

EXPLOITING MASS CUSTOMIZATION TOWARDS OPEN INNOVATION

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Abstract: *Mass customization in the sportswear industry has become an established business for many of the leading brands. The Adidas mass customization program (miAdidas) was initially developed in the late 1990s and launched in 2000. In this case study, we investigate how miAdidas has evolved over the past 10 years and how it has become a strategic business for the Adidas Group. Furthermore, by examining other customer involvement models, we derive opportunities how to further exploit the creative and innovative potential of the customers especially with regards to extending mass customization programs towards open innovation approaches.*

Key Words: *Mass Customization, Customer Co-Creation, Open Innovation, Innovation Contests*

1. INTRODUCTION

»Any customer can have a car painted any color that he wants so long as it is black«. This famous quote by Henry Ford, the founder of Ford Motor Company, nicely illustrates how individual customer requirements have been respected in the *mass production* age. But as we know times have changed, and so has the role of customers and suppliers in a globalized economy. This paper focuses on the concept of *mass customization*, which in the recent years has gained popularity across companies, industries, and continents. By our definition (following Kaplan and Haenlein [1]), mass customization means the production of products which have been customized by the customer, at production costs similar to those of mass-produced products. Although the concept is not new, we see that many companies, who are today running their mass customization business professionally, have undergone a process of continuous improvement and change. The paper at hand investigates this evolution by focusing on the mass customization program at Adidas, a global leader in the sportswear industry. Their mass customization program »miAdidas« started more than 10 years ago with a single soccer boot model for customization. Over the past years, this business has been stepwise enhanced and expanded, and has today become a sustained business model with strategic relevance.

However, when looking at customer engagement concepts, we also realize that mass customization is not the only form of engaging customers in historically internal firm processes: Customers can also be involved in the process of *innovation*. In the past decade, quite an

extensive stream of literature (c.f. [2]) has been focusing on all kinds of collaborative innovation activities beyond the boundaries of research and development departments. Firms do not innovate exclusively within their walled garden anymore; they also innovate openly with external sources – including customers. This concept, i.e. developing innovations not exclusively inside a singular firm, is nowadays referred to as »open innovation«, a term which has been coined by Henry Chesbrough in 2003 and which has been widely adopted in theory and practice [3].

From our point of view, there is an inherent link between the concepts of mass customization and open innovation: Both concepts allow customers to participate in traditionally purely internal processes (production process and innovation process). The link between these concepts is the *customer* who is not anymore satisfied with buying off-the-shelf products. Instead, she wants individual products – or even better products. Based on our analysis of the Adidas mass customization program, we develop and discuss opportunities for exploiting the customers beyond individual product configuration towards enabling them to participate in the innovation process.

Following the argumentations above, we define two distinct research questions to be answered in this paper:

- a) First, by analyzing the Adidas mass customization business, we want to understand *how a professional mass customization business is organized today, and how customers can create their individual products based on this offer*
- b) Second, by looking at open innovation and especially customer involvement in innovation, we then discuss *how the creative and innovative potential of the Adidas mass customization customers could be further exploited as a source of innovation for the next generation product lines*

The remainder of this paper is structured as follows: In chapter 2 we discuss the theoretical background of the mass customization concept in general and with a particular focus on the sportswear industry. In chapter 3 we introduce the case study, provide relevant company information, and summarize the origins of the miAdidas program. The first research question is then analyzed in chapter 4, where we describe the development and the current state of the miAdidas mass customization

business. Building upon two earlier studies describing the development of miAdidas until 2005 [4] and 2006 [5], we conducted several case interviews and also collected secondary data in order to gain a profound understanding of the more recent developments.

In chapter 5 we take a look at mass customization from a different angle: We present different forms of customer involvement in innovation processes, and we discuss the potentials to exploit a mass customization business (such as miAdidas) towards open innovation approaches. In the final chapter 6 we discuss the presented opportunities and draw conclusions for theory and practice.

2. THEORETICAL BACKGROUND

2.1. Mass Customization

The concept of mass customization has been subject to research for many years. Numerous authors have published articles about mass customization, and many more have been part of the discussion. But what does mass customization mean? When has it become relevant? And why? Let us begin with two citations: »Even today, most United States automobiles are, in a sense, custom-produced. Figuring all possible combinations of styles, options and colors available on a certain new family sports car, for example, a computer expert came up with 25,000,000 different versions of it for a buyer«. And: »Yet we are only beginning the march toward destandardization of our material culture«. They sound like insights from today, but they were published back in 1970 in Alvin Toffler's book »Future shock« [6].

It took some more years until Stan Davis first came up with the term »mass customization«, and until mass customization became more than a prediction for the future [7]. Practitioners and academics started to pay increasing attention especially after B.J. Pine II in 1993 published his seminal work titled »Mass customization. The new frontier in business competition« [8]. In contrast to mass production, the predominant production strategy since the industrial revolution, the concept of mass customization does not primarily focus on standardization, but also requires modularization and tools for integrating the modules into a solution which is tailored to customers' demands [9]. It allows customers to select attributes from a set of pre-defined features in order to design their individualized product, by which they can fulfill their specific needs and take pride in having created a unique result [1], [10], [11].

