the production and distribution of individually customized goods and services for a mass market.”

Glazer (1999, p. 63): “... is usually associated with flexible manufacturing and operations, it can also refer to strategies based on flexible marketing methods.”

Lavidge (1999, p. 72): “... to making mass customization of advertising practical.”

Pine et al. (1995), p. 105: “Customization means manufacturing a product or delivering a service in response to a particular customer’s needs, and mass customization means doing it in a cost-effective way.”

Rabinovich et al. (2003), p. 66: “These product design and manufacturing policies have been grouped under the term ‘mass customization.’”

Sheth (1992, p. 61): “... is the practice of mass customization in which each element of the marketing mix ... is based on standard platforms or architecture.”

Source Kaplan and Haenlein (2006)

whenever the customer expresses its preferences it is giving precious information for the producer’s marketing department which is traditionally acquired through expensive surveys.

Another important issue strictly connected to extra costs is extra time. Standardized products, whether mass produced or handmade, are immediately available and customers have become used to zero waiting time. A personalised product not only needs the time of the buyer to express its preferences, but might also require more time to be produced and to reach its final destination. This issue must be seriously considered because, while for some products immediate availability is not strictly necessary, for others buyers would give up customization if confronted with too long waiting time (Table 2.3).

Mass customization integrates the buyer’s preferences as product’s specifications into the production chain. Kaplan and Haenlein use Porter’s value chain to show the different steps at which mass customization can be integrated (see Fig. 2.3). The choice of which step of the chain to select has a strong impact on the level and quality of personalisation and, in the opposite direction, on the extra producer’s costs.

The visionary answer would be to let the user participate into the product’s design without imposing any restriction. This, however, would make the producer lose all the benefits of mass production since it requires for each customer a complete expensive change in the technology of the production chain with, probably, also a restructure of the firm infrastructure. Moreover, it is also too costly for the buyer itself since it needs time and competences typical of product’s designers.

Kaplan and Haenlein⁹ give therefore two definitions of mass customization: a visionary one and a working one which applies personalisation at fabrication/assembly stage.

Mass customization (working definition): “Mass customization is a strategy that creates value by some form of company-customer interaction at the fabrication/

⁹ Kaplan and Haenlein (2006).

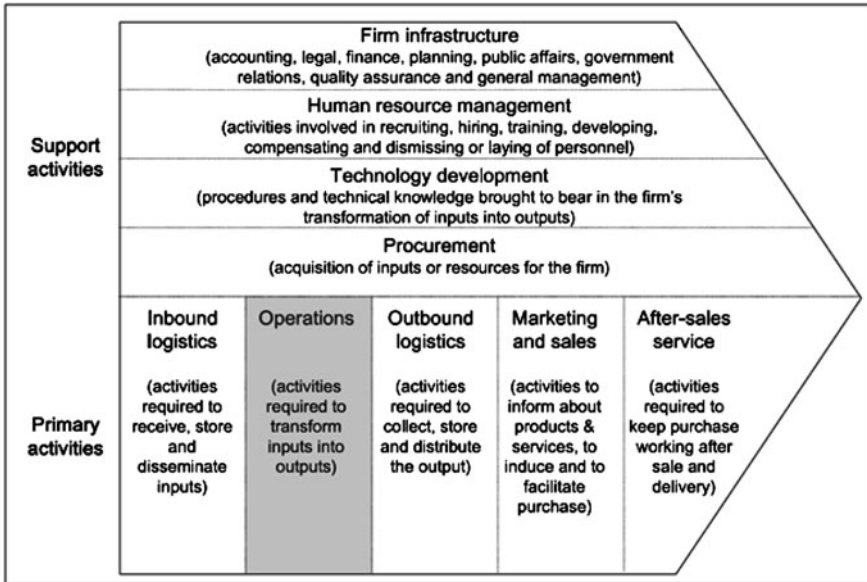


Fig. 2.3 Porter value chain for mass customization [Porter (1985) modified by Kaplan and Haenlein (2006)]

assembly stage of the operations level to create customized products with production cost and monetary price similar to those of mass-produced products”.

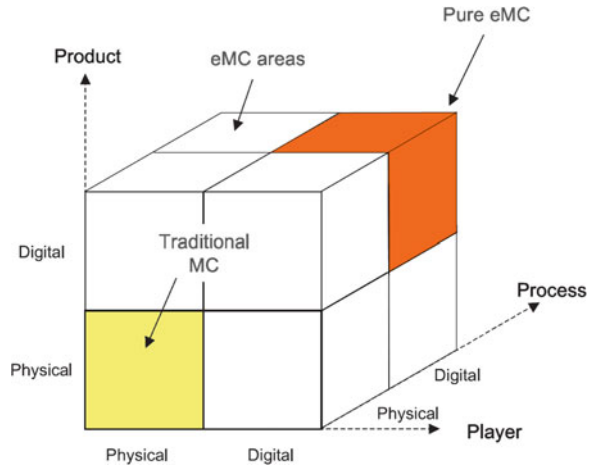
Mass customization (visionary definition): “Mass customization is a strategy that creates value by some form of company-customer interaction at the design stage of the operations level to create customized products, following a hybrid strategy combining cost leadership and differentiation”.

2.2 Electronic Mass Customization

The advent of the Internet, and in particular the graphical interactive World Wide Web, marks an important turning point in mass customization. Web interfaces are the ideal tool to dialoguing with the potential customer providing the necessary information about the product and collecting its preferences in a totally automatic way. This reduces considerably the time and costs for the first step of product’s customization and can turn the buyers work into a pleasant experience which can further induct the need for a personalised object. Choice of the interface is clearly a crucial one, since it must be at the same time easy to use, complete and offer all the possibilities, and with good defaults choices.

An *easy to use* interface avoids frustrating a not-expert customer and keeps it from judging the personalisation task too difficult and thus leaving it.

Fig. 2.4 Choi, Stahl and Whinstone model as modified by Kaplan and Haenlein [Kaplan and Haenlein (2006)]



An interface must be *complete*, in the sense that it must present to the user all the possibilities and each one with a clear indication of the impact on the final result. This is usually achieved through a product's picture which dynamically changes when the customers changes parameters, even through this solution works only for customization in the assembly stage.

Finally, the web interface must have *default choices* which speed up those potential buyers who do not need a deep personalisation or who do not have enough competences neither time to go through all the possible options. Clearly, the choice of these defaults must be very precise and possibly dynamically based on other individual customer's preferences or choices obtained through user profiling techniques.

Choi, Stahl and Whinstone¹⁰ have suggested a three dimensional model for electronic commerce, which can be easily extended to electronic mass customization. The three dimensions (see Fig. 2.4) are the product dimension, which states how much digital is the sold object, the player dimension which defines the way the buyer interacts with the producer and the process dimension which distinguishes different ways for controlling the production process. Kaplan and Haenlein make the clear example of a customized newspaper: as long as it is printed on paper (physical product), assembled with a direct interaction with the clerk (physical process) based on user preferences expressed to an employee (physical player), it is an example of traditional mass customization. However, each of these three dimensions can be digitalized: the preferences gathering process can be transferred to a web interface, the assembling stage can be fully automated with the help of an appropriate program while the newspaper itself can become a digital electronic newspaper.

Although most companies offer their products for a similar price as the same, non customizable products, there is one decisive critical point in electronic mass

¹⁰ Choi et al. (1997).



www.lanyman.com

Textil & Offsetdruck is a German textile printing

company. The company was founded in 1984 and introduced mass customization in 2003.

The company offers customization of lanyard keychains. The customer can choose the colour (nine colours) of the lanyard keychain and add a personal text (2 lines with up to 30 characters each), choosing the font (15 fonts) and colour of the text (14 colours) as well as adding one of the 110 predefined symbols. The price of a customized lanyard keychain amounts to 8.90 €. One piece of a similar, non-customized product is priced approximately the same.

Table 2.4 lanyman.com shipping and handling conditions

Country	Cost (€)	Free shipping and handling from	Waiting time in days
Belgium	7.20	150 items	6–8
Bosnia-Herzegovina	9.65	150 items	9–12
Bulgaria	9.65	150 items	9–12
Germany	4.60	60 items	5–7
Denmark	8.60	150 items	7–9
Finland	24.70	150 items	10–13
France	13.50	150 items	8–10
Greece	7.60	150 items	11–19
Great Britain	7.60	150 items	7–9
Ireland	28.50	150 items	9–11

Even though lanyman offers customized products for the same price, as can be seen in Table 2.4 the extra costs boost the final price by 325% for Ireland, 152% for France and 52% for Germany, the country where the item is manufactured. Under these conditions many potential small customers will opt for other ways of personalizing the keychains.

Waiting time is instead fully acceptable for a personalised product, while it is absolutely not comparable to a buy of a standard keychain in a physical shop.

customization. As the customized products have to be dispatched the customer has to add additional costs for shipping and handling. Especially for low-cost articles shipping and handling cost can be more than the price of the article itself.

Thus, it would be favourably for companies to find convenient solutions regarding this matter in the short run, since this represent extra cost for the buyer and, as we have seen before, it is a crucial point for an effective mass customization. In the medium run, shipping and handling must approximate zero. This will increase competitiveness both to mass customizing and mass producing

companies and attract even customers which are not specifically searching for customizable products.

