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Mass Customization from a Customer's Perspective: An Empirical Investigation of the Success Factors of Customer Driven Value Creation

Tesis Doctoral

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Los directores de la presente Tesis Doctoral, Dra. Carmen de Pablos Heredero y Dr. Carlos Rodríguez Monroy, damos por finalizado este trabajo titulado **"Mass Customization from a Customer's Perspective: An Empirical Investigation of the Success Factors of Customer Driven Value Creation"**, realizado por D. Raphael Damm. Lo consideramos concluido y que reúne los requisitos necesarios para su exposición y defensa ante el tribunal oportuno.

Dra. Carmen de Pablos Heredero

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Raphael Damm

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List of Abbreviations

AVE	Average Variance Extracted
CE	Customer Equity
CET	Cognitive Evaluation Theory
CEV	Customer Engagement Value
CIV	Customer Influence Value
CKV	Customer Knowledge Value
CLV	Customer Lifetime Value
CODP	Customer Order Decoupling Point
CRV	Customer Referral Value
CRM	Customer Relationship Management
CS	Customer Satisfaction
GDP	Gross Domestic Product
IP	Intellectual Property
IPR	Intellectual Property Rights
IPP	Intellectual Property Protection
KBV	Knowledge-based View
MC	Mass Customization
OI	Open Innovation
OSL	Optimum Stimulation Level
PEOU	Perceived Ease of Use

PLS	Partial Least Squares
PU	Perceived Utility
RBV	Resource-based View
SEM	Structural Equation Modeling
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
VC	Value for the Customer
WACC	Weighted Average Cost of Capital
WOM	Word of Mouth
WTA	Willingness to Accept
WTP	Willingness to Pay

Resumen en Castellano

Antecedentes:
En la presente tesis se investiga cómo los clientes perciben los productos individualizados. La diversidad de las necesidades de los consumidores es la base en la cual las empresas pueden crear una ventaja competitiva. Principalmente, la idea fundamental del concepto del Mass Customization (MC; el término no ha sido traducido al castellano, pero se puede entender como la individualización en masa) es que los productos individualizados satisfacen las necesidades de los consumidores mejor que los productos convencionales. Un mayor grado de satisfación de las necesidades incrementa el valor que los clientes perciben del producto. Por lo tanto, las empresas que sirven a los clientes individuales (‘markets of one’) tienen una ventaja competitiva sobre las empresas que se dirigen a los mercados de masas.

MC se diferencia de la personalización por incorporar procesos y capacidades, los cuales ayudan a las empresas a centrarse en el cliente. Eso conlleva que las empresas sean más receptivas ante la demanda del mercado. Como consecuencia, las empresas pueden reaccionar de una manera más rápida y eficiente en situaciones volátiles y anticipar cambios. No obstante, desde el punto de vista del cliente, MC implica la aportación de tiempo y energía. A pesar de que la implicación en el proceso de producción proporciona al cliente la oportunidad de especificar necesidades particulares y obtener productos que cubren mejor sus preferencias, la sensación de sobrecarga de información o la percepción de tener que hacer un esfuerzo durante el proceso de MC puede disminuir el valor añadido.

En la literatura académica se ofrecen diversas explicaciones sobre el valor añadido que los clientes atribuyen a los productos individualizados. Por ejemplo: el aumento en el valor pragmático del producto, la satisfacción de necesidades hedónicas, la unicidad del producto o sentimientos de orgullo de ser el autor de un objeto han sido mencionados como factores relevantes para el cliente y su percepción de valor. Sin embargo, no está claro cómo interactúan estos factores y qué determina su magnitud.

Objetivos:
La meta de esta investigación es entender mejor cómo los clientes perciben el valor del concepto de MC y aumentar los conocimientos sobre los factores clave que determinan el

valor de MC. La pregunta de investigación pretende examinar los motivos que incitan a los clientes a utilizar el MC y determinar la influencia de varios factores. Especialmente se explora la influencia de las características del producto, del proceso de MC y del cliente en los factores clave que determinan la percepción de valor (percepción de la satisfacción de preferencias, percepción del esfuerzo del proceso, percepción del placer del proceso, sentimientos de propiedad psicológica, sentimientos de orgullo de autoría y percepción de la unicidad del producto).

A fin de ofrecer respuestas a la pregunta de investigación, los objetivos son (1) establecer un marco amplio que proponga explicaciones a qué motiva a los clientes a utilizar MC, (2) validar empíricamente el marco y (3) deducir implicaciones para el diseño de las ofertas de MC. Basado en una revisión exhaustiva de la literatura, se propone y comprueba empíricamente un modelo conceptual fundado en la teoría de la acción razonada (theory of reasoned action), teoría del comportamiento planificado (theory of planned behavior) y la teoría de la propia determinación (self-determination theory). Más en detalle, se verifica que tanto los factores del producto (frecuencia de compra, nivel de visibilidad y lujo), los factores del proceso de MC (grado de autonomía, suministro de feed-back y disponibilidad de bocetos de diseño) como las características del cliente (implicación del producto, conocimientos de preferencias y la capacidad de expresar sus preferencias) están relacionados con los factores clave que determinan el valor de MC.

Metodología:
En la parte empírica de la tesis, se ha empleado la metodología hipotética deductiva para comprobar un número de hipótesis. Se ha desarrollado un cuestionario adaptando preguntas de investigaciones previas a fin de captar los constructos teóricos relevantes. Noventa y dos consumidores con experiencia personal en MC han participado en el estudio. Las relaciones propuestas entre los constructos se han analizado utilizando el método PLS (partial least squares).

Conclusiones:
Los productos mencionados por los participantes de la encuesta se han agrupado en dieciocho categorías distintas. La disposición a pagar por un producto individualizado en comparación con un producto convencional por parte de los participantes varía sustancialmente. Suponiendo que el valor percibido se refleje finalmente en una mayor

disposición a pagar, los resultados sugieren que el valor que los clientes atribuyen a MC difiere considerablemente.

Además, la mayoría de las relaciones propuestas entre los factores clave de valor y las características del producto, proceso de MC y cliente están respaldados por los datos. Esto contribuye significativamente a la investigación existente porque proporciona evidencias empíricas para los factores que preceden a los factores clave de valor. Por ejemplo, los hallazgos respaldan la hipótesis de que el grado de autonomía en el proceso de MC es un elemento central influyendo de una manera significativa en los sentimientos de propiedad psicológica (psychological ownership) así como la percepción de la unicidad del producto, disfrute y esfuerzo durante el proceso. Otro resultado relevante es el fuerte efecto que tienen los sentimientos de propiedad psicológica en la disposición a pagar por un producto individualizado cuando está moderado por la sensación de diversión.

Abstract

Antecedents:

This research addresses how customers perceive customized products. The heterogeneity of customers' needs is the foundation on which firms can build competitive advantage. Essentially, the basic idea of the mass customization (MC) concept is that customized products fulfill customers' needs in a superior way. A higher degree of need satisfaction increases the value customers perceive. Consequently, firms that serve markets of one, that is the individual customer, hold a competitive advantage over firms that target the mass market.

MC, as opposed to personalization, encompasses the establishment of processes and capabilities that support firms to become more customer-centric. This makes firms more receptive to the demands of markets. As a consequence, firms can react faster and more efficiently in volatile situations and anticipate changes. However, from a customer's point of view, MC implies the investment of time and energy. Although the involvement in the production process provides customers with the opportunity to specify particular needs and obtain products that better fit their preferences, feelings of information overload or the perception of effort during the MC process might diminish the added value.

In academic literature diverse explanations are offered for the additional value customers attribute to mass customized products. For example, the increase in the utilitarian product value, the satisfaction of hedonic needs, a product's uniqueness, or feelings of pride to be the author of an object have been mentioned to be relevant for customers' perception of value. However, it is unclear how those factors interact and what determines their magnitude.

Objectives:

The aim of this research is to understand better customers' value perception of the MC approach and augment knowledge about the key value drivers of MC. The underlying research question seeks to investigate the motives that cause customers to use MC and determine the influence of various factors. Specifically, the influence of product, MC process, and customer characteristics on customers' perception of the preference fit, process enjoyment, process effort, product uniqueness, as well as customers' feelings of psychological ownership, and pride of authorship is explored.

In order to provide answers for the underlying research question, the objectives are (1) to establish a comprehensive framework that offers explanations for customers' motivation to use MC, (2) empirically validate the framework, and (3) deduce implications for the design of MC toolkits. Based on an exhaustive literature review, a conceptual model grounded in the theory of reasoned action, theory of planned behavior, and self-determination theory is proposed and empirically tested. More in detail, a product's purchase frequency, degree of visibility, and luxury level as well as the extent of (design) autonomy, the provision of feedback, and existing solutions (e.g. design drafts) during the MC process as well as customers' product involvement, preference insight, and ability to express preferences are related to the key value drivers of MC.

Methodology:
In the empirical part of the dissertation hypothetico-deductive methodology was used in order to test a number of hypotheses. A questionnaire was developed by adapting measurement items from previous research in order to account for the relevant theoretical constructs. Ninety two real world consumers with personal MC experience participated in the study. The proposed relationships between the conceptual constructs were analyzed using the partial least squares method.

Conclusions:
The products mentioned by respondents were grouped in 18 different product categories. Respondents' willingness to pay (WTP) for a customized over a non-customized product varies substantially. Assuming that the perceived value is ultimately reflected in an increased WTP, the results suggest that the value customers attribute to MC differs considerably.

Further, the majority of the proposed relationships between product, MC process, and customer characteristics and the key value drivers are supported by the data. This contributes significantly to the body of existing research by providing empirical evidence for the factors that precede the key value drivers. For example, the findings support the assumption that the degree of (design) autonomy in the MC process is a central element, influencing significantly customers' feelings of psychological ownership as well as their perception of the product uniqueness, the process enjoyment, and process effort. Another finding is that an individual's feelings of psychological ownership have a strong effect on the WTP for a mass customized product when moderated by the feelings of enjoyment.

Chapter One: Introduction

The aim of this chapter is to introduce the reader to the concept of mass customization (MC) and to describe the context in which MC can be situated. The chapter is divided into three sub-sections, headed ‘Contextual Background’, ‘Objectives and Research Question’ and ‘Structure of the Thesis’.

First, a brief discussion of the MC concept is given and several definitions are stated. The growing importance of the MC concept for both academics and practitioners is illustrated. Second, the objectives of this investigation are outlined and summarized in a condensed way in the research question. Lastly, a short overview of the structure of this research is presented.

1. Contextual Background

The dilemma firms face today is that customers do not buy out of pure need but tend to buy in order to satisfy desires that go beyond their basic requirements. Having gone through the evolution from an agrarian, to an industrial, and then to a service economy we have now entered an experience economy (Pine and Gilmore, 1999 in Fiore et al., 2004). Customers seek to be recognized as individuals and pick out those offerings that fit them best. Vargo and Lusch (2004) argue that customers do not need goods but rather need to perform mental and physical activities for their own benefit or have goods that assist them with these activities. The MC approach provides a way to deliver customers individualized products at a cost comparable to mass produced offerings. MC increases the fit between customers' preferences and the products' attributes and further, enables customers to actively engage in a collaborative product development process. Therefore, it may be argued that MC activities deliver additional value to customers. Self-designing a product constitutes not only the opportunity to express one's preferences but also an activity which has the potential to satisfy customers' needs for competence and creativity. In this way, as customers' preferences have become increasingly heterogeneous in many markets (Franke et al., 2009), MC accounts for the augmented customer demand for individualized products and moreover, for the need to perform mental and physical activities.

Since the oxymoron 'mass customization' has first been mentioned by Davis (1987) the MC concept has received considerable attention both from academics and practitioners. On the one hand, a number of MC initiatives have been launched by established firms. For example, Dell, Levi Strauss, Mattel, Lands' End, Nike, or Adidas are frequently cited when illustrating approaches to MC (Thomke and von Hippel, 2002; Berger and Piller, 2003; Piccoli et al. 2003; Piller et al., 2004). Furthermore, many start-up companies base their business on the MC concept. Companies such as Spreadshirt, Timbuk2, Mymuesli, or Audena put forward personalized offerings ranging from apparel, bags, or cereals to furniture and other product categories. Additional evidence for the importance of MC, from a managerial point of view, is provided by the Cyledge Configurator Database, which lists 782 configurators from diverse industries that enable customers to customize products from categories such as apparel, automobiles, electronics, food, footwear, or sports equipment ("Cyledge Configurator Database". Retrieved April 11, 2012, from www.configurator-database.com). Moreover, a series of forward-looking sector studies within the scope of the project 'Comprehensive Sectoral Analysis of Emerging Compe-

tences and Economic Activities in the European Union' identifies MC as a crucial future trend for a number of sectors. In the sector report on distribution and trade (van der Giessen et al., 2009) MC is suggested to be a main driver for the commerce sector that will be fully adapted in the future providing an alternative for fierce price competition and constituting an opportunity to increase profitability and competitiveness.

On the other hand, academic research on MC has evolved very significantly over the last decade, especially on the subject of customer-manufacturer interaction (Fogliatto et al., 2012). Scholars have analyzed various aspects of MC and produced diverse definitions of MC. Amongst the aspects that have received attention the following four, which represent the great part of research undertaken in the field of MC, may be mentioned: economics, success factors, enablers, and customer-manufacturer interactions of MC (Fogliatto et al., 2012). Table 1 shows a number of MC definitions given by recognized scholars in the field. It is generally agreed that the term 'mass customization' has been coined by Davis (1987) and further popularized by Pine (1993) (e.g., Kotha, 1995; Da Silveira et al., 2001; Broekhuizen and Alsem, 2002; Duray, 2002; Piller, 2004; Senanayake and Little, 2010; Buffington, 2010). Pine (1993), however, states that MC was anticipated as a technological capability by Toffler (1970). Even though definitions vary, crucial to the MC concept is an interactive and individual company-to-customer contact that integrates customers into the value creation by enabling them to define, configure, match, or modify an individual solution (Piller, 2004).

Table 1: Selected definitions of the MC concept; source: own elaboration

Definition of the MC concept	**Author and year**
"[…] the same large number of customers can be reached as in mass markets of the industrial economy, and simultaneously treated individually as in the customized markets of pre-industrial economies."	Davis, 1987, p. 169
"[…] the new technologies permit us to go back to tailoring goods and services for customers on an individual basis- without the long wait."	Kotler, 1989, p. 13
"In this new frontier, a wealth of variety and customization is available to consumers and businesses through the flexibility and responsiveness of companies practicing this new system of management."	Pine, 1993, p. 7
"[…] a process by which firms apply technology and management methods to	Kotha, 1995, p.

provide product variety and customization through flexibility and quick responsiveness."	22
"Mass customization relates to the ability to provide customized products or services through flexible processes in high volumes and at reasonably low costs."	Da Silveira et al., 2001, p. 1
"[…] producing goods and services to meet individual customer's needs with near mass production efficiency."	Tseng and Jiao, 2001, p. 2
"Customers are integrated into value creation by defining, configuring, matching, or modifying an individual solution."	Piller, 2004, p. 315
"With mass customization, customers must first interact with the producer, the retailer or the product (i.e., adaptive products) to configure their product. In other words, they must be involved in specifying characteristics of the product during design, fabrication, assembly, or use."	Broekhuizen and Alsem, 2004, p. 310
"[…] a strategy that creates value by some form of company–customer interaction at the fabrication/assembly stage of the operations level to create customized products with production cost and monetary price similar to those of mass-produced-products."	Kaplan and Haenlein, 2006, pp. 176-177
"The core idea of mass customization is to provide a web-based user toolkit that allows the individual customer to design a product which suits her individual preferences and is then produced exclusively for her."	Franke and Schreier, 2008, p. 2
"[…] mass customization is not about achieving some idealized state in which a company knows exactly what its customers want and can manufacture specific, individualized goods to satisfy those demands -- all at mass production costs. Rather, it is about moving towards these goals by developing a set of organizational capabilities that will, over time, supplement and enrich an existing business."	Salvador et al., 2009, p. 2
"[…] the process that allows consumers to participate in the product design process to create the customized product that you want by selecting different options of color, fabric, styles, details, and size offered by the company."	Lee and Chang, 2011, p. 181
"Whereas ten years ago MC might be viewed as a promising manufacturing strategy especially for niche market producers, it is now a dominant form of production in business-to-business and business-to-consumer, high-end and major consumer markets."	Fogliatto et al., 2012, p. 9

It can be observed that the definitions of MC slightly vary and that the aspects of production cost, individuality and interactivity are stressed. Piller (2004, p. 314) states that despite of the amount of research dedicated to MC, "no clear definition and common understanding of the term have evolved." This does not only affect research, as the absence of a clear delimitation of MC prevents the systematical investigation of related issues, but also the perception of the importance of MC. For the purpose of this research we define MC as a strategy that enables customers to collaborate interactively in any stage of the production process in order to obtain individualized products that exhibit an increased value for the customer.

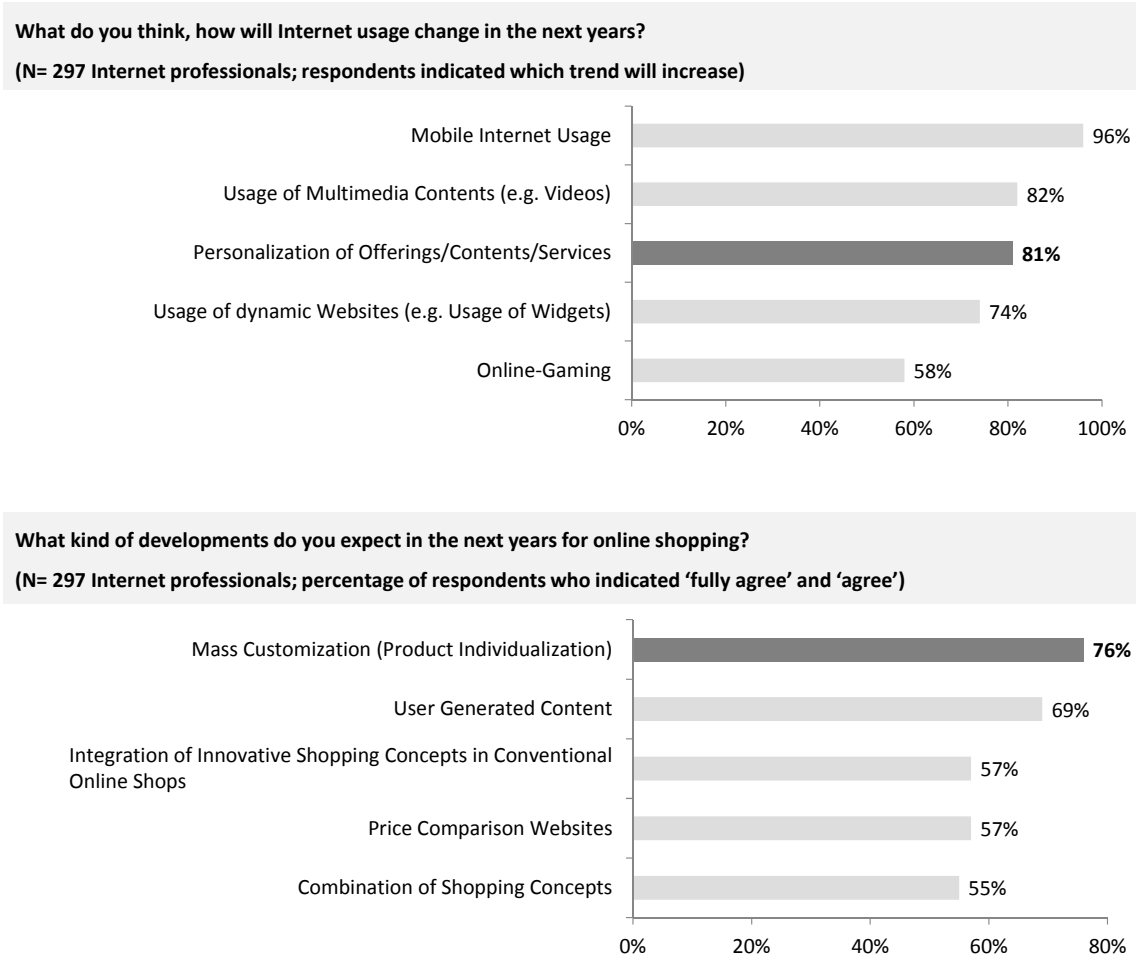
Although studies have covered sectors such as the food industry, electronics, large engineered products, mobile phones, and personalized nutrition (Fogliatto et al., 2012), to the best of our knowledge, no comprehensive market research exists, which would capture the sales figures of companies performing MC activities and therewith illustrating the relevance of MC. This can be explained, on the one hand, by the fact that MC is neither a sector nor an industry. As a complementary strategy MC is usually integrated into regular business activities. On the other hand, besides large multi-national firms, a multitude of small start-up companies focus on MC making the MC market rather fragmented and therefore difficult to estimate.

Recently, Walcher and Piller (2012) compared 500 online configuration systems and customization offerings providing a comprehensive benchmark study in the field with respect to the implementation of MC. In a different way, a cooperative study carried out by 'deutsche-startups.de' and 'INNOFACT AG' has analyzed development trends on the Internet surveying more than 1000 Internet users and 297 'Internet-professionals' ("zwei.null trends", 2008. Retrieved May 9, 2012 from http://web2.1a-8231.antagus.de/index.php?id=109). The fact that the survey was posted on two websites directed at German audience suggests that the results are somewhat biased and generalizability is limited due to cultural differences. Nevertheless, results indicate that Internet professionals perceive MC to be an important trend that will increase in the next years (see Figure 1).

In the same way, research carried out by Eurofound's European Monitoring Centre on Change suggests that MC is an important concept that will affect the future of jobs and skills of a number of sectors. The studies on the trends and drivers of change in selected

sectors indicate that increasing market segmentation and MC in particular, is perceived to be a relevant driver for different sectors.

Figure 1: Future Internet trends accordingly to Internet professionals; source: zwei.null trends, 2008, retrieved May 9, 2012



In the textiles and clothing sector study (Eurofound, 2008, p. 17) MC is said to provide firms with competitive advantage. "In the clothing industry, new technologies will enable the EU industry to offer products tailored to the individual needs and wishes of a customer, while being manufactured in a mass-production system. Such mass-customisation, facilitating the production of tailor-made clothing at cheap prices, will provide the EU industry with a competitive advantage over mass-produced clothing." Among the sectors that consider MC a relevant driver especially the 'computers & electronics', 'distribution & trade', 'furniture', and 'other services' sectors perceive MC to be of great relevance. The 'distribution & trade' as well as the 'furniture' sector further expect substantial impacts on the volume of employment (see Figure 2).

Figure 2: The relevance of increasing market segmentation (tailor made production, mass customization) for different sectors; source: own elaboration, compiled from 'New skills for new jobs' sector studies, Eurofound, 2009

Driver: Increasing market segmentation (tailor made production, mass customization) \ Sector	Chemicals and pharmaceuticals	Computers and electronics	Distribution and trade	Electricity, gas, water and waste	Electromechanical engineering	Financial services	Furniture	Health and social services	Hotels and restaurants	Non-metallic materials	Other services	Post and telecommunications	Printing	Publishing	Shipbuilding	Textiles and leather	Transport and logistics
Is this driver relevant for the sector? Y / N	N/A	Y	Y	N	N/A	N/A	Y	N	N/A	Y [1], N [2]	Y	T: Y	Y	Y	N/A	N/A	Y
How relevant is this driver for the sector? Scale 0-10 *		9	10				10			5	9	6	8	8			8
How uncertain is this driver for the sector? Scale 0-10 *		2	0				2			6	3	2	5	1			2
Are substantial impacts expected on the volume of employment? Y/N		N	Y				Y			N	N	N	N	Y			Y
Are substantial impact expected on employment composition? Y/N		Y	Y				Y			Y	Y	N	Y	Y			Y
Are substantial impacts expected on new skills? Y/N		Y	Y				Y			N	Y	Y	Y	Y			Y
Short (0-3 yrs.), medium (3-7 yrs.) or long (>7yrs.) run impact? S		X	X				X					X	X	X			X
M		X	X				X			X	X	X					X
L		X	X				X			X	X	X					
Are substantial differences expected between (groups of) countries? Y/ N		Y	N				Y			Y	Y	N	N	Y			Y
Are substantial differences expected between subsectors? Y/N		Y	N				Y			Y	N	Y	Y	N/A			Y

* 0= low, 10= high; [1] glass and ceramics sub-sector; [2] construction materials sub-sector

In the light of the fact that important firms belonging to different industries such as Levi Strauss, Mattel, and others have discontinued their engagement in MC, it seems reasonable to investigate the factors that determine whether the pursuit of MC will be successful or not and under which circumstances it makes (economic) sense to offer MC. After all, the implementation of MC implies additional costs. Amongst others, production processes need to be modified and toolkits, which enable customers to configurate products, have to be set up and success, in financial terms, will only be reached if customers demand the personalization of products and are willing to pay a price premium that covers the additional costs. Therefore, this research focuses on the key value drivers of MC as we argue that the success of MC activities depends on customers' motivation to engage in such activities. Customers will be motivated to a greater degree if MC offerings provide them with superior value. Therefore, we relate customer motivation to use MC to the value perceived by customers. This is supported by Broekhuizen et al. (2002, p. 327) who em-

phasize "the importance of linking the success of mass customization with perceived customer value."