2.2. Mass Customization in Sportswear

Compared to other industries, mass customization in the sportswear industry is a rather young business model: Car manufacturers already started in the middle of the 20th century to offer more models, more variants, and custom configurations for their cars [6]. Kotler in the 1980s reported about mass customization in the Japanese housing industry, where customers could design new houses with computer-aided design and manufacturing tools [12]. In the IT industry in the 1990s, the personal computer company Dell based its entire business model

on the mass customization concept by offering build-to-order computers from modular components [13].

Over the past years, mass customization also became popular in the sportswear industry. Today many of the leading brands have implemented a mass customization offer: Nike has »NIKEiD«, Adidas has »miAdidas«, Reebok has »YourReebok«, and Converse has »Design Your Own«. From our point of view this is an interesting field for investigation, because of two reasons:

- a) The customization business in sportswear is quite young, first offers were launched in the late 1990s. Such a young business certainly required a certain space and time for experimentation, but now in 2012 should have achieved a rather stable form with a professional integration into the core »mass production« business.
- b) Over the past years, the Internet has become a more important sales channel for fashion products in general and also sportswear products in particular, despite the inherent challenges of size determination and order returns. It is therefore also interesting to see how the Internet has affected the mass customization business in fashion and especially in the sportswear industry.

Besides the business and the technical view, we also should take the customer perspective into consideration: Successful mass customization offers highly depend on the attractiveness of product range, user experience in the configuration process, short delivery times, and customer satisfaction in using the customized product. In our case study we will consider these elements and investigate how Adidas has taken them into account.

3. CASE INTRODUCTION

3.1. Adidas

Adidas today is the second biggest sportswear company worldwide, with more than 40,000 employees and revenues of more than 13 bn. EUR in 2011. Founded in 1949, Adidas managed to quickly become a leading manufacturer of sport footwear, equipping already many athletes for the Olympic Games in 1952 and the FIFA World Cup in 1954. In its early years, Adidas could very quickly expand its market position as a supplier for many soccer teams and Olympic Games athletes.

From its initial focus on athletic footwear, Adidas soon started to expand its product range, and since the mid-1960s also produced sportswear apparel and balls. Over the years the product range was further expanded to a wider set of sport categories (e.g. tennis, basketball, and skiing), and in the 1990s complemented with sports fashion products. The fashion business has proven to be very successful and thus important to Adidas, such that today Adidas is running two very successful business segments: Sports Performance and Sports Fashion.

The history of Adidas has not always been marked by continuous growth; there have also been turbulent times. In the mid-1980s, markets across industries were facing increasing competition and price pressures due to the globalization of the world economy. Back then, Adidas decided to take a major strategic and organizational

decision, moving away from its focus on product manufacturing towards a strong focus on marketing. Manufacturing was to a large extent outsourced to third party suppliers in cheaper labor countries. In order to keep up with its main competitors, Adidas also started to look for take-over opportunities in the market and acquired the companies TaylorMade and Reebok (in 1997 and 2005).

In order to better understand the development of the miAdidas business outlined in the following section, we also need to look at the sales channels at Adidas. In the sportswear industry, historically, there has always been a strong market presence of large resellers and retail chains (e.g., InterSport, Foot Locker, and Decathlon) which operate large numbers of distributed stores and sell products of many different sports brands. Adidas still makes the majority of sales through this reseller/wholesale channel. But over time Adidas has established other sales formats with a more direct control: Own retail stores operated by Adidas itself, mono-branded franchise stores, shop-in-shops, co-branded stores with sports organizations and other brands, and joint ventures with selected retail partners. With these formats, Adidas has a higher influence on the product offering and the product presentation at the point of sale, thereby being able to strengthen its brand and grow revenues. As stated in the 2011 annual report, Adidas intends to further increase its controlled space initiatives from currently 36% of Group sales towards 45% in the next four years, especially by expanding own retail stores and mono-branded franchise stores [14].

Besides wholesale and retail, Adidas is also focusing on the online channel. E-commerce was for many years not seen as a relevant, and only in the US market Adidas offered its products in its own webshop. In Europe, e-commerce was even stopped after a trial phase in 2001. Only in 2008, e-commerce was re-introduced to the European market and subsequently also to other markets. Today, e-commerce has been defined as the third major sales channel as part of the strategic business plan [14] and will be systematically expanded in the next years.

