

THE VALUE OF MASS-CUSTOMIZED PRODUCTS. EXPLORING ITS PECULIARITIES FOR BUSINESS CUSTOMERS

Leontin K. Grafmüller, Hagen Habicht

HHL Leipzig Graduate School of Management, Jahnallee 59, 04109 Leipzig, Germany

Abstract: *Quite in contrast to the B2C context, business customers have always profited from customized offers. Typically, this is due to the high product complexity, requiring a personal and time-consuming customer-manufacturer interaction. In order to introduce mass customization (MC) with its efficiencies, a deeper overall understanding of B2B customization practices is needed. However, research provides only few insights regarding value components of customization in B2B, which is required to design the offer. Our goal is a better understanding of these value components. This paper uses an explorative approach based on 29 interviews with CEOs, sales representatives and development & procurement managers. We develop a construct for business customer value of customization. The findings suggest a strict distinction between expert and non-expert customers for the co-creation process. Furthermore, we also found psychological value facets for certain scenarios.*

Key Words: *B2B, mass customization, co-design, value creation*

1. INTRODUCTION

During the last decades, mass customization (MC) has prevailed in numerous domains of product customization. Its main advantage is considered the combination of being both inexpensive and individualized [44]. Initially, the increase of output diversity without losing cost advantages of mass production was the main challenge of MC. It is only since the early 2000s that research also focuses on interaction-related topics such as toolkits, the value of mass-customized products or the co-design process. MC relies on a number of principles. Manifold studies address MC drivers, success factors, enablers, the customer-manufacturer interaction or the solution space of customization [7, 15]. However, besides rare exceptions [p. ex. 16], much less attention has been paid to B2B markets. Although early examples of MC can be found in B2B value creation networks [63], the domain of B2B customization is hardly addressed in the field of MC research.

The case of business customers differs fundamentally from the situation of end consumers. For instance, a single business customer is usually much more important than a single consumer. As a consequence, business

customers have always been attended to with customized offers.

Furthermore, in the literature, customized B2B offers are discussed under the terms of engineer-to-order (ETO), solution selling and solution business [29]. This is the case, because a customized offer for business customers does not only encompass products and services, but it fulfils specific functions for the customer through assistance in internal processes and the provision of certain resources. Accordingly, specific knowledge and expertise is required [22, 61]. In order to achieve high utility for the customer, the solution is created within an individual and personal customer-manufacturer interaction, a time-consuming process with a high degree of product customization and hence complexity [9, 54, 60].

In many more respects, business customers are dissimilar to end consumers. They exhibit different characteristics and goals that impose other requirements on the design of the customer interaction process. For instance, they buy rather for economic than for emotional reasons [11] and are seen to be experts, capable of handling much more complex configuration tasks [54, 60]. Hence, toolkits for end consumers are designed for non-experts, i.e., they represent relatively small solution spaces. The higher level of expertise of business customers, however, allows the use of more complex toolkits with larger solution spaces. Furthermore, it has been shown that end consumers value elements that fulfil hedonic desires in multiple ways [35]. Extant research has not described the relevance of such value components for business customers.

Before going into detail, a clear understanding of the concept of 'value' is crucial regarding the subsequent executions. For the purposes of this paper, we follow [14], stating that "value is created by delivering benefits that help customers achieve their goals." This definition relates to a set of benefits customers are willing to pay for [1]. This set must exceed the sacrifices related to buying [4]. Thus, 'value' is defined as a trade-off between benefits and sacrifices, which depends on each perception [65]. [31] stress the subjectivity of the conception of 'perceived [customer] value': identical products or processes are perceived in different ways by different customers. We consider this understanding also appropriate with regard to extant studies from the MC and B2C context. For instance, [18] found that

consumers are willing to pay more for the customized offer, following the logic of the trade-off suggested by [65] or [35], drawing attention to assorted characteristics of perceived value within the customization process.