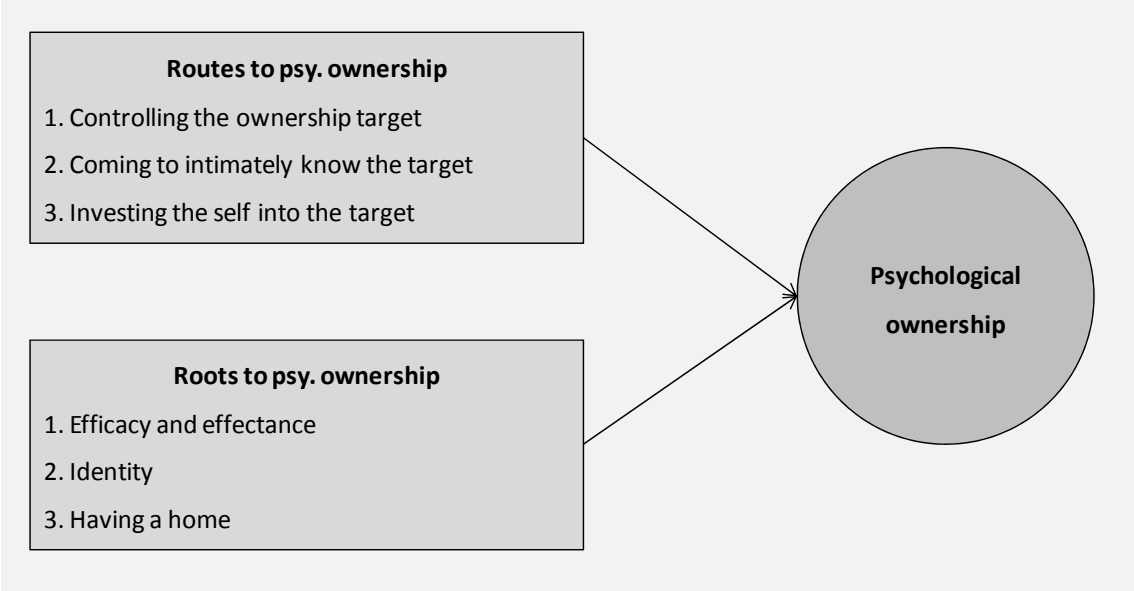
Table 2: Key value drivers of MC; source: own elaboration

Key Value Drivers of MC
Preference Fit: refers to the correspondence of customer preferences with a product's characteristics.
Product Uniqueness: relates to a product's distinctiveness.
Process Enjoyment: justifies consumer behavior with the intrinsic motive of fun.
Pride of Authorship: refers to the feelings of pride experienced by an individual.
Feeling of Psychological Ownership: describes a mental attachment towards an object.

Generally, customers' willingness to pay (WTP) is influenced by the competitive advantage or added value provided by firms. In the context of MC, scholars have investigated aspects linked to the value creation through MC considering (1) the increased fit between consumers' preferences and a product composition as the main underlying value driver (Piller et al., 2004; Kaplan et al., 2007; Franke et al., 2010; Franke and Schreier, 2010). Other customer motives relevant for additional value attribution to personalized products have been mentioned to be (2) an object's uniqueness (Fiore et al., 2004; Franke and Schreier, 2008, Lee and Chang, 2011), (3) the enjoyment perceived when customizing a product (Fiore et al., 2004; Franke and Schreier, 2010), (4) the perception of pride to be the author of a product (Franke, Schreier, and Kaiser, 2010), and (5) the feeling of psychological ownership (Franke et al., 2010). Franke et al. (2010) build upon the assumptions that the achieved preference fit, which should be as high as possible and the design effort, which should be as low as possible, are completed by what they call the 'I designed it myself' effect. Their studies provide empirical evidence for the existence of such an effect and its intensity. When the preference fit of the outcome of the MC process and the contribution to that result are perceived higher, the 'I designed it myself' effect itself is higher. Further, they discuss the contribution of psychological ownership to the endowment effect. Investing the self in the object, controlling the object and getting to know it intimately are three ways that lead to psychological ownership. MC toolkits gen-

erally promote those activities. Therefore, it seems reasonable to argue that the use of MC toolkits creates psychological value for the customer (VC). However, Franke et al. (2010) state that empirical evidence for the existence of psychological ownership and its drivers is scarce making it necessary to empirically test theoretical assumptions.

Figure 3: Conceptualization of the development of psychological ownership; source: own elaboration based on Pierce et al., 2002



In a broader sense, the personal need for something that is not available in the marketplace (von Hippel and Katz, 2002), the desire to network with like-minded peers and the possibility to have an impact on the environment (Kollock and Smith, 1999), the feeling of obligation to support others (Ozinga, 1999), or the wish to create something have been mentioned to motivate individuals to engage in Open Innovation (OI) activities. Piller (2006) generalizes the motives of innovative customers to participate in innovative activities and mentions extrinsic, intrinsic, and social motives based on the work of Reichwald et al. (2004). However, studies investigating factors, which influence the five key value drivers of MC mentioned above, are scarce. Therefore, the objective of this research is to analyze the magnitude of the key value drivers of MC and further investigate how external factors alter their relevance. Although it is commonly agreed that, for example, the preference fit perceived by customers influences the acceptance of MC, it is unclear under which circumstances it is the dominant value driver of MC and when other value drivers are leading. We explain consumers' motivations to engage in MC activities by building on existing research arguing that a number of other factors influence consumers' motivations as well.

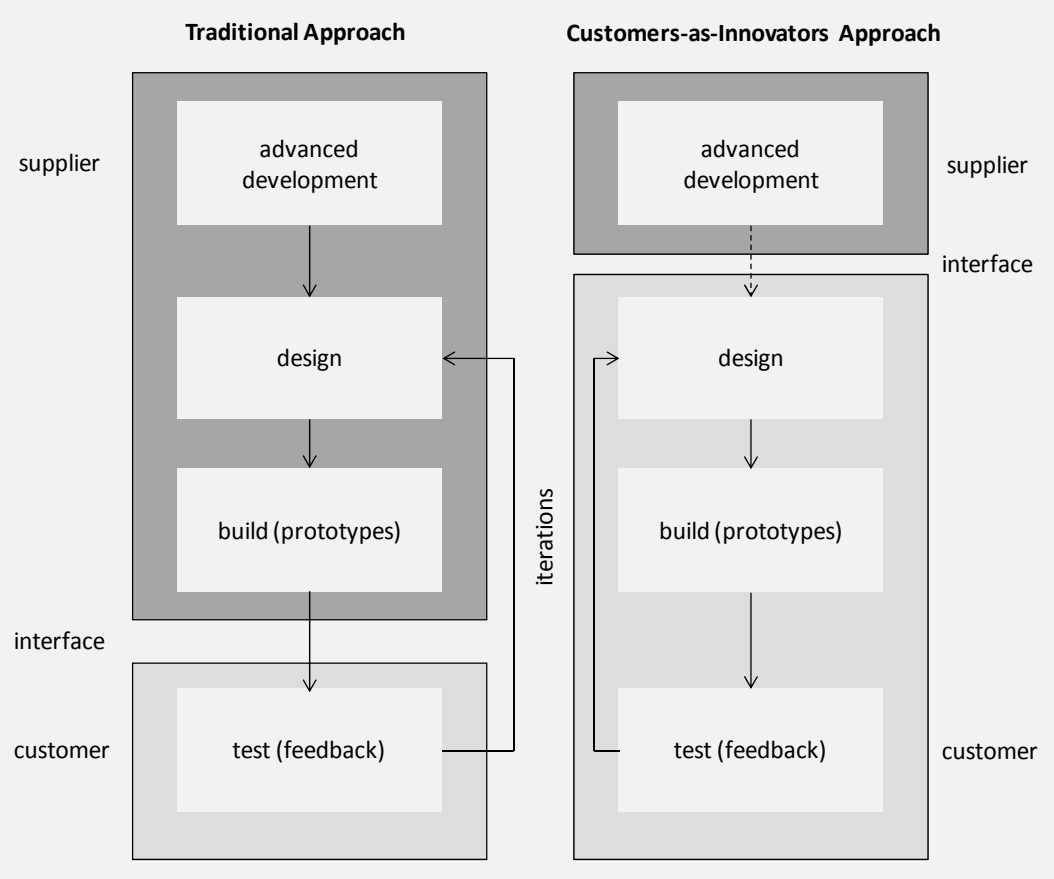
In the classical view of user innovation customers initiate, autonomously and independently from the manufacturer, the innovation process to satisfy personal needs (Piller, 2006). MC, however, aims at incorporating external customer knowledge into the firm by providing customers with a MC toolkit, a solution space that allows them to modify products within pre-defined boundaries. According to the 'Factors of Business Success' survey product innovation is the most common type of innovation among successful entrepreneurs and in industry (Schrör, 2008). Product innovation is defined as the "introduction of new and significantly improved goods and/or services with respect to their fundamental characteristics, technical specifications, incorporated software or other immaterial components, intended uses, or user friendliness (Schrör, 2008, p. 7)."

As a strategy to collaborate with external actors aiming at the generation of product innovations MC can be situated in the field of OI. Chesbrough (2003b) emphasizes in his definition of the OI concept that the boundaries between firms and external actors should be porous so that innovations can be created by either one and be easily transferred. Thus, the MC concept constitutes a promising strategy as external actors can use their specific knowledge to optimize products accordingly to their preferences. Although the first mention of the OI approach is associated with Chesbrough (2003a), the lead user concept defined by von Hippel (1986) explores the contribution of users to emerging needs for new products, processes, and services in a similar way. Von Hippel (1986) defines lead users as users whose present strong needs will become general needs in a marketplace in the future and explores how they can be systematically identified and how their perceptions and preferences can be incorporated into marketing research analyses.

The handling of customers' perceptions and preferences constitutes the fundamental issue of knowledge management which von Hippel (1994) addresses in terms of information stickiness. He mentions the nature and amount of information as well as attributes of the information seekers and providers as reasons for information stickiness and explores the locus of problem solving when information is sticky, that is to say, costly to acquire, transfer and use. Amongst other things, von Hippel and Katz (2002) mention the interaction with "technological gatekeepers" or "information transfer groups" as crucial in influencing information transfer costs between and within organizations. Similarly, users of MC might be seen as information transferring individuals who exhibit strong needs that

are not satisfied by the mass market and MC toolkits might be seen as tools that help customers articulate their needs and translate them into corresponding offers.

Figure 4: A new approach to develop custom products; source: Thomke and von Hippel, 2002



In order to put this research into context it should be noted that the view of the firm has developed from being seen as an entity that develops new ideas internally to benefit from their exclusiveness (Schumpeter, 1942) towards an open firm that networks with external actors. This has been caused, amongst other things, by technological advances and led to a number of complementary concepts such as open innovation, organizational learning or customer relationship management (CRM). Recognizing changing circumstances gives way to concepts such as the dynamic capabilities (Teece et al., 1997). Just as the OI concept builds upon the traditional innovation model by further considering external resources as potential knowledge contributors, von Hippel (1978) describes similarly the development from a manufacturer-active paradigm towards a customer-active paradigm recognizing the importance of customer knowledge. Here, the transfer and particularly the translation of knowledge become crucial to the creation of new knowledge. Organizational learning focuses on models and theories that explain the ways organizations learn and

adapt to their environment. With respect to OI activities, the internalization of external knowledge is of particular importance. Urban (2005, p. 157) states that "[…] CRM helps a company understand each customer and then deliver a consistent message or service to that customer." Through the establishment of long-term relationships firms can build up trust and learn what products customers really want. Accordingly, CRM might be seen as the basis for communication with customers as it aims at building up trust and long-term relationships. The common goal that stands behind those approaches is the efficiency enhancement of the employed resources.

Vargo and Lusch (2004) state that the traditional understanding of marketing with a focus on the exchange of tangible goods is evolving into a new dominant logic that focuses on the exchange of intangible assets such as skills, knowledge, and processes. In the resource-based view (RBV) of the firm, intangible assets and capabilities have been identified as key resources that enhance firms' ability to secure competitive advantage (Clulow et al., 2007). This has been explained by competitive advantage providing characteristics inherent in key resources. Fahy (2000) mentions value, barriers to duplication, and appropriability as three advantage providing characteristics that broadly summarize the more extensive propositions by earlier research. Knowledge management consequently becomes crucial for the assurance of competitive advantage and sustainable development of firms. The challenges in this context include the identification, organization, creation, and sharing of relevant knowledge.

Furthermore, in the knowledge-based view (KBV) of the firm, knowledge in particular, is viewed as the most important source of competitive advantage for the firm (Nonaka et al., 2000). Differing from the RBV, where knowledge is regarded a resource for the production process considering inputs and outputs, in the KBV knowledge is viewed in a broader sense. Knowledge itself and the ability to create and utilize it are seen to be context-specific, relational, dynamic, and humanistic. The focus of the KBV on processes inside the firm and organizational capabilities permits the development of general competences that enable the firm to act smarter. As the MC approach constitutes the opportunity to incorporate external customer knowledge into the firm, it can be argued that it is a source of competitive advantage. Ogawa and Piller (2006) state that newly launched products suffer from high failure rates because of a faulty understanding of customer needs. They propose the integration of customers into the innovation process as an alternative to tradi-

tional market research in order to incorporate customer preferences and requirements. Further, they outline postponement, mass customization, and collective customer commitment as three strategies to reduce the risk of new product development.

Reducing the risk of new product development through postponement is based on the assumption that forecasts are more accurate after observing the initial sales. To avoid uncertainties in dynamic markets some activities may be purposely delayed until more information is available. The condition that permits such manner is a two phase manufacturing process where generic components are built to stock that can be quickly assembled when market information is certain. Mass customization refers to the co-design of products by the customers using a configuration system to specify their preferences. Customers' creativity is limited through the options incorporated into the configuration system so that it might be argue that the results are rather diversifications of the original product than groundbreaking innovations. For the collective customer commitment strategy postponement and mass customization are combined in the form that customers, who are considered experts, are early involved and the manufacturing cycle does not begin until customers show real commitment to purchase. Although it is unclear which factors lead to a stronger customer commitment and superior results, precise knowledge about what customers perceive to be valuable is fundamental to satisfy customers efficiently.

We conclude the introduction of this research recapitulating that despite the fact that the MC concept has been known for 25 years and received considerable attention from scholars and practitioners since then, it has not become a clearly defined and recognized business concept so far. Although it is commonly agreed that customers' demands have increased and that MC is the most advanced market segmentation strategy, that can satisfy individual needs in a superior way, knowledge about the success factors of MC is insufficient. Serving the 'market of one' requires thorough knowledge about the value perception of individuals in order to overcome high failure rates of new product developments. In the context of MC this means understanding the factors that lead customers to adopt mass customized products. The key value drivers of MC arguably constitute additional benefits for customers, but which factors influence their relevance and how do they correlate?

2. Objectives and Research Question

In order to contribute to the existent body of research we provide a structured approach to the underlying value drivers of MC and aim to determine their relevance for the motivation of individuals to use MC. MC aims at incorporating customer knowledge into the product development process in order to generate products that fit customers' preferences better than products made for the mass market. A great part of MC initiatives as well as scholarly research focuses particularly on product co-design, which seeks to empower customers to adjust selected product characteristics altering the optical and qualitative perception of the product. It seems reasonable to argue that the reason to change product characteristics is the willingness to adapt a product to one's own preferences. However, other factors, such as the product's uniqueness, the perceived enjoyment during the MC process, or the feeling of pride to be the author have been mentioned to be relevant for customers as well. Since knowledge about the influence of those factors on customer motivation to engage in MC is limited, the main purpose of this research is to deepen the understanding of the factors that cause customers to use MC toolkits.

Do customers personalize products only in order to meet their preferences in a superior way or do customers want to express individuality with a customized product? Are customers proud to have participated in the product development and is this feeling influenced by the fact that they share the product with others? Do customers enjoy the customization process or do customers perceive the product personalization as stressful and do those feelings influence the value customers attribute to the product? Do the underlying value drivers of MC vary? If so, then what are the factors that influence the magnitude of the key value drivers of MC? Does the purchase frequency of the product influence the adequacy for MC, does the level of product visibility influence whether customer will be anxious to personalize the product or is the luxury level of a product the decisive factor that makes customers want to engage in MC? Further, it might be asked whether a high degree of design autonomy makes the MC process more enjoyable or whether it overstrains customers. Similarly, do design drafts help customers to develop an initial ideal and does automated feedback advance customers' ability to express their preferences?

On the one hand, it seems reasonable to argue that customers seek to tailor products to their preferences but, on the other hand, this appears to be insufficient to explain the sacrifices customers are willing to make for a customized product. Therefore, another objec-

tive of this research is to increase the understanding of how participation of customers can be stimulated towards the levels that firms desire. This requires an extension of our knowledge on the effects of motivation on behavior. The key value drivers mentioned throughout literature taken together provide a comprehensive explanation. However, it is unclear which factors alter the relevance of the underlying key value drivers of MC. Furthermore, possible interactions between the key value drivers are rarely discussed throughout literature. Therefore, the objective of this research is to deepen the understanding of the factors that cause customers to use MC toolkits in the following way:

1. **Establish a comprehensive framework offering explanations for customers' motivation to use MC.**
2. **Empirically validate the framework.**
3. **Deduce implications of key motives for the design of MC toolkits.**

The fundamental questions of what customers need and value are of a complex nature and require a broad view to be answered. Although MC toolkits might be seen as abandoning the attempt to understand customers' needs in detail (von Hippel and Katz, 2002) this might only be valid for specific product attributes. The sophisticated understanding of preference building and value creation, as perceived by customers, is vital in order to maintain customers satisfied and loyal. Consequently, solely the provision of a solution space in the form of MC toolkits might not be enough. Knowledge creation is fundamental for the creation of value. A critical element in the competitive strategy of the firm in order to provide superior value is the sharing of knowledge as it permits to multiply the power of internal knowledge. However, customer knowledge sharing is of a complex nature and especially the management of tacit knowledge requires a thorough understanding of the knowledge provider and the processes related to the articulation and internalization of knowledge. Nevertheless, understanding customers' motivations to use MC should contribute to share customer knowledge more efficiently and consequently multiply the power of internal knowledge.

Adopting a utilitarian perspective of 'value for the customer' (Woodall, 2003) implies that customers may participate in the creation of products in order to reduce sacrifices or increase benefits. In the utilitarian view of VC customers' purchase decisions are the result of balancing benefits and sacrifices in order to choose products that result in a positive perceived value. This is termed net VC by Woodall (2003). Contrary, customers

might abstain from co-creating products if they value the increases in non-monetary sacrifices such as time, effort etc. higher than the increases in the monetary and non-monetary benefits that they would derive from personally creating the product. This is consistent with the social exchange theory (Thibaut and Kelley, 1959) that individuals only act when the expected reward is perceived greater than the cost of the action. However, social and economic exchanges differ in the way that social exchanges involve trust rather than legal obligations (Stanfford, 2008). In the 'use value' form of VC, which Woodall (2003) names derived VC, the consumption experience is linked to social and human values and is outcome oriented. Depending on the product category the factors that customers perceive to be important vary. This means that approaches to MC should differ in dependence of the product specific VC. More in detail, we argue that the value customers derive from a mass customized product varies accordingly to its characteristics, due to the fact that some products fulfill rather hedonic needs whereas other products satisfy utilitarian needs. This is supported by Franke et al. (2009) who state that "[…] the generalizability of our findings is a weak point in this study. Newspapers are frequently purchased, low-cost products with a large number of potential variants. They are hedonic (rather than utilitarian) products that are consumed in private (Knox and Walker, 2001). The question arises as to whether our findings also hold for products which systematically differ from newspapers."

We argue that, fundamentally, three relevant aspects for the motivation of customers to use MC may be distinguished. First, the objective of MC is the creation of personalized products. Consequently, the product and its associated characteristics possess a pivotal role. Although, for example, the luxury level, purchase frequency, or product visibility have been mentioned to be relevant for the success of MC (Broekhuizen et al., 2002), the influence of product characteristics on the key value drivers of MC and the success of MC activities has rarely been investigated. Second, in order to customize a product customers have to go through a process. As a result, the characteristics of MC toolkits or the MC process affect customers' motivation as the incorporation of useful and stimulating characteristics can influence the level of perceived process effort and process enjoyment. Here, the degree of design freedom, the availability of design drafts or feedback might be mentioned. Third, MC toolkits are operated by individuals. This means that not only product and process factors need to be taken into account but also characteristics of customers. The ability to express one's preferences, the level of product involvement, the

degree of MC experience, or the extent of preference insight can arguably alter the value customers derive from engaging in MC.

Drawing upon the findings from the literature review, we propose a comprehensive framework with product and process factors as well as customer characteristics establishing relations to the key value drivers of MC. Therewith, we aim to contribute to the field by offering a differentiated explanation of customers' motivations to use MC and answer the underlying research question:

What motivates customers to use MC and how do factors of the product and the MC process as well as customer characteristics further influence those motives?

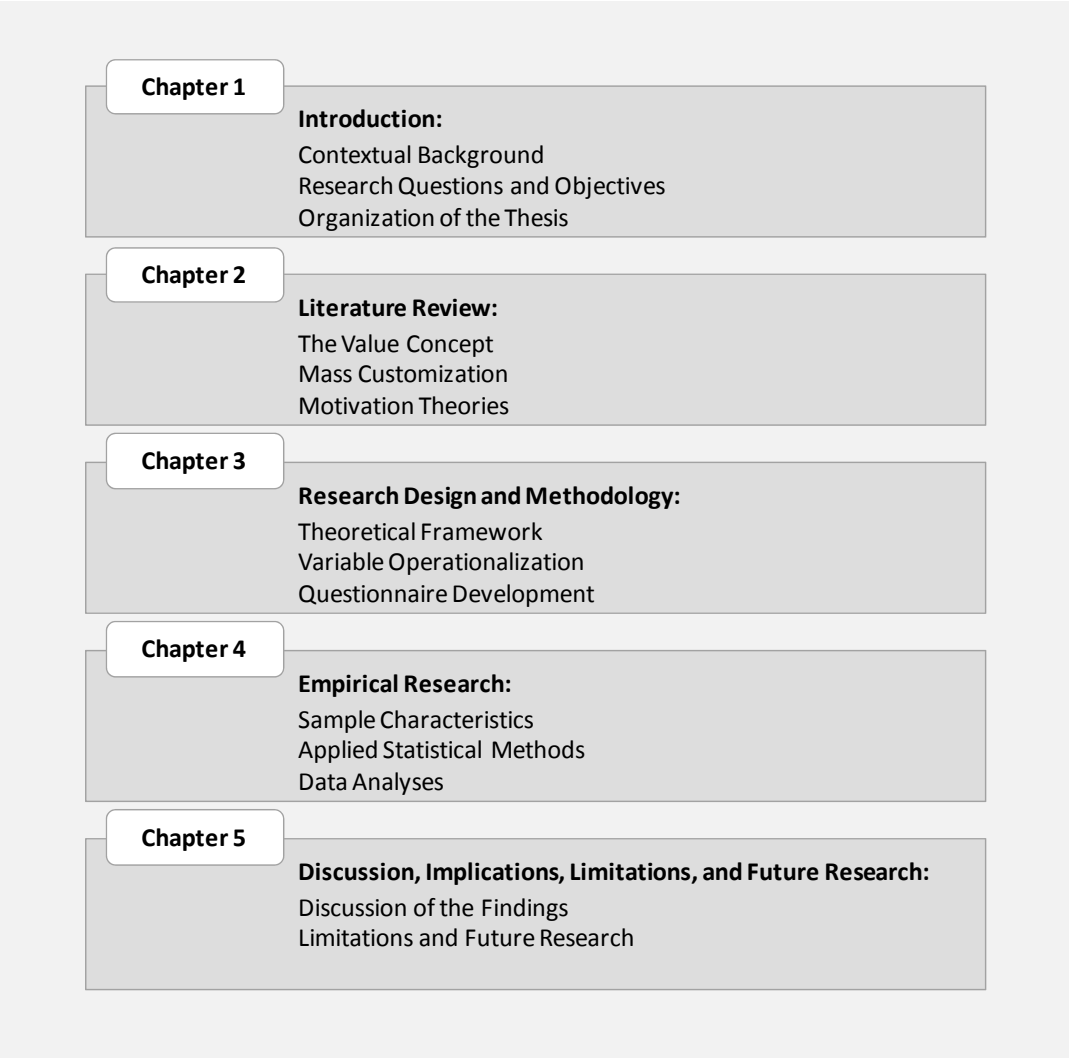
Although research has investigated the relevance of the perceived preference fit, the perceived product uniqueness, the pride of authorship effect, the feelings of psychological ownership, perceived process effort, and perceived process enjoyment to some degree; the factors impacting those key value drivers have been neglected. In order to advance the understanding of the relevance of external factors we develop hypotheses and test them with empirical data. External factors, namely product and process factors as well as customer characteristics, are manipulable and influence the design of MC strategies. Therefore, it is crucial to establish a better understanding of their influence so that they can be addressed more efficiently. For example, the degree of customer involvement in the collaborative product development is influenced by the degree of autonomy granted to customers. However, the fit between customers' preferences and a product's characteristics can only be increased to a satisfactory level if the customer is able to make desired adjustments. Consequently, it can be argued that the level of autonomy indirectly influences, through the perceived preference fit, the value derived from MC. Since other factors influence the key value drivers of MC similarly, our aim is to explore the relevance of the factors influencing the key value drivers.