3.2. The Origins of miAdidas

Historically, Adidas has been focusing on mass production – with attractive »mass products«, highly standardized processes, vertical integration of manufacturers in the supply chain, and a strong brand marketing focus. But the underlying presuppositions for successful mass production businesses have changed in the past decades: Companies across industries have been facing increasingly diversified demand patterns from their customers, supported by sociological changes and technological developments, especially the Internet. Global competition and increasing customer purchasing-power made many companies introduce more product variants in smaller quantities, in order to compete not only on price but also by a differentiated product offering. This broader product range in smaller quantities not only reduced economies of scale, but also made planning and forecasting much more difficult, with an increased risk for out-of-stock and overstock situations. Christoph Berger, the former head of the miAdidas business unit, described the origins of miAdidas as

follows: »As a consequence of the changing competitive situation, Adidas management realized that implementing made-to-order manufacturing instead of made-to-stock variant production could become a promising option to manage the costs of variant explosion and broad product assortments« [4, p.73]. The origins of miAdidas date back to the mid 1990's, when the management board decided to start developing a mass customization program and introducing a first product range of customizable shoes [15]. This decision was also a response to the mass customization activities of the major competitor Nike, who was the first to introduce its »NIKEiD« customization offering already in 1998 [5].

In 2000, after the concept and development phase, Adidas launched the first miAdidas customization offers in selected test markets. At that time, miAdidas was not yet a permanent offer, but only installed temporarily at major sports events. The early installations of miAdidas were mainly seen as a test phase, with the objective of reviewing and improving the production process, and for validating customer acceptance of this new offer. Based on the positive experiences, miAdidas was expanded to larger campaigns: In 2003 the equipment was built into a large truck which toured across the United States, offering customization at a mobile point-of-sale.

Very soon miAdidas also became a permanent offer in retail stores. The first installation was the Stockholm concept store already in 2002. Two years later miAdidas was launched in the New York performance store, one of the largest concept stores at that time. Subsequently the in-store concept was rolled out to more retail stores in major cities around the world. One highlight was the spacious installation at the Adidas store in Paris Champs-Élysées in 2006: Equipped with the latest technical features, the »mi Innovation Centre« offered customers to run on a treadmill while their digital reprint was displayed on a large LED screen in front of them. Electronic sensors in the treadmill collected all individual running characteristics. Based on this data and according to the customer design, a perfectly matching individual shoe was produced.

Summarizing the above, miAdidas was implemented and introduced as a customization offer at the physical point of sale. Interestingly, the major competitor Nike followed a very different sales strategy: From the very beginning in the late 1990s the customization offer NIKEiD was implemented only as a digital service on Nike's website. Only after several years, NIKEiD also started to open physical studios within their stores in major cities in Europe, USA and China.

4. MI ADIDAS TODAY

As defined above, the first objective of this research paper is to investigate how mass customization at Adidas has evolved and has been professionalized over the past years. In this chapter we will discuss how miAdidas has been transformed from an offline offering in retail stores towards an e-commerce business; how the product portfolio initially focused on performance footwear was extended towards a more comprehensive customization product range, including special offerings for new

market segments; how the product introduction process has become a professional procedure, integrated with the inline new product development processes; and how customization from the consumer perspective (order-to-deliver) has been streamlined in order to create a unique customer experience.

We started our data collection for this research with a thorough review of the literature. Within the body of literature dealing with various aspects of mass customization, we have found two very interesting articles with a special focus on the miAdidas program: Berger, Moeslein, Piller, and Reichwald [4] provide a comprehensive summary and interpretation from over seven years of collaborative research on mass customization together with Adidas. Also, Moser, Mueller, and Piller [5] describe the evolution of miAdidas until 2006 and provide insights about various aspects such as the product portfolio, manufacturing and logistics, customer interaction, and also customer loyalty.

The above mentioned articles describe the miAdidas case from the perspective of the years 2005 and 2006. In order to examine and understand the developments until today, we have run several in-depth case interviews with functional managers from the miAdidas business unit. Interviews were audio-recorded and systematically analyzed. From the interviews, we could extract fact-based information about the current setup of miAdidas, the changes and advances over the past years, and we also discussed potentials for future enhancements of mass customization, especially towards open innovation practices (see chapter 5).

Synthesizing our interviews, we can report that the miAdidas customization business today has become an integral part of Adidas' overall business, operated by a professional organization with clearly defined roles and responsibilities, supported by streamlined processes aligned with the mass production inline business and manufacturing suppliers, and a technical infrastructure enabling efficient processes at the front-end as well as in the back-end. We will discuss these different aspects in the subsequent sections. The relevance of this business can be underlined by the fact that in 2011, for the first time, miAdidas was mentioned in the Adidas Group's annual report as an important lever to achieve the strategic business plan: Research and development activities now also focus on individualization, digital technologies, and sustainable product innovation. It is stated that one of the major objectives is to foster the personal interaction with the end-customers [14].

4.1 Product Portfolio

When the miAdidas business was initially launched in 2000, it started with offering the Predator Precision soccer boot model for customization. Over the years, the miAdidas product range was expanded by the number of models, but also by additional categories such as tennis, running and indoor shoes. By 2007, miAdidas comprised already 14 different shoe models from six different sport categories. In 2008 the portfolio was complemented by a new product line: Sneakers from the »Adidas Originals« style segment since then complement the miAdidas product portfolio. Until mid-2012 the product range has been further expanded from season to season, but is still

limited to footwear: Currently there are 32 different models available on the German miAdidas website, 22 of them from the sport performance categories and 10 from the miOriginals segment.