As mentioned above, the promise of MC with respect to business customers is rather the opposite, that is, a move from a consistently individual approach to a more standardized offer. But in order to standardize a part of the offer, a deeper understanding of the overall process is needed. Within the MC literature, it is argued that customers perceive value from different sources, which must be understood in-depth in order to appropriately adjust the offer. Addressing this research gap, our paper aims at investigating the perceived value of mass-customized products for business customers. Three research questions are addressed:

RQ 1: What are expertise-related values in the context of B2B mass-customization?

RQ 2: Do business customers value hedonic components?

RQ 3: What other MC values can be identified in the B2B context?

The identified values are considered crucial with regard to designing the co-creation process, the MC offer as well as toolkits [34, 47, 55] for the B2B context.

MC studies on B2B markets are rare compared to studies in the B2C domain. To gain a first view on its conception in the literature, we present a literature review that contrasts customer value for B2B and B2C markets in the subsequent section. The method section describes the setting of the study and the analysis of the 29 semi-structured interviews which we conducted in the mass-customizing German textile industry with CEOs, sales representatives and development & procurement managers. Subsequently, findings of the business customers' value of mass-customized products will be presented. The discussion encompasses main implications for research and practice as well as limitations.

2. BACKGROUND AND THEORY

To gain a first view in the research area, we condense relevant literature that contrasts customer value for B2B and B2C markets. This is necessary because, in contrast to the B2C domain, literature falls short in giving insight into value components of B2B mass customization. We structure the review by choosing a service perspective, which is helpful for structuring origins of customer value that unfold throughout the phases of customer-provider interaction. In particular, the service perspective offers the three dimensions of potential, process, and outcome as origins of customer value. For the B2B domain, we choose a rather general approach with regard to '[perceived] customer value'.

The literature review was conducted following the three-step process of (1) planning, (2) conduction, and (3) reporting / dissemination proposed by [53]. We started by reviewing customer value in the B2C context first. The planning of the review was informed by literature reviews in the field by [7] and [15]. For the

B2B context, we broadened the scope of our search to cover relevant keywords from other fields, such as B2B marketing, production and operations management. This was required because relevant literature is not necessarily addressed with the terminology of MC; it is an intersection of multiple areas such as ETO and industrial marketing. Although the concepts of MC and ETO deviate, both prerequisite an interaction with the customer, within which value co-creation and a co-design process take place. Hence, this field is very promising for our purposes.

2.1. MC and B2C markets

In the B2C domain, the literature presents a rich and elaborated picture of value components of MC, which makes the current body of knowledge interesting as an orientation for the less developed B2B domain. Following the service perspective, Table 1 provides a systematization of customer value components based on the three dimensions of potential, process and outcome.

Table 1. *Customer value of individualized products in the B2C context*

Value	Characteristic	Sources
<i>Potential-related customer value in B2C</i>		
Quality of service personnel & buying environment (online or offline shop)	The dimension of service personnel in terms of reliability, responsiveness, assurance and empathy & "tangibles", i.e., up-to-date equipment, appropriate facilities; evaluation of the toolkit, e.g. based on the attributes of trial-and-error element, appropriateness of the solution space, etc.	[6, 20]
<i>Process-related customer value in B2C</i>		
Hedonic value	Value acquired from the experience's capacity to meet needs related to enjoyment, fun, or pleasure	[34, 48, 52]
Creative achievement value	Value acquired from the feeling of accomplishment related to the creative task	[34, 48, 52]
Perceived complexity of the design process	High perceived complexity represents a burden for customers in the co-design process	[27, 42]
Perceived delivery value	Time and reliability of delivery	[28]

Quality of the co-design process (offline shop)	Comprises the perceptions about relevant activities of the offline co-design process.	[28]
Integration of customer's competences	Relates to companies' capabilities to integrate customer knowledge and to foster the success of his contribution	[37, 43]
<i>Outcome-related customer value in B2C</i>		
Utility value, perceived preference fit	closeness of fit between outcome characteristics and personal preferences	[10, 17, 25, 34]
Uniqueness value	Value acquired from the opportunity to assert personal uniqueness	[35, 48, 50, 62]
Self-expression value, pride of authorship value	Value derived from the opportunity to possess or consume something that is a reflection of personality, self-oriented value	[34, 48, 49]