There are currently many solutions which can be borrowed from standard electronic commerce, which have exactly the same problems.

Intensive cooperation with dispatchers as well as with other companies is recommended. An increasing number of customers will reduce costs additionally and would make the customer feel he/she is saving money if several orders can be combined together reducing shipping costs. Free shipping and handling is not an impossible challenge, as the book industry shows: Amazon offers free shipping and handling for all new books with shipping destination in Germany, Austria, Belgium, Liechtenstein, Luxembourg, the Netherlands and Switzerland.¹¹ The book itself is offered to the same price customers have to pay in traditional bookshop.

Another possible solution is cooperation with shop chains which have many points of sale, possibly adding also local independent shop which can act simply as distributors to this network. With this solution shipping costs for the manufacturer can be drastically reduced, since orders to the same point can be combined together and at the same time customers would have the advantage of a personal dispatch from a physical reference person who represents the producer.

2.3 Mass Customization Strategies

In 2000, Spring and Dalrymple developed a mass customization typology from case study research and identified different roles of customization from four case studies.

Companies do not always use mass customization as a profitable business strategy but also as a way of forcing themselves to develop new capabilities.¹² According to Spring and Dalrymple, mass customization may be a vehicle for learning or a symbol to the industry and, moreover, it can be used to build an entry barrier to new competitors. Table 2.5 provides an overview of a strategies' typology.

This typology has more practical than academic relevance due to the limited number of underlying case studies. In 2007, Moser extended this typology and revealed three other roles of mass customization (see Sect. 1.3.2) from 14 case studies for a total of seven mass customization strategies (Table 2.6):

Table 2.7 gives an overview of the classification of case studies presented in this book according to Moser typology.¹³

As described in Sect. 1.3 and graphically shown in Fig. 1.8 a product can be defined as customized when at least one of the operational activities of design,

¹¹ <http://www.amazon.de>

¹² Spring and Dalrymple (2000).

¹³ Moser (2007).

Table 2.5 Mass customization typology

Strategy	Rationale	Time of benefit	Costing philosophy	Volume required	Possible manufacturing issues
Entry barrier	Product may be unprofitable, but will keep competition out	Medium-term	Cost of account?	Depends on balance of potential loss of revenue and cumulative effect on manufacturing costs	Identify all costs; develop shared understanding of rationale
Vehicle for learning	Product may be unprofitable, but new organizational or technological capabilities will be learned	Very long-term	Indirect costs as product line overhead	Enough in various/demanding applications to accelerate learning	Capture learning and involve potential disseminators
Symbol to industry	Product may be unprofitable, but, if suitably communicated, it will enhance standing/brand in industry	Long-term	Indirect costs as general overhead	Minimum to achieve effect	Develop shared understanding of rationale
Profit-taker	Product attracts high price and makes profit in its own right	Immediate	Indirect costs charged to customer per product	Any profitable	

Source Spring and Dalrymple (2000)

Table 2.6 The seven mass customization strategies

Strategy	Rationale	Volume required
<i>Sustainable mass customization business</i>		
Profit-taker	Customized product attracts high price and makes profits in its own right	Any profitable
Vehicle for market entry	Offering a customized product attracts customers when other differentiation factors are missing for a market entry	Enough to attract a sufficient share of the market, create a profitable business and become a profit-taker
Path to mass producer	The basic principles and competencies for mass customization are applied to generate a superior mass production organization	Enough to be able to implement the basic mass customization competencies, pursue a profitable business today (profit-taker) and create a profitable mass production business in the future
<i>Support of a non-mass customized business</i>		
Entry barrier	Product may be unprofitable, but will keep competition out	Depends on balance of potential loss of revenue and cumulative effect on manufacturing costs
Symbol to industry	Product may be unprofitable, but suitably communicated, will enhance standing/brand in industry	Minimum to achieve effect
Vehicle for learning	Product may be unprofitable, but new organizational or technological capabilities will be learned. Focus on learning: marketing data	Enough in various/demanding applications to accelerate learning
Vehicle for increasing operational efficiency	Product may be unprofitable, but organization is able to capture data for improving operational efficiency	Enough in various/demanding applications to accelerate learning

Source Moser (2007)

Table 2.7 Classification of mass customization case studies according to the Moser typology (strategy)

Company name	Mass customization strategies
BMW (MINI)	Profit-taker
Dell, Inc.	Vehicle for market entry (in the past), profit-taker, entry barrier
Deutsche Post AG	Symbol to industry, vehicle for increasing operational efficiency
Edelwiser ski	Vehicle for market entry, profit taker
Gaspo Sportartikel GmbH	Vehicle for market entry, vehicle for increasing operational efficiency, profit-taker (future)
Jones Soda Co.	Entry barrier, symbol to industry
K-Swiss, Inc.	Symbol to industry, vehicle for learning
Mars, Inc.	Symbol to industry, vehicle for increasing operational efficiency
My Twinn, Inc.	Vehicle for market entry (in the past), profit-taker
PersonalNOVEL	Vehicle for market entry (in the past), profit-taker
Tastebook, Inc.	Vehicle for market entry, path to mass producer
Textil & Offsetdruck	Symbol to industry, vehicle for increasing operational efficiency, profit-taker
Timbuk2 Designs, Inc.	Vehicle for market entry (in the past), profit-taker

fabrication, assembly or distribution is carried out according to the customer’s specifications. The level of customization depends on the technology used by the enterprise. The following section presents a simple but versatile mass customization model to demonstrate customized (see Sect. 1.3) using a simple LEGO™ car.

www.mykswiss.com

K-Swiss, Inc. is an American footwear company listed on the NASDAQ stock exchange. The company was founded in 1966 and introduced mass customization in 2005.



The company offers its customers the possibility to choose from three different men’s and two different women’s models as a base for the customization process. Depending on the selected model, the customer can choose between a palette of 19 different colours for 3–6 parts of the sneaker (base colour, outsole, stripe colour, overlay colour, shield colour, laces colour). Additionally,

the customer may add a personal text composed of one to eight letters or numbers for which he may also choose the colour. The prices for the different models of sneakers range from US\$ 65 to US\$ 95. The identical non-customized product is priced at US\$ 5 below the customizable product (Fig. 2.5).



Fig. 2.5 mykswiss.com customization process (screenshot)

Mykswiss offers personalised shoes for 6% more than standard shoes. Considering that the customization process allows for many variants which are not normally on sell and includes a name written on the back, which clearly cannot be pre-produced on stock, we can suppose that the production cost for K-Swiss is considerably higher than a standard product. This is therefore an example of a company which enters mass customization business to enforce its symbol among its customers (see Table 2.6).

2.3.1 A Demonstrative Model for Customized Assembly

The model¹⁴ in this section demonstrates how a customized assembly strategy (see Sect. 1.3) works. This approach for mass customization has been selected because it is most widely followed by companies in many industries.

A simple LEGOTM car with a total of 30 components demonstrates this approach to mass customization. The LEGOTM blocks are ideal to demonstrate customized assembly since all components are pre-fabricated and customer involvement only takes place at the assembly stage (see Fig. 1.8).

The first level of customization of the car is offered by size variation, enabling customers to select between small, medium or large cars. Further customization is offered by colour selection for six parts in the car (steering-wheel, driver's seat,

¹⁴ Basic idea adopted by Metta et al. (2007).



Fig. 2.6 LEGO™ car models

sunroof, car doors, headlights and tyres including rims). A number of eight different colours is available for each part. Considering all the colour and size options, the total car variants are equal to 786,432. The car model designed is shown in Fig. 2.6. Figure 2.7 shows the bill of materials (BOM) for the car indicating the customizable parts.

In order to produce the LEGO™ car according to the customer's specifications, preferences are expressed using a web-based interface. The customer navigates autonomously and configures the product. At first, the customer decides the size of the car. Then, the colour for the six customizable parts and finally the customer is asked to approve the visually shown car and to enter billing and shipping information.

When a company offers mass customization using customized assembly strategy the single parts are already fabricated at the moment when the customer places the order. The customer has therefore no possibility to design the single parts or to influence the fabrication process. The product is assembled after the customer orders it according to the requested specifications. In practice, most practical mass customization operations, as in this model, entail filling in a web form which sends an e-mail to the manufacturing plant where the product is produced by manual labour and then sent by mail to the customer. This represents the most widely used strategy at present.