All miAdidas footwear models are based on the latest Adidas inline product range of non-customized footwear. In our interviews we could confirm the underlying rationale for this setup [5]: The custom shoe production is done by the same manufacturing suppliers which Adidas uses for its inline business, hence manufacturing processes are established and working efficiently. The suppliers use mainly the same materials, components and machinery for the production and can achieve economies of scope. Furthermore, the inline product serves as reference point for miAdidas customers, in terms of the performance features and also the retail price tag. One interviewee added another rationale for using inline products as a basis for customizable products: Order quantities and required raw material stock volumes can be more accurately planned by correlating forecasts to sales figures from respective inline product.

Because new miAdidas customization products need to be launched soon after the inline market introduction, development processes must be closely aligned. The critical path for miAdidas product introduction is determined by the inline development process. The miAdidas product introduction process includes the selection of the product range for a specific season, creation of all new designs offered for customization, development of samples, product testing, forecasting of sales and materials, marketing planning, and market introduction. The growing miAdidas product portfolio increases the coordination complexity with the inline business. Therefore the new product introduction process over the past years has become more systematic, but not shorter in duration.



Fig. 1. New configurator (miTeam)

In order to not only serve individual consumers, Adidas in 2008 introduced a second business line for miAdidas. This offer (named "miTeam") is directed at semi-professional teams, university teams, schools and community teams. The miTeam product portfolio covers a wide range of sport categories including soccer, basketball, and also running. Until recently, miTeam products could only be ordered from selected distribution partners in retail stores. Since the launch of the new

miTeam website in June 2012, miTeam products can be directly be customized and ordered online. The new product configurator in the miTeam website already offers the ability not only to customize footwear, but also apparel (e.g., shirts, pants, socks) and accessories. This configurator is soon to be implemented also for the miAdidas individual customization website, which in the near future shall also include apparel and accessories.

4.2 Sales Channels

miAdidas today is mainly a digital experience: The management team decided to take a major shift in their miAdidas sales channel strategy, moving away from the formerly purely physical on-site business in selected retail stores towards offering a mix of online and offline channels. In 2009, the first miAdidas online platform was launched in the US, and in 2010 also rolled out to European markets in the UK, Netherlands, France, and Germany. Today the miAdidas online platform is integrated in the different own webshops in the countries (e.g. <http://shop.adidas.de>). The major advantage of the online channel is that miAdidas customers can design their product anytime and anywhere, and do not need to find a miAdidas retail store first.

Offering mass customization via the Internet is concerned with two major challenges: First, there is no sales support for consulting the customer and for reacting to individual questions which may be relevant for the customer's purchasing decision. When miAdidas was initially introduced to retail stores, the management team was concerned that it needed to send specialized and trained personnel as temporary sales clerks, because the existent sales staff was not able to handle the complex processes and could not sufficiently assist the customer in the co-design process [4]. This challenge is even stronger in the Internet: All required product and process knowledge must be explained in clear and simple ways, enabling customers to perform the customization process completely by themselves and providing them with sufficient confidence to complete the purchase order.

The second challenge is the »no returns« policy which Adidas applies for customized products. In contrast to non-customized products sold via the Adidas online shop, which can be returned within 30 days after receipt, customized products cannot be returned (except for manufacturing defects). This implies a high degree of customer trust in Adidas as a brand and its product quality. It also requires that the online configurator displays the customized product on the screen very realistically and accurately, in order to ensure that the final product exactly meets the customer's expectations.

Despite those challenges, the shift towards offering miAdidas via the online channel was a logical move: E-commerce has become increasingly relevant in the entire fashion industry, and is therefore also highly relevant for Adidas and also its mass customization business. This trend has been supported by increasing commercial pressures on retail sales floors: Tight controlling of sales per square meter does not permit spacious installations anymore. With the new configurator, the miAdidas retail space can become even more efficient in the future: Developed as a multi-platform solution, the configurator can be integrated not only in the Adidas webshop but

also on tablet computers in retail stores. The configurator can even be integrated in third-party web shops and in social networks. This flexibility may support further sales channel harmonization in the future and thereby enable a more congruent customer experience.

4.3 Order-to-Delivery

Adidas since decades uses third party manufacturers for mass production and uses the same manufacturers also for producing the miAdidas customized products. The order-to-delivery process works as follows: Once the customer has finished customizing the product, a customer order is produced and the product-specific technical document is created from the system. The technical document together with the purchase order is transmitted to the appropriate supplier. The supplier then starts producing the customized product. If the customer ordered the product in one of the miAdidas retail stores, it will be delivered to the store and the customer needs to pick it up there. If the customer ordered the product via the miAdidas website, the product will be shipped directly to her home address.