2.2. Creating value in the B2B domain

Purchasing managers buy rather for economic than emotional reasons [11], hence customer value for business customers is likely to be very different. But like on consumer markets, the benefits of MC on B2B markets depend on the complexity of the design problem. In areas with low to medium complexity in the co-designing, e.g., personal computers, the process represents a relatively simple configuration task [24]. However, this is different for industries with comparably complex outcomes and hence a complex co-design task [2, 54]. In practice, such markets are typically addressed with one-to-one marketing and personalization, but not necessarily with MC [63]. In such markets, e.g., industrial architecture or technical textiles, MC represents a means of standardizing an otherwise individual ETO process. The literature on ETO does not present a rich picture of the interaction, that is in MC terminology the co-design process. Accordingly, we draw on a rather general concept of customer value that does not refer to the customization process exclusively. Again, following the service perspective, Table 2 provides a systematization of customer value components for the business context.

Table 2. Customer value of individualized products in the B2B context

Value	Characteristic	Sources
<i>Potential-related customer value in B2B</i>		
Customer commitment to collaborate, to learn and to	Customer commitment to collaborate positively impacts the actual co-design behavior	[23, 30, 46, 51]

communicate his needs		
Customer's and salespeople's (technical) knowledge	Customer knowledge on his needs which are clearly articulated; effectiveness of salespeople's individual solution depending on knowledge	[2, 12, 45, 54, 57, 60]
<i>Process-related customer value in B2B</i>		
The degree of definition and communication of requirements	Increasing degrees of both increase transparency about the customer's goals for the provider	[2, 23, 39, 57]
Customer's and provider's investment in learning during co-creation	Increases the realization of value from the provided offer; mutually dependent	[26, 30, 38]
Flexibility within the process	Strict formalization of the process negatively impacts salespeople's value opportunity recognition	[32, 45, 57, 58]
Speed, efficiency value, responsiveness & easy access value	Whole process as efficient and fast as possible regarding information processing, incoming inspections or order-handling	[21, 32, 45, 57, 58, 64]
Expert consulting value	Customers value strong expertise, also about the customer's customer's needs.	[3, 8, 12, 13, 26, 59]
Offline interaction value	Strong need for offline interaction due to high complexity (p. ex. intangible product characteristics)	[12, 13, 45]
<i>Outcome-related customer value in B2B</i>		
Quality, on-time delivery and long-term availability value	Delivering consistent quality and availability of the same individual product over time	[39, 56, 57]
Post-purchase support & verification value	Value of post-purchase support and verification of the accuracy of the fit	[3, 14]

Overall, efficiency and responsiveness as well as the expert consulting value play a superior role on the potential- and process-related dimension. More particular, the value components indicate that the customer's business, not only his needs, must be taken in consideration, as [2] state: "a deeper understanding of customers' businesses is thus important in advanced selling situations aimed to create superior customer value

proactively.” (p. 26) In this respect, recent studies show that complexity does not solely emerge because of intangible product characteristics, but also when the needs of the customer’s customer are taken into consideration [8, 26].

2.3. Integration of literature & research questions

Contrasting the literature drawn from the B2C and B2B context, we derive three areas of research as follows.

First, in contrast to B2C studies, strong technical knowledge is emphasized in the business context on both sides provider and customer. This refers to the potential as well as to the process dimension. In line with that, many studies in the field stress the importance of expert consulting within the co-design process, questioning the nature of knowledge-related values for the MC context.

Secondly, the process dimension shows B2B value components such as speed and efficiency, which are in strong contrast to hedonic desires of end customers such as creativity or enjoyment, drawing attention to the question whether business customers value these fun components, too, or if it is purely efficiency-driven. The same applies to the outcome dimension.

Thirdly, we aim at identifying values related to the MC offer in general and which are both particularly important for business customers and not present in the extant literature.

3. RESEARCH DESIGN

This paper explores business customers’ value of mass-customized products. In light of the lack of literature regarding B2B customer value of customized offerings in general, an exploratory approach was chosen.