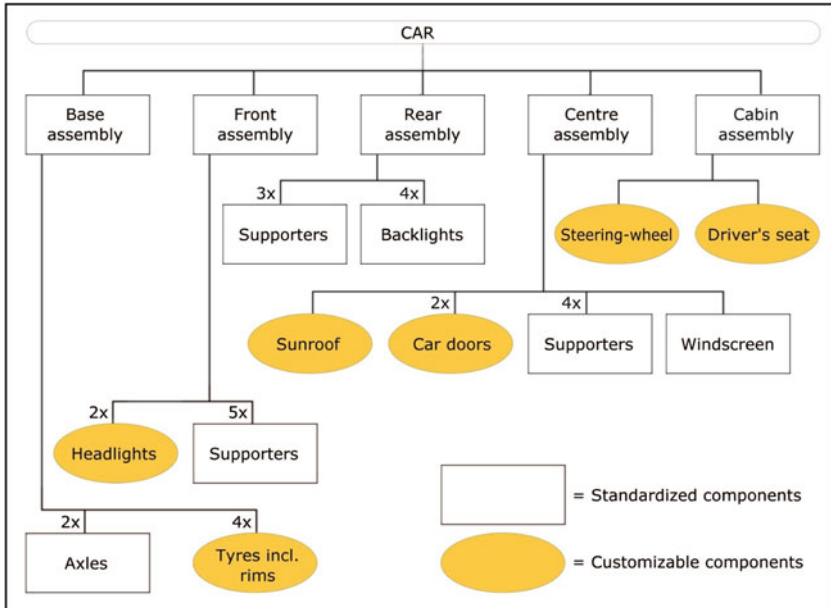


Fig. 2.7 Bill of materials (BOM) for car model

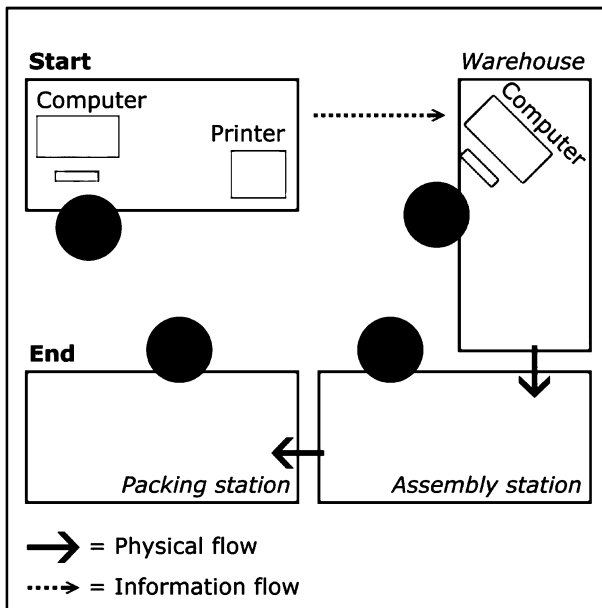


Fig. 2.8 Manufacturing plant organization

In the model, the customer places an order and the system sends the customized BOM to the manufacturing plant as shown in Fig. 2.8 where it is analyzed and forwarded to the warehouse. The warehouse is responsible for supplying the assembly station with the necessary parts according to the BOM. At the assembly station the product is composed using the individual parts. Finally, the finished product is passed on to the packing station where it is packed and sent by mail to the customer.

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Chapter 3

Empirical Investigation

Abstract A survey with more than 500 subjects is aimed to examine the desire of customers to customize different kinds of products. A trilingual questionnaire investigates the generic online buying preferences and, in detail, the personalization intention of the interviewed persons. The sample is well balanced with respect to sex and work activity, while slightly unbalanced towards the younger generations, which however represent the largest potential for a mass customization online business. The major results of the statistical analysis confirm the considerations of the previous chapters, indicating prices and availability as the main reasons for shopping online, and thus suggesting a price for customized products as close to the price of standardised products as possible. It also emphasizes the possible limit of delivery time, but shows at the same time that brand loyalty barriers can be broken in favour of personalization. While sex, being for sure a discriminating factor in Internet usage and online shopping, does not make any difference in personalisation's intention.

Keywords Survey · Statistical analysis · Brand loyalty · Personalisation intention

3.1 Sample and Methodology

A survey has been conducted from February 25, 2008 to June 30, 2008 with the aim to explore both the potential and the challenges of markets for personalised products from a customer's point of view.

The sample consists of 561 European respondents aged 16 or older. Particular care has been taken in balancing male and female subjects (see Table 3.1) and students, who are probably more prone to new technologies, with non-students (see Table 3.2).

Concerning age distribution, the questionnaire has been submitted to people from 16 to 86 with a particular emphasis on young adults (see Fig. 3.1) since they

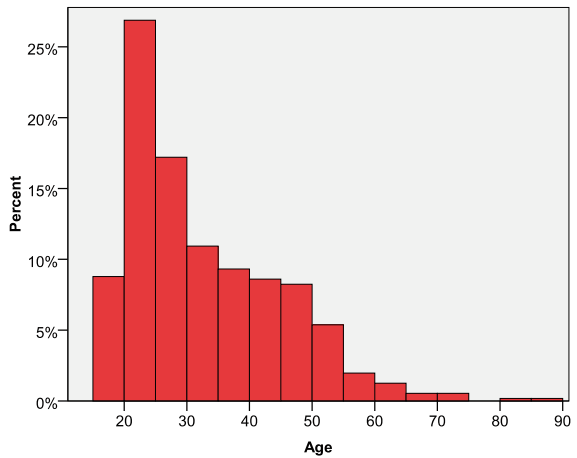
Table 3.1 Distribution of sex

	Frequency	Percentage
Female	275	49.2
Male	284	50.8
Total valid cases	559	

Table 3.2 Distribution of occupation

	Frequency	Percentage
Student	133	25.3
Employed	356	67.8
Other	36	6.9
Total valid cases	525	

Fig. 3.1 Distribution of respondents' age



are the ones who currently use most online services and who will be in the near future the largest share of the consumer market in terms of total expenses.

Nationality of respondents is strongly focused on the central Europe area, with Italy, Austria and Germany having the largest frequencies (Table 3.3).

A staff of English, German and Italian speaking assistants has been trained and put in charge of assisting respondents in filling in the questionnaire, with clear indication of interacting only in case of problems in understanding the questions and avoiding any possible suggestion.

Each respondent has been allowed to choose whether to answer the questions in English, German or Italian. Questionnaires can be found in Appendixes I, II, III and IV. Furthermore, all respondents have read the questions and ticked the answers by themselves. The complete list of answers' frequencies can be found in Appendix V.

Since some questions involve product personalisation, the questionnaire provides a brief explanation through a short text and, as an example, a picture of Nike's sneakers customization web site.

Table 3.3 Distribution of survey respondents' nationalities

	Frequency	Percentage
Italy	389	69.3
Austria	69	12.3
Germany	47	8.4
Other European countries	56	10.0
Total	561	

Table 3.4 Distribution of use of the Internet via mobile phone by sex

Use of Internet via mobile phone	Female		Male	
	Frequency	Percentage within female	Frequency	Percentage within male
Yes	22	11.1	60	25.9
In the future	16	8.0	19	8.2
No	161	80.9	153	65.9

Preliminary questions on the use of Internet have been asked in order to study possible relations between customization attitude and Internet usage. 92% of respondents have at least an Internet access, with the largest part at home or at work (78 and 75% respectively), while Internet access in public places and via mobile phone is relatively rare (13 and 15% respectively). Therefore our sample consists of people with more Internet access compared to the 52 and 75% Internet penetration rates¹ for Italy and Germany. Also usage of Internet via mobile phone is very high, indicating that our sample is focused on new technologies users. Moreover, male users display a significantly² larger usage of Internet via mobile phones, as shown in Table 3.4, and, as we see in the next sections, this has an impact on online-shopping habits but not on customization attitude.

3.2 Factors Impacting Consumers' Behaviour

The answers of the 561 respondents were analysed in order to search for results which may be interesting for marketing purposes and four key aspects have been found:

1. prices and availability as reasons for shopping online,
2. delivery time as possible limit for personalised products,
3. brand fidelity as a barrier for the success of personalisation
4. an analysis of personalisation intention based on endogenous factors.

¹ <http://www.internetworldstats.com>, May 2010.

² χ^2 15.6 with significance 0.000.

3.2.1 *Prices and Availability*

The first topic to study for a successful marketing strategy on mass customization are the reasons why customers buy or do not buy online, which lead to interesting considerations which can be applied to product personalisation via web sites.

The survey divides the subjects into two groups: those who have already shopped online (48%), and therefore have experience and a clear idea of its characteristics, and those who have never had the chance to shop online, among whom 14% declare to have no intention of doing it in the future. The most important reason which has pushed customer to buy or which might push them to buy in the future is price: it is the main reason to do it for online-buyers (65%) and a reduction of half price, not so rare in many online shops, is able to make 25% of the non-online-buyers change their attitude.

Thus, price is the first element which mass customization web sites must keep under control, since it is the main source of customers' attraction. A price increase might drive both old and potential new customers back to traditional shops or, at least, to non customizable products. This is also confirmed by a study of Songlin and Mitchell³ and a similar one of Bardakci and Whitelock,⁴ which study the demand curve for consumers and its flexibility towards price, underlining the importance of finding an equilibrium point must be found with company's offer curve.

The second aspect which pushes customers to shopping online is product availability. There are many examples of products which are not easily found in small traditional shops, especially for what concerns large products variety. Availability is in fact the second scope for online-buyers (52%) while the percentage of non-online-buyers which may be convinced to change their habits by availability is only 19%. This is a surprising result, considering that it implies that the remaining 81% of subject would prefer not buying the product at all. Probably it is due to the fact that non-online-buyers do not have experience of the wide range of products which is available on the Internet and therefore have never seen the reduced number of products of traditional shops as a limitation. A similar effect can also be observed also in [Sect. 3.2.2](#).