3. Organization of the Thesis

In order to define the structure of the thesis an outline is given in this section. The research is arranged in five chapters. In the first chapter, the contextual background for this thesis is established briefly discussing the relevance of MC and introducing the main research objectives. In the second chapter, the value and MC concept as well as theories on motivation are discussed more in detail.

Based on the research objectives and the literature review, a theoretical model explaining customers' motivation to use MC is proposed in chapter three. Further, the methodology and the research design, applied to test the conceptual model, are explained. Subsequently, the model is subjected to statistical analysis in chapter four. Ultimately, in chapter five a detailed discussion of the findings is given before concluding with an overview of the limitations of this research and recommendations for further research.

Figure 5: Structure of the thesis



Chapter Two: Literature Review

In this chapter a comprehensive review of the relevant literature is provided. Specifically, research regarding the concepts of MC, value, and motivation is discussed. The supposition, on which this research is based, is that the value perceived by customers is the underlying factor that substantially influences customers' decisions to engage in MC.

Since value is often simply reduced to utility, quality or price we revise the literature on the value concept and highlight the most significant aspects. Further, literature on the MC concept is revised and a structured overview of the undertaken research is provided. Lastly, theories, which explain customer behavior and motivation in general, are outlined in order to deduce implications for the MC specific context.

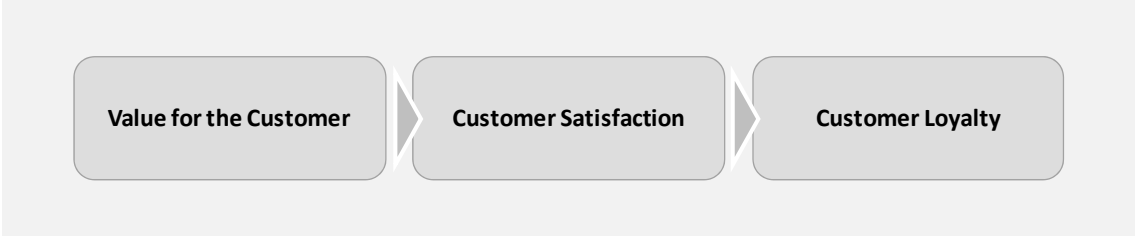
1. The Value Concept

The relationship and service orientation of contemporary theories associated with the exchange of goods and the understanding of organizational and individual behavior emphasize the dynamic nature of supplier and customer interactions as well as the importance of intangible assets. While intangible assets secure competitive advantage for the firm, they shall provide value for customers. This leads to the questions, what value embraces and how it might be conceptualized?

As one of the external knowledge contributors to the firm, customers provide personal knowledge that can lead to innovative solutions. Further, they offer need information at first hand. Other stakeholders such as suppliers, public research institutions, shareholders, or others might also contribute knowledge to the firm. Due to personal experiences in a variety of use situations customers develop specialized knowledge about products and develop a consciousness for their unsatisfied needs. Customers can be seen as experts in a certain field or product category. Therefore, and because of their disposition to voluntary share their knowledge, customers constitute a valuable resource for the firm. The analysis of knowledge contributions from other external actors to the firm is likely to be of interest as well. This research, however, is limited to knowledge contributions from customers.

Moreover, value is broadly defined as anything that is valuable from a firm's and customer's perspective. This could be a product, service, activity, or feeling. In other words, tangible and intangible as well as monetary and non-monetary factors might be seen as value providing. Further, this is not only done in terms of utility but also regarding other factors that are described further on. Following, an overview of the value concept from a customer's and a firm's perspective is given.

Figure 6: Conceptualized relations between value, satisfaction, and loyalty; source: own elaboration

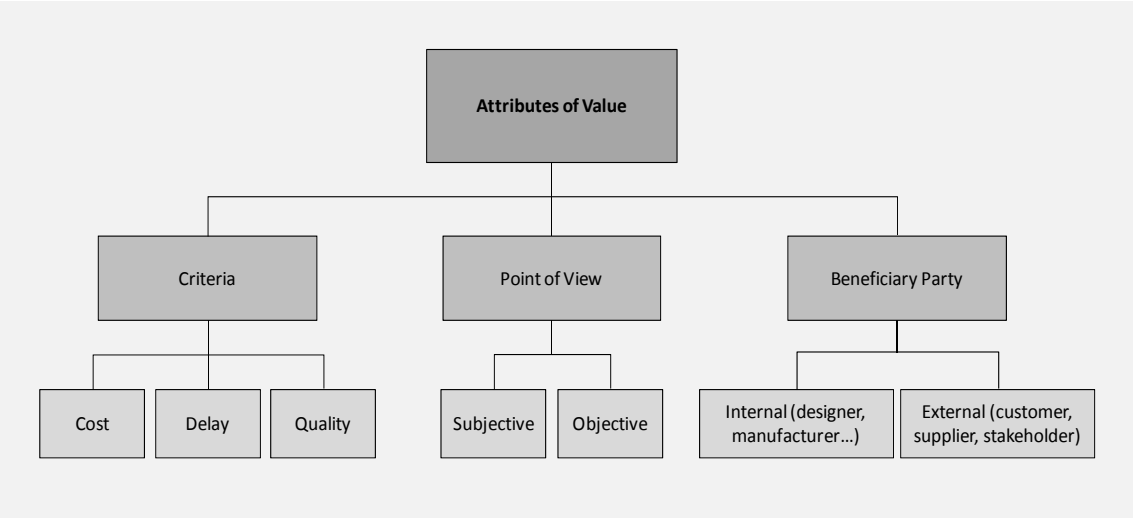


1.1. Value from the Demand Side: Value for the Customer

The literature on the value concept contains a multitude of different definitions, models, and measurement approaches. Woodruff (1997, p. 141) mentions some areas of consensus for the customer value concept but also states that "substantive meaning differences" exist. Consensus exists about the fact that value is perceived by customers and is not determined by the seller and that value involves a trade-off of what is given and what is received. The way definitions are constructed is mentioned as one of the differences.

Graf and Maas (2008) state that no consistent definition for 'customer value' has been given. After a thorough review of literature on value, Woodall (2003) acknowledges that no agreement exists on a distinct term for what customers derive from suppliers. As established by Woodall (2003) the term 'value for the customer' is adapted throughout this thesis in order to clearly distinguish the value perceived by the demand side from the value concept of the supply side.

Figure 7: Attributes of value; source: Daaboul et al., 2011



Value per se is a complex construct. In the marketplace, however, it has been simplified to "quality that the customer can afford" (Sinha and DeSarbo, 1998, p. 1). In scholar articles the complexity of VC has been recognized and approached from different angles. Payne et al. (2008), for example, explore the nature of value creation in the context of the service dominant logic and investigate how suppliers can manage the co-creation of value. They mention customer processes, supplier processes, and encounter processes as the main components of their value co-creation framework and associate them with

customer and organizational learning. Recognizing customer processes leads to the development of a full understanding of "where a supplier's offering fits within the customers overall activities" (Payne et al., 2008, p. 87).

Graf and Maas (2008) approach the value concept in terms of perceived and desired value further differentiating perceived value into product and relationship oriented. Woodruff (1997) states that value is seen by customers in the form of (1) preferred attributes, (2) attribute performances, and (3) consequences from use but that it is often measured as attribute-based desires only. This supports the argument that the value concept is not fully understood. Further, Woodruff (1997, p. 140) asks the following questions that are relevant for the understanding of the value concept in general and might be directed to MC activities specifically as well.

- What exactly do customers value?
- Of all the things customer value, on which values should the firm focus to achieve advantage?
- How well do customers think we deliver that value?

The approach taken throughout this research to 'value for the customer' is based on the framework presented by Woodall (2003). The term has been chosen for the same reasons mentioned by Woodall (2003, p. 1) who states that

> "[…] the primary purpose is to act as an 'umbrella' term, one that captures a range of associated, existing concepts, all of which use similar names and imply a similar idea - that there exists some discernable property that is perceived/derived/experienced by a customer and which explains their psephological connection to a particular good or service."

Woodall (2003) differentiates between several primary forms of VC. This offers a theoretical basis for understanding motivational factors that drive customers' engagement. On the one hand, the principal and temporal forms of VC deliver insights that serve to explain customers' WTP for an offering. On the other hand, they might also explain willingness to provide knowledge, interact with others, and engage in collaborative product development. Naturally, the value perception from a firm's and from a customer's perspective is likely to be inconsistent.

> "So, not only does each of us value the same things differently, we individually value different things, and at different times in different ways. From this perspective value can only be judged within the context of 'some implicitly limited set of conditions' (Smith, 1987) determined as much by environmental, social and cultural factors as by utilitarian or economic considerations" (Woodall, 2003, p. 4).

This means that value has to be seen within its context and that it is of a dynamic nature changing in dependence of time, space, and the person who perceives it. This is comparable to the idea of 'exchange value' that value is (ac)countable and predicted upon cost, in dependence of time, place, cultural, and socio-political agenda (Amin, 1978) and scarcity. The concept of use value refers to the maximization of expected use value through the reduction of sacrifices and the increase in benefits (Woodall, 2003).

In the following, the primary forms of VC that have been established by Woodall (2003) are summarized in order to provide a common framework of the 'value for the customer'. Woodall refers to value for the customer in a transaction related context that is focused on purchasing. This approach provides important insights for the understanding of customer motivation to engage in MC.

Net VC – Balance of benefits and sacrifices

This form of VC assembles ideas that are based on a utilitarian perspective. The customer's decision is the result of a comparison of weights and/or quantities of benefits and sacrifices. In this way the customer determines a product's worthwhileness. The equal and coincident consideration of benefits and sacrifices seem to be commonly regarded as fundamental for the establishment of VC.

However, regarding the calculation of VC opinions differ. Subtracting sacrifices from benefits or dividing them are suggested, with any result being positive or greater than one indicating an acceptable VC. Further, the computation process is considered an intuitive calculation or a trade-off as well as a balancing process, judgment or relational comparison that could be product-specific or focused on a number of alternatives.

Another unclear issue is the perception of benefits and sacrifices. Benefits might be formulated and perceived in terms of product attributes, outcomes or both. Sacrifices are possibly of a practical/cognitive nature, related to the senses and affection or both.

Derived VC – Use/experience outcomes

As the name implies, in this form of VC benefits are derived from consumption-related experiences. Value is perceived as a function of outcomes rather than a function of properties. The consumption experience is linked to social and human values creating value through outcomes rather than computing it. The main focus of this form of VC is on the use value suggesting a certain independence of the related sacrifices.

Rational VC – Difference from objective price

Essentially utilitarian in nature, this form of VC represents the idea that the customer computes the fair price of a product. Initiating the computation with a price benchmark in terms of a tolerable price band, market price, reservation or maximum price, the customer establishes a fair price taking the benchmark and perceived benefits or attributes of the product into account. The VC is stated in terms of the difference between the established benchmark and the fair value. The aim is to objectively evaluate competing offers with varying prices and features. Though computed by the customer, estimating the rational VC allows the supplier to determine the customer's price tolerance for product features.

Sale VC – Option determined primarily on price

The reduction in sacrifice or the lowest possible price is the determining factor of this form of VC. Rather than referring to increasing monetary gains, sale VC implies that the best value comes from the lowest priced alternative. Contrary to the other VC concepts, balancing of benefits and sacrifices, use outcomes, or the nature of product attributes are not relevant in this form of VC.

Marketing VC – Perceived product attributes

Associated with product attributes, this form of VC stresses the importance of product qualities. Based on the assumption that customers value product qualities accordingly to their personal value system in a hierarchy, a product quality can become an intrinsic value. Human and personal values motivate and lead to a decision that seeks to select particular product attributes that provide customers with advantage. Here, VC is seen as an asset of considerable strategic importance favoring a supplier-oriented view. Howev-

er, the proposition of the product attributes by the supplier might differ from the perception of the customer.

Aggregated VC

The goal of this form of VC is to represent the customer's overall view of VC. How and when the customer valuation process works is best presented as a 'gestalt'. That is, "a phenomenon that is greater than and/or different from the sum of its individual parts, and that offers a different model of 'overall' VC to the similarly resultant form, 'Net VC' (Woodall, 2003, p. 24)." This takes into account that post-purchase evaluations are unlikely to be rational and that overall VC evaluation is likely to consider several aspects in a cumulative way. Here, the temporal aspect is highlighted in order to reflect the dynamic nature of VC. Woodall (2003, p. 21) states the following definition for VC:

> "Value for the customer is any demand-side, personal perception of advantage arising out of a customer's association with an organisation's offering, and can occur as reduction in sacrifice; presence of benefit (perceived as either attributes or outcomes); the resultant of any weighed combination of sacrifice and benefit (determined and expressed either rationally or intuitively); or an aggregation, over time, of any or all of these."

Having outlined the primary forms of VC it becomes clear that various explanations for customers' behaviors exist, but that the reliable prediction of customers' perceptions of value and their corresponding behavior is not an easy task. It might be concluded that "VC is perceived to be coincidentally personal, contingent and dynamic" (Woodall, 2003, p. 24). As customers become more intimate with a product their perception is influenced by their personal experiences with the product and company as well as by the public perception of the company's product and activities. This supports the idea that customers' contributions and motivations to participate in MC activities vary due to changing customer knowledge, which is influenced by experiences.

Oliver and DeSarbo (1988) state that according to equity theory customer perceived value constitutes the ratio of customers' outcome/input and provider's outcome/input. The fundamental question for the customer is, "what is right, fair, or deserved for the perceived cost of offering" (Bolton and Lemon, 1999 inYang and Peterson, 2004, p. 802). It has been recognized that differences in the possible price premium exist accord-

ingly to the product category. For example, Berger and Piller (2003) found that a higher price premium can often be demanded for products that require matching physical dimensions as opposed to products that customize on design patterns only. Horsky et al. (2004) show that customers' stated preferences do not always translate into coherent behavior and mention the tangibility effect to show that predominant decisive factors change in dependence of the situation. This has three important implications:

First, a MC toolkit, or more in general, the interface between customers and suppliers is evaluated by customers. This means that it is fundamental to understand what customers perceive to be valuable when engaging in MC. Second, different product attributes have varying impacts on customers' motivation to participate. This means that suitable attributes need to be determined in order to efficiently counterbalance additional costs of MC. And third, value for the customer varies throughout situations. This means that the underlying key value drivers of MC should be determined accordingly to product's use situation.

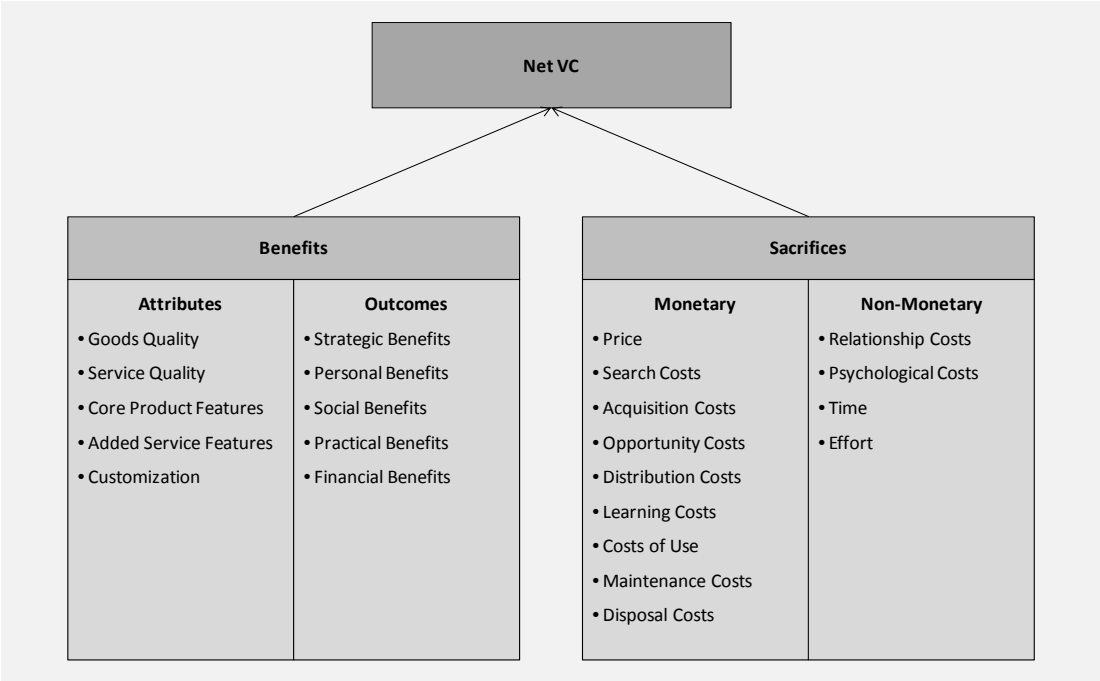
Shifting the view of customers from seeing them as purchasing clients to knowledge providers requires the adaption of the value concept. As the primarily goal of MC is the generation of personalized products through the active involvement of customers, the terms 'benefit' and 'sacrifice' might be understood in a broader way than in a conventional transactional context. Khalifa (2004) mentions Huber et al. (2001) who point out monetary, time, search, learning, and emotional costs as well as cognitive and physical effort coupled with financial, social, and psychological risk. Further, Khalifa (2004) states that up to 70 percent of a customer's decision to buy is based on interactions and only 30 percent on product attributes (McKean, 2002).

Product co-design activities provide products that excel through their exclusiveness and the incorporation of specific customer preferences. This provides additional value to customers. Therefore, it might be argued that customers' decisions to participate in MC activities are not limited in the same way by monetary constraints as customers' purchasing decisions in the mass market. Whereas the acquisition of a product in the mass market only requires the availability of financial resources, MC requires customers' willingness to actively participate and make sacrifices. However, drawing upon the contingent nature of value, it can be argued that sacrifices do not influence customers solely in a negative way but also constitute the foundation for the emergence of feelings of pride, psychological ownership, or challenging enjoyment. This supports the argument

that MC creates value for the customer through the participation in the development process. Figure 8 offers a view of the benefits and sacrifices that impact on Net VC.

MC activities provide value for the customer in the sense that customers are able to share their personal knowledge. The desire to share knowledge may be founded in unsatisfied needs. These could be of a tangible nature in terms of nonexistent products or of an intangible nature such as the desire to be part of a community or the wish to create something. As MC activities imply the active involvement of customers, sacrifices are rather the time and the personal, psychological or intellectual energy employed. Further, the terms 'perceived value', 'right' and 'fair' imply a subjective view dependent on a customer's personal value system. This emphasizes the intangible nature of VC that is partly emotional. Likewise, approaches such as the technology acceptance model (TAM), which contribute to analyzing the factors that lead customers to adopt a technology, imply that products need to be accepted by customers. Acceptance, however, is not always created by utility solely. The underlying questions are how personal factors and product attributes are correlated, and to what extent they have influence on customers' decisions.

Figure 8: Benefits and sacrifices; source: Woodall, 2003



Nevertheless, utility might be seen as an underlying value driver, which is completed by additional factors of a less tangible nature. Katz and Shapiro (1985) use the term 'consumption externalities' in order to argue that the utility customers derive from consump-

tion is influenced by other customers using the product. They illustrate the direct physical effect of the number of purchasers on the quality of the product with the example of the telephone. The utility of other communication technologies depends equally on those network externalities. Further, they mention the importance of other buyers to consumers of specialized products arguing that the supply of complementary products depends on the overall demand for the initial product. For durable goods, further important consumption externalities are the quality and availability of post purchase service, which depend on the experience and size of the service network. Lastly, they mention better availability of more popular brands, the role of market share as an indicator for product quality and purely psychological bandwagon effects as more subtle effects.

For MC activities this implies, on the one hand, that besides product attributes other factors exist which influence utility. It might be argued that, what Katz and Shapiro call utility can also be seen in a broader sense as value for the customer. Being able to actually use a product or have it serviced is not just utile but constitutes fundamental value for customers. Likewise, the value of MC might not only stem from the use intended by the supplier but also from network effects or others. On the other hand, the fact that some product categories actually require shared usage in order to provide value for the customer implies that the product evaluation might be influenced by other individuals.

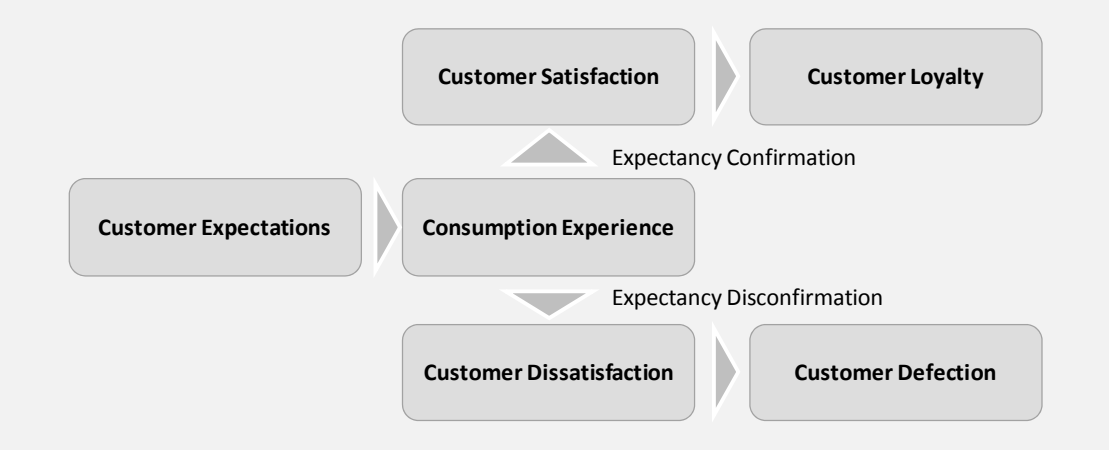
Yang and Peterson (2004) investigated the role of switching costs on customer perceived value, satisfaction, and loyalty and mention emotional and psychological switching costs besides economic switching costs. Making reference to Oliver (1999b), they name social bonding and personal fortitude as switching barriers that are likely to keep customers loyal. Having said this, benefits of MC activities might also be associated with derived VC. Besides functional benefits of user design, other factors such as pride of authorship, exclusiveness of the product or the active role of customers are supposed to impact the value perceived by customers (Franke and Piller, 2004). Applying the TAM to the consumer context Bruner and Kumar (2003) found that the fun of using a device to access Internet determines attitudes toward usage more powerful than the perceived usefulness of the device. Further, they suggest that making a device easy to use increases the fun associated with its usage.

Drawing upon the primary forms of VC, it might be suggested that in the context of MC customers' willingness to engage is the result of a process taking various aspects into account. Trading off benefits and sacrifices is possibly the underlying method in order

to come to a decision. The relevance of particular benefits and sacrifices, however, might be determined by their consequences as suggested by the derived VC. The marketing VC emphasizes product attributes. Since the focus of sale VC is on low price, it might be perceived as a product attribute as well. Generally, product attributes translate into benefits or sacrifices for the customer. Therefore, benefits, sacrifices, and consequences might be suggested as relevant factors for the success of MC. Personal factors, which determine the perception of the former (Bolton and Drew, 1991), need to be taken into account as well. This is consistent with Sinha and DeSarbo (1998, p. 237) who state that "perceived value is clearly a multidimensional construct derived from perceptions of price, quality, quantity, benefits, and sacrifices, and whose dimensionality must be investigated and established for a given product category."

Lastly, the links of the VC concept to other relevant concepts are outlined. There are a number of customer measures that firms use to determine their performance. Customer acquisition rate, customer retention rate, frequency, recency and the amount of purchase, share of wallet, customer referrals, or intention to purchase are common determinants that are used to illustrate customers' behaviors. On a more general level repeated purchases are explained by customer satisfaction (CS). It has been argued that customer loyalty reduces the time spent in searching, locating, and evaluating alternatives as well as the time and effort of learning processes of new suppliers. Customer loyalty is attributed to CS.

Figure 9: Illustration of the (dis-)confirmation expectation approach; source: own elaboration based on Bowden, 2009



The value concept is closely linked to CS and perceived quality (Graf and Maas, 2008) and has been suggested to be an antecedent (Yang and Peterson, 2004; Woodall, 2003;

Graf and Maas, 2008) or a complementary construct of the former (Eggert and Ulaga, 2002; Gale, 1997). CS might be seen as a transaction based emotional response varying in intensity depending on the situation, as a result of an overall evaluation taking into account various products and facets of the firm in a cumulative way, or as a function of perceived service quality.

Bowden (2009) mentions the confirmation-disconfirmation of expectations approach, which conceptualizes CS as a post-consumption cognitive process, as the most commonly used way to determine customer satisfaction. Figure 9 illustrates this approach. However, the consumption experience itself has been suggested to be rich in value as well. The motivation for consumption has been attributed to functional, conditional, social, emotional, and epistemic utility (Mathwick et al., 2001). Likewise, the motivation to engage in MC might be explained by the same factors. Seeing VC as an antecedent or complementary construct of CS it is germane to identify and address the critical value drivers that matter most to customers in order to achieve customer loyalty.