3.1. Field setting

This study was conducted in cooperation with different companies within the East German textile industry. This industry is characterized by narrow-specialized SMEs, and is especially interesting because intangible characteristics are co-designed, too. This is considered a particularly complex configuration task. The choice of the sector is likely to put limitations on the generalizability of the results, since not every MC scenario in the B2B domain presents intangible and complex product characteristics. However, numerous industries struggle with exploiting related value creation opportunities (see 2.2), which makes this field setting relevant and interesting also for other sectors.

During on-site visits, interviews and field notes were taken. In total, 29 interviews were conducted in 12 fabric manufacturing firms. The different branches within this industry and study, the interview database as well as the numbers of companies and interviews read as follows:

Table 3. Overview of conducted interviews and branches

Branch of textile industry	Duration in total	Firms	Interviews
Furniture fabrics	15 h 3 min	2	11
Functional clothes	7 h 28 min	5	7
Coated fabrics & textile equipment	5 h 42 min	2	6
Home textiles	4 h 20 min	2	5

Despite the different branches, all listed companies have the following four commonalities. First, their offering is configured within a customer-manufacturer interaction. Consequently, it is always a customized solution. Within this co-design process, there are no supporting toolkits, which would typically constitute a configurator in the MC context. Furthermore, usually, at least a part of this process takes place in an offline setting. Secondly, the companies produce with MC efficiencies, at any rate with regard to the production. Thirdly, the major share of the companies’ customers is in the industrial segment. In fourth place, all companies deliver fabric manufacture, providing thus the textile basis for applications such as outdoor seating furniture, fire-resistant clothes or water-repellent tablecloth.

The main sampling criterion for the selection of the interviewees was to include every actor which is involved in the value co-creation process with business customers. In line with the purposeful sampling approach by [40], we selected CEOs, sales representatives and development & procurement managers in order to gain insights into the value concept from different angles. CEOs were interviewed because we were interested in how value capturing processes are addressed from a strategic point of view; the other groups showed a high degree of customer interactions or were customers themselves, since the procurement managers that we interrogated buy individualized textile products, too. The interviews took 68 min on average, the shortest was 49 min. The semi-structured interviews followed a guideline based on a list of topics drawn from the literature described in this paper. All interviews were conducted in German, transcribed and then analyzed. The quotes in this paper were translated by the researchers and checked by a professional translator.

3.2. Data analysis

The qualitative data analysis was based on the coding procedure suggested by [5]. The first step consisted of formulating initial codes that were based on the interview guideline. This code list was then revised and expanded [5, 36] using the QDA software ATLAS.ti. The second step aimed at identifying the essence of the data and patterns within the database. The goal of the method is both reflecting constructs drawn from the literature as well as exploring new constructs based on the data. This approach thus combines deductive and inductive elements of qualitative research. In accordance with recommended qualitative data analysis practice [19, 33], data was analyzed in parallel in order to make sure that each process can inform the other. In this context, [36] emphasize that this method meets established criteria for credibility of qualitative research, since it provides numerous opportunities to prove the consistency of the underlying interpretations.

4. FINDINGS

This section presents data and interpretations upon which we build the construct of B2B customer value of mass customization. The identified components in the areas of knowledge-related values and hedonic values (see 2.3) are structured according to the three service

dimensions. The focus of the findings is explicitly on neglected areas and contradictions to extant literature on B2B customization.

4.1. Potential dimension

Regarding potential-related customer value, we found customers' and salespersons' commitment decisive with regard to the individualization's success. Especially, the customers' communication of his particular needs before the start of the actual co-design process seems crucial. Otherwise, the salesperson struggles in preparing and conducting the co-design process.

The customer must communicate his needs. [...] That's why the business is so complicated. Customers are very indifferent and some of them don't want to be involved, which makes it impossible for us to develop a design. [...] If we notice that the customer doesn't want to be part of the process, we can't work with him. It's difficult to raise that awareness. (I23 7:34)

Furthermore, technical knowledge is considered a prerequisite for a successful co-design on both sides customer and provider. Accordingly, the expertise of the customer is much more pronounced in the B2B context.