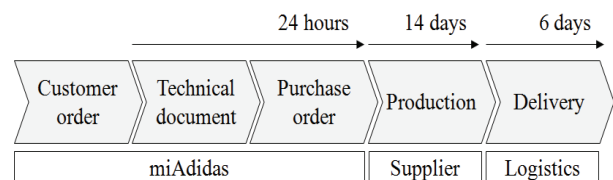


Fig. 2. Order to delivery process

The entire process from order to delivery is designed to complete within 21 days. This is on the one hand certainly longer than the order-from-stock delivery time for non-customized products, but on the other hand it is a robust build-to-order process integrated with its retailers and suppliers along the supply chain. Such a streamlined and robust process is a key requisite for achieving high compliance with the promised service level to the customer and thus one of the fundamental capabilities of successful mass customization [17].

For miTeam customization orders, the process can take up to 45 days, due to an increased chance that raw material is not available on-site at the manufacturer because of larger order quantities. miTeam orders will always be sent to one of the retail partner stores. The following illustration shows the different product lines, customer order sales channels, and delivery types.

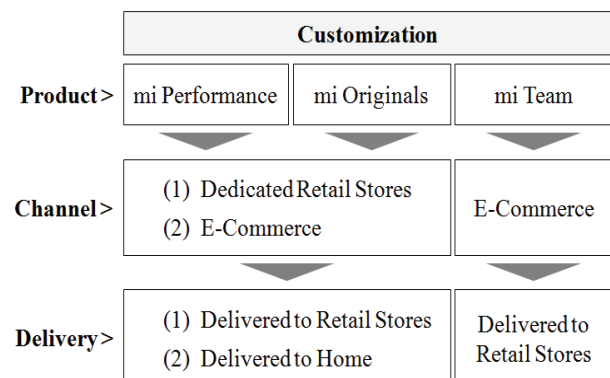


Fig. 3. Product Lines, Sales Channels, and Delivery

4.4 User Experience

Mass customization by definition is based on the interaction with the customers. This process is more than a one-off product purchase decision: Customers want to enjoy pleasure and fulfillment of their emotional needs [18] which they can only obtain if the company is able to create a memorable event and a personal *user experience* [19]. User experience only recently has become a focus topic for miAdidas. In the past years, the business unit was rather concerned about establishing professional structures and a robust and efficient back-end with integrated processes and tools. Having these structures in place, Adidas is starting to focus also on the front-end, i.e. the customers and their experience.

According to one interviewee, user experience needs to be considered for the entire interaction process and all customer interfaces, not limited to the purchasing process but rather accompanying the customers over their entire customer lifetime. User experience is seen as a key enabler for intensifying the customer relationship, and also for differentiating from competitors with similar mass customization offers. However, understanding user experience as a holistic concept requires a process of change for an organization that (from a corporate group perspective) in the past has focused on third party retail and wholesale partners as its primary »customers«. In order to create and offer a unique user experience, a first step at miAdidas was to rebuild and optimize the product configurator, i.e. focus on the digital experience within the configuration process. The configurator is the primary customer interface and must be designed to enable a perfectly efficient and effective interaction [11]. Implementing a good user experience is concerned with ease of use of the 3D engine for configuring the product model, but also with accuracy of the displayed size, forms, colors, and product material.

User experience is not limited to the customization process, i.e. the individual design of the product. User experience also needs to be considered for the 21 days order-to-delivery time. A continuous information feed is required to inform the customer about the status of production and delivery.

In addition, user experience should also be taken into account for the experience with the finished product. If customers have a great experience with their miAdidas products, they will more likely come back to buy the next product, and also recommend miAdidas to others. Only by creating a unique and superior experience over the entire product lifetime, Adidas will be able to turn excitement into customer loyalty and thereby creating an enduring customer relationship.

4.5 Summary of the miAdidas Development

The miAdidas business has continuously grown and evolved. This evolution has been accompanied by the implementation of professional structures – new product development processes aligned with the inline business, standardized supply chain processes from order to delivery, clear organizational roles and responsibilities, and also integrated IT solutions supporting all processes at the front-end and in the back-end.

The following table provides a summary of the major developments over the past years. We compare miAdidas in 2012 with the situation when mass customization was initially launched and tested (until 2003), and with 2005, when miAdidas had »reached a moderate level of experience and left its pilot stage« [4, p.83].

Table 1. *miAdidas development and milestones*

Until 2003	2005	2012
First miAdidas offers at events and via campaigns	Sales mainly via dedicated retail stores	Still offered in retail stores, but focus on online channel
Limited to small number of soccer boots	More sport categories, various performance models	Extended product range (performance & style), plus miTeam
Manual processes, not standardized and integrated	Standardized processes, designed to run a sustainable offline business	Processes and tools integrated, ready for further product range & sales channel expansion
Focus on trial testing and gaining experience	Focus on establishing processes and tools	Focus on next generation configurator, scalable tools & processes, and user experience

We have seen that miAdidas has constantly evolved into a sustainable and professionally managed business. In the near future, the miAdidas product portfolio for individual consumers is planned to be extended to also include apparel and accessories. This will offer the customers new opportunities to unfold their creativity and demonstrate their talent for design. Sales channel optimization and harmonization can be supported by the new configurator, which is no longer hard-coded into the Adidas e-commerce webshop, but designed as a stand-alone module ready to be integrated in the own webshop, tablets in retail stores, and third party systems.