Table 3: Factors influencing individuals' purchase decisions

Author	**Influencing Factors**
Katz and Shapiro (1985)	Consumption externalities: quality and availability of post purchase service, availability of more popular brands, role of market share as an indicator for product quality and purely psychological bandwagon effects as more subtle effects.
Davis et al. (1989)	Perceived usefulness and perceived ease-of-use
Khalifa (2004)	Monetary, time, search, learning and emotional costs. Cognitive and physical effort coupled with financial, social, and psychological risk
Yang and Peterson (2004)	Economic, emotional and psychological switching costs Switching barriers: social bonding and personal fortitude

1.2. Value from the Supply Side: Customer Value

Traditionally, value from a firm's perspective has been considered in monetary terms. However, a growing number of researchers argue for a more comprehensive view of value that recognizes intangible aspects as well. However, the challenge is the measurement of intangible assets. In the context of the customer lifetime value (CLV), mainly customers' potentials to make referrals (Ryals, 2002; Urban, 2005; Kumar et al., 2007) or learning and knowledge contribution (for example, Stahl et al., 2003; Iyengar et al., 2007; Ryals, 2002 and 2008) have been mentioned throughout literature.

Organizational metrics focus to a great extent on financial measures. For the estimation of the value of a customer a number of measures exist. Those can be broadly categorized as retrospective or prospective measures and determined by the level they focus on, that is, the individual customer or a firm's customer base. Further, measures can be characterized as one-dimensional or multidimensional. Due to the complexity of the different approaches to estimate customer value and their divergence, only the most relevant aspects are outlined in this review. Rather than providing an all-embracing overview of existent customer measures the review of customer value measures pretends to highlight the change in the perception of the customer from a firm's point of view.

In the CRM approach, for example, customers are seen as long-term assets. With the MC approach, firms can establish relationships with their customers, not only providing them with products that offer added value but also generating value for the firm by getting hold of customers' preferences and needs. Further, customers might act as advocates of the firm and recommend its products or services to others. However, Kumar et al. (2007, p. 7&8) point out that customers do not make "referrals if they don't feel much attachment to the product, which is the case with many categories in fast-moving consumer goods markets. (In these instances, it's also difficult to track individual customers' behavior anyway.)" Exactly for those reasons, because firms can attract customers, make customers' insights transparent, and communicate with them, MC constitutes a vital strategy for the firm.

A common way to estimate the customer value is the CLV approach. The CLV estimates the customer's present (financial) value over his lifetime with the company from

a firm's perspective (for an extensive discussion see, for example: Dwyer, 1997; Berger and Nasr, 1998; Jain and Singh, 2002). Kumar and Rajan (2009, p.2) define the CLV as:

> "The sum of cumulated cash flows – discounted using the weighted average cost of capital (WACC) – of a customer over his or her entire lifetime with the company."

The CLV requires assumptions about customers' future purchasing behavior and the duration of the lifetime with the company as well as estimates for the costs associated with the relationship and an appropriate discount rate. It is a one-dimensional prospective measure that estimates the financial value at the individual customer level. In recent research three weaknesses concerning the net present value (NPV) approaches for the customer assessment have been revealed. First, forecasting difficulties might limit the practical use and acceptance of the CLV. Second, using a single discount rate might not fully account for the risk inherent in customer relationships, and third, it is questioned that the CLV is a comprehensive compilation of all the values created by customers (Ryals, 2008).

The measures that determine the value of the CLV are generally the revenues from a customer and the costs of attracting, selling, and servicing that customer. More in detail, those measures are the recurring revenues, the discount rate, the customer acquisition and retention rate, the (expected) customer lifetime with the company on the one hand, and the costs of acquisition, retention, sales and maintaining the relationship with the customer on the other hand. A number of assumptions may be made in order to illustrate the CLV concept and its calculation in different scenarios. Revenues may be generated annually, more frequently or less frequently as well as the amount of revenues might be constant or variable and discrete or continuous over time. The same is valid for the other variables determining the CLV.

A number of different CLV models have evolved from the basic model and other terms such as lifetime value, customer profitability, customer relationship, and customer valuation are used synonymously to refer to the CLV construct (Heidemann et al., 2009). Although the CLV only takes financial measures into account it might also indicate which customers have great experience with a firm's products as it takes customers' spending and lifetimes into account. Therefore, it might serve as an indicator of product involvement, preference insight, and one's ability to express preferences. This implies

that customers with a high CLV should derive more value from MC than customers with a low CLV, due to the fact that their experience allows them to achieve a higher preference fit.

The aggregated CLVs of a firm's customer base are referred to as customer equity (CE). The knowledge about individual CLV is important for customer equity marketing, but CE provides an aggregated measure that delivers a broader view of the customer base and consequently provides an upper control measure for marketing. Also, CE provides a means to estimate future cash flow potential as it takes current and future customers into account. Bayón et al. (2002, p. 218) state that "the CLV is the central criterion for making decisions on the allocation of marketing resources. However, calculation of the CLV is not sufficient for implementing a consistently value-oriented marketing strategy." It is argued that not all customers are equally profitable and do not contribute to the firm's success in the same way. While some customers are profitable others even destroy value (Kumar and Rajan, 2009).

Adapting a more comprehensive view of value it becomes clear that a number of factors influence the financial value of customers. Kumar et al. (2007, p. 2) emphasize that "[…] the value of any one customer does not reside only in what that person buys." Just as value from a customer's point of view is not limited to price and quality, value from a firm's point of view should not be limited to the financial value of customers. The customer engagement value (CEV; Kumar et al., 2010) is a fourfold model that goes beyond the purely financial perspective by incorporating, besides the CLV, the customer referral value (CRV), customer influencer value (CIV) and customer knowledge value (CKV). The CEV is a conceptual multidimensional framework which recognizes direct and indirect effects of customers. It is an attempt to comprehensively approach the evaluation of customers' contributions from the firm's perspective.

Generally, referrals lead to lower acquisition costs and in addition existing loyal customers refer new customers that are more loyal themselves (Reichheld, 1996 in Ryals, 2002). Therefore, it seems obvious that outsourcing the customer acquisition process would lead to a competitive advantage if conventional marketing efforts will be reduced maintaining the customer acquisition rate or if a greater number of customers will be attracted with the same marketing efforts. This justifies the consideration of customers' potentials to refer new customers.

The CRV, which theoretically permits calculating the value, which can be attributed to customers due to their ability and willingness to attract new customers, is a formal approach to quantify the indirect effect of customer advocacy. The CIV reflects mainly three aspects through which the behavior of other customers can change. Specifically, information sharing, word of mouth (WOM), and interaction with or assistance to other customers can convert potential customers into actual ones. Further, influence from others might lead to customer retention or a change in the share of wallet. Lastly, the CKV refers to the value added to the firm through customers' feedback. Kumar et al. (2010) argue that CKV could be maximized if customers had the chance to engage in activities which would permit them to offer feedback and collaborate with the firm. This illustrates that attempts have been made to capture customer value in a more comprehensive way in order to account for non-financial benefits as well. Although it is generally recognized that customers provide more than financial value to the firm the main difficulty remains the quantification of those additional benefits.

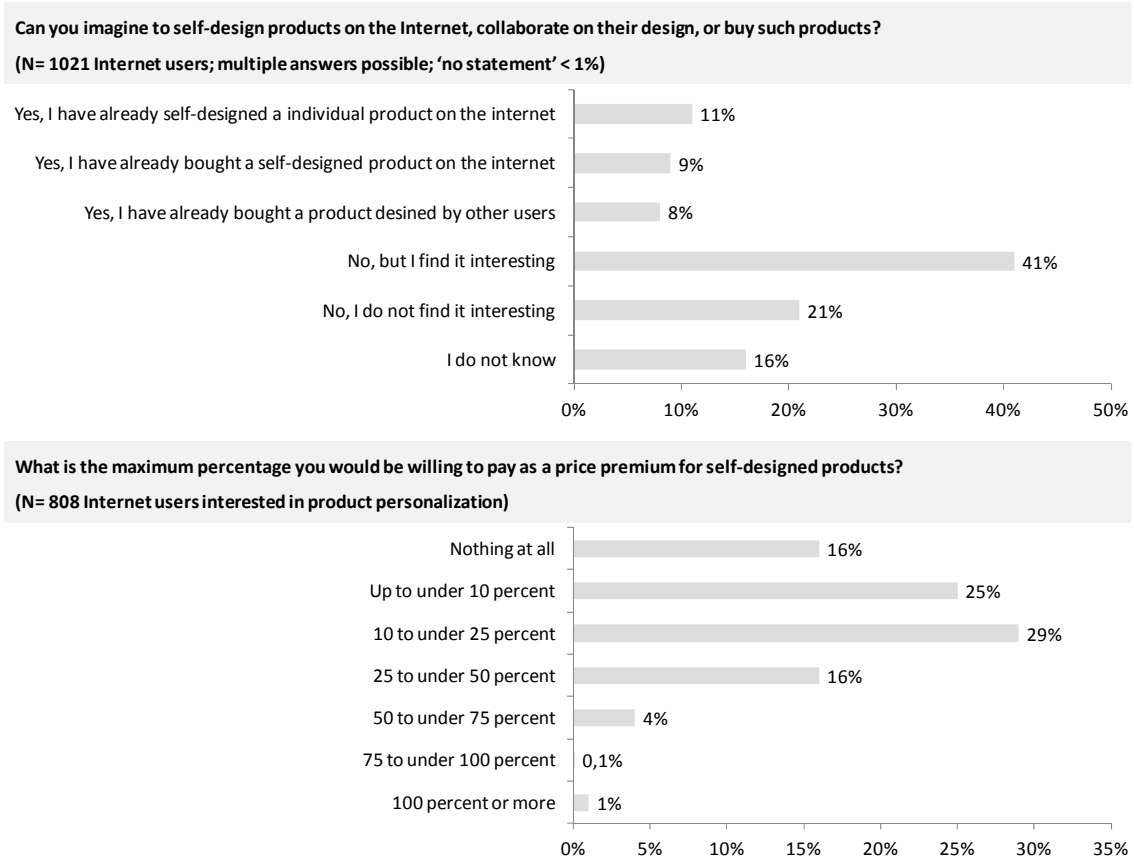
In the context of MC, Fogliatto et al. (2012) reflect that value on the producer's side might be given through a premium price for customized products and 'economies of integration', which refers to postponement, better market intelligence, and customer loyalty. This sense of value is contrary to the meaning of value on the customer's side where value is supposed to stem from intrinsic (hedonic, pride) or extrinsic (utilitarian, individualism, self-expression) value drivers (Merle et al., 2008 in Fogliatto et al., 2012)

In summary, it can be said that from a firm's point of view the value of a customer is predominately measured in financial terms and other potentials are mostly neglected. Though some approaches pretend to capture the value of customer referrals or innovative contributions, the accurate evaluation of certain customer behaviors is a pending task. Market segmentation considers differing customer needs and potentials. MC as the most sophisticated segmentation approach considering the individual customer constitutes for the firm the opportunity to establish relationships with customers and articulate their needs and preferences. Supposing that users of MC possess a higher product involvement, preference insight, and better abilities to express their preferences than average customers, it can be argued that they are lead users whose preferences will be common in the marketplace. Therefore, from a firm's perspective those customers who actively participate in the product development process, exhibit a higher value than conventional customers.

2. Mass Customization

At first sight, the term 'mass customization' might appear contradictory. Customization is traditionally associated with individual adjustments according to personal preferences. However, developments in information technologies have enabled the creation of computer-aided programs, generally referred to as MC toolkits, which allow the personalization of products on a large scale. Despite the fact that the concept has been known for some time, it is still perceived to be a growing trend.

Figure 10: Internet users' interest in MC and WTP for MC products; source: zwei.null trends, 2008, retrieved May 9, 2012



As illustrated in Figure 10, Internet users show a great interest towards MC and seem to be willing to pay considerable price premiums for personalized products (zwei.null trends, 2008, retrieved May 9, 2012). Accordingly to the cooperative study carried out by 'deutsche-startups.de' and 'INNOFACT AG', only 16% of the respondents would not pay a price premium for a customized product. The indicated price premiums seem reasonable, taking into account that other studies found even higher increases in customers' WTP. For example, Franke and Piller (2004) found that users of MC toolkits designing their own watches exhibit a WTP a price premium of more than 100%.

Mass customization enables customers to customize on their own and in an easy way, "mostly through modularized product/service design, flexible processes, and integration between supply chain members" (Fogliatto et al. 2012, p. 2). According to Davis (1987, p. 169), mass customization is present when "the same large number of customers can be reached as in mass markets of the industrial economy, and simultaneously treated individually as in the customized markets of pre-industrial economies." Pine (1993, p. 44) describes the evolution from mass production to mass customization for many industries and the accompanying shift in the paradigm of management arguing that firms are dealing with an unstable and uncontrollable world "by creating variety and customization through flexibility and quick responsiveness." However, the original idea of the MC approach to consider customers' heterogeneous needs and increase customers' preference fit with the efficiency of mass production has developed over the years. Walcher and Piller (2012, p. 5) emphasize that "the key to profiting from mass customization is to see it not as a standalone business strategy that is replacing today's production and distribution systems, but as a set of organizational capabilities that can supplement and enrich an existing system."

When customers carry out tasks themselves, they apply their tacit knowledge. For the firm, this constitutes the opportunity to gain insights on customer specific knowledge and make it more explicit. Wilson (2002) mentions that knowledge involves the mental processes of comprehension, understanding, and learning that occur in one's mind, whereas information is exchanged by messages when one wishes to communicate what he knows. Information, in the form of (un)structured and/or (dis)aggregated data, becomes knowledge when it is comprehended and incorporated into one's own knowledge structure. Since knowledge structures are not the same for the sender and receiver the knowledge built from the messages can never be exactly the same. Nonaka (1991) differentiates between tacit and explicit knowledge and mentions articulation and internalization as the critical steps in knowledge management. The fact that the formulation of tacit knowledge is troublesome and therefore difficult to transmit to others (Nonaka and Takeuchi, 1995), suggests that emphasis should be put on methods and processes that promote knowledge sharing. Likewise, MC toolkits bring together need and solution information (Thomke and von Hippel, 2002) allowing customers to create value by themselves, which is said to result in a better fit to market as well as reduced time and cost to market (Piller, 2006).

2.1. Required Capabilities

Salvador et al. (2009) have identified three common capabilities, besides industry- and product-specific factors, that influence a company's fundamental ability to mass customize its offerings. First, the solution space must be developed identifying customers' heterogeneous needs and product attributes, which are valued differently by customers. Second, robust process design must be ensured in order to avoid the impairment of a firm's operations and supply chain. Third, choice navigation should be implemented in order to facilitate customers the exploration of a firm's offerings. Table 4 illustrates the approaches to develop capabilities presented by Salvador et al. (2009).

Table 4: Fundamental capabilities for MC; Source: Salvador et al., 2009

Capability	Approaches to Develop Capabilities
Solution Space Development: Identify the product attributes along which customer needs mostly diverge	• Innovation toolkits: Software that enables large pools of customers to translate their preferences into unique product variants, allowing each customer to highlight possibly unsatisfied needs. • Virtual concept testing: An approach for efficiently submitting scores of differentiated product concepts to prospective customers via virtual prototype creation and evaluation. • Customers' experience intelligence: Tool for continuously collecting data on customer transactions, behaviors or experiences and analyzing that information to determine customer preferences.
Robust Process Design: Reuse or recombine existing organizational and value chain resources to fulfill a stream of differentiated customers' needs	• Flexible automation: Automation that is not fixed or rigid and can handle the customization of tangible or intangible goods. • Process modularity: Segmenting existing organizational and value-chain resources into modules that can be reused or recombined to fulfill differentiated customers' needs. • Adaptive human capital: Developing managers and employees who can deal with new and ambiguous tasks.
Choice Navigation: Support the customers in identifying their own solutions, while minimizing complexity and the burden of choice	• Assortment matching: Software that matches the characteristics of an existing solutions space (that is, a set of options) with a model of the customer's needs and then makes product recommendations. • Fast-cycle, trial-and-error learning: An approach that empowers customers to build models of their own needs and interactively test the match between those models and the available solutions. • Embedded configuration: Products that "understand" how they should adapt to the customer and then reconfigure themselves accordingly.

In detail, solution space development refers to a firm's capability to identify customers' needs in order to design the MC approach accordingly, so that the incorporated options deliver superior value for the customer. In contrast to the concept of mass production, where universal needs of target groups are defined, the MC solution space should enable customers to adapt attributes that are crucial to them providing a multitude of different combinations. In order to identify crucial attributes Salvador et al. (2009) mention 'innovation toolkits' that have an easy-to-use interface and a library of basic modules and functionalities. In this way customers are able to express their preferences and needs actively and firms can evaluate the selections made by customers. But also data from users that do not finish the MC process are an important source of information as they might reveal the causes for abandoning the customization process.

Robust process design is meant to secure that increased variability in customers' requirements will not affect a firm's operations and supply chain. Existing operational and supply chain resources might be reused and combined in order to create customized offerings. In order to achieve robust process design Salvador et al. (2009) suggest flexible automation, process modularity, and adaptive human capital. Flexible automation refers to the dynamic adaptation of automated processes so that varying requirements can be met. Similarly, process modularity refers to the segmentation of the operational and value-chain processes in order to relate segments to differing customer needs. In this way different customer requirements can be satisfied by recombining segments. Lastly, Salvador et al. (2009, p.7) mention the importance of adaptive human capital in order to ensure the correct employment and success of robust process design. Adaptive human capital needs to be "capable of dealing with novel and ambiguous tasks in order to offset any potential rigidness that is embedded in process structures and technologies."

The merit of MC, the provision of numerous and unique combinations of product attributes, can also turn into an excess of information leading to frustration and abandoning the MC process. Choice navigation is meant to prevent this. Through choice navigation customers can identify their needs and explore existing solutions. Information overload or "paradox of choice, in which too many options can actually reduce customer value instead of increasing it" can be avoided through simple choice navigation (Salvador et al. 2009, p. 8). Salvador et al. (2009) propose 'assortment matching', which refers to the automated building of configurations for customer needs accordingly to the available

characteristics of the solution space. Customers are presented potential solutions that meet their requirements and only need to evaluate it, saving time and effort. However, it might be argued that making the MC process too simple decreases customers' perception to be the creator of the product and further, reduces their perception about the products' uniqueness. Nevertheless, in order to help customers recognize their needs choice navigation software that incorporates fast-cycle can be utile because trial-and-error learning advances customers' knowledge about their needs. This allows customers to combine repeatedly a series of product characteristics and evaluate the overall result rather than product characteristics in an isolated way. Moreover, Salvador et al. (2009) mention 'embedded configuration capability', referring to standardized items that are embedded in products in order to adjust product characteristics in the use situation.

2.2. Levels of Customer Integration

MC toolkits are meant to provide personalized products on a large scale that satisfy customers' needs in a superior way taking account for increased customer power in making purchasing decisions. In order to deliver adequate solutions for customers' demands, MC toolkits need to provide a number of options from which customers can choose. This is frequently referred to as 'solution space' throughout literature. MC initiatives that provide customers with a virtual solution space where co-design, co-development, or co-creation tasks can be carried out aim at the creation of user innovations. Franke et al. (2010) mention configurator, choice menu, design kit, or toolkit for user innovation and design as terms synonymously used by other researchers. Von Hippel (2001) divides toolkits into trial and error experiments for new product design/development and into applications that provide immediate (simulated) feedback for the user-design attempt. Further, toolkits can be characterized as parameter-based or need-based (Randall et al., 2007). Whereas parameter-based toolkits allow customers to specify values for design parameters, need-based toolkits offer users the opportunity to state their needs and the program returns suitable solutions.

Traditionally, MC approaches have been characterized by the level of customer integration. The customer order de-coupling point (CODP) is defined as the point up to which customers are implicated in the specification of the product (Senanayake and Little, 2010). The degree of customer integration and the level of (design) autonomy granted to customers is a critical issue. Design autonomy refers to the constraints incorporated into a toolkit, in terms of the number of product features and their possible alternatives to be manipulated. A high degree of autonomy permits customers to act more creatively but requires more knowledge from customers since a high number of options to choose from make the design process more complex.

From a firm's point of view, the degree of design autonomy is important since it influences the production process. A high degree of design autonomy implies a highly individual manufacturing process, whereas a small degree permits the production process to be more standardized. The production process limits the number of options since economic considerations require a reasonable number of manipulable options in order to control costs for inventory. Counterbalancing the costs of MC requires the fundamental elements of a customizable product to be made standard in order to let arise economies of integration through, amongst other factors, postponement (Piller et al., 2004).

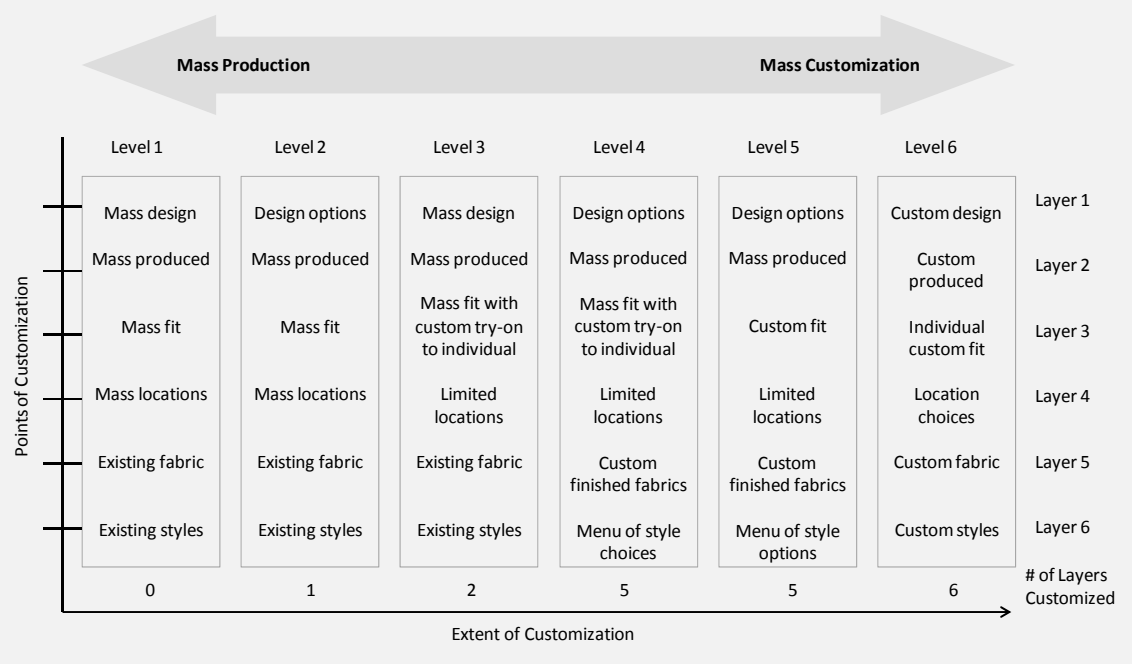
Senanayake and Little (2010) differentiate specifically for apparel products between ‘occupational’ and ‘customer’ customized products. They mention products with monograms on it or sports uniforms with the name and number on it as examples for occupational customized products. Products that are made to customers’ fit, specifications, designs, or combinations of these are named as examples for customer customized products. Specifically, as the types of customization in the context of MC of apparel they discuss (1) adjustable customization, (2) dimensional customization, (3) postponement, (4) standardization, (5) delayed product differentiation, and (6) customization from forecast parts inventory.

Adjustable customization can be seen as postproduction customization. It might incorporate adjustable features so that customers are able to adapt a product to their needs, manually or automatically. Products can be mass-produced offering some kind of customization without the need to forecast customer choices. Dimensional customization means the adaption of products’ dimensions to customers’ preferences. Postponement is based on the assumption that modular product design allows to individualize products. Customization can be achieved through the combination of different modules that are incorporated into a standard platform after the production process.

Standardization aims, in a similar way, to make products and its components standard in order to make production efficient. Customization is achieved through the combination of different components. Delayed product differentiation aims at increasing product variety and maintaining production process efficiency at the same time. Opposite to the early product differentiation approach the identification of the product is delayed. Lastly, customization from forecast parts inventory refers to a postproduction customization method in which assemble-to-order modules are created from the forecasted inventory (Senanayake and Little, 2010).

In a similar way, Anderson et al. (1995) refer to the CODP and their extents as levels/layers of customization from design stage to production. This is illustrated in Figure 11. The levels of customization are illustrated in a continuum reaching from mass production to mass customization. Six layers of MC points highlight design, production, fit, location, fabrication, and styles with different numbers of layers in the corresponding levels.

Figure 11: Points and extents of customization adapted from the levels/layers of customization; source: Anderson et al., 1995



Customer integration refers to the stage of the value chain where MC occurs. The degree of customer integration consequently indicates the way in which the customer influences the development process. Da Silveira et al. (2001) summarize a number of frameworks that have been presented in order to illustrate how customers are integrated into the value creation process. Table 5 presents the approaches by [I] Gilmore and Pine (1997), [II] Lampel and Mintzberg (1996), [III] Pine, 1993, and [IV] Spira 1993 and summarizes them in eight generic levels of MC. In the context of their research related to apparel products, Senanyake and Little (2010) use post assembly, fabrication, feature, fit, and design as five distinct de-coupling points of customization in order to characterize current practice in MC for apparel. Further, they argue that each point of customization can be practiced at different levels, which they refer to as extents, defining the variety and depth of customizable options.