The impact of availability, even though in a reduced form for non-online-buyers, is another aspect which must therefore be carefully considered when planning a mass customization online shop. Offering products, and especially personalisation, which cannot be offered by traditional shops will bound many customers to personalised products, since they will start to see the limitations of low range of traditional shops' offers.

Availability is a crucial point for a mass customization especially towards online-buyers since people which shop online for a larger product availability have

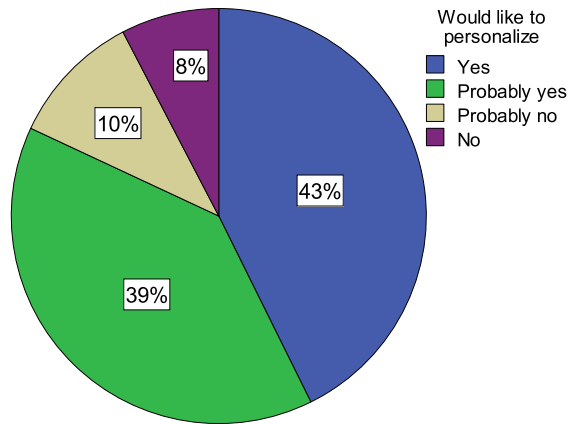
³ Songlin and Mitchell (1998).

⁴ Bardakci and Whitelock (2003).

Table 3.5 Distribution of personalisation's intentions by shopping because of availability

Would like to personalize	Shops online because product is not available in traditional shops		Shops online for other reasons	
	Frequency	Percentage within column	Frequency	Percentage within column
Yes	122	48.8	79	35.7
Probably yes	85	34.0	100	45.2
Probably no	24	9.6	25	11.3
No	19	7.6	17	7.7

Fig. 3.2 Distribution of personalisation intention



expressed a significantly⁵ stronger positive decision when asked for their personalisation intention, as can be seen from Table 3.5.

3.2.2 Personalisation Intention

A direct question posed to the respondent whether he/she would like to personalise products, after a brief description of what is online mass customization and a brief example with Nike's web site (see questionnaire in Appendix II or web site <http://www.nikeid.com>), has given the results shown in Fig. 3.2.

The large majority of subjects (82%) wants, or probably wants, to personalise. These percentages are calculated on people who have an Internet connection and who have at least a minor interest in shopping online in the future. The result can be considered a large success, since it clearly demonstrates that consumers with at

⁵ χ^2 8.8 with significance 0.032.

Table 3.6 Distribution of personalisation intention by Internet use for online-shopping

Would like to personalize	Use of Internet for online-shopping		Use of Internet for other reasons	
	Frequency	Percentage within column	Frequency	Percentage within column
Yes	121	50.2	80	34.8
Probably yes	88	36.5	97	42.2
Probably no	22	9.1	27	11.7
No	10	4.1	26	11.3

Table 3.7 Distribution of online-shopping behaviour/intention by sex

	Female		Male	
	Frequency	Percentage within female	Frequency	Percentage within male
Shops online	99	38.7	151	57.2
Intends to shop online in the future	22	8.6	15	5.7
May shop online in the future	87	34.0	73	27.7
Will never shop online	48	18.8	25	9.5

least a little experience on the Internet are ready to switch from online-shops to mass customization online-shops, provided that products are offered with the restrictions on prices and times illustrated in Sects. 3.2.1 and 3.2.3.

Having already a large experience with online-shopping increases significantly⁶ the desire to try out to personalise products, as can be seen in Table 3.6.

This effect is probably very similar to the one in Sect. 3.2.1, where people with already a large experience have a much clearer idea of the advantages of the buying process and, probably influenced also by positive previous experiences, are more willing to try new features.

Even though male respondents are usually more in favour of shopping online than female ones (Table 3.7), the personalisation intention does not show significant⁷ dependence on sex, as can be seen in Table 3.8.

This result is a clear indication that, while Internet and online-shopping remain traditionally male-dominated fields, female consumers represent an already mature potential basin for customers.

On the other hand, age does play a major role in the personalisation intention. As can be seen in Fig. 3.3, people who do not want to personalise are slightly older⁸ than the most committed to personalisation, even though there are still young people who absolutely do not want to personalise.

⁶ χ^2 16.2 with significance 0.001.

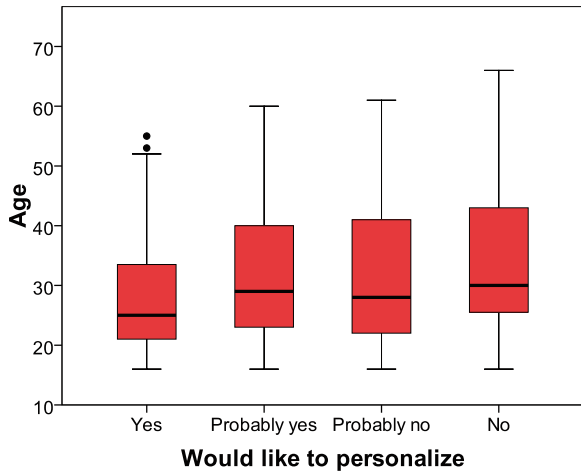
⁷ χ^2 1.9 with significance 0.585.

⁸ Kruskal–Wallis test for equality of distributions 16.2 with significance 0.001; Jonckheere–Terpstra test for order of distributions 41212 with significance 0.000.

Table 3.8 Distribution of personalisation intention by sex

Would like to personalize	Female		Male	
	Frequency	Percentage within female	Frequency	Percentage within male
Yes	95	42.6	105	42.5
Probably yes	93	41.7	92	37.2
Probably no	20	9.0	29	11.7
No	15	6.7	21	8.5

Fig. 3.3 Distribution of age by personalisation intention



This is an expected result, since younger people are the typical online-shoppers. However, if we restrict the analysis to those subjects who do not use Internet for online-shopping, therefore concentrating on the future potential buyers, the age relation does not remain significant anymore. This result indicates that older consumers can be driven to mass customization web sites directly without passing through web shops which do not offer personalisation of products.

3.2.3 Time

Time is another crucial factor that influences customers' attitude towards mass customization. As it is evident, a too long production time combined with the extra delivery time that is typical for Internet shopping, can keep many potential customers from buying online as well as from trying out online mass customization.

The survey asks the respondent to consider the last item bought on the Internet and the last item bought in a traditional shop for more than 10 € and checks his/her tolerance on waiting time in case of product personalisation. The answers have clearly a large variance since they depend strongly on the individual product

Table 3.9 Distribution of waiting time for last bought item in traditional shops and in online shop

Would you personalise the last product you bought?	Traditional shop			Online shop		
	Frequency	Percentage	Cumulative percentage	Frequency	Percentage	Cumulative percentage
Yes, if available immediately	188	35.5	35.5	101	32.8	32.8
Yes, if available after 1 day	73	13.8	49.3	40	13.0	45.8
Yes, if available after 7 days	83	15.7	65.0	65	21.1	66.9
No	186	35.0	100.0	102	33.1	100.0

considered by the subject: for example, for an immediate consumption product, such as food, no waiting time is usually tolerated, while for gifts or futile products a larger waiting time is tolerated.

The fact that 16 and 21% of respondents (for last item bought on the Internet and in a traditional shop, respectively) are ready to wait up to 7 days for a product personalisation has to be considered a very good result since 7 days is a rather long waiting time which allows automated production lines to make the personalised product and even ship it to destination. 14% of people who bought their last item in a traditional shop are willing to add 1 day of waiting time if personalisation is offered. As 1 day does not allow for shipping but for personalisation, these customers might not be willing to change from a traditional to an online shop, even though they are in favour of product personalisation. 13% of people who bought their last item in an online shop are ready to add one extra day of waiting time. This means that online shops offering product personalisation can plan to use this extra time completely for the personalisation process because shipping time is already included in their order-to-delivery period.

As shown in Table 3.9, the majority of people who would personalise the last product bought (36 and 33%) want the product to be available with no added waiting time, meaning immediately for the people who bought it in a traditional shop and with the same waiting time as for the original product for people who bought the product online. Thus, to satisfy all potential customers companies will have to optimise their operations in order to be able to find the extra time necessary to customize the product without requiring their customers to wait longer than usually. This seems to be a highly challenging task for traditional shops because people want to take the product immediately away. Online shops have more alternatives to fulfil the customer's expectations. First, they can improve the production process in order to allow for the extra time necessary for customization. Second, if the production process cannot be optimised, they can improve shipping, e.g. by using more sophisticated IT-systems or by choosing a faster parcel service.

These results put another condition for successful mass customization implementation: personalisation time must be kept as short as possible in order to be

able to deliver the final product to the customer according to his personal preferences. As many customers are not willing to wait any longer than they were used to, for some products personalisation must be an immediate operation, without adding any extra waiting time. This is also confirmed by the previously mentioned studies of Songlin and Mitchell⁹ and Bardakci and Whitelock,¹⁰ which study also the customer's demand curve flexibility towards delivery time and also propose a framework for a negotiate between company and customer to reach the equilibrium point that the customer deems as sufficient.