Some customers give us specifications like '1200g, thickness of 1,2mm, flame-retarding, water-proof [...]'. But some equipments cannot be combined, and customers don't even have a little technical understanding, which makes it almost impossible to cooperate. (I17 33:54)

4.2. Process dimension

During the co-design process, especially the complexity in the textile B2B context represents a challenge, which is a result of the high degree of product customization and haptic properties. Typically, this implies a time-consuming customer-manufacturer interaction, as indicated by [9]. The complexity is usually faced with an offline interaction, as suggested by [13].

The product is only convincing when the customer can sense its quality. We also do a lot of online activities to embody the characteristics of the textile, but in the end, the customer must feel it. (I5 86:11)

I'm not a textile expert. I must be explained every single detail. [...] Preferably, I go to the company's site to see everything. [...] I don't quite get it anyway when I don't see it. (I2 51:09)

In order to have a basis for a discussion and thus to reduce complexity, prototypes or samples are used. Within the co-design process, some features can be configured, which mainly refer to aesthetic characteristics. Since customers struggle imagining the concrete product design, a sample with the co-created design is always required.

With the basic product, we show what we can do on a technical level. And then, when we meet, we present our ideas for the individual needs of the customer. [...] Usually, he says 'I like the textile, but with a little

different design' like a special stitching or color of the corporate design. Then, we make a sample. He always wants a sample. (I18 27:52)

While the B2C and B2B literature showed major differences with regard to fun components such as creativity or enjoyment, we found manifold indications for a bipolar characteristic, i. e. hedonic value components do play a role in B2B, but only for certain scenarios.

There are two types of customers. There is the designer type and the purchasing agent. Imagine a hotel. The purchasing agent of a hotel just wants an efficient process. He doesn't want to spend a lot of time, he just wants us to solve his problem. That's easy to handle. But for the designer, it's always trail-and-error because he doesn't know himself what kind of product he actually wants, which means that we make a lot of samples. That's the main cost driver. (I18 34:28)

Very often, the purchasing agent is found to be easy to handle, since he wishes an efficient and convenient process as possible. This type of business customer is in line with the extant B2B literature: he values speed, responsiveness and efficiency.

It's easy to convince the purchasing agent. [...] Sometimes we can even show that he saves money because the textile is much easier to handle. [...] It's like he doesn't have a chance to buy something else when he understands our product. (I3 74:03)

For the designer type, it is rather the opposite. As mentioned above, the purchasing agent wishes a quick and goal-oriented process. His target is saving of time, while the designer type values the enjoyment of experimentation and an extensive configuration process. We argue that his nature is close to end customers.

We develop our products together with our customers. They come to us for one day and we present our designs. Then, we discuss it and make modifications. [...] Our customers want great involvement, they want to be part of the process and to be creative. (I20 07:23)

The nature of the designer type is also addressed from a strategic point of view.

I always say, they [designer type] live the product. You would not believe, but they go completely overboard in the configuration process. [...] Sure we try to meet these wishes precisely, that's our thinking. That's also the core message of our marketing. (I10 31:04)

Furthermore, we found one value component particularly important in the B2B context for both purchasing agents and designer types: expert consulting. As also numerous studies emphasize (technical) knowledge on a very high level, we found the expertise-based consulting part highly pronounced in the business context. Our interviews show that this is considered a major reason to choose a particular provider.

Our partners [provider] must be ready to develop new products with us and here we need their expertise. They know best what the required features are and tell us what product design we must choose. (I8 13:47)

Closely related to that knowledge-related value, a transparent communication, openness and commitment to collaborate are considered a prerequisite for a successful customization, also on the process dimension.

I often failed finding a supplier that tries to understand our specific applications. I always wondered [...] how they want to provide a product without asking where it is used. He [the provider] is the expert and he must tell me, that's why I actually buy there. (I14 18:12)

4.3. Outcome dimension

Also on the outcome dimension, the B2C literature presents psychological facets such as uniqueness and self-expression. The analyzed literature on B2B markets does not refer to analogue customer value components. However, we found according indications in the B2B context. But in contrast to B2C, it is rather for strategic reasons such as the exclusive right for a particular design.