Da Silveira et al. (2001, p. 3 & 4) define the generic levels of MC in the following way: Level 8, design "refers to collaborative project, manufacturing and delivery of products according to individual customer preferences. Level 7 (fabrication) refers to manufacturing of customer-tailored products following basic, predefined designs (e.g. Motorola's Bandit pager). Level 6 (assembly) deals with the arranging of modular components into different configurations according to customer orders (e.g. Hewlett-Packard products). In levels 5 and 4, MC is achieved by simply adding custom work

(e.g. Ikea's furniture) or services (e.g. Burger King's hamburgers) to standard products, often at the point of delivery. In level 3, MC is provided by distributing or packaging similar products in different ways using, for example, different box sizes according to specific market segments (e.g. Wal-Mart's peanuts). In level 2, MC occurs only after delivery, through products that can be adapted to different functions or situations (e.g. Lutron's lighting systems). Finally, level 1 refers to Lampel and Mintzberg's pure standardization, a strategy that can still be useful in many industrial segments."

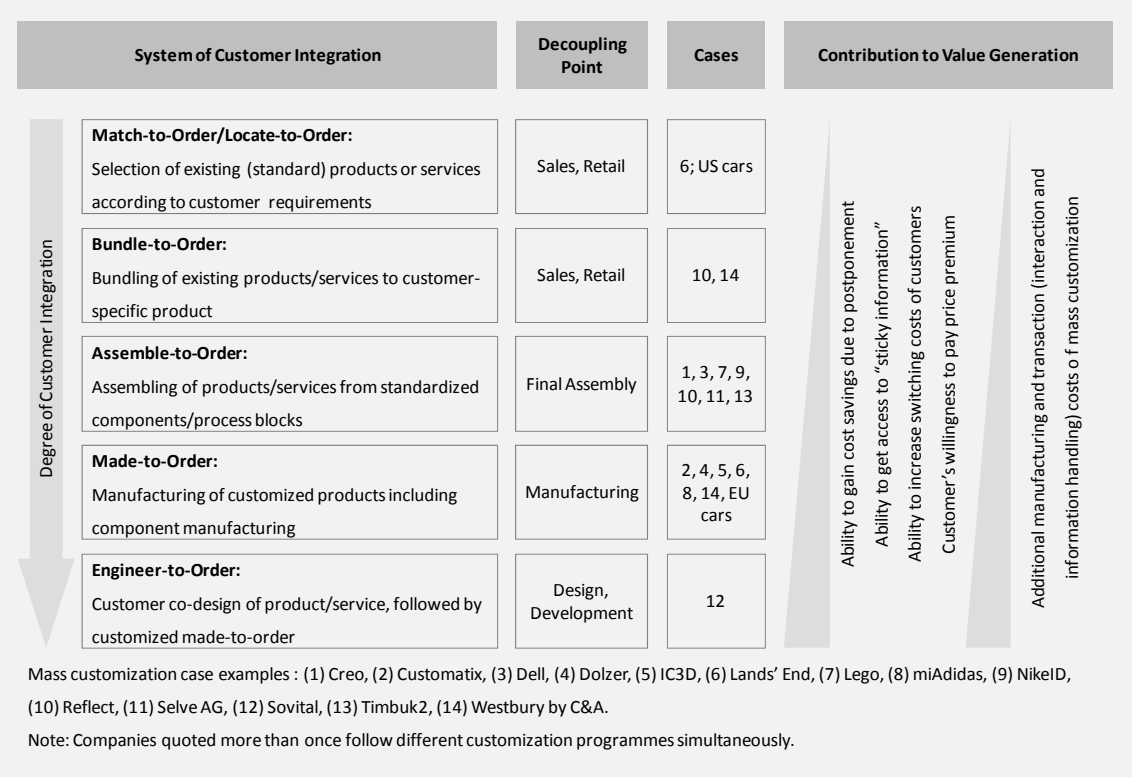
Table 5: Generic levels of MC; Source: Da Silveira et al. 2001

MC Generic Levels	MC Approaches (GILMORE and PINE, 1997)	MC Strategies (LAMPEL and MINTZBERG, 1996)	Stages of MC (PINE, 1993)	Types of Customization (SPIRA, 1996)
8. Design	Collaborative; Transparent	Pure Customization		
7. Fabrication		Tailored Customization		
6. Assembly		Customized Standardization	Modular Production	Assembling Standard Components into Unique Configurations
5. Additional Custom Work			Point of Delivery Customization	Performing Additional Custom Work
4. Additional Services			Customized Services; Providing Quick Response	Providing Additional Services
3. Package and Distribution	Cosmetic	Segmented Standardization		Customizing Packaging
2. Usage	Adaptive		Embedded Customization	
1. Standardization		Pure Standardization		

Similarly, Piller et al. (2004) relate the degree of customer integration to the potential to generate 'economies of integration'. They mention a product's complexity as well as the expenditures and risks of the customization process from the customer's perspective as the degree of customer integration influencing product characteristics. Those characteristics, they argue, lead to additional costs because adequate instruments such as customer care centers have to be implemented in order to counterbalance customer anticipated risks. Consequently, the degree of customer integration is not only important from a customer's point of view but also from a firm's point of view. Figure 12 shows different degrees of customer integration and makes reference to a number of cases that illustrate different MC approaches (for details, see Piller, 2004).

Naturally, the degree of customer integration affects the extent to which the key value drivers of MC motivate customers to use MC. If the dominant underlying value creator of a MC approach is a product's uniqueness firms should aim at providing options that enable customers to develop a truly individual product in order to satisfy that need. In the case that the preference fit should be the dominant value driver of the MC approach customers should be integrated into the development process in the way that they are able to satisfy their preferences. Since the degree of customer integration influences customer motivating value drivers as well as a firm's production process and production cost, it should be carefully determined which approach will be chosen. Instead of assuming that a high degree of autonomy and customer integration in early stages of the value chain results in success, the underlying value drivers of the MC approach should be determined and targeted correspondingly.

Figure 12: Archetypes of MC; source: Piller et al. 2004

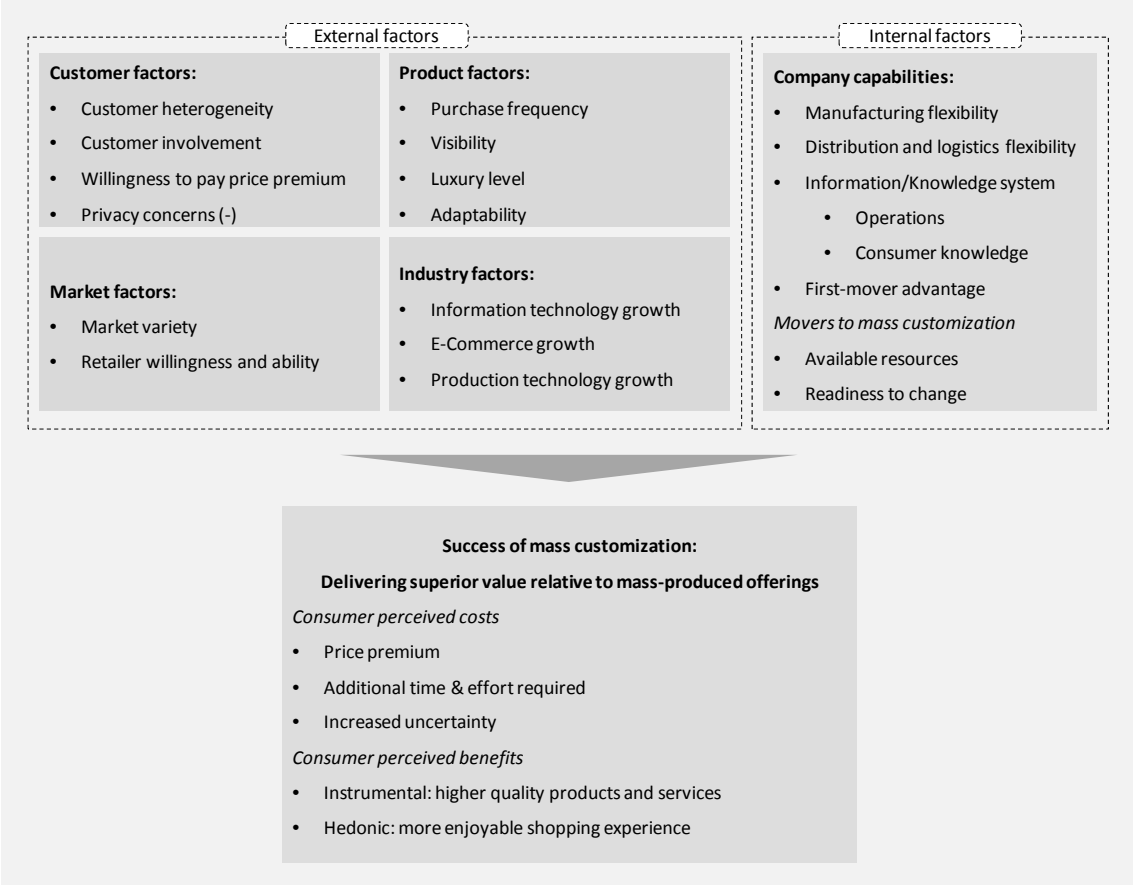


However, Da Silveira et al. (2001, p. 8) conclude their literature review indicating that "studies do not provide enough knowledge on how to determine the appropriate level of customization for a specific product or service." Advancing the understanding of the underlying value drivers of MC should enable firms to design MC approaches more efficiently since the underlying value drivers could be targeted more adequately.

2.3. Success Factors of Mass Customization

In this section, we discuss the success factors of firms' MC approaches from a customer's perspective. Factors external and internal to the firm determine the success of the MC approach as a competitive strategy. External factors depend on market conditions whereas internal factors are influenced by organizational settings (Da Silveira et al, 2001). Broekhuizen and Alsem (2002) mention customer, market, industry, and product factors as external factors and company's capabilities as internal factors. Overall success will only be achieved if all factors are implemented effectively. However, even if the factors of the market, industry, product, and companies' capabilities are employed adequately, in the end customers decide whether they choose to engage in the customization of a product or not. Therefore, this section is dedicated to investigate the reasons why customers attribute additional value to MC.

Figure 13: Conceptual model of success factors of MC; source: Broekhuizen and Alsem, 2002



Why should customers get involved in the production process? On the one hand, participating in the production process implies immerging oneself into a number of aspects. The ultimate objective of the collaborative product development, from a customer's point of view, should be the creation of an ideal product. Therefore, the composition,

the design, the configuration, or the materials of the product have to be taken into account thoroughly. This implies both interest in the product and profound knowledge about the product and the suitability of the components for its intended use. Further, this requires time and implies a certain risk as the final outcome is unknown, although it is digitally displayed and specified. On the other hand, the participation in the production process offers customers the chance to create their own product. This constitutes the opportunity to increase the utilitarian value of the product, to create a unique product, or to develop an emotional value for the product, which is rooted in feelings of pride and self-determination. In consideration of those aspects we argue that the success of a given MC approach can be influenced significantly by its design, for example through the incorporation of mechanisms that support customers in their decisions.

The first step in the design of MC toolkits is the definition of the solution space and the determination of the adjustable product characteristics. On the basis of defined boundaries, MC toolkits provide varying degrees of design autonomy. The degree of autonomy is likely to lead to differing perceptions of creativity, self-determination, peer recognition, preference fit, and uniqueness. For this reason, the degree of (design) autonomy constitutes a central parameter in the value creation through MC. The degree of autonomy determines to which extent customers are able to incorporate their specific needs into a product. Two fundamental motives to use MC are the increase of the preference fit and the advancement of the product or service in question in order to meet individual needs in a superior way (Thomke and von Hippel, 2002; von Hippel and Katz, 2002; Piller et al., 2004; Schreier, 2006; Franke and Schreier, 2010). However, those two motives will only be of relevance if customers can influence them. Therefore, the degree of autonomy should be determined carefully and correspondingly to the underlying value drivers of the product in question.

Limited research exists to explain consumers' preferences for their own individual design (Moreau and Herd, 2009). The design effort during the self-design process has been found to have a negative effect on the willingness to use MC toolkits (Huffman and Kahn 1998; von Hippel 2001; Bendapudi and Leone 2003; Dellaert and Stemersch 2005, all in Franke et al., 2010). Although the design effort or, more in general, the sacrifices made by customers throughout the MC process might be compensated by a higher preference fit of the customized product, it remains unclear what weight the different benefits and sacrifices have. In other words, how much more are customers willing to

sacrifice to have individual features, customized designs, or personalized solutions incorporated into a product? Moreover, in some cases it might not even be clearly distinguished whether an effort is perceived to be an inconvenient sacrifice or an enjoyable problem solving challenge. In the same way, a great variety of options to choose from might either be perceived as high (design) autonomy or lead to information overload (Pine, 1993).

In a number of studies customers' WTP has been used as a dependent variable when analyzing the influence of varying factors on MC (e.g. Franke and Schreier, 2010; von Hippel, 2009; Piller et al. 2004). However, financial resources are not the only sacrifice customers have to make. The willingness to learn, the ability to familiarize oneself with provider specific processes, the investment of time and energy, as well as the uncertainty about the actual physical end result, oppose the benefits of customized products. Self-design, which may feature a customer's favorite color, symbols, fabric, cut, etc., is assumed to be an important source of value for the customer (Franke and Schreier, 2010), but other motives exist as well. For example, Franke et al. (2010) argue that the feeling of accomplishment and being the creator of an object play an important role in the motivation of customers. They call the value increment derived from being the creator of an object the 'I designed it myself effect'. In the same vein, other seemingly important factors are discussed in the literature on MC. Furthermore, great participation in OI activities, which involve customers in problem solving but do not result in customized products for the customer (e.g. crowdsourcing initiatives such as Wikipedia, Innocentive, The 300 $ House, or Island's constitution), illustrate that personalization issues are only one aspect in the motivation of external actors and that social and psychological factors play an important role as well.

Social science researchers as well as researchers in other fields have analyzed motivation of human beings in a number of different settings focusing on diverse aspects such as cultural factors, sociological forces, gender effects, or psychological causes (e.g. Politz, 1956; Schein, 1965; Rose, 1969; Gefen, 1997; Orlikowski, 2000). With the rise of the information age, the interconnectedness of customers and the virtuality of goods and services have grown. This has led to the emergence of new aspects concerning the motivation of actors outside the firm to participate in OI activities. Examples are the willingness to be part of a (virtual) community (Lakhani and Wolf, 2005), being part of some larger cause (Boudreau and Lakhani, 2009), the feeling of psychological owner-

ship (Franke et al., 2010), or the desire for self-disclosure (Lee et al., 2011). Those aspects need closer attention since the design of MC activities affects the type of external actors and, consequently, the level of dedication as well as the type of knowledge that will be attracted (Belenzon and Schankerman, 2008 in Boudreau and Lakhani, 2009). Schreier (2006, p. 12) assumes that "specific perceptual factors might underlie the value created by mass-customized products from an individual's perspective" and that knowledge about the value generation is key for the success of mass customization in general and for the design of MC activities in particular.

It might be assumed that the factors relevant for the specific motivation to participate in MC activities might influence each other and added value for the customer might only be created when certain (basic) needs are satisfied. For example, Franke et al. (2010) provide empirical evidence supporting the assumption that the process outcome and the individual's perceived contribution to the customization process moderate the 'I designed it myself effect'. Further, drawing upon the idea that Western societies have entered an 'experience economy' (Pine and Gilmore, 1999 in Fiore et al., 2004) and assuming that basic needs are generally covered, emphasizes a stronger importance of creative, enjoyable, challenging, and intellectual aspects in MC activities, rather than utilitarian considerations.

In order to satisfy customers demanding memorable experiences, value creation has to focus more on the 'how' than on the 'what' to deliver (Vargo and Lusch, 2004; Spohrer et al., 2007; Maglio, 2008). This is well illustrated not only by coffee serving bookstores but also by the event character of new product launches. In an extreme case, new product launches may be characterized as cultural events (Pedersen, 2008) featuring like-minded followers of corporatized ideals, who are willing to spend the night in front of the company's point of sale to collectively celebrate the advent of a new part of their life. Lastly, MC toolkits might be seen as hygiene factors that enable customers to carry out a certain activity. The functionality of the system is vital as systems, which are not properly developed or terminate the process abruptly, result in great frustration of users and probably lead them to abandon the process. The fact that the system works correctly, however, is expected by the user and does not generate satisfaction. However, the fact that the perception of fun and process enjoyment during the use of MC toolkits is associated with intrinsic motivation advocates a functional and enjoyable process design.

In a similar way, von Hippel and Katz (2002) explore toolkits for user innovation and provide insights on the elements of toolkits and the factors that drive their performance. They state that customers will only communicate their insights if the solution space is appropriate for a given type of product and its employment is user-friendly with low requirements for the user. The incorporation of libraries with useful components and modules that have been pretested and debugged, the integration of information about capabilities and limits of the production process as well as the possibility to complete series of design cycles coupled with learning by doing activities are further mentioned to be essential capabilities of toolkits (von Hippel and Katz, 2002).

MC demands customers to get actively involved in the innovation process resulting in increased sacrifices, namely the time to design or create an object, the uncertainty about the actual appearance of the object, the possible price premium, and the need to acquire necessary skills. Understanding the relevance of benefits and sacrifices for the customer means knowing how they affect customers and allows addressing crucial factors that have the potential to cancel out sacrifices. For example, the creation of a photobook is time consuming, requires getting to know the supplier specific software, and thinking about the design and layout. Furthermore, some customers might be concerned about privacy and authorship of their private photos. All those sacrifices seem to be counterbalanced by the benefits of having a personal, self-created, and professionally manufactured photobook. Is this attributable to the personal character of a photobook which brings back personal memories? Or is it the direct need for a photobook and the process enjoyment that make customers sacrifice their time and energy?

In a different way, customers' decisions might be modeled as a result of their preferences influenced by a product's consequences. Taking the use situation into account, the aspect of individuality becomes less important for product categories that are not associated with a shared usage or public meaning. Software, which is used in an isolated setting and does not require other users, is likely to emphasize mainly a utilitarian value. On the other hand, in the case of jointly used software, e.g. for (instant) messaging, social networking, or presentation purposes the utilitarian value is implied and social as well as other motives are likely to be more important. That being said, it seems reasonable to argue that the balance between benefits and sacrifices varies throughout different product categories.

The following table gives an overview of the factors relevant for the motivation of customers to engage in a broad range of customer driven value creation activities. Although the direct need for an object not available in the market place and the wish to personalize might be the original motivators for individuals to actively engage in the development of an innovative solution, the table shows that a number of other motives exist. Fun, for example, has been mentioned by various researchers to be essential. If perceived fun and enjoyable by the customer, the innovation process itself, can be seen as an incentive instead of a time consuming, annoying, and complicated procedure. This is consistent with Bruner and Kumar (2005), who analyzed the acceptance for handheld internet devices, using the technology acceptance model, they found that fun is an important motivator to use such devices in an non-work environment, contrary to the factors relevant in the workplace context (Davis, 1992).

Table 6: Overview of motives for customer driven value creation; source: own elaboration

Source & Research Method	**Motivators (Analyzed Motivators in Bold)**
1. Franke and Schreier (2010) "Why Customers Value Mass-Customized Products: The Importance of Process Effort and Enjoyment" Questionnaire administered to management students from an Austrian University (n= 186) after self-designing a scarf, Vickrey auction.	Process effort, process enjoyment, preference fit, 'flow' feelings, and the need for competence and autonomy. Moderating factors: personality variables (optimum stimulation levels, cognitive playfulness, need for uniqueness), situational variables (product involvement, experience with self-design, and expertise in self-design). **Perceived enjoyment/effort of the self-design process and perceived value (measured as WTP for self-designed scarf relative to WTP for the most preferred standard scarf) using a MC toolkit for self-designing a scarf.**
2. Franke, Schreier, and Kaiser (2010) "The 'I Designed It Myself' Effect in Mass Customization" In-depth interview in study 1 (n= 37; design T-shirt, scarf, cell phone cover), incentive-compatible BDM auctions in studies 2 (n= 114; T-shirt), 3 (n= 116; ski design), 4 (n= 129; T-shirt), and 5(n= 66;	Preference fit, design effort, **awareness of being the creator of the product design, feelings of accomplishment (mediating factor), process outcome and perceived contribution to the self-design process (moderating factors),** utility, psychological factors, endowment effect, psychological ownership (investigating/creating, controlling, and knowing an object), product tangibility, design freedom/autonomy, process experience and the effort involved (disutility), positive emotions, proudness, preference learning, preference insight, fun, enjoyment, consumers' social comparisons to the designer of comparable 'off-the shelf' products, feelings of competence and efficacy, the mere exposure effect, mood effect,

wristwatches) with business students from Austrian University.	product interest, feeling of creativity, process costs (time and cognitive effort), immediate feedback.
3. Boudreau and Lakhani (2009) "How to Manage Outside Innovation" n/a	Extrinsic factors: financial incentives, wish to acquire certain skills, personal need, establish one's reputation, build relationships, demonstrate one's talent to others, generate goodwill. Intrinsic factors: fun, enjoyment, self-determined tasks that are interesting and intellectually challenging, feeling to be part of some larger cause, status and identity gained through interactions with others in collaborative efforts, autonomy, reciprocity.
4. Franke, Keinz, and Steger (2009) "Testing the Value of Customization: When Do Customers Really Prefer Products Tailored to their Preferences?" Self-administered online questionnaires; data from Austrian online panel (study 1: n= 1589; study 2: n= 1039).	Closer preference fit, preference insight (important moderating variable), product involvement, ability to express own preferences. **Study 1: benefits of (simulated) customized newspaper (measured as WTP, customers' attitude towards product, and purchase intention); Study 2: benefit between standard and customized product and resulting WTP (newspaper, fountain pens, kitchens, skis, and cereals).**
5. Lakhani and Panetta (2007) "The Principles of Distributed Innovation" n/a	User need (primary driver for participation in Open Source Software projects), curiosity, extrinsic and intrinsic factors, economic motivations, notions of enjoyment and having fun together with identity and the social benefits of community, job market signaling, skill and reputation building, possibility of future rewards, (intellectual) challenge, enjoyment, creativity, sense of identity and community belonging, obligation, personal sense of identity with the accomplishment of complex technical tasks, contributors self-selection to tasks.
6. Reichwald, Ihl, and Seifert (2004) "Kundenbeteiligung an unternehmerischen Innovationsvorhaben- Psychologische Determinanten der Innovationsentscheidung" n/a	Product knowledge, product experience, product involvement, economic reasons, parsimony, logical reasoning, prestige, status, social acceptance, social desirability, submission to behavioral norms, lust, excitement, curiosity. Extrinsic motives: expectation to use sth., personal need, rewards (bonus, discount, free samples, royalties), learning aspects relevant for the job. Intrinsic motives: feeling of fun, exploration, creativity, state of flow, task perceived to be challenging but doable, feedback generates feeling of self-determination, control and competence. Social motives: mutual

	support, jointly executions, recognition, altruism, reciprocity, trust, moral obligation, social contact with like-minded, impact on one's environment, obligated and committed to community goals and values. Transaction costs: time, effort, psychological costs, perceived risk, uncertainty about result and consequences, financial risk, risk of accomplishment, physical risk, social risk, time risk, risk of psychological discomfort. User-friendliness, information richness, perceived control.
7. Wiliams (2004) "A lifestyle choice? Evaluating the motives of do-it-yourself (DIY) consumers" Face-to-face interviews (n= 511) in English urban areas.	Economic constraints, lack of other choices, search for fun, sociality, distinction, discernment, desire to express what and who one is, desire to keep up with trends, reflect personality, taste, refinement, attitude and desires, pleasure, satisfaction, individualization, ease (unavailability and lack of trust of labor). **Consumers' motivation to acquire do-it-yourself products.**
8. Fiore, Lee, and Kunz (2004) "Individual differences, motivations, and willingness to use a mass customization option for fashion products" Nine hypotheses based on a conceptual model were tested using data collected from 521 university students from different regions of the USA.	Creating a unique product, having an exciting experience, better fit, closer fit of customer's design specifications, exploratory tendencies (motivated by variety seeking, (intrinsic) curiosity, and risk taking), sensation seeking, differentiation, individuality, unique appearance, attract attention. **Experience- and product-oriented clothing interest (experimenting with appearance, enhancement of individuality), optimum stimulation level, importance of co-design, interest in using co-design, WTP more for co-design, willingness to spend more time to use co-design.**
9. Lakhani and von Hippel (2003) "How Open Source Software Works: 'Free' User-to-User Assistance" Interviews; historical data from online discussion groups (Usenet; 1996-1999); questionaire data (n= 336); precedent pilot study (Lakhani, 1999)	Direct need for the software and software improvements, enjoyment of the work itself, enhanced reputation, learning benefits, altruism, incentives, expectations of benefits from reciprocal helping behavior by others ('generalized' exchange), promote Open Source Software/free software movement, enhanced likelihood of receiving help, obligation, challenge, having an effect on the environment, attachment or commitment, (distribution) cost and benefits, (peer) recognition, career concern incentive, having expertise, feeling of competence. **Motivation for providing a 'necessary but mundane' task in Open Source Software (Apache) field support system.**

10. Lakhani and Wolf (2003) "Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects" Web-based survey, administered to 684 software developers in 287 free/open source software projects. 45 % of respondents from North America (U.S. and Canada) and 38 % from Western Europe.	External motivational factors in the form of extrinsic benefits (immediate and delayed payoffs): e.g. better jobs, career advancement, improving skills, financial benefits, direct use of a software, user need to solve a problem, pressure, rewards. Intrinsic motivators (enjoyment-based and obligation/community-based): how creative a person feels when working on the project (strongest and most pervasive driver), user need, intellectual stimulation, improving skills (top motivators), fun, challenge entailed, human need for competence and self-determination, which are directly linked to the emotions of interest and enjoyment, creative discovery, a challenge overcome and a difficulty resolved, principles and norms of a group, community identification, obligation/responsibilities. **Effort (as the number of hours per week spent on a project) and motivations of individuals to contribute to the creation of Free/Open Source software analyzing alpha, beta, and production/stable projects as well as mature projects.**

The success of initiatives that pursue good causes such as fair trade projects or green technologies further illustrates that the feeling of doing something good or helping others plays an important role besides price, quality, and utility considerations. However, a purely altruistic behavior, especially in a commercial context, is usually not the only motivator for collaborative behavior. Nevertheless, social factors such as the need for contact or belongingness play an important part in driving customers' motivation to collaborate. Giving up time, dedicating effort or even investing financial resources for a personalized product might not yield financial benefits for the participants. However, recognition by the community and social contacts besides the feeling of accomplishment can be seen as the non-financial profits that motivate people to actively engage in MC activities.