3.2.4 Brand

Brand loyalty is one of the best-known marketing strategies used to keep customers' pool. For a new-born type of products, such as personalised products, it can represent a strong entry barrier for many markets. Moreover, the interest and especially ability of personalisation changes strongly with product's familiarity, as found by Loginova¹¹ and this can represent a further incentive or disincentive towards investing time in customisation.

In order to check which ones might be the potentially open markets, the willingness to change brand in exchange for personalisation has been asked to the survey's respondents. Since brand loyalty depends strongly on the product category, the question is split into seven different categories: footwear, clothing, sport equipment, computers, dinnerware, toys, gifts. It is important to underline that this question is under the hypothesis of identical price and identical quality, to restrict the result on brand loyalty and eliminate the effect of well-known or low cost brands.

The percentage of people willing to change brand for the opportunity to personalise the product ranges from 50% to 74%, showing that at least half of brand loyalty can be broken by mass customization companies provided price and quality remain the same (Fig. 3.4). The two lowest percentages are for dinnerware (50%) and toys (50%), two categories for which probably people do not deem personalisation as so important. The percentage rises up to almost 74% for gifts, where brands are not so important and especially where personalisation can give a very large plus to the product. This result is emphasised also by a study by Franke and Schreier,¹² which distinguishes the categories which present conformity from those which present counterconformity, where clearly customisation becomes much more interesting from the customer's point of view.

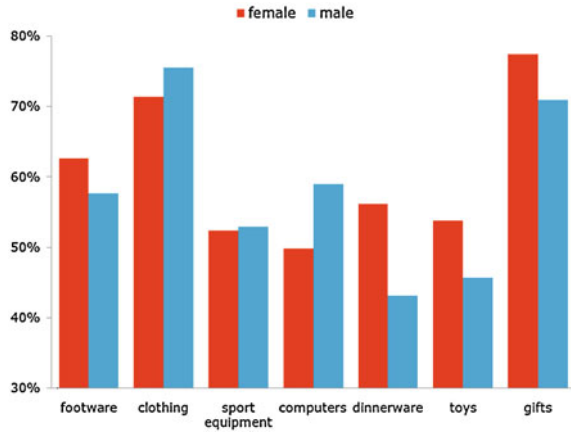
⁹ Songlin and Mitchell (1998).

¹⁰ Bardakci and Whitelock (2003).

¹¹ Loginova (2010).

¹² Franke and Schreier (2008).

Fig. 3.4 Consumers availability to change favourite brand in exchange for personalization by sex



When distinguishing between female and male respondents, female subjects display a significantly¹³ smaller preference only for computers and a significantly¹⁴ larger preference for dinnerware, two sectors where typically men and women have different needs and different perspectives.

The analysis of brand loyalty displays that there are good opportunities for market penetration in all the sectors, but it is necessary to target the marketing strategies specifically to the type of product and, for some types, to the customer's sex since brand loyalty can vary a lot.

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¹³ χ^2 4.4 with significance 0.041.

¹⁴ χ^2 8.3 with significance 0.005.

Chapter 4

Conclusions

Abstract While the survey's results show a large potential interest in personalised products, other investigations demonstrate the current customers' dissatisfaction in finding products fitting their individual needs and preferences. Taking into account the importance of both price and delivery time, the role of stores has to be further investigated in order to find out how a company can build a working and profitable business model using mass customization.

Keywords Finding products · Stores · Customization demand

By offering customizable products in a mass production environment companies expect to realise significant advantages in competition through the generation of enduring customer value.¹ This is attempted by offering the customer a possibly unlimited number of choices to customize a certain product according to his/her individual needs.

Both existing literature and the conducted investigation put in evidence two important aspects which influence the customer choice whether to rely on a certain company to buy a customized product or not: price and waiting time. Despite the willingness of customers to pay significantly more for self-designed versus off-the-shelf-products,² various studies determine implicitly the fundamental goal of achieving mass customization products at the same price or a marginal higher price as mass produced products,³ as well as this study does.

The ongoing desire to express personal individuality based on social change⁴ is not a reliable indicator that mass customization will be accepted in the future. Sensibility towards customizable offers is essential.⁵

¹ Pine (1993), Fiore et al. (2001), and Reichwald and Piller (2006).

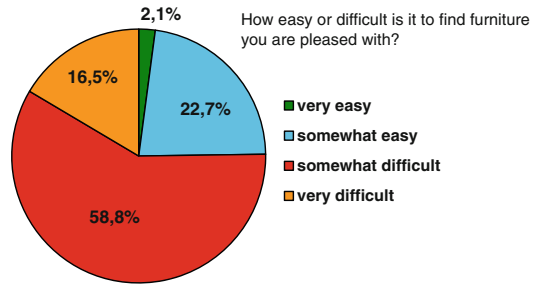
² Pine (1993), Franke and Piller (2004), Schreier (2006).

³ Shen and Ball (2006) and Kaplan and Haenlein (2006).

⁴ Schneider (1998) and Blaho (2001).

⁵ Guilbert and Donthu (2006).

Fig. 4.1 Business example (furniture) for which customers experience difficulties in finding what they want (FurnCo. Market Survey, June 2004)



As shown in Sect. 3.2.2, 82% of survey respondents which use Internet show an interest in online mass customization and would wait from one additional day (13%) to seven additional days (21%) before getting their online customized product. On the other hand, nearly the same number (33%) of people is not willing to add waiting time compared to a traditional online bought product. This clearly shows that waiting time plays a crucial role in the willingness to use product customization offers and should be a signal to companies which are offering mass customization not just to concentrate on price equality but to optimise information and physical flow (see Fig. 1.7) in order to reduce production and delivery time to a minimum. This can increase operational efficiency decisively.

Despite an increasing product variety (see Table 1.3) people have difficulties to find products they are pleased with (see Fig. 4.1).

The result of our market survey underlines that there is a high demand regarding personalised products. This finding is supported by the fact that 52% of the survey respondents say that they do or intend to shop online because of unavailability of the product in a traditional shop. Furthermore, a total of 19% of people which explicitly respond they neither shop nor intend to shop online in the future would shop online if the product was not available in a traditional shop (see Table 3.5).

These numbers gain in importance by taking into account the negative factors associated with mass customization and online shopping which include the perceived risk when purchasing a customized product, the payment of a price premium, the acceptance of waiting time and the time and effort involved.⁶ The following figure shows which kind of difficulties customers experience by searching for the product they want.

Whilst it seems to be highly difficult to satisfy all different customer needs (see Fig. 4.2) by mass producing goods where finished goods have to be kept on stock, most of the above mentioned needs can be taken into account by offering mass customization in order to satisfy the customer's needs. As a result, customer satisfaction can increase and lead to a higher sales volume of the company.

A steadily increasing number of well positioned brands (see Sect. 2.3) is introducing mass customization in order to set a symbol to the industry or to set an entry barrier for competitors (see Table 2.6). These strategies are reasonable in the face of

⁶ Bardakci and Whitelock (2003).

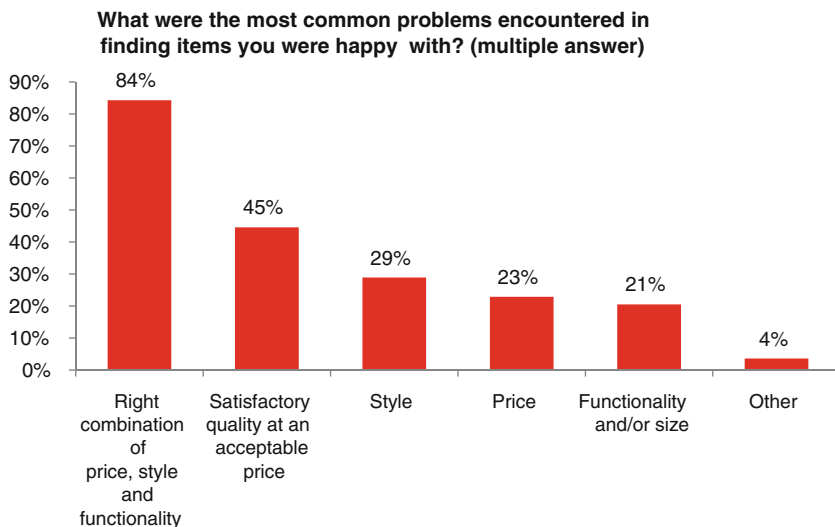


Fig. 4.2 Difficulties experienced by consumers in finding the product (furniture) they want (FurnCo. Market Survey, June 2004)

an increasing desire to express personal individuality and the wish to purchase products with the right combination of price, style and functionality (see Fig. 4.2). What is more, symbolic and emotional benefits arise from style customization.⁷

Branding products no longer guarantee loyal customers because tried-and-true marketing techniques from the past no longer work for most products—particularly for complex ones based on new technologies.⁸ On one hand, mass customization is a promising strategy to improve a company's relationship with its customers,⁹ which might reward mass customization companies with increased loyalty in exchange for the better fit between the self-designed product and individual preferences.¹⁰ This implies that, on the other hand, customers might be willing to change brand if another company offers a similar product with identical price and identical quality combined with the possibility to customize the product. The findings of the conducted investigation support this assumption: a number of 50–74%, depending on the product category, would abandon their old brand and change.