Some customers get an exclusive design, for example for their corporate identity or their airline colors. [...] but this is nothing special we would advertise, because that's a basic condition from the beginning. (I4 51:48)

As an outcome-related value, several interviewees emphasized the importance of redelivering the individual product over time. This value of redeliverability is not found in the B2C context. So, since business customers source strategically, the possibility of whether the customizer represents a value creation partner in the future has an impact on the perceived overall value of the MC offer.

Sure, we must make sure that our customer can get the exact same design after 1 or 2 years. Especially for bigger clients who work with us in the long term this plays a major role. (I12 28:13)

5. DISCUSSION AND CONCLUSION

The goal of this study was to explore the value of mass-customized products in the B2B context. Based on the analyzed literature, we assumed multiple differences with respect to the overall customer value emerging at the consumer and business customer side. In the presented findings we draw from 29 interviews in 12 companies, we explicitly focused on neglected areas and contradictions to extant literature on the B2B domain. Unlike consumers, business customers source strategically. Hence, the perception of whether the customizer represents a potential value creation partner in the future also has impact on the perceived overall value of the MC offer.

Regarding potential-related customer value, we found customers' and salespersons' knowledge decisive with

regard to the individualization's success and much more pronounced than in the B2C domain.

On the process dimension, quite in contrast to our initial assumptions, we found hedonic desires in the business context, too. For instance, creativity plays a role in a design configuration task when it is an aesthetics-driven user. However, this concerns only one customer segment that we called designer type. The other segment, i. e. purchasing agents, still wishes a rather efficient process. Consequently, we suggest decreasing direct interaction with purchasing agents, since it increases effort on the customer side which is eventually not valued by the this customer. For the designer type, it is the opposite, i. e., increasing creative collaboration and creating an according atmosphere provides value. Process-wise, these findings also impact the deployment of a configurator. While the idea of a configurator to replace (parts of) the customization process has been successfully implemented in B2C markets for many years [41], it can be expected that these findings cannot be simply copied to B2B markets. In this context, [13] found that highly complex products present specific features which cannot be easily described on an online sales platform. In line with that, our findings strongly suggest that a part of the process must take place offline due to the high complexity. However, a partial standardization of the process seems attractive especially in light of the efficiency-driven purchasing agents. We call for further research in this area. Furthermore, we found another value component in the B2B context related to complexity. This is the expertise-related value of expert consulting. We argue that this value is decisive with regard to the overall MC offer, especially with regard to redesign the co-creation process as well as the customized outcome. Also here, we call for studies in the field based on our findings. Employing toolkits changes the role of sales persons as well as the respective customer perception of the co-design process, which must also be taken in consideration.

The outcome dimension particularly showed the importance of redelivering the individual product over time, which is arguably due to strategic sourcing in the B2B domain.

In conclusion, this study extends knowledge on customer value of mass-customized offers for business customers. It also provides explanations, why certain value components play a role in the B2B context and others do not. Hence, it offers a three-dimensional structure to map the values we drew from the literature as well as from our data.

The findings are preliminary with regard to the fact that it is an early exploration. For sure, the sample offers a rather big database, but it is still limited to the textile industry, and particularly to this sector in Germany. Moreover, the analyzed textile industry is characterized by intangible product characteristics, making the configuration task even more complex. Not every sector in the B2B domain deals with related complexities, which puts limitations on our study. However, many industries are concerned by coping with intangible product characteristics in the co-design process. As a next step, it would be highly interesting to test our

suggested values by choosing a quantitative approach, since this allows using bigger samples.

6. REFERENCES

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CORRESPONDENCE



Leontin K. Grafmüller
HHL Leipzig Graduate School of Management
Center for Leading Innovation & Cooperation
Jahnallee 59
04103 Leipzig, Germany
leontin.grafmueller@hhl.de



Gen Habicht
HHL Leipzig Graduate School of Management
Center for Leading Innovation & Cooperation
Jahnallee 59
04103 Leipzig, Germany
gen.habicht@hhl.de