Crowdsourcing initiatives draw upon the diversity of their users and announce, mostly, financial rewards for the successful completion of a challenge. Besides the financial reward, Boudreau and Lakhani (2009) mention a number of other indirect factors that influence the motivation to contribute to the solving of a problem. The wish to acquire certain skills, the solution for one's own benefit, establishing one's reputation, or the feeling to be part of some larger cause are factors that play an important role in the motivation of external actors. Other factors that have been mentioned in literature to drive motivation are the personal need for something that is not available in the marketplace

(e.g. von Hippel and Katz, 2002), the desire to network with like-minded peers and the possibility to have an impact on the environment (Kollock and Smith, 1999 in Piller, 2006), the feeling of obligation to support others (Ozinga, 1999 in Piller, 2006), or the wish to create something. Williams (2004) mentions more in general pleasure, individualization, ease, and economic reasons for conducting tasks on a do-it-yourself basis. Reichwald et al. (2004) also stress that direct feed-back or great autonomy throughout the innovation process moderate customer motivation by triggering feelings of self-determination, control, and competence.

Personal commitment and the identification with the company and its mission are key factors in order to achieve knowledge creation in an organizational setting (Nonaka, 1991). In the same vein, Gittel (2009) proposes mutual respect, shared goals, and knowledge as success factors that lead to high quality and efficiency performance as well as job satisfaction. It seems reasonable to argue that the same is true for customers in an MC context. However, although the identification with the firm and its mission have probably less importance to customers than to employees, the relevance of the product is certainly pivotal for customers and their decision to contribute to its development.

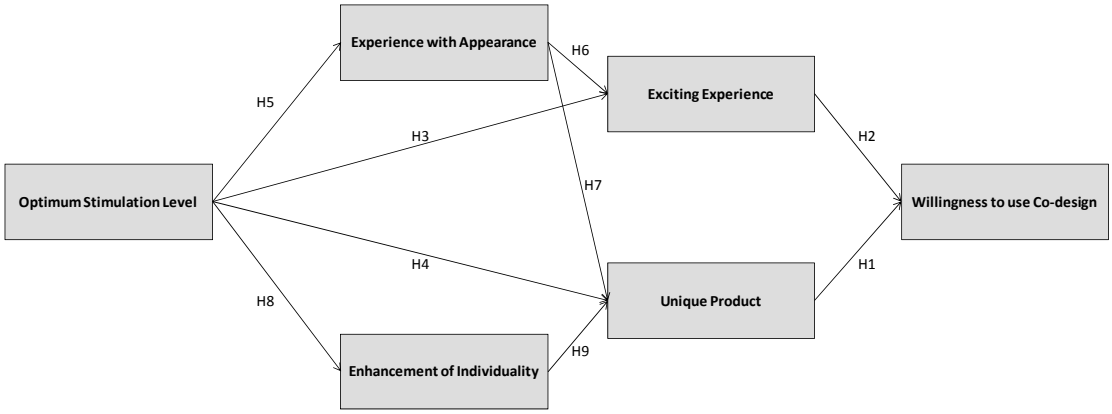
Further, it might also be of interest to investigate non-financial measures. For example, the willingness to make a referral to other customers might be studied as an alternative sacrifice for customizing products. The open research and development platform Innocentive, for example, offers financial rewards for the successful resolution of problems and also encourages members to refer problems they are unable to resolve to other potential problem solvers. However, financial incentives are said to have an extrinsic short-term motivation. Thus, it might be questioned whether economic stimuli are sufficient to keep successful contributors motivated to innovate. Other components such as awards or different statuses could aim at building up respect for successful innovators giving them feelings of competence and identification with the community.

It is important to recognize that the experience of external actors might influence their motivation to use MC toolkits and their potential form of contribution. For instance, potential customers, who do not own a product, might use MC toolkits as a way to investigate the unknown product and reduce their uncertainties. While their contribution likely consists of little solution information, they may provide need information and become more intimate with the product. This could possibly lead to an increase in the

feeling of psychological ownership and consequently result in a stronger WTP for the product in question. Lastly, an overview of selected research models is given in order to illustrate the approaches that have been taken. Different factors have been analyzed. It can be observed that the aspects of uniqueness, utility, capabilities, and customers' WTP have been considered in general.

Figure 14: Conceptual research model and hypotheses proposed by Fiore et al., 2004

Source: Fiore et al. (2004): "Individual differences, motivations, and willingness to use a mass customization option for fashion products"

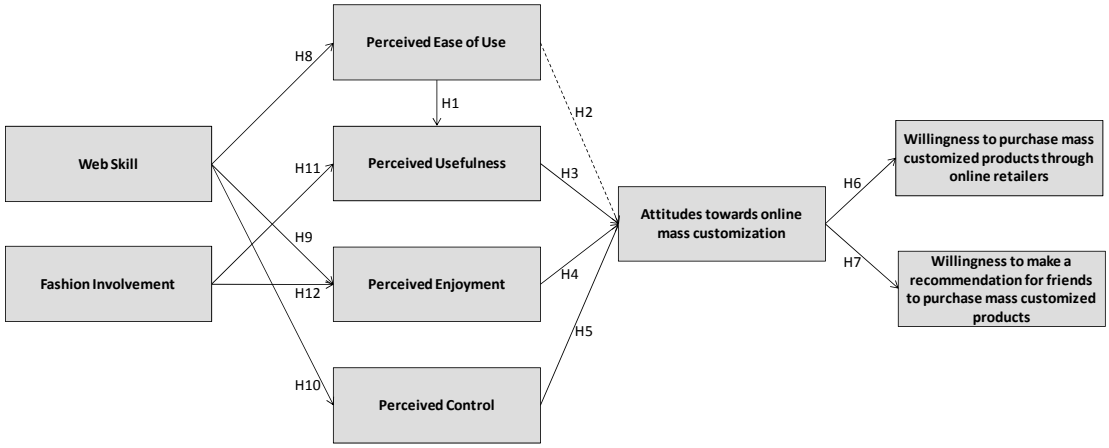


H1: The motivation, creating a unique product, will positively predict subjects' willingness to use co-design.
H2: The motivation, trying co-design as an exciting experience, will positively predict subjects' willingness to use co-design.
H3: OSL will positively predict trying co-design as an exciting experience.
H4: OSL will positively predict using co-design for creating a unique design.
H5: OSL will positively predict experience with appearance.
H6: Experience with appearance will positively predict trying co-design as an exciting experience.
H7: Experience with appearance will positively predict using co-design to create a unique fashion product.
H8: OSL will positively predict enhancement of individuality.
H9: Enhancement of individuality will positively predict using co-design to create a unique fashion product.

Fiore et al. (2004) argue that exciting experiences provide additional value for customers and suggest that customers use MC in order to satisfy their desire for experience. Further, they show that the constructs of 'creating a unique product' and 'exiting experience' contribute significantly to customers' willingness to use co-design.

Figure 15: Conceptual research model and hypotheses proposed by Lee and Chang, 2011

Source: Lee and Chang (2011): "Consumer attitudes towards online mass customization: An application of extended Technology Acceptance Model"



H1: Perceived ease of use of the online mass customization will positively affect perceived usefulness of the online mass customization.

H2: Perceived ease of use of the online mass customization will positively affect attitudes toward the online mass customization retailer.

H2-1: Perceived ease of use of the online mass customization will indirectly and positively affect attitudes toward the online mass customization retailer.

H3: Perceived usefulness of the online mass customization will positively affect attitudes toward the online mass customization retailer.

H4: Perceived enjoyment of the online mass customization will positively affect attitudes toward the online mass customization retailer.

H5: Perceived control of the online mass customization will positively affect attitudes toward the online mass customization retailer.

H6: Attitudes towards the online mass customization retailer will positively affect willingness to purchase mass customized fashion product through the online retailer.

H7: Attitudes towards the online mass customization retailer will positively affect willingness to make a recommendation for friends to purchase mass customized fashion product through the online retailer.

H8: Web skill will positively affect perceived ease of use of the online mass customization.

H9: Web skill will positively affect perceived enjoyment of the online mass customization.

H10: Web skill will positively affect perceived control of the online mass customization.

H11: Fashion involvement will positively affect perceived usefulness of online mass customization.

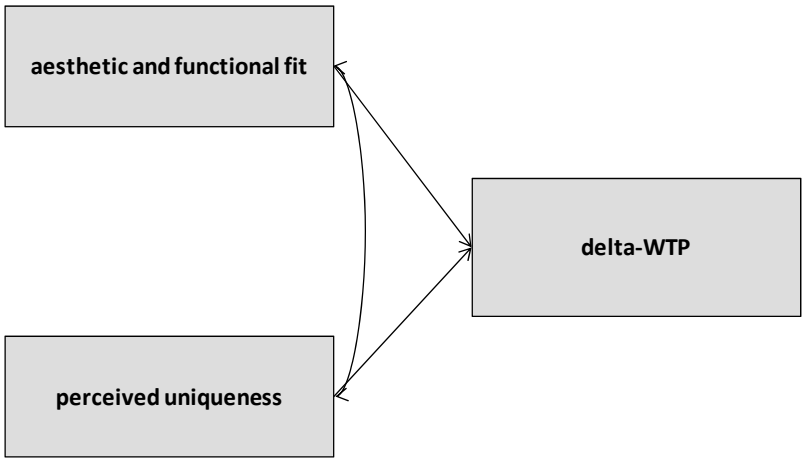
H12: Fashion involvement will positively affect perceived enjoyment of online mass customization.

Lee and Chang (2011) extended the TAM by incorporating the constructs of 'perceived control' and 'perceived enjoyment'. Their findings suggest that perceived ease of use predicts the perception of usefulness and that the perceived enjoyment has the strongest

effect on attitudes towards online retailers, which is followed by the perceived usefulness. Further, they found that an individual's web skills affect the perception of the ease of use. Moreover, they strongly suggest including the perception of control in future models.

Figure 16: Conceptual research model and hypotheses proposed by Franke and Schreier, 2008

Source: Franke and Schreier (2008): "Product uniqueness as a driver of customer utility in mass customization"



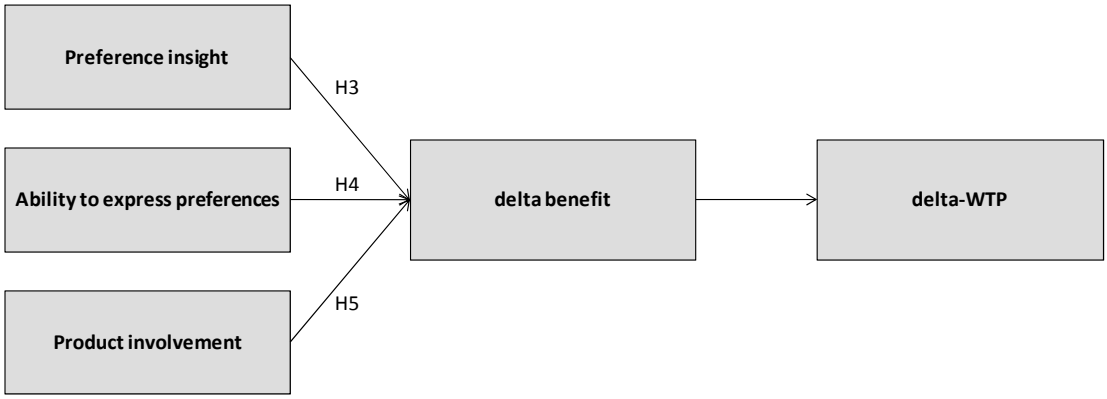
H1: The perceived uniqueness of a self-designed product has an independent impact on the utility a customer derives from the MC toolkit beyond the product's aesthetic and functional fit.
H2: The relationship between the perceived uniqueness of a self-designed product and the resulting utility a customer derives from it is moderated by the customer's general desire for unique products (i.e., there will be a positive interaction effect).

The findings of Franke and Schreier (2008) demonstrate that the perceived product uniqueness and aesthetic and functional fit are distinct constructs that influence the utility customers derive from mass customized products. They suggest that distinction from others is a key motive for the usage of MC.

Franke et al. (2009) show, based on two different studies, that customers benefit from customization when based on customer expressed preferences. They measure the benefits in terms of willingness to pay, purchase intention, and attitude toward the product. They suggest that the benefits customers derive from MC depend on customers' preference insight, ability to express preferences, and product involvement.

Figure 17: Conceptual research model and hypotheses proposed by Franke et al., 2009

Source: Franke et al. (2009) "Testing the value of customization: When do customers really prefer products tailored to their preferences?



H1: Products customized on the basis of measured preferences generate greater benefits for customers than H1a: segment-specific and H1b: mass-marketing products.

H2: The closer the fit between measured preferences and product attributes, the higher the resulting benefit for the customer.

H3: A customer's preference insight has a positive effect on the benefit she derives from customization.

H4: A customer's ability to express her preferences has a positive effect on the benefit she derives from customization.

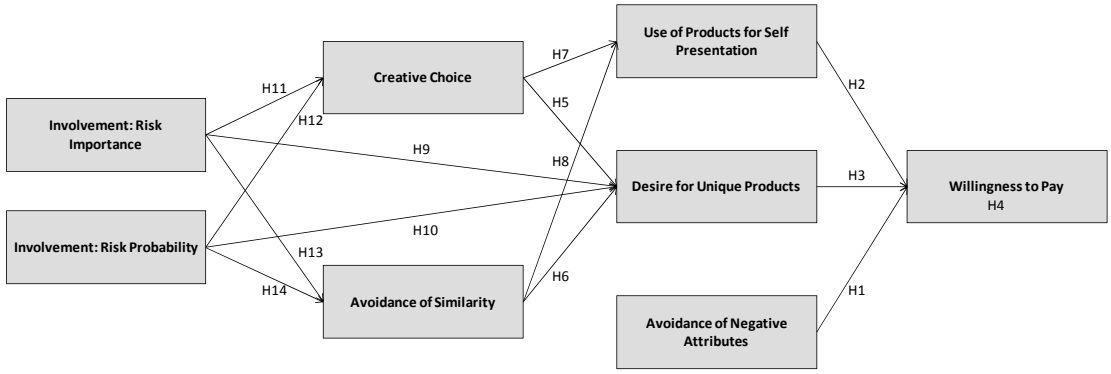
H5: Product involvement has a positive effect on the benefit a customer derives from customization.

Lastly, Michel et al. (2009) investigated the key value drivers of customized products, whether they differ throughout customer segments, and what their antecedents are. They suggest that the avoidance of negative attributes, a desire for self-presentation, and a desire for unique products cause the demand for customized products. Further, they state that category risk importance precedes the desire for unique products and creative choice. Moreover, they suggest that the motivation to buy mass customized products differs throughout customer segments.

However, they note that generalizability of their findings is limited due to the fact that the research was carried out in a single product context and in a single country. For future research they suggest analyzing multiple product categories in order to overcome the limitations.

Figure 18: Conceptual research model and hypotheses proposed by Michel et al., 2009

Source: Michel et al. (2009): "Mass-Customized Products: Are they bought for uniqueness or to overcome problems with standard products?"



H1: The more a consumer perceives customized products to overcome negative product attributes, the higher his or her willingness to pay a price premium for these products.

H2: The higher the consumer's need for positive self-presentation, the higher his or her willingness to pay a price premium for these products.

H3: The higher a consumer's desire for unique products, the higher his or her willingness to pay a price premium for these products.

H4: The willingness to pay for individualized products varies among consumers of these products.

H5: The higher a consumer's need for creative choice, the higher his or her desire for unique consumer products.

H6: The higher a consumer's need for avoidance of similarity, the higher his or her desire for unique consumer products.

H7: The higher a consumer's need for creative choice, the higher his or her use of products for self-presentation.

H8: The higher a consumer's need for avoidance of similarity, the higher his or her use of products for self-presentation.

H9: The higher the perceived risk importance of a product category to a consumer, the higher his or her desire for unique products.

H10: The higher the perceived risk probability in a product category to a consumer, the higher his or her desire for unique products.

H11: The higher the perceived risk importance of a product category to a consumer, the higher his or her need for creative choice.

H12: The higher the perceived risk probability in a product category to a consumer, the higher his or her need for creative choice.

H13: The higher the perceived risk importance of a product category to a consumer, the higher his or her need for avoidance of similarity.

H14: The higher the perceived risk probability in a product category to a consumer, the higher his or her need for avoidance of similarity.

3. Motivation Theories

After a brief discussion of prominent motivation theories in general, the expectancy-value theory (EVT), theory of reasoned action (TRA), theory of planned behavior (TPB), and self-determination theory (SDT) are outlined in order to suggest some explanations for customers' motivation to engage in MC. One prominent approach to explain motivation is the hierarchy of needs theory developed by Maslow. Basic needs (in short, physiological, safety, love, esteem, and self-actualization) are said to motivate human beings and suggested to be related to each other (Maslow, 1943). The basic needs are hierarchically arranged so that "the most prepotent goal will monopolize consciousness and will tend of itself to organize the recruitment of the various capacities of the organism" (p. 395). This means that the fulfillment of the next basic need will only be relevant when the former is satisfied. For the MC concept this implies that various factors could influence customers' perception of value and that more sophisticated value drivers (e.g. uniqueness) only become relevant if basic value (e.g. utility) is delivered.

Another classical concept on the motivation in work settings has been presented by Herzberg (1966) who differentiates between hygiene factors and motivators. Greatly simplified, the concept states that motivators have a positive stimulating effect whereas hygiene factors are taken for granted and are only noticed when absent. Lacking hygiene factors cause dissatisfaction but the presence of hygiene factors does not cause satisfaction. Applied to MC, the functionality of toolkits could be seen as a hygiene factors. Whereas the fact that the configurator works is expected and does not create satisfaction, a system error that aborts the MC process would probably lead to dissatisfaction.

A model proposed by Klandermans (1997) explains the motivation to participate in social movements by collective, social, and reward motives. For collective motives, expected costs and benefits to participate in a movement are taken into account and the perceived value of the goals is weighted by the expected likelihood that those goals will be accomplished. Social motives refer to expected reactions of relevant others such as family and friends. Analog to collective motives, reward motives are weighted by their expected likelihood and include monetary and nonfinancial costs and benefits. This model has been extended by the construct of collective identification (Simon et al., 1998).

3.1. Expectancy Value Theory

The reason why motivation is of importance is illustrated by Wigfield and Eccles (2000), who state that, according to a number of concepts presented by motivation theorists, motivation influences choice, persistence, and performance. In the EVT it is argued that individuals develop attitudes towards objects based on the beliefs about the object. Fishbein and Ajzen's (1975) expectancy-value model of attitudes exemplifies the cognitive approach to attitude formation taken by contemporary social psychologists (Ajzen, 1991). Beliefs about objects are formed by associating it with certain attributes. Attitudes towards behavior, however, develop from believes that link behavior to a certain outcome. Attributes related to the outcome, such as costs of conducting a behavior, are valued and attitudes towards the behavior are formed automatically and simultaneously. Consequently, individuals form positive attitudes towards behavior that has positive consequences and negative attitudes towards behavior that leads to negative consequences.

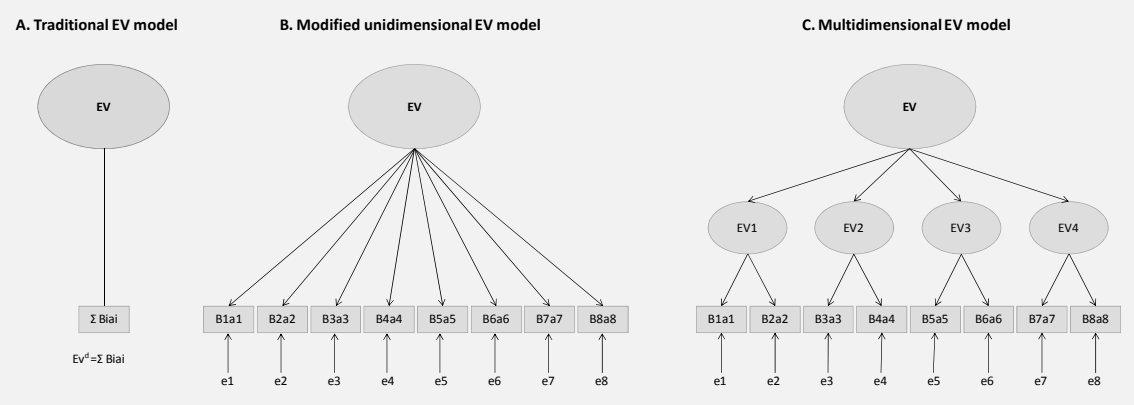
More in detail, the subjective value of an outcome influences attitudes proportional to the strength of the belief that the behavior will lead to a certain outcome. An individual's attitude is directly proportional to the combination of the strength of each salient belief, defined as the subjective probability that a given behavior will produce a certain outcome (Fishbein and Ajzen, 1975), and the subjective evaluation of the belief's attribute. Here, it is important to note that despite the fact that individuals can hold many different beliefs, it is assumed that attitude is only influenced by beliefs that are readily accessible in memory and that a belief's chronic accessibility is likely to be influenced by (1) the frequency with which the expectancy is activated, (2) the recency of its activation and (3) the belief's importance (Higgins 1996 and Olson et al. 1996 in Ajzen, 2001). Nevertheless, "various contextual factors can temporarily make certain beliefs more readily accessible" (ibid., p. 35).

Although a great number of studies have tested the expectancy-value model and supported the relation between salient beliefs and attitudes, the magnitude of this relation has been found to be weak and some investigators have questioned the multiplicative combination of beliefs and evaluations in the expectancy value model of attitude. Ajzen (1991) emphasizes that salient beliefs must be elicited from respondents themselves and not arbitrarily or intuitively selected from a set of beliefs. When the estimation of attitudes is based on salient beliefs, the correlation of standard and belief-based measures is

higher than correlations based on intuitively selected set of beliefs. However, even when based on salient beliefs the correlation between standard and belief-based measures is sometimes of only moderate magnitude (Ajzen, 1991).

That individuals' salient beliefs about a certain behavior and their attitude towards that behavior are related is the essential hypothesis of the EVT and is also incorporated in the TRA and TPB. However, the sum of belief-times-evaluation products represents expectancy-value attitude as a single value implying that individual responses to product attributes are independent. Yi (1989) draws upon research that supports the assumption that beliefs about certain attributes are often correlated in product evaluations and proposes the representation of expectancy-value attitude in a structural form.

Figure 19: Three types of EV models; source: Yi, 1989 (EV1-4 indicate sub dimensions of EV attitude)

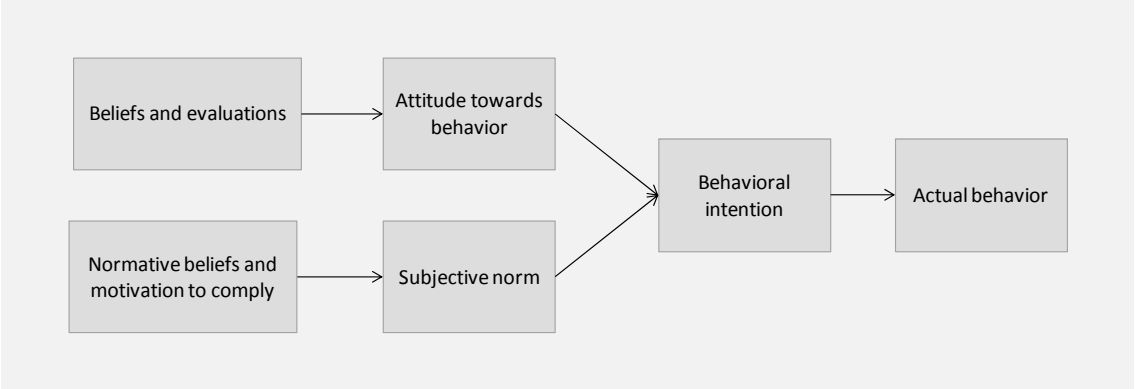


Previous research has advanced the traditional model of expectancy-value attitude and proposed modified unidimensional and multidimensional EV models. Whereas the traditional EV model represents attitude as an aggregation of the beliefs about the outcomes of a behavior and the evaluations of the outcomes, in the modified unidimensional EV model (Bagozzi, 1982 and 1985 in Yi, 1989) EV attitude is seen as a latent variable and all belief-times-evaluation products are considered its indicators. In the multidimensional EV model different sub dimensions (EV 1-4) indicate the higher-order latent variable EV. Sub dimensions are indicated by different subsets of belief-times-evaluation products with each expectancy-value measure serving as a separate indicator of the latent variable. In the context of MC, it might be of special interest that accordingly to the EVT attitude formation and activation is an automatic process with evaluative reactions occurring without awareness. Therefore, in order to make positive attitude influencing beliefs more present, factors should highlight the specific underlying value drivers.