These findings and the fact that brand attachment theory has its origins in psychology¹¹ but has more recently been applied to the marketing domain¹² are the best indicators that mass customization related marketing strategies (see Table 2.6) will

⁷ Bauer (2007).

⁸ McKenna (1988).

⁹ Peppers and Rogers (1997) and Pine et al. (1995).

¹⁰ Ansari and Mela (2003) and Simonson (2005).

¹¹ Bowlby (1980).

¹² Thomson et al. (2005), Thomson (2006).

be essential for most existing companies to keep their market share stable or to expand it and for new companies to enter the market.

4.1 The Role of Stores for Mass Customized Products

At present, traditional stores where finished goods are stored are the main sales platforms for mass produced goods. Potential customers enter the store and choose among a limited number of displayed products. Despite an increasing product variety (see Table 1.3) the choice is limited due to limited exhibition and storage space of the store.

In spite of the findings of the conducted investigation, where 65% of survey respondents state that they would rather have bought the last product they bought in a traditional shop for more than 10 € in a shop that offers the possibility to personalise the product than in the original shop, stores will serve little purpose in the future of marketing mass customized products for the following reasons:

- 36% of survey respondents are willing to use customization in traditional stores only if the product is available immediately (see Table 3.9). At present, this seems to be a hardly realisable challenge;
- customers would have to come back a second time to the store after a certain period of time. This is connected to both an investment in time and additional costs, e.g. bus ticket or parking fee;
- finally, traditional stores would have to provide digital equipment to the customers in order to allow them to personalise the product using a consumer-friendly interface. Further, the order must be digital to be able to forward it to the manufacturing/production plant instantly. A delay at this point would result in a further competitive disadvantage compared to online mass customization.

67% of survey respondents of the conducted investigation state that they would rather have bought the last product they bought online on a web site that offers the possibility to personalise the product than on the original web site, 33% are not willing to accept additional waiting time, whereas 34% accept slower delivery time (see Table 3.9).

It is the mass customization companies' responsibility to use the cost savings based on the omission of the obsolete traditional retail network to optimise intern communication in order to start the manufacturing process as fast as possible. In this way both the need for personalisation and the desire of customers not to add waiting time can be satisfied.

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Appendix I: Survey's Questions

In this section all survey questions are described in detail, following this schema:

Survey question detail	Explanation
Question	The question as it appears on the English questionnaire (see Appendix II)
Response type	The type of possibilities given to the user: open answer, closed answer, single/multiple answer
Response options	The response options as they appear on the English questionnaire (see Appendix II) are reproduced
Explanation	A short explanation on why this question makes part of the survey is given. This text did not appear in respondent questionnaires
Question 1	
Question	Age
Response type	Open answer
Explanation	This detail is asked for checking the representativeness of the sample and for an analysis of the effect of respondent's age
Question 2	
Question	Sex
Response type	Closed answer, single answer
Response options	Male Female
Explanation	This detail is asked for checking the representativeness of the sample and for an analysis of the effect of respondent's sex
Question 3	
Question	Occupation
Response type	Closed answer, single answer
Response options	Student Employed Other
Explanation	This detail is asked for checking the representativeness of the sample and to avoid an unbalanced sample towards students. Furthermore, it is asked for an analysis of the effect of respondent's occupation

(continued)

(continued)

Question 4

Question	Use of internet
Response type	Closed answer, single answer to any of the subquestions
Subquestion 1	At home
Response options	Yes In the future no
Subquestion 2	At work/university
Response options	Yes In the future No
Subquestion 3	Internet cafe
Response options	Yes In the future No
Subquestion 4	Mobile phone:
Response options	Yes In the future No
Explanation	These details are asked for an analysis of the different relations involving the use of Internet of the respondents All respondents answering "no" to all four subquestions are asked to continue the answering of the questionnaire from question 12, because all questions from number 5 to 11 are specifically addressed to people who are using or are planning to use the Internet

Question 5

Question	What are you using internet for?
Response type	Closed answer, multiple answers
Response options	To surf To chat, write e-mails To book a hotel or a holiday For online-shopping For online-banking I have not used internet yet
Explanation	These details are asked for an analysis of the different relations involving the use of the Internet of the respondents The option "I have not used internet yet" is not necessary, since respondents who have never used the Internet were asked to go to question 12. However, it is included the rare case of respondents not following the instructions properly

Question 6

Question	Please tick what applies to you
Response type	Closed answer, single answer
Response options	I shop online I intend to shop online in the future I may shop online in the future I will never shop online

(continued)

(continued)

Explanation This detail is asked for an analysis of the different relations involving the online-shopping behaviour or intention of the respondents
While for the Italian and German text there are no ambiguities, the supervisor was always ready to explain that “intend to shop” answer means a stronger intention than “may shop” answer

Question 7

Question If you ticked “I will never shop online”, would you shop in at least one of the following cases?

Response type Closed answer, multiple answers

Response options if the product were to cost more than 50% less than in a traditional shop
if the product were not available in a traditional shop
no, I would never shop online

Explanation This question is asked in order to verify whether the respondent who answered “I will never shop online” in the preceding questions would consider shopping online under certain circumstances. If the respondent confirms having no intention to shop online, he is asked to go on with the questionnaire from question 12, because all questions from number 8 to 11 are specifically addressed to people who are shopping or intend to/may shop online in the future
The option “no, I would never shop online” is not necessary. However, it is included in case of respondents wrongly believing this to be a single response question

Question 8

Question Why do you shop online or intend to shop online in the future?

Response type Closed answer, multiple answers

Response options For convenience
For low prices
To try out new technologies
Because I am not able to find the product in a traditional shop

Explanation These details are asked for an analysis of the different relations involving the online-shopping behaviour of the respondents

Question 9

Question Would you like to personalize a product online? (i.e. individually choose colour, size, writings, pattern, logos, material and so on)

Response type Closed answer, single answer

Response options Yes
Probably yes
Probably no
No

Explanation This detail is asked for an analysis of the different relations involving the desire of the respondents to personalize a product online. Moreover, this question aims at finding out whether the respondents would like to personalize a product online

Between questions 8 and 9 a brief description of what is Mass Customization was provided to the respondent, together with a colour screenshot from Nike's website where the customization choices for a shoe is clearly displayed.

Question 10	
Question	Would you prefer to buy the product of a company that offers mass customization (see question 9) rather than of a company that does not offer mass customization?
Response type	Closed answer, single answer
Response options	Yes No
Explanation	This question aims at finding out whether the respondents would prefer to buy a product of a company that offers mass customization rather than of a company that does not offer mass customization
Question 11	
Question	Referring to the last product you bought online: Would you rather have bought the product on a website that offers you the possibility to personalize the product than on the original website?
Response type	Closed answer, single answer
Response options	I have not shopped online yet Yes, with identical delivery time Yes, if the delivery time were no longer than one additional day Yes, if the delivery time were no longer than seven additional days No, I would have bought the product anyway at the original website
Explanation	This question aims at finding out whether people would prefer to shop on a website that offers mass customization rather than on a website that does not offer mass customization and how flexible the respondents are in terms of extension of the delivery time
Question 12	
Question	Referring to the last product you bought in a traditional shop for more than 10 €/15 \$: Would you rather have bought the product in a shop that offers you the possibility to personalize the product than in the original shop?
Response type	Closed answer, single answer
Response options	Yes, if the product were available immediately Yes, if the product were available after one day Yes, if the product were available after seven days No, I would have bought the product anyway in the original shop
Explanation	This question aims at finding out whether people would prefer to shop in a store that offers mass customization rather than in a store that does not offer mass customization and how flexible the respondents are in terms of waiting period
Question 13	
Question	If you could find a similar product (identical price and identical quality) of a brand that offers personalization, would you abandon your old brand and change? Please tick what applies to you for each category
Response type	Closed answer, single answer to each subquestion
Subquestion 1	Footwear
Response options	Yes, change No, not change
Subquestion 2	Clothing
Response options	Yes, change No, not change
Subquestion 3	Sports equipment

(continued)

(continued)

Response options	Yes, change No, not change
Subquestion 4	Computers
Response options	Yes, change No, not change
Subquestion 5	Dinnerware
Response options	Yes, change No, not change
Subquestion 6	Toys
Response options	Yes, change No, not change
Subquestion 7	Presents
Response options	Yes, change No, not change
Explanation	This question aims at finding out how flexible are people with respect to brand changing when faced with the advantage of mass customization. The question is divided into seven subquestions in order to be able to differentiate between various product categories

Appendix II: English Questionnaire



Name:	<input type="text"/>
Residence:	<input type="text"/>
Nationality:	<input type="text"/>

Survey on Mass Customization

- 1) Age:
- 2) Sex: female male
- 3) Occupation: student employed other
- 4) Use of internet:
- | | | | |
|--------------------|-----------------------|-----------------------|-----------------------|
| | yes | in the future | no |
| at home | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| at work/university | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| internet cafe | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| mobile phone | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

If you ticked "no" 4 times, please continue with question 12.