5. EXPLOITING THE ACTIVE CUSTOMER

As discussed in the previous chapter, the current implementation and the future prospects for miAdidas should allow for a continuous growth story in the next years. The organization, the processes, and the tools are capable of scaling the business to higher levels. However we have been wondering whether there could be further potential to exploit the creative and innovative potential of the miAdidas customers, as posed in the second research question (c.f. chapter 1). In the following, we aim to develop a deeper understanding of the linkage between the concepts of mass customization and open innovation.

We start this discussion with a presentation of concepts related to customer involvement in *innovation processes*, and then shift our view back to mass customization at Adidas, evaluating whether and how these customer involvement concepts could be applied.

5.1 Active Customers and Lead Users

The customer-active paradigm is usually applied in the context of idea generation for the development of new products [20]. This paradigm describes the concept that not only manufacturers can initiate the idea generation process in order to come up with new product ideas, but also customers can identify new demand, develop ideas for a desired product, and even develop the product themselves or find an appropriate supplier who develops it. The customer-active paradigm is contrasted to the manufacturer-active paradigm, which relates to the classical role of the manufacturer as the initiator and coordinator of the idea generation and the new product development processes.

Customers who proactively engage in new product development are also called »lead users« [21]. Lead users are characterized by (1) experiencing needs earlier than many other users in the market, and (2) anticipating high benefits from a solution to their needs. For example, surgeons working in university clinics in Germany have been found to develop or improve certain medical equipment in order to satisfy specific needs in their work environment [22]; and also webmasters of company IT networks were observed to not only enhance the Apache web-server software for their specific needs, but they also communicate these enhancements back to the development community [23].

Many examples of lead users have also been found in the sporting equipment industry: The first mountain bikes were developed by lead users in the 1970s, when they found joy in using their bicycles off-road, but available commercial bikes could not be used for this activity. Building upon the lead user innovations, the production of mountain bikes was then professionalized and became new business for existing manufacturers and also for new players in the market [24]. Other lead users have improved their windsurfing equipment, when they developed the new practice of making high jumps in the waves, and therefore built footstraps onto their surfboards. The sport of jumping with windsurfing boards was then widely diffused in the windsurfing community, and equipment manufacturers adopted the footstrap innovation for developing a new category of surfboards.

Mountain biking and windsurfing are only two examples of many. There is a general broad opportunity for lead users in the sports industry, because the sports enthusiasts are usually the first to identify and develop new practices and therefore modify and enhance their equipment.

5.2 Open Innovation with Customers

Not only lead users can be a valuable external source for innovation. The open innovation paradigm provides manifold theoretical options for engaging with external partners in the development of new products and also new services [3]. Open innovation can encompass lead users, but also joint research projects with universities, innovation labs, and other companies (even competitors). And also beyond the specific group of lead users, companies have also started to involve »ordinary« customers in their innovation processes. These customers

have fewer innovative capabilities and less enthusiasm to solve a problem by themselves (like lead users do), but they still have valuable knowledge, skills, and they have also individual needs for products or services. This need information makes them also a valuable potential source for innovation.

Piller and Ihl provide a typology of different modes for open innovation with customers [25]. At the so called front-end of the innovation process, customers can be engaged in the generation of new ideas, and also in the selection of the most valuable or promising ideas. A common approach is the execution of *idea contests*, where customers are invited to provide ideas related to a specific problem [26], [27]. Idea contests are usually run via an online platform, in order to facilitate access for a broad number of customers. In practice, quite a large number of idea contests has been run in the past years, with very different task definitions: In some cases the tasks are rather broadly defined with a large solution space and little complexity; in other cases the tasks are very specific and complex, require a high degree of expertise, and only very knowledgeable and skilled participants are able to find a solution for the problem. Adidas used this approach once for miAdidas in order to obtain customer ideas for improving their (at that time still physical) miAdidas offering. However, this contest so far was only a one-off exercise and not implemented as a continuous approach [28].

A similar format for involving customers at the front-end of the innovation process is the »suggestion box« approach. Compared to idea contests, there are two major differences: There is no distinct formulation of the problem, and there is no deadline for participants. The solution space is very large compared to idea contests, and accordingly the required expertise from participants is rather low. An example of such a suggestion box is the platform »Ideastorm« run by the computer company Dell. Customers can propose ideas and can discuss and vote on other's ideas. Depending on the voting but also on the feasibility and business value, Dell implements some of the ideas for improving their service and for offering better products.