3.2. Theory of Reasoned Action

Proposed by Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980) the TRA aims at explaining the influence of attitudes on the behavior of individuals. Behavioral intention, attitude, and subjective norm are the three components of the theory that are taken into account in order to determine the behavior of an individual. Attitudes and subjective norms in turn are influenced by a number of salient beliefs about the performance of behavior in question. Attitude refers to the favorable or unfavorable feelings a person exhibits towards a behavior. Subjective norm accounts for an individual's perception of social pressure, normative beliefs, and motivations to behave in a certain way assuming that individuals interact with a social network. However, attitudes and norms are weighted differently since they possess a varying relevance, further, a clear distinction between attitude and intention is made. "Although we view a person's attitude towards an object to be related to the totality of his intentions with respect to the object, there is no necessary relation between his attitude and any given intention (Fishbein and Ajzen, 1975, p. 288)." However, concerning the attitude construct Ajzen (1991, p. 200) notices that "In developing the theory of reasoned action, no clear distinction was drawn between affective and evaluative responses to a behavior." In a study on the leisure activities of college students Ajzen accounts for this by distinguishing between affective and evaluative measures of beliefs and attitudes but concludes that the two different measures do not significantly improve prediction of leisure intentions (Ajzen, 1991).

Figure 20: Illustration of the theory of reasoned action; source: Davis et al., 1989

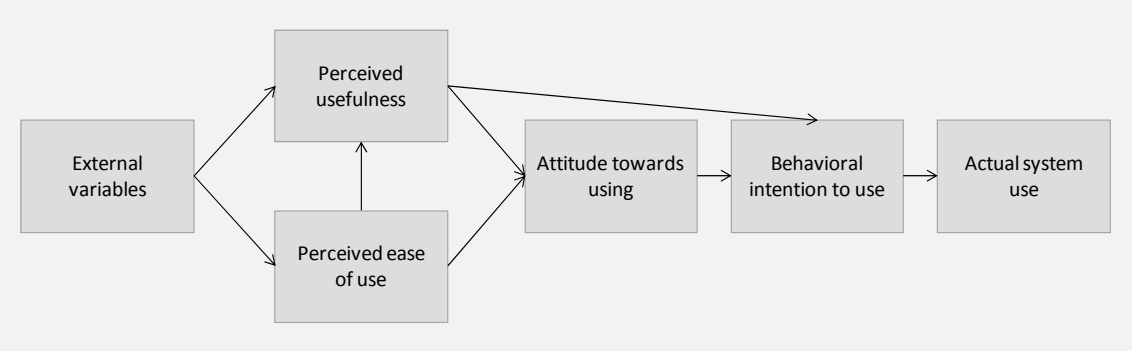


As a precursor of the TPB the TRA constitutes an important element in the justification of the framework used in this research to explain customer motivation to use MC. Whereas the TRA has been "designed to explain virtually any human behavior" (Ajzen and Fishbein, 1980, p. 4) the TAM developed by Davis (1985) can be seen as an adaption of the TRA to a specific research situation (Kaplan et al., 2007). The TAM is an

approach frequently used to investigate customers' acceptance to use information systems. Salient beliefs held by individuals influencing attitudes and subjective norms are reduced to 'perceived usefulness' (PU) and 'perceived ease of use' (PEOU). In this way it is argued that the utility and effortlessness associated with the usage of an information system are the main drivers for the adoption of such a system. Since the TAM originally focused on the adoption of technologies on the job, it is supposed that high degrees of usefulness and ease of use should lead to enhanced job performance.

Further, the existence of a pleasant and enjoyable shopping environment has been accentuated to be important for customers' attitudes and purchase intention in conventional as well as online retailing settings. Because the enjoyment construct was found to influence the acceptance of technology by customers it was included in the TAM (Davis et al., 1992 in Lee and Chang, 2011). Lee and Chang (2011) mention research applying the TAM with the enjoyment construct in an online grocery shopping and online apparel retailer context and state that perceived enjoyment strongly predicts positive consumer attitudes.

Figure 21: Illustration of the technology acceptance model; source: Davis et al., 1989

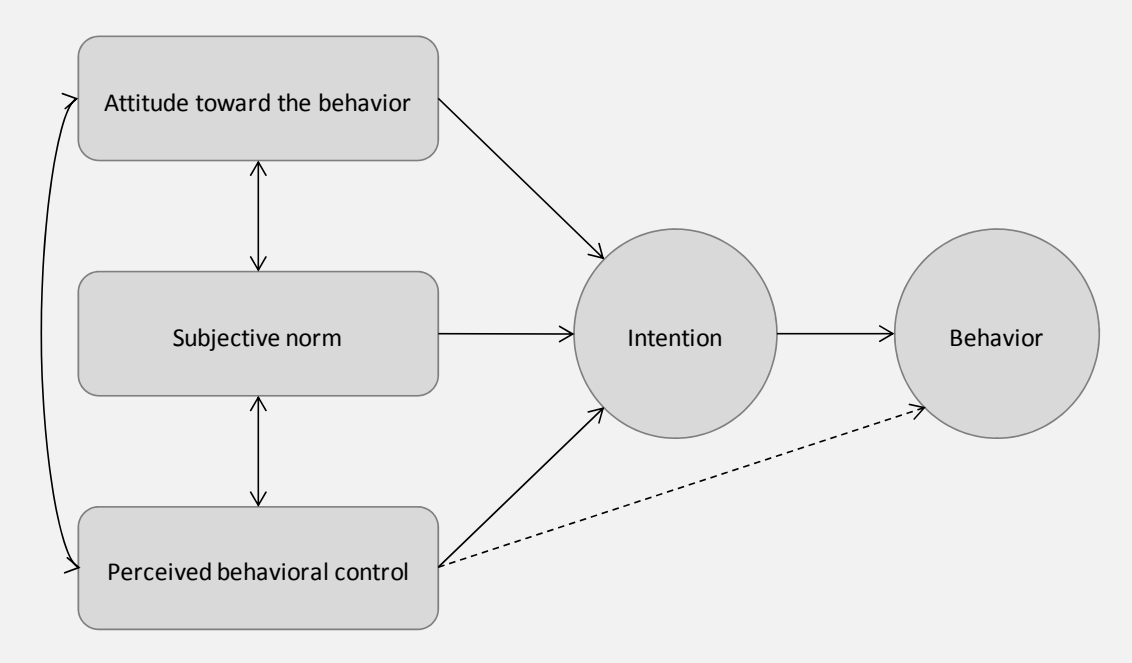


Although in the original TAM the attitude construct is included as illustrated in Figure 21, Kaplan et al. (2007) offer two reasons for its exclusion. First, the mediating impact of attitude is limited and second, the renouncement of the attitude construct explains intention in a more direct way so that the TAM can be applied to a wider scope of systems and system-users. In conclusion, it can be said that the TAM offers a good way to conceptualize the success factors of MC. The actual MC use depends on customers' intention and attitude, which are affected by the perceived usefulness and ease of use. Those, in turn, are influenced by other external factors.

3.3. Theory of Planned Behavior

Originally designed to predict individuals' behavior across social and psychological settings, the TPB is an extension of the TRA adding the concept of perceived behavioral control (Ajzen, 1991). Ajzen (1985) proposed the TPB defining the intention to perform a certain behavior as a central element. The TPB recognizes the importance of self-efficacy and behavioral control offering an advanced explanation for individuals' behavior. In addition to the attitude towards a behavior and subjective norms, perceived behavioral control is mentioned as a third element influencing the intention to act in a certain way.

Figure 22: Structural diagram of the theory of planned behavior; source: Ajzen, 1991



Motivational factors that influence an individual's behavior are assumed to be captured by intentions. The extent of intentions serves to predict the likeliness to perform a certain behavior. However, actual behavior might only take place if it is feasible. A number of factors such as time, money, skills, or cooperation of others influence an individual's actual control over a behavior. Therefore, it is argued that behavior is jointly influenced by motivation (intention) and ability (behavioral control). More in detail, the TPB argues that the perception of the behavioral control, defined as the ease or difficulty to perform a certain behavior, determines the actual behavior of an individual. Together with behavioral intention perceived behavioral control can be used to predict behavior directly (Ajzen, 1991).

The prediction of a behavior of interest, however, requires that (1) the measures of intention and perceived behavioral control are compatible or correspond with the behavior in question, (2) that they are stable from the point when they are assessed to when they are observed, and (3) that perceived behavioral control accurately reflects reality. Depending on the degree of influence over a certain behavior, intentions and perceived behavioral control have a varying importance. When individuals have full control over their behavior, intentions alone should explain it. In the case that control over a certain behavior does not depend solely on the individual, the construct of perceived behavioral control becomes increasingly important. Hence, the varying importance of intentions and perceived behavioral control for the prediction of behavior signifies that behavioral performance might be explained jointly by the two factors or by only one of the two factors.

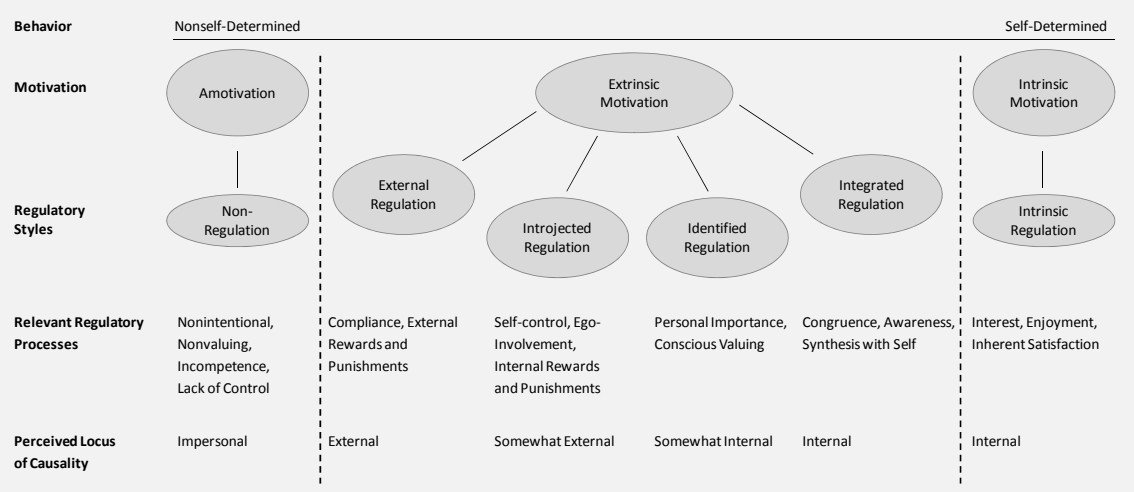
On the one hand, perceived behavioral control can explain behavior directly, on the other hand, it determines, together with attitudes and subjective norms, the intention of individuals. The 'attitudes toward the behavior' construct refers to an individual's subjective perception about a certain behavior. Subjective norm refers to the social influence perceived by an individual to be obliged, or not, to behave in a certain way. Usually this refers to the extent to which respondents believe that 'important others' would approve or disapprove their engagement in a certain behavior. Lastly, perceived behavioral control refers to the perceived ease or difficulty to perform a certain behavior. Just as the importance of intentions and perceived behavioral control vary for the determination of behavior, the three conceptually independent constructs determining individual's intentions have a different importance for the determination of intentions. Thus, intentions might be explained conjointly by the three factors, a combination of two of the factors, or one of the factors only.

Arguing that behavior is determined by intentions, which are formed by attitudes, norms, and behavioral control, the TPB mentions salient beliefs, namely behavioral, normative, and control beliefs, as antecedents for the determinants of intentions. Salient beliefs refer to the set of beliefs that is present when determining a behavior. However, Ajzen (1991, p. 206) states that "although there is plenty of evidence for significant relations between behavioral beliefs and attitudes toward the behavior, between normative beliefs and subjective norms, and between control beliefs and perceptions of behavioral control, the exact form of these relations is still uncertain."

3.4. Self-Determination Theory

SDT has been proposed by Deci and Ryan (1985) and aims at explaining motivation of individuals differentiating between levels and types of motivation. Types of motivation are based on different reasons and goals, which are classified as intrinsic and extrinsic motivators. "Intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome" have shown to influence the quality of experience and performance (Ryan and Deci, 2000). The continuum of SDT provided in Figure 23 relates the motivational types to the levels of self-determination. Motivational types influence the behavior, performance, and well-being.

Figure 23: The self-determination continuum; source: Ryan and Deci, 2000



In general, motivation is of relevance due to its effects. Ryan and Deci (2000) state that "[…] in the real world, motivation is highly valued because of its consequences: Motivation produces. It is therefore of preeminent concern to those in roles such as manager, teacher, religious leader, coach, health care provider, and parent that involve mobilizing others to act." In the context of MC, the aim of managers is to mobilize customers to engage in the collaborative production process. Further, SDT is of relevance because the causes of human behavior and the design of social environments that optimize people's performance are investigated.

Three psychological needs, namely competence, autonomy, and relatedness have been found to enhance self-motivation and mental health (Ryan and Deci, 2000). SDT assumes that individuals' inherent growth tendencies and innate psychological needs are the basis for self-motivation. This implies that, in order to develop feelings of self-

motivation, MC approaches should be designed in such a way that customers can satisfy those psychological needs. Positive feedback, autonomy, self-fulfillment, and recognition have been shown to positively affect the motivation of individuals. Moreover, investigations have found that people, whose motivation is self-authored, exhibit more interest, excitement, and confidence compared to externally motivated people. This is said to result in increased performance, persistence, and creativity.

The importance of SDT in a MC specific context is founded in the fact that it is concerned with examining the conditions that provoke and prolong intrinsic motivation. For example, cognitive evaluation theory (CET) as a sub theory within SDT argues that social-contextual incidents during an action, such as feedback, communications, or rewards, which provoke feelings of competence, can enhance intrinsic motivation. In the same way, optimal challenges, effectance-promoting feedback, and freedom from demeaning evaluations are said to enhance intrinsic motivation. Empirical findings show that positive performance feedback enhances and negative performance feedback diminishes intrinsic motivation as well as that perceived competence mediates these effects. Moreover, feelings of competence need to be accompanied by a notion of autonomy in order to enhance intrinsic motivation (Ryan and Deci, 2000). In the design of MC toolkits this is relevant when deciding on the number of manipulable product characteristics (degree of autonomy) or the incorporation of mechanisms that provide customers with (automated) feedback.

The state of amotivation, when people do not act at all or act without intent, is the result of not valuing an activity, the perception of lacking the necessary competence, or not expecting the activity to result in the desired outcome. In order to turn amotivation into extrinsic or intrinsic motivation potential customers of MC offerings need to perceive the MC process or its outcome as valuable, experience feelings of competence to accomplish the necessary process steps, and expect to receive what they desire. Further, Ryan and Deci (2000) state that conducting extrinsically motivated behaviors can be explained by the wish to relate oneself to significant others, who promote or value the behavior. Although, individualized products are meant to be unique and might serve to differentiate from others, they might also be used to relate oneself to a smaller subgroup. Consequently, the need for relatedness can be satisfied by MC products and should be related to product specific value drivers.

Chapter Three: Research Design and Methodology

In this chapter the conceptual research model is presented. Subsequently the theoretical constructs of the research model and their measurement items are discussed. Further, a number of hypotheses are suggested in order to express the anticipated relations between the theoretical constructs.

Lastly, the development of the research instrument is described. Based on the presented theoretical constructs a questionnaire has been composed. Mainly existing measurement items have been adapted in order to capture the aspects relevant in the context of this research.

1. Conceptual Framework and Research Hypotheses

From the above provided discussion of motivational factors it becomes clear that a multiplicity of aspects influences customers' decisions to participate in OI activities. The review of factors mentioned to be predominant for the willingness to use MC toolkits provides a useful approach to further analyze the motives of customers to engage in product personalization activities. The key value drivers of MC, namely the perceived preference fit, the perceived process effort and enjoyment, the perceived uniqueness, feelings of psychological ownership, and the perceived pride of authorship have been analyzed in a number of studies. However, it is unclear how the key value drivers of MC interact and how other factors influence their magnitude. Further empirical testing provides the opportunity to yield helpful insights, so that a better understanding of the effects that influence the relevance of the key value drivers can be established. Consequently, taking account of the varying relevance of product, process, or customer factors for the key value drivers of MC, the resources in MC should be employed more efficiently.

Woodall (2003) states that value can be private or public. He mentions the Austrian School that suggests an integrated theory of value, where value consists of two different but complementary components, namely the subjective (or personal) and the objective (or generalizable) value. The Austrian School accounts for the uniqueness and the impermanence of individuals' needs by emphasizing that the value derived from an object varies for different individuals. In contrast, the concept of utilitarian value suggests that the value derived from an object is equal for all, not accounting for personal peculiarities.

How a product is used and what its intended use situation is, are important determinants that influence the relevance of its particular characteristics. Richin (1994a) proposes that the meaning of a possession creates value for the owner for two reasons. First, possessions have a communicative power and form part of an elaborate social communication system which determines the meaning of different objects. Second, possessions play an important role in forming and reflecting the self as well as in defining the personal identity, especially in Western cultures. Public value refers to the value attributed to an object by a collective, whereas private value is defined by an individual taking also into account emotional or psychological aspects of an object. In the words of Richin (1994b, p. 523) "Public meanings are the subjective meanings of an object that

are shared by society at large." Social scientists have recognized the importance of the influence of others on an individual's behavior (Bearden and Etzel, 1982). The concepts of group membership or reference groups as well as the theories discussed in chapter two offer some explanations to justify the behavior of individuals.

Thus, it can be argued that the concept of private value is closely related to the underlying key value drivers of MC activities. Perceived preference fit, perceived uniqueness, perceived process enjoyment and effort, perceived pride of authorship, and feelings of psychological ownership are all subjective sensations that are felt personally by individuals. Therefore, we argue that perceiving a private value beyond the commonly agreed value is a powerful driver for the motivation to engage in MC. Examples of personal values that go beyond the general value of an object can be the pride of authorship, the feeling to possess a unique object, or an enjoyable experience. Summing up, assessing the value for the customer provided by an object, not only in terms of utility but also in terms of personal value, indicates the relevance individuals attribute to certain objects and therefore predict customers' WTP.

Schreier (2006) suggest in his empirical assessment of the value increment of mass customized products that the toolkit itself might impact the value creation. Due to substantial differences in the value increment between different toolkits (ΔWTP of 106% for a self-designed scarf and 113% for a self-designed T-shirt, as opposed to a ΔWTP of 204% for a self-designed cell phone cover), the degree of design freedom as well as the user friendliness and fidelity of the solution space are suggested to impact value creation. However, it might be argued that the discrepancy in the value increment is also founded in the varying characteristics of different product categories. Furthermore, the perceived pride of authorship or the feeling of psychological ownership imply that beyond process and product related aspects social and psychological effects influence the willingness of individuals to use MC.

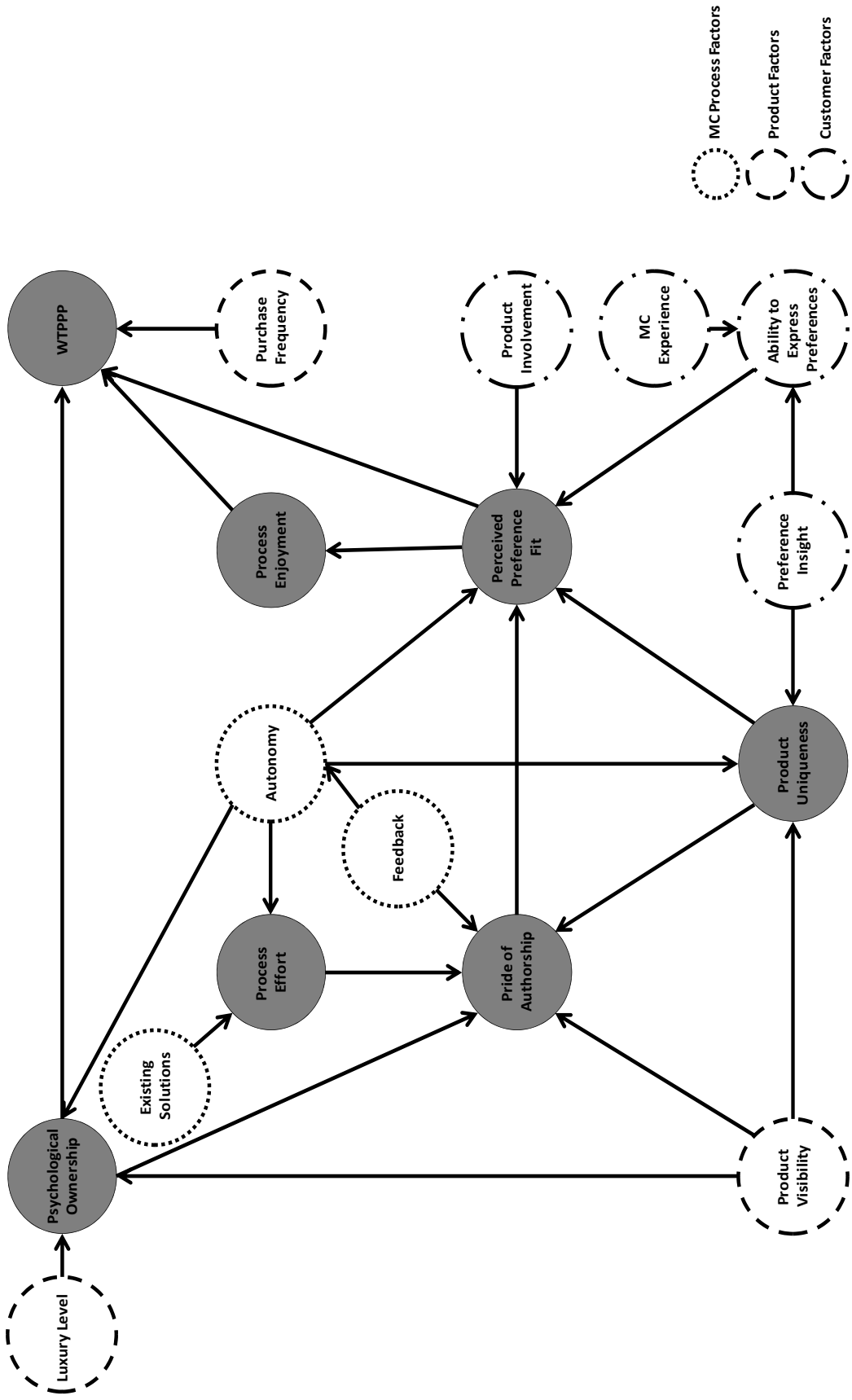
Previous studies have analyzed success factors of MC activities mainly in an isolated way. That is, investigating the effects of, for example, perceived contribution to the MC process, feelings of accomplishment, or process effort and enjoyment without establishing a comprehensive framework accounting for product or customer characteristics. Fiore et al. (2004) suggest, based on their findings that 'creating a unique product' has a stronger effect on customers' willingness to use MC than 'trying co-design as an exciting experience', that the uniqueness of the product should be the primary marketing

feature. Although they focused their research on fashion products, we argue that even within product categories differences between types of products influence the relevance of factors important to MC. It seems reasonable to argue that customers attribute diverse levels of importance to sports shoes, T-shirts, or scarves. Therefore, it is likely that different value drivers underlie the successful employment of MC toolkits for sports shoes, T-shirts, or scarves, even though all are fashion products.

General conclusions are unlikely to hold true for different MC toolkits and therefore, the design of MC toolkits should take into account specific aspects, especially product immanent factors. Given the multiplicity of factors impacting consumers' motivations to use MC, it is crucial not only to analyze the main but also the moderating and mediating effects. This is supported by Simonson (2005, p. 42): "investigation [of responses to customized offers] must consider the moderating variables […] instead of just searching for main effects". Franke et al. (2009) found that the effects that preference insight, the ability to express preferences, and product involvement have on the benefit a customer derives from a customized product are moderated by the product category. Continuing with the above stated example, we speculate that T-shirts and scarves present similar value increments because they belong to the same product category, are used in the same way, in public and without the need of others, and have a similar relevance to their users. An individual cell phone cover, on the other hand, seems to possess a greater relevance. Possibly this might be explained by a more active use of a cell phone and the fact that it requires a second person for its intended use. In contrast to a passively worn T-shirt or scarf a cell phone, literally, calls attention.

In the following we propose a number of factors that have the potential to alter significantly the relevance of the key value drivers of MC. An instrument was developed to measure the constructs of interest. The conceptual model specifying the antecedents, moderator, mediator, and consequences of MC activities is presented in Figure 24. In the following, the different variables of the proposed model are discussed and an overview of the constructs and the items used to measure them is provided.

Figure 24: Research model; source: own elaboration



2. Operationalization of Constructs

Based on Edwards and Bagozzi's (2000, p. 156-157) definition of a construct as "a conceptual term used to describe a phenomenon of theoretical interest", we define the main construct analyzed in this research as 'added value perceived by customers'. Based on the relevant literature we operationalize value using the key value drivers of MC as shown in Figure 24. Multi-item scales for each of the following constructs were adopted or developed: (1) perceived process effort, (2) perceived preference fit, (3) perceived process enjoyment, (4) perceived product uniqueness, (5) feeling of psychological ownership, and (6) perceived pride of authorship.