- 5) What are you using internet for?
You may tick all or none of the following.
- to surf
 - to chat, write e-mails
 - to book a hotel or a holiday
 - for online-shopping
 - for online-banking
 - I have not used internet yet
- 6) Please tick what applies to you:
- I shop online
 - I intend to shop online in the future
 - I may shop online in the future
 - I will never shop online

7) If you ticked "I will never shop online", would you shop in at least one of the following cases?

- if the product were to cost more than 50% less than in a traditional shop
- if the product were not available in a traditional shop
- no, I would never shop online

If you ticked "no, I would never shop online", please continue with question 12.

8) Why do you shop online or intend to shop online in the future? You may tick all or none of the following.

- for convenience
- for low prices
- to try out new technologies
- because I am not able to find the product in a traditional shop

Mass Customization describes the operation of personalizing, normally online, a product. This individual personalization happens step by step via a simple user interface within a few minutes. Customers can individually design the product according to their individual conception by choosing colour, size, writings, pattern, logos, material and so on. The price of such a personalized product corresponds to the price of a traditional, non-personalized, product that can be bought in a traditional shop.



9) Would you like to personalize a product online? (i.e. individually choose colour, size, writings, pattern, logos, material and so on)

- yes
- probably yes
- probably no
- no

10) Would you prefer to buy the product of a company that offers Mass Customization (see question 9) rather than of a Company that does not offer Mass Customization?

- yes, I would prefer to buy the product of a company that offers Mass Customization
- no, I would prefer to buy the product of a company that does not offer Mass Customisation

11) Referring to the last product you bought online: Would you rather have bought the product on a website that offers you the possibility to personalize the product than on the original website?

- I have not shopped online yet
- yes, with identical delivery time
- yes, if the delivery time were no longer than 1 additional day
- yes, if the delivery time were no longer than 7 additional days
- no, I would have bought the product anyway at the original website

12) Referring to the last product you bought in a traditional shop for more than 10 Euro/15 Dollars: Would you rather have bought the product in a shop that offers you the possibility to personalize the product than in the original shop?

- yes, if the product were available immediately
- yes, if the product were available after 1 day
- yes, if the product were available after 7 days
- no, I would have bought the product anyway in the original shop

13) If you could find a similar product (identical price and identical quality) of a brand that offers personalization, would you abandon your old brand and change? Please tick what applies to you for each category.

	yes, change	no, not c.
footwear	<input type="radio"/>	<input type="radio"/>
clothing	<input type="radio"/>	<input type="radio"/>
sports equipment	<input type="radio"/>	<input type="radio"/>
computers	<input type="radio"/>	<input type="radio"/>
dinnerware	<input type="radio"/>	<input type="radio"/>
toys	<input type="radio"/>	<input type="radio"/>
presents	<input type="radio"/>	<input type="radio"/>

Appendix III: German Questionnaire



Name:	<input type="text"/>
Wohnort:	<input type="text"/>
Nationalität:	<input type="text"/>

Umfrage zur kundenindividuellen Massenfertigung (Mass Customization)

- 1) Alter:
- 2) Geschlecht: weiblich männlich
- 3) Tätigkeit: Student/in berufstätig sonstiges
- 4) Verwendung des Internets:
- | | ja | in Zukunft | nein |
|--------------------|-----------------------|-----------------------|----------------------------------|
| zuhause | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| Arbeit/Universität | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Internetcafé | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Handy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Sollten Sie 4 mal "nein" gewählt haben fahren Sie bitte direkt mit Frage 12 fort.

- 5) Wofür verwenden Sie das Internet?
Keine oder mehrere Antworten sind möglich.
- zum surfen
 - zum chatten, e-Mails schreiben
 - um Urlaub und Hotel zu buchen
 - zum Einkaufen und shoppen
 - für online-Banking
 - ich verwende das Internet noch nicht
- 6) Bitte wählen Sie was auf Sie zutrifft:
- ich kaufe online ein
 - ich habe vor in Zukunft online einzukaufen
 - ich kaufe vielleicht in Zukunft online ein
 - ich werde niemals online einkaufen

7) Wenn Sie "ich werde niemals online einkaufen" gewählt haben, würden Sie in mindestens einem der folgenden Fälle online einkaufen?

- sollte das Produkt mehr als 50% günstiger als in einem traditionellen Geschäft sein
- sollte das Produkt in keinem traditionellen Geschäft verfügbar sein
- ich werde niemals online einkaufen

Sollten Sie "ich werde niemals online einkaufen" gewählt haben fahren Sie bitte direkt mit Frage 12 fort.

8) Warum kaufen Sie online ein bzw. möchten Sie online einkaufen? Keine oder mehrere Antworten sind möglich.

- aus Bequemlichkeit
- wegen der günstigen Preise
- um neue Technologien auszuprobieren
- weil ich das Produkt in keinem traditionellen Geschäft finden kann

Kundenindividuelle Massenfertigung bzw. Mass Customization beschreibt den Vorgang einer in der Regel online stattfindenden Personalisierung eines Produktes. Diese individuelle Personalisierung erfolgt schrittweise über eine einfach verständliche Benutzeroberfläche innerhalb weniger Minuten. Dabei können Kunden das Produkt nach Ihren individuellen Wunschvorstellungen gestalten und Farbe, Größe, Muster, Schriftzüge, Material, Logos usw. individuell wählen. Der Preis entspricht in der Regel dem des selben, nicht personalisierten, Produktes das in einem traditionellen Geschäft gekauft werden kann.



9) Würden Sie gerne ein Produkt online personalisieren? (d.h. individuell Farbe, Größe, Schriftzüge, Muster, Logos, Material usw. wählen)

- ja
- wahrscheinlich ja
- wahrscheinlich nein
- nein

10) Würden Sie es bevorzugen bei gleichen Preisen das Produkt eines Unternehmens zu kaufen das Mass Customization (siehe Frage 9) anbietet?

- ja
- nein

11) Bezug nehmend auf das letzte Produkt, das Sie online gekauft haben: Hätten Sie das Produkt eher auf einer Website gekauft, die Ihnen die Möglichkeit der Personalisierung angeboten hätte?

- ich habe noch nie online eingekauft
- ja, bei gleichen Lieferzeiten
- ja, bei Verlängerung der Lieferzeiten um höchstens 1 zusätzlichen Tag
- ja, bei Verlängerung der Lieferzeiten um höchstens 7 zusätzliche Tage
- ich hätte trotzdem auf der ursprünglichen Website eingekauft

12) Bezug nehmend auf das letzte Produkt, das Sie für mehr als 10 Euro in einem traditionellen Geschäft gekauft haben: Hätten Sie das Produkt eher in einem traditionellen Geschäft gekauft, das Ihnen die Möglichkeit der Personalisierung angeboten hätte?

- ja, bei sofortiger Verfügbarkeit
- ja, bei Verfügbarkeit nach max. 1 Tag
- ja, bei Verfügbarkeit nach max. 7 Tagen
- nein, ich hätte das Produkt trotzdem im ursprünglichen Geschäft gekauft

13) Sollten Sie ein ähnliches Produkt (selber Preis und gleiche Qualität) einer Marke finden, welche Personalisierung anbietet, würden Sie die Marke wechseln? Bitte wählen Sie je nach Kategorie was auf Sie zutrifft.

	ja, wechseln	nein, nicht w.
Schuhe	<input type="radio"/>	<input type="radio"/>
Bekleidung	<input type="radio"/>	<input type="radio"/>
Sportgeräte	<input type="radio"/>	<input type="radio"/>
Computer	<input type="radio"/>	<input type="radio"/>
Geschirr	<input type="radio"/>	<input type="radio"/>
Spielwaren	<input type="radio"/>	<input type="radio"/>
Geschenke	<input type="radio"/>	<input type="radio"/>

7) In caso avesse scelto "non farò mai shopping online", lo farebbe comunque in almeno uno di questi casi?

- se il prodotto costa oltre il 50% in meno rispetto a un negozio tradizionale
- se non dovesse trovare il prodotto in un negozio tradizionale
- no, non farà comunque mai shopping online

In caso abbia scelto "no, non farà mai shopping online" vada subito alla domanda numero 12.

8) Perché fa o intende fare shopping online?
Può scegliere quante risposte desidera, anche nessuna.

- per comodità
- per prezzi economici
- per provare nuove tecnologie
- perché non riesco a trovare il prodotto in un negozio tradizionale

Personalizzazione di massa ossia Mass Customization descrive il processo, che solitamente avviene online, nel quale ci si personalizza un oggetto. Questa personalizzazione individuale avviene in pochi minuti con una facile procedura passo passo. I clienti possono personalizzare l'oggetto secondo le loro preferenze per quanto riguarda colore, misura, scritta, disegno, sfondo, materiale ecc. Il prezzo equivale solitamente a quello dello stesso oggetto, ma non personalizzato, comprato in un negozio tradizionale.



9) Le piacerebbe personalizzare un oggetto online? (cioè scegliere personalmente colore, misura, scritta, disegno, sfondo, materiale ecc.)

- sì
- probabilmente sì
- probabilmente no
- no

10) A parità di prezzo e qualità, preferirebbe comprare prodotti di un'azienda che offre Mass Customization (veda domanda 9) o di un'azienda che non lo offre?