Customers can also be engaged at a later stage of the innovation process, in the design and development phase. At this stage, tasks are more specific, they require specific knowledge and skills, and results need to be more elaborated in order to be valuable for the company [25]. This calls for a very structured approach for the interaction with customers which should be supported by toolkits for innovation [23], [29]. Such toolkits may be very similar to those toolkits which companies use internally for their designers and developers, for example computer aided design software (CAD). The toolkits by their functionality define the solution space and also provide access to the company's sticky solution information, i.e. how the problem can be solved; in a trial-and-error iteration, customers can then develop solutions within the given solution space in order to find the ideal solution which best matches their needs [29].

Figure 4 illustrates a schematic overview of the different forms of customer involvement in open innovation. It should be noted that from the different customer involvement modes [25] we have focused on

those approaches where contributing to innovation is the central objective, and which are organized by the company and not by the community. The latter limitation is used because of the underlying assumption that the innovation process in a company-context is always driven and controlled by the company, as opposed to community-driven innovation processes e.g., open source software development (not our focus).

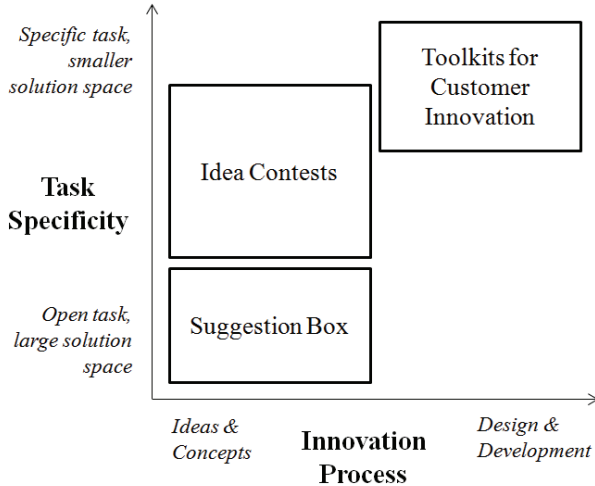


Fig. 4. Open Innovation with Customers

5.3 miAdidas and Open Innovation

Apparently there is a major difference between mass customization and open innovation: Mass customization enables customers to participate in the *production process*, whereas open innovation offers customers the opportunity to participate in the *innovation process*. The way mass customization is implemented today – not only in miAdidas but across industries – allows customers to be creative, but not innovative. A successful innovation is not only based on the creation or invention of something new, it is also required that it is widely accepted by the market and results in significant usage or sales figures [30]. In mass customization, customers design their products only for themselves. The result is a single individual product. In contrast the result of an innovation process is not a single product, but a new offer to the market. This new offer can differentiate incrementally or also radically from the previous offers.

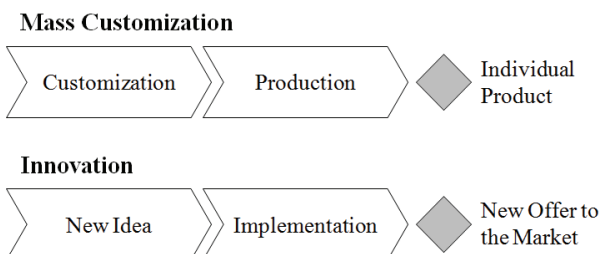


Fig. 5. Mass Customization vs. Innovation

Despite the differences of these concepts, we argue that there is also a clear potential for establishing a connection between them. Let us remind of the lead user characteristics, which we have discussed earlier. To a certain extent, also customers of miAdidas who design

individual products demonstrate lead user characteristics: They experience a need to differentiate from others and express their individuality, and they modify mass-market products according to these needs. Compared to the customer who buys products off the shelf, mass customization customers are certainly more active and engaged.

In the following, we conceptualize the potential to further exploit the activity and the ability of the mass customization customers. We derive three opportunities which are related to the discussion of customer involvement in open innovation. Our evaluation of these opportunities follows in chapter 6.

- Using the configurator for design contests:* The new configurator has been developed as modular solution and could also be integrated into a design contest environment. Customers could use the configurator to design their product and then share their design with others. The other participants of the contest could then vote which designs they like most. Such an approach would be very similar to the offers from companies like Threadless.com and Spreadshirt.com, which have based their entire business model on crowdsourcing t-shirt design. The benefit is not only that the design task is outsourced to the community and thus the internal workload should reduce; there is also a great benefit of very reliable demand forecasts and thus minimizing the risk of overstock production [31]. Especially for t-shirt design customization, which is planned to be offered soon also for individual miAdidas customers, design contests could be a promising opportunity.
- Offering a toolkit for customer innovation:* The configurator as the existing customer interface is currently limited to the selection of colors, some material elements, a set of predefined logos, and a personal engraving. We could imagine that Adidas could offer a toolkit for customer innovation with a much wider solution space beyond customization of colors, logos, and letterings. An extended toolkit could provide an additional functionality to also modify the form factor of the products (CAD functionality), and maybe even the definition of the material. This would enable customers to express their innovative potential much more than today. The extended toolkit could be implemented as a stand-alone product, or as an extension of the configurator.
- Feeding mass customization data back into the inline new product development process:* Mass customization can also be understood as a valuable source for collecting need information from the customers, which for non-customized products can only be obtained by using classical market research instruments. By designing their individual product, customers automatically provide information with regards to their preference for certain designs and design attributes. Systematic data analysis of all miAdidas configurations over a certain period would reveal the most preferred and also the most unpreferred design attributes. This information could then be used by the inline product development teams for designing the next generation product range.