Further, we explore the influence of a number of product and MC process factors as well as customer characteristics on the key value drivers. Specifically, the relevance of a product's purchase frequency and visibility as well as the impact of product involvement, customers' ability to express preferences, their experience and preference insight are suggested to alter the magnitude of the key value drivers. Moreover, the characteristics of the MC process, namely the degree of (design) autonomy, the provision of feedback, and the availability of existing solutions are suggested to impact the value customers derive from MC.

Ability to express preferences, existing solutions, and feedback:

The main underlying value driver of MC, the perceived preference fit, is directly influenced by individuals' ability to express their preferences. If individuals are unable to express their preferences, because they do not know them or because they cannot articulate them, MC is unlikely to generate value for them. MC toolkits offer customers the opportunity to express their preferences in a limited way and customers might not be fully aware of their preferences. Therefore, customers' ability to express their preferences is a crucial determinant of the value they derive from MC.

The availability of existing solutions (e.g. design drafts) support inexperienced customers and provide them with initial ideas. This could enhance the perception of the process effort and stimulate their feelings competence. Further, the availability of design drafts could influence the relevance of feedback as customers perceive the MC process in a more interactive way. The initial proposal of a design draft might lead customers to expect some form of feedback as a form of logic consequence.

Due to the inability to express preferences the process outcome might not be a true representation of customers' preferences but rather a random choice (Franke et al., 2009). This would reduce the value customers derive from engaging in MC. However, Franke et al. (2009) have shown that peer feedback influences the evaluation of preliminary design solutions. Therefore, we argue that the availability of feedback during the MC process positively influences customers' feelings of pride as well as their perception of the MC process autonomy.

Consequently, we argued that the availability of existing solutions and feedback as well as customers' ability to express their preferences eventually affect the value customers perceive when engaging in MC. In order to measure the constructs of 'ability to express preferences', 'existing solutions', and 'feedback' the items presented in Table 7 were adapted from Franke et al. (2008 and 2009). Accordingly to the previous statements we propose the following hypotheses:

H1a: An individual's ability to express preferences positively affects the perceived preference fit.

H1b: The availability of existent solutions positively affects an individual's perception of the process effort.

H1c: The provision of feedback positively affects an individual's feelings of pride of authorship.

H1d: The provision of feedback positively affects an individual's perception of the degree of autonomy.

Table 7: Measurement items for 'ability to express preferences', 'existing solutions', and 'feedback'

Construct	Items
Ability to Express Preferences (source: Franke et al., 2009)	1. It would be easy for me to describe what an ideal [product] should look like. 2. It would be no problem for me to name those attributes of a [product] which are most important to me. 3. I could easily explain to someone else what kind of [product] I like best. 4. If I had three minutes' time to explain to someone else what I like and what I dislike, this person could theoretically choose a [product] for me that would meet my requirements.

Existing Solutions (source: Franke et al., 2008)	1. I evaluated many different ideas for [product] designs before I started to design my custom [product]. 2. I started to design my custom [product] by adapting an existing [product] design. 3. An existing [product] design served as a starting point for my own design.
Feedback (source: Franke et al., 2008)	1. I consider suggestions from other people on how to improve my [product] design. 2. My final [product] design is based on recommendations from other people. 3. Tips from other people were very important in the further improvement of my design. 4. I received feedback on my design from people.

Product involvement, luxury level, and purchase frequency:

Based on Zaichkowsky (1985) Franke et al. (2009, p.10) state that "product involvement generally refers to the relevance of a specific product (category) as perceived by a customer on the basis of her individual needs, preferences and interests." Product involvement has been used as a moderating or explanatory variable and considered a central framework, which is crucial for the understanding of consumer decision-making behavior and associated communications (Bian and Moutinho, 2008). The relevance of a product defines the importance customers attribute to it. A high degree of product involvement, therefore, implies that customers attribute a high value to a product. Moreover, research has shown that a product's personal relevance influences consumers' motivation to process information about it (Bian and Moutinho, 2008).

Luxury products, that "tend to be more distinctive, higher priced, and unique" (Broekhuizen and Alsem, 2002, p. 320) are less frequently purchased and consequently higher valued. Further, luxury products do not fulfill basic needs but rather satisfy hedonic desires. Therefore, we argue that the luxury level of products positively predicts a product's appropriateness for MC. De Barnier et al. (2011) mention that luxury has been addressed by many studies in areas such as philosophy, economics, sociology, or psychology. Accordingly to the research area, investigations have focused on price setting issues, analyzing the consumption of luxury brands as a way of affirming one's social position, or identifying the motivations in the consumption of luxury products. More,

the importance of pleasure and emotions in general for the consumption and possession of luxury products is brought up (Dubois and Laurent, 1996; Vigneron and Johnson, 1999; De Barnier et al., 2006 all in De Barnier et al., 2011) and psychological benefits, with social recognition and self-esteem as the most frequently mentioned, are pointed out as factors that contribute to the distinction and therefore the uniqueness of brands.

In addition to the product involvement and the luxury level, the purchase frequency is likely to impact a product's aptitude for MC. Frequency is, in conjunction with recency, a fundamental measure in the evaluation of direct marketing promotions. Defining the time between two purchases as a product's lifetime, we argue that products with a long lifetime, thus a low purchase frequency, are better suited for MC. Since MC is costly for customers, long living products enable customers to benefit longer from their investment and amortize their efforts throughout an extended period of time. This is contrary to Broekhuizen and Alsem (2002) who hypothesize that the purchase frequency will positively affect the success of MC.

Due to the association of luxury with psychological benefits, we argue that a product's luxury level will predominately affect customers' feelings of psychological ownership. The level of product involvement, on the contrary, is likely to influence customers' perception of the preference fit. A product's purchase frequency, however, has neither the potential to provoke feelings of uniqueness or psychological ownership nor does it affect the preference fit. It rather influences customers' WTP directly. Based on the above stated argument we hypothesize that customers are rather willing to pay a price premium for long living products such as cars, computer, or furniture.

For the measurement of the luxury level we examined the following three scales: 1. Kapferer (1998), Dubois et al. (2001), and Vigneron and Johnson's (1999). De Barnier et al. (2011, p. 9) reveal different dimensions of perceived luxury with the notion of 'elitism' being the only dimension "to occur in all three scales simultaneously, and moreover being very strongly associated with the uniqueness dimension in the Vigneron et al. (1999) scale." Therefore, we chose items measuring elitism in order to capture the luxury level and because the other dimensions of perceived luxury (uniqueness, quality, refinement, power, hedonism, distinction, creativity, and renown) address aspects covered by other constructs in our model.

The following table shows the items that have been used to measure product involvement and purchase frequency along with luxury level. Accordingly to the previous statements we propose the following hypotheses:

H2a: A high degree of product involvement positively affects an individual's perception of the preference fit.

H2b: A product's luxury level positively affects an individual's feelings of psychological ownership.

H2c: A high purchase frequency negatively affects an individual's WTP.

Table 8: Measurement items for 'product involvement', 'luxury level', and 'purchase frequency'

Construct	Items
Product Involvement (source: Franke et al., 2009)	For me, a [product] (is)… 1. "matters" vs. "doesn't matter" 2. "important" vs. "unimportant" 3. "useless" vs. "useful" 4. "boring" vs. "interesting" 5. "not needed" vs. "needed" 6. "essential" vs. "nonessential"
Luxury Level (source: adapted from 1.-4. Kapferer, 1998 and 5. Dubois et al., 2001)	1. This product can only be bought by a minority. 2. This is a very expensive product. 3. Very few people own this product. 4. This is a select product. 5. This product represents luxury.
Purchase Frequency (source: adapted from Kaplan et al., 2007)	1. How often do you purchase a [product]?

Preference insight and MC experience:

When product involvement or the relevance of a product is low, customers are likely to be unaware of their preferences (Simonson, 2005 and Kramer, 2007). In the same vein, Bharadwaj et al. (2009, p. 216) draw upon the findings of earlier research and assert that "buyers who have less than perfect insight into their preferences […] may not benefit from the matching process inherent in customization." Franke et al. (2009) state that the multitude of options in MC toolkits is rather likely to deliver a random solution than an exact copy of a customer's ideal product. However, in order to derive value from MC activities customers need to be aware of their preferences.

Insights about one's preferences can be augmented by investing the target object, by using or creating it, or by learning from others. Franke et al. (2009) analyze the influence of customers' preference insight and customers' ability to express those preferences on the perceived preference fit and show that the benefits derived from customization depend on both factors. In the same way, we argue that a higher preference insight manifests mainly in customers' ability to express preferences, through which it affects the perceived preference fit.

Further, a high degree of preference insight implies a certain interest for a product and knowledge about it. This is likely to lead knowledgeable customers to perceive MC products as rather standard. Therefore, we suspect that besides its influence on customers' ability to express preferences, customers' preference insight will affect the perceived product uniqueness in a negative way. Additionally, we suggest that customers' experience with MC influences their ability to express preferences and propose the following hypotheses. The items used to measure the degree of preference insight and MC experience are shown in Table 9.

H3a: A high degree of preference insight positively affects an individual's ability to express preferences.

H3b: A high degree of preference insight negatively affects an individual's perception of the product's uniqueness.

H3c: A high degree of MC experience positively affects an individual's ability to express preferences.

Table 9: Measurement items for 'preference insight'

Construct	Items
Preference Insight (source: Franke et al. 2009)	1. Regarding [product], I know exactly what I want. 2. When I purchase a [product], I usually know quite soon what I prefer. 3. When I purchase a [product], I find it easy to choose among different alternatives.
MC Experience (source: own elaboration)	1. How often have you personalized products online?

Product visibility:

We define product visibility as the degree to which the results of a MC activity are visible and communicable to others (Moore and Benbasat, 1991). Building upon Oliver (1999a), Woodall (2003) defines single-stimulus value as value for the customer, which stems from the relationship between an individual and a product only, and dual-stimulus value as value for the customer, which needs a secondary stimulus such as a social or commercial context. Given the influence of others on customers' behavior, we argue, in the same line with Da Silvera et al. (2001) and Broekhuizen and Alsem (2004) that the success of MC toolkits partially depends on whether the product in question provides single-stimulus or dual-stimulus value.

Franke and Schreier (2007, p. 18) highlight that for some product categories "the possibility of demonstrating individuality with the self-designed product is limited." This implies that the relevance of the underlying value drivers of MC, aesthetic and functional fit of a product or its uniqueness, vary in dependence of the value the product provides. The differentiation between single- and dual-stimulus value further implies the absence, respectively presence, of other individuals in a product's use situation. This is likely to influence the relevance of motives such as feelings of pride or need for recognition. Further, Moreau and Herd (2009) propose that publicity influences an individual's behavior through the diminishment of negative effects of an upward comparison. They assert that displaying publicly one's abilities does not only serve as a means for repairing or enhancing self-regard but also provides the opportunity to achieve recognition, which leads to improving one's self-evaluation.

Taking into account the communicative power of possessions, the feelings of competence a customer might perceive from using a MC toolkit is likely to be different for single-stimulus and dual-stimulus value providing products. We argue that it considerably affects the value customers derive from MC whether products provide single-stimulus or dual-stimulus value. Products that are used in a social context provide the opportunity to exhibit one's abilities, generating a perception of pride of authorship. Therefore, it might be argued that MC toolkits that enable customers to personalize products that provide dual-stimulus value should be designed in a different way than MC toolkits for single-stimulus value providing products. However, factors such as usage conditions, expectations of product-related conversations, and individual differences in consumers' consideration of social comparison information can influence customers' perception of product visibility (Fisher and Price, 1992).

Franke et al. (2009) mention that the way, in which a product is consumed, solely or in public, influences customers' WTP. However, they recommend further investigation since a number of other product characteristics as well as the MC toolkit itself influence customers' WTP. In response to the call for additional research, we include the construct of product visibility in our conceptual research model. To our knowledge, no empirical research has investigated the effects of product visibility on the key value drivers of MC. In order to measure the level of product visibility we adapted the items presented by Fischer and Price (1992). We suggest that the level of visibility, which is product specific, predominantly influences customers' (1) perception about the product's uniqueness as well as their (2) feelings of pride to be the author and their (3) feelings of psychological ownership. The measurement items used to capture customers' perception of the product's degree of visibility are shown in the following table. Accordingly to the previous statements we propose the following hypotheses:

H4a: A high degree of product visibility positively affects an individual's perception of the product's uniqueness.

H4b: A high degree of product visibility positively affects an individual's feelings of pride of authorship.

H4c: A high degree of product visibility positively affects an individual's feelings of psychological ownership.

Table 10: Measurement items for 'product visibility'

Construct	Items
Product Visibility (source: Fischer and Price, 1992)	When the [product] is being used people close by will notice. When the [product] is being used it will be highly visible to people. When the [product] is being used it will generate a lot of attention. When the [product] is being used it will stand out.

Autonomy:

Traditionally, autonomy has been viewed as the amount of freedom and independence individuals have when carrying out their work assignment (Hackman and Oldham, 1975 in Morgeson and Humphrey 2006). Further, the extent to which a job allows freedom, independence, and discretion to schedule work, make decisions, and choose the methods used to perform tasks have been incorporated into the concept of autonomy (Breaugh, 1985; Wall, Jackson, and Davids, 1992; Wall, Jackson, and Mullarkey, 1995 in Morgeson and Humphrey 2006). Accordingly, Morgeson and Humphrey (2006) propose that autonomy consists of three interrelated aspects centered on freedom in (a) work scheduling, (b) decision making, and (c) work methods.

In the context of MC, the degree of autonomy is an important factor, on the one hand, because it enables customers to adapt products to their preferences and, on the other hand, because it enhances the development of self-motivation. A high degree of autonomy allows customers to highly personalize products and might serve as a key motivator to use MC. In a similar way, Moreau and Herd (2009) state that customers, who engage in creative tasks, are motivated, to some extent, by a sense of autonomy. The degree of autonomy can be determined by the number of manipulable attributes and available options per attribute.

For all types of MC approaches the optimal level of autonomy, from a customer's perspective, is given when customers can choose the necessary options that satisfy their needs without overstraining them. This results not only in a higher perceived preference fit and a higher perception of the product's uniqueness but also in a higher perceived process enjoyment. However, from a firm's point of view, some restrictions to the MC process have to be made in order to secure that the production process works with a

similar efficiency as in mass production and that an information overload of customers is avoided. Consequently, the balance between autonomy and constraints is crucial as it influences the creativity customers perceive during the MC activity and the feeling of competence they develop. Further, a low degree of autonomy is likely to impede that recognition from others will be of importance as customers will feel to run through a predefined process rather than being the creator of a special object.

Establishing a degree of autonomy might be seen as a trade-off between process effort and enjoyment. Although design effort has been said to have negative effects on the value customers derive from MC and even though it has been suggested that it should be as low as possible, we argue that process effort per se is not negative. Psychological ownership develops through investigating the self into an object, getting to intimately know, and controlling it. Further, the degree of perceived contribution to the mass customized product affects the feeling of pride of authorship. Therefore, the level of autonomy in the MC process is crucial for the development of feelings of psychological ownership and feelings of pride of authorship. Process effort will rather have a positive than a negative effect on the perceived pride of authorship as long as the MC process is enjoyable and well structured.

Franke et al. (2010) provide empirical evidence that a high degree of design autonomy, measured as the perceived contribution, generates a higher WTP. Further, a high degree of autonomy gives customers the feeling of being in charge of what they do. Consequently, they develop a feeling of responsibility. We argue that this leads to greater intimacy with the product and further satisfies feelings of competence and evokes a need for recognition. Thus, we hypothesize that the degree of autonomy granted to users of MC toolkits affects the perceived preference fit, the perceived process enjoyment, the feeling of psychological ownership, the perceived process effort, and the perceived product uniqueness. Accordingly to the previous statements we propose the following hypotheses:

H5a: A high degree of autonomy positively affects an individual's perception of the preference fit.

H5b: A high degree of autonomy positively affects an individual's perception of the process enjoyment.

H5c: A high degree of autonomy positively affects an individual's feelings of psychological ownership.

H5d: A high degree of autonomy positively affects an individual's perception of the process effort.

H5e: A high degree of autonomy positively affects an individual's perception of the product's uniqueness.

Table 11: Measurement items for 'autonomy'

Construct	Items
Autonomy (source: 1-4 adapted from Morgeson & Humphrey, 2006 and 5&6 Franke et al., 2010)	1. The toolkit allowed me to make a lot of decisions on my own. 2. The toolkit provided me with significant autonomy in making decisions. 3. The toolkit gave me considerable opportunity for independence and freedom in how I designed [product]. 4. The toolkit allowed me to decide on my own how to go about designing/creating [product]. 5. I had a great deal of control over the design process. 6. I had a significant influence over the outcome of the design process.

Perceived process effort

Design effort refers to the extent of work associated with a design activity. More in general, effort also arises with co-development, co-creation or co-production activities. Concerning collaborative activities the general position is that the effort for customers should be as low as possible in order to facilitate the access of a great number of innovators. However, as explained earlier, investigating the self into an object is one way to create psychological ownership and might lead to a stronger dedication to the object, wherefore effort can also be seen as a factor that moderates the dedication of an innovator towards the object in question. However, generally the experience of self-designing a product, and the effort involved have been portrayed as a disutility impacting the customers' willingness to use a MC toolkit and the likelihood of abandoning the customization process without actually buying the product (Bendapudi and Leone 2003, Dellaert and Stemersch 2005, Huffman and Kahn 1998, von Hippel 2001).

Comparable to what Woodall (2005) calls sacrifice, effort can be seen as a by-product that comes with any activity be it designing, creating, developing, or producing an object. Whereas design-effort refers to the effort customers are confronted with when designing a product, sacrifices refer in a broader sense to all the factors customers have to give up, financial or non-financial. Not only does it take time to get familiar with a MC toolkit and learn to operate it but also price premiums are demanded in some cases. Customers' benefits are further moderated by an additional uncertainty about the actual appearance and condition of the customized product.

As outlined in the literature review, fun is a powerful determinant of attitudes towards usage, which is achieved, among other factors, through ease of use. This allows suspecting that the activities of co-designing, co-developing or co-producing should be designed in such a manner that customers perceive the process as enjoyable. Franke and Schreier (2010, p. 20) state that "process effort has a positive or a negative effect on WTP, depending on the preference fit of the resulting product." Similarly, we argue that process effort per se does not have a negative effect.

The perception of process effort can be influenced by the provision of existing solutions (e.g. design drafts/ideas from other customers). Based on Franke et al. (2008) we argue that external information is helpful for problem solving in MC and consequently suggest that access to existing solutions positively affects customers' perception of the process effort. External inspiration is likely to serve customers as a starting point on which they can further build. Especially novice customers without MC experience are likely to benefit from suggestions and consequently perceive the MC process less challenging. Franke et al. (2008) show empirically that the availability of existing design solutions from other customers, as an inspiration in the phase of developing an initial idea, positively influences a more systematic problem-solving approach. Nevertheless, based on findings from other research we argue that the perception of process effort has a negative effect on the development of feelings of pride of authorship due to the fact that it reduces the ease of use. Accordingly we propose the following hypothesis:

H6: A high degree of process effort negatively affects an individual's feelings of pride of authorship.

Table 12: Measurement items for 'perceived process effort'

Construct	Items
Perceived Process Effort (source: Franke and Schreier, 2010)	1. Designing the [product] required much effort. 2. Designing the [product] was time-consuming. 3. I perceived designing the [product] as 'exhausting'.

Perceived preference fit:

In the literature, preference fit is seen as the main value driver for users of MC toolkits (Franke and Schreier, 2010; Schreier, 2006). The general view of the MC concept is that self-designing a product usually results in a higher preference fit, in terms of aesthetic and functional preferences. This provides superior value to customers, assuming that their needs are heterogeneous. Preference fit is used to refer to the degree of preferences satisfied. Based on Dellaert and Stremersch (2005) as well as Randall, Terwiesch, and Ulrich (2007) Franke and Schreier (2010) "define 'perceived preference fit' as the customer's subjective evaluation of the extent to which the product's features correspond to her preference system."

We argue that the perceived preference fit is influenced by various factors. First, the ability to express preferences is a prerequisite for the specification of individual needs and desires, and preferences can only be matched if they have been stated previously. Second, the level of product involvement indicates the relevance of a particular product for customers. The more relevant a product is perceived the more important should be the perceived preference fit. Third, preferences can only be satisfied to a pleasing degree if the MC toolkits enable customers to make the choices they want. Fourth, if the MC process provokes feelings of pride of authorship the perceived preference fit is likely to be affected because feelings of pride are special and imply positive feelings. Lastly, the perceived product uniqueness, as the original reason for the product customization together with the preference fit, should positively influence the perceived preference fit. On the contrary, an increase in the perceived preference fit should ultimately be reflected in an increased WTP. Accordingly, we propose the following hypotheses:

H7a: A high degree of preference fit positively influences an individual's perception of the process enjoyment.

H7b: A high degree of preference fit positively influences an individual's WTP.

Table 13: Measurement items for 'perceived preference fit'

Construct	Items
Perceived Preference Fit (source: 1-3 Franke et al., 2008; 4-5 Franke et al. 2010)	1. I am very satisfied with my self-designed [product]. 2. Compared to the [product] available at conventional stores, I prefer my self-designed [product]. 3. My self-designed [product] reflects my idea of an ideal [product]. 4. I like the design of the [product]. 5. The design of the [product] looks really great.

Perceived process enjoyment:

Perceived enjoyment is described by Davis et al. (1992, p. 1113) as "the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequence that may be anticipated." Enjoyment has been considered a significant determinant in the adoption of a technology along with its perceived usefulness and ease of use. Therefore, we argue that the perception of enjoyment in the process of MC will be beneficial to customers as well.

Further, we argue that whether a process is perceived enjoyable is determined by the degree of autonomy granted to customers and the perceived preference fit. Autonomy enables users to experience feelings of competence and creativity, two strong intrinsic drivers that allow the emergence of a 'flow feeling' (Csikszentmihalyi, 2002), which leads to enjoyment. A high preference fit leads to satisfaction and allows customers to enjoy their personalized product.

"Enjoyment is more than the absence of effort; although the perception of effort and enjoyment might be (negatively) correlated, they are conceptually independent (Franke and Shreier, 2010, p. 8)." Lee and Chang (2011) found in their study, investigating consumers' attitudes towards online MC using an extension of the TAM that perceived enjoyment had the strongest effect. In a similar way, Fiore et al. (2004) investigated 'using MC as an exciting experience'. We define perceived process enjoyment as a broad construct that accounts for all the factors that make customers enjoy the MC process itself.

Franke and Schreier (2010) recommend integrating both process effort and enjoyment in future models. Consequently, we consider process effort and enjoyment separately in order to evaluate the relevance of each construct individually. We hypothesize that the perception of enjoyment leads customers to consider the MC process as a pleasant experience. This should influence customers' WTP. The measurement items used to capture customers' perception of the process enjoyment are shown in the following table. Accordingly to the previous statements we propose the following hypothesis:

H8: A high degree of perceived process enjoyment positively affects an individual's WTP.

Table 14: Measurement items for 'perceived process enjoyment'

Construct	Items
Perceived Process Enjoyment (source: adapted from Franke and Schreier, 2010)	1. I enjoyed this design activity very much. 2. Designing was fun. 3. I thought designing the [product] was quite enjoyable. 4. Designing the [product] was very interesting. 5. This design activity was fun.

Perceived uniqueness:

Differing product characteristics produce the sensation of uniqueness. Products in the same category are more likely to be perceived unique when the extent to which customers regard them to be different is high (Tian, Bearden, and Hunter 2001 in Franke, 2008). The construct 'perceived uniqueness' accounts for the desire of individuals' to be different and unique. "The core argument here is that the almost infinite variety of products offered by MC systems not only allows more effective adaptation to the customer's aesthetic and functional preferences, but also facilitates enhanced differentiation from other customers and their belongings by means of a truly unique product (Franke and Schreier, 2008, p. 3)."

Enhancing individuality and being recognized as a unique individual with the help of a personalized product are the reasons why perceived uniqueness creates additional value for the customer. Franke and Schreier (2008) draw upon commodity theory arguing that

perceived scarcity should augment the desirability of objects and that owing such objects facilitates that individuals differ from others. Although the desire to differentiate from others might appear to be conflictive with the psychological need for relatedness, we argue that the perceived product uniqueness enables customers, on the one hand, to differentiate from the vast majority and, on the other hand, relate themselves to a smaller subgroup with which they can identify themselves better.

The factors that make a customized product unique are customers' preference insights, the product visibility, and the (design) autonomy of the MC toolkit. On the one hand, an elevated degree of autonomy enables customers to highly personalize their product and chances that other customers will incorporate exactly the same features in their product decrease.

On the other hand, a high degree of product visibility allows customers to compare their products with others, which will lead customers to recognize the true uniqueness of their product. Lastly, a high degree of preference insight means that customers are familiar with a certain product category and their variations. This implies that customers with a high degree of preference insight have expertise, which should enable them to create a truly unique product.

Moreover, perceiving a product to be unique should affect customer's feelings of pride of authorship and perception of the preference fit. Uniqueness implies scarcity. Therefore, customers should experience feelings of pride to be the creator of a rare (and valuable) object. The perception of the preference fit should also increase due to the fact that customers of MC seek to differentiate from others. Due to the lack of scales measuring perceived product uniqueness we adopted the scale developed by Franke and Schreier (2008), which is based on the relevant literature. An overview is given in the following table. Accordingly to the