- di un'azienda che offre Mass Customization
- di un'azienda che non offre Mass Customization

- 11)** Prenda come riferimento l'ultimo oggetto che ha acquistato online. Se avesse trovato un altro sito che le permetteva di personalizzare lo stesso oggetto della stessa marca:
- non ho ancora fatto shopping online
 - avrei comprato nell'altro sito solo se l'oggetto fosse disponibile con gli stessi tempi
 - avrei comprato nell'altro sito solo se l'oggetto fosse disponibile entro 1 giorno in più
 - avrei comprato nell'altro sito se l'oggetto fosse disponibile entro 7 giorni in più
 - avrei comprato comunque nel sito abituale
- 12)** Prenda come riferimento l'ultimo oggetto di almeno 10 Euro che ha acquistato tradizionalmente. Se avesse trovato un altro negozio tradizionale che permetteva di personalizzare lo stesso oggetto della stessa marca:
- avrei comprato nell'altro negozio solo se l'oggetto fosse disponibile immediatamente
 - avrei comprato nell'altro negozio se l'oggetto fosse disponibile entro 1 giorno
 - avrei comprato nell'altro negozio se l'oggetto fosse disponibile entro 7 giorni
 - avrei comprato comunque nel negozio abituale
- 13)** Se trovasse una nuova marca che offrisse un servizio di personalizzazione con la stessa qualità e prezzo, cambierebbe la sua marca abituale? Per favore scelga per ogni categoria se cambierebbe marca o no.
- | | sì, cambio | no, non c. |
|-------------------|-----------------------|-----------------------|
| scarpe | <input type="radio"/> | <input type="radio"/> |
| abbigliamento | <input type="radio"/> | <input type="radio"/> |
| attrezzi sportivi | <input type="radio"/> | <input type="radio"/> |
| computer | <input type="radio"/> | <input type="radio"/> |
| stoviglie | <input type="radio"/> | <input type="radio"/> |
| giocattoli | <input type="radio"/> | <input type="radio"/> |
| regali | <input type="radio"/> | <input type="radio"/> |

Appendix V: Questionnaire's Answers

	Frequency	Percentage	Cumulative
<i>Nationality</i>			
Italy	389	69.3	69.3
Germany	47	8.4	77.7
Austria	69	12.3	90.0
Switzerland	19	3.4	93.4
Portugal	1	0.2	93.6
Russia	3	0.5	94.1
France	2	0.4	94.5
Spain	2	0.4	94.8
Czech Republic	1	0.2	95.0
Slovakia	2	0.4	95.4
Sweden	19	3.4	98.8
Netherlands	2	0.4	99.1
Bulgaria	2	0.4	99.5
United Kingdom	2	0.4	99.8
Poland	1	0.2	100.0
Total	561	100.0	
<i>Age</i>			
16	15	2.7	2.7
17	6	1.1	3.8
18	12	2.2	5.9
19	16	2.9	8.8
20	28	5.0	13.8
21	32	5.7	19.5
22	33	5.9	25.4
23	31	5.6	31.0
24	26	4.7	35.7
25	27	4.8	40.5
26	22	3.9	44.4

(continued)

(continued)

	Frequency	Percentage	Cumulative
27	15	2.7	47.1
28	19	3.4	50.5
29	13	2.3	52.9
30	15	2.7	55.6
31	13	2.3	57.9
32	3	.5	58.4
33	17	3.0	61.5
34	13	2.3	63.8
35	14	2.5	66.3
36	10	1.8	68.1
37	11	2.0	70.1
38	9	1.6	71.7
39	8	1.4	73.1
40	14	2.5	75.6
41	9	1.6	77.2
42	11	2.0	79.2
43	12	2.2	81.4
44	2	0.4	81.7
45	13	2.3	84.1
46	8	1.4	85.5
47	5	0.9	86.4
48	13	2.3	88.7
49	7	1.3	90.0
50	8	1.4	91.4
51	6	1.1	92.5
52	6	1.1	93.5
53	7	1.3	94.8
54	3	0.5	95.3
55	5	0.9	96.2
56	3	0.5	96.8
57	2	0.4	97.1
58	1	0.2	97.3
60	1	0.2	97.5
61	4	0.7	98.2
62	2	0.4	98.6
65	2	0.4	98.9
66	1	0.2	99.1
70	3	0.5	99.6
83	1	0.2	99.8
86	1	0.2	100.0
Total	558	100.0	
<i>Sex</i>			
Female	275	49.2	49.2
Male	284	50.8	100.0

(continued)

(continued)

	Frequency	Percentage	Cumulative
Total	559	100.0	
<i>Occupation</i>			
Student	133	25.3	25.3
Employed	356	67.8	93.1
Other	36	6.9	100.0
Total	525	100.0	
<i>Use Internet at home</i>			
Yes	437	81.1	81.1
In the future	32	5.9	87.0
No	70	13.0	100.0
Total	539	100.0	
<i>Use Internet at work/university</i>			
Yes	419	82.8	82.8
In the future	12	2.4	85.2
No	75	14.8	100.0
Total	506	100.0	
<i>Use Internet at Internet cafes</i>			
Yes	74	17.7	17.7
In the future	12	2.9	20.6
No	332	79.4	100.0
Total	418	100.0	
<i>Use Internet with mobile phone</i>			
Yes	83	19.2	19.2
In the future	35	8.1	27.3
No	315	72.7	100.0
Total	433	100.0	
<i>To surf</i>			
Yes	452	85.3	85.3
No	78	14.7	100.0
Total	530	100.0	
<i>To chat, write e-mails</i>			
Yes	441	83.2	83.2
No	89	16.8	100.0
Total	530	100.0	
<i>To book a hotel or a holiday</i>			
Yes	290	54.7	54.7
No	240	45.3	100.0
Total	530	100.0	
<i>For online-shopping</i>			
Yes	244	46.0	46.0
No	286	54.0	100.0

(continued)

(continued)

	Frequency	Percentage	Cumulative
Total	530	100.0	
<i>For online-banking</i>			
Yes	278	52.5	52.5
No	252	47.5	100.0
Total	530	100.0	
<i>Have not used Internet yet</i>			
Yes	7	1.3	1.3
No	523	98.7	100.0
Total	530	100.0	
<i>Shops online</i>			
Shops online	250	48.1	48.1
Intends to shop online in the future	37	7.1	55.2
May shop online in the future	160	30.8	86.0
Will never shop online	73	14.0	100.0
Total	520	100.0	
<i>Would shop online with discount of 50%</i>			
Yes	18	24.7	24.7
No	55	75.3	100.0
Total	73	100.0	
<i>Would shop online if product not available in shops</i>			
Yes	14	19.2	19.2
No	59	80.8	100.0
Total	73	100.0	
<i>Would never shop online</i>			
Yes	44	60.3	60.3
No	29	39.7	100.0
Total	73	100.0	
<i>Shops online for convenience</i>			
Yes	235	48.4	48.4
No	251	51.6	100.0
Total	486	100.0	
<i>Shops online for low prices</i>			
Yes	315	64.8	64.8
No	171	35.2	100.0
Total	486	100.0	
<i>Shops online to try new technologies</i>			
Yes	58	11.9	11.9
No	428	88.1	100.0

(continued)

(continued)

	Frequency	Percentage	Cumulative
Total	486	100.0	
<i>Shop online because product not available in shops</i>			
Yes	253	52.1	52.1
No	233	47.9	100.0
Total	486	100.0	
<i>Would like to personalize</i>			
Yes	201	42.7	42.7
Probably Yes	185	39.3	82.0
Probably No	49	10.4	92.4
No	36	7.6	100.0
Total	471	100.0	
<i>Would prefer MC company</i>			
Yes	382	82.5	82.5
No	81	17.5	100.0
Total	463	100.0	
<i>Would buy by MC-online company</i>			
Yes with identical delivery time	101	32.8	32.8
Yes if one additional day	40	13.0	45.8
Yes if seven additional days	65	21.1	66.9
No	102	33.1	100.0
Total	308	100.0	
<i>Would buy by MC company</i>			
Yes if available immediately	188	35.5	35.5
Yes if available after one day	73	13.8	49.2
Yes if available after seven days	83	15.7	64.9
No	186	35.1	100.0
Total	530	100.0	
<i>Change footwear company</i>			
Yes	312	60.0	60.0
No	208	40.0	100.0
Total	520	100.0	
<i>Change clothing company</i>			
Yes	360	68.3	68.3
No	167	31.7	100.0
Total	527	100.0	
<i>Change sports equipment company</i>			
Yes	266	52.7	52.7
No	239	47.3	100.0
Total	505	100.0	
<i>Change computers company</i>			
Yes	279	54.5	54.5
No	233	45.5	100.0

(continued)

(continued)

	Frequency	Percentage	Cumulative
Total	512	100.0	
<i>Change dinnerware company</i>			
Yes	244	49.5	49.5
No	249	50.5	100.0
Total	493	100.0	
<i>Change toys company</i>			
Yes	246	49.7	49.7
No	249	50.3	100.0
Total	495	100.0	
<i>Change presents company</i>			
Yes	380	73.9	73.9
No	134	26.1	100.0
Total	514	100.0	