6. DISCUSSION AND CONCLUSIONS

6.1 Evaluation of Opportunities

The presented opportunities for further exploiting the mass customization business and the community of active customers have currently some limitations. Most obvious and presumably easy to realize would be the *third opportunity*. This has already been proposed in earlier studies, where the authors discuss that »the mass customization segment can be seen as providing panel-like market research information« [4, p.74]. However, a systematical approach to forecasting based on miAdidas customer preference information has not yet been implemented for two reasons: First, because it would require a comprehensive business intelligence IT solution which is not in place at the moment; and second, because the trends and customer preferences in the fashion business are subject to frequent changes, i.e. what is hot this season may be outdated and »old fashioned« already next season. Theoretically, this approach may also bear the problem of some kind of cannibalization effects: The accuracy of trend forecasts based on customization preferences increases with a larger customer base using miAdidas. Simultaneously the relevance of these forecasts for the inline business will be reduced, once more customers shift from mass production to mass customization offers. At the very extreme, which is only an imaginary situation, if all customers would buy mass customized products, the explanatory power of their customization preferences would diminish.

The *second opportunity*, which is offering a toolkit for customer innovation, certainly bears some potential. Although most of the miAdidas customers will hardly have sufficient technical knowledge and skills required for developing new form designs and new product material compositions, there may be people outside the organization who could be a valuable innovation source. »Not all the smart people work for us« [3, p. xxvi] is certainly also true for companies in the sportswear business. Only recently, Adidas has launched a design competition inviting artists, designers and creators worldwide to customize fashion sunglasses. Participants need to have certain design knowledge and skills in order to contribute their own sunglasses 2D and 3D designs. For these kinds of competitions, a toolkit for design and innovation could be very useful, because it would facilitate the activity of crowdsourcing product design and development from an external community of experts. But the use of such an innovation toolkit is also limited: Technical, material, and design innovations are key for Adidas to secure its market position, differentiate against competitors, and grow sales and revenues. Hence Adidas always has and will continue to develop new innovations to a large extent with its own team of R&D specialists.

In order to exploit the creative potential of the broader community of miAdidas customers, who in general have only limited technical skills, the *first opportunity* (running miAdidas design contests on a temporary or permanent basis) seems to be a promising approach. Adidas has already done a first project in this direction: In 2011, a design competition was run together

with the Olympique de Marseille soccer club, where more than 60,000 fans created over 240,000 design proposals for the next season team jersey. With the new modular configurator, the execution of such design contests should be possible without too much implementation efforts. Adidas could also consider a complementing business model for miAdidas centered around a permanent implementation of design contests, similar to the offers of Threadless and Spreadshirt. Imagine the best designs would be produced as a limited edition and offered to customers for pre-ordering before production. This would allow Adidas to make precise material planning without any overstock production. And the successful customer-designers could not only say »look, I have designed my own shoe«, but instead tell their friends »look, you are wearing a shoe which I have designed«.

6.2 Conclusions

Mass customization will continue to be a dynamic business, offering lots of opportunities for future developments and enhancements. This applies not only for miAdidas, but also for all other mass customization offers in the different industries. In this paper we have thought about new opportunities to further exploit the mass customization customer, particularly in terms of opening the innovation process(es) and enabling the customer to participate in an innovation context. One very promising approach would be to extend the usage of the online configurator and let customers not only design their individual product, but also offer them a platform for sharing their design with others and compete with other designers for the best design to be finally produced for the market. Especially in the fashion industry, we have seen that there are companies which center their entire business model on crowdsourcing and design contests. It will be interesting to see whether also the large global brands will further move in this direction and make better use of their customers' creative and innovative potential.

We are aware that this study has some limitations to be considered. Our discussion of further exploiting the customer potential beyond mass customization is clearly a conceptual discussion and currently lacks fundamental proof in practice. Academics but especially mass customization practitioners could build upon this gap by implementing and testing the proposed opportunities. Findings from such an exercise could be used for further fine-tuning the concepts and also for advancing the theoretical discourse.

Even though this case study has focused on Adidas, our conceptual discussion and the derived opportunities are by no means limited to Adidas. We can lead the same discussion for other mass customization offers in the sportswear industry, and also in other industries. Due to this generality, this paper also contributes to the body of academic research in the areas of mass customization and also open innovation. To the best of our knowledge, little systematic research has been done about the relation between the concepts of mass customization and open innovation. We hope that our discussion can be used for further developing new ideas, running new analyses, and gaining new insights in this context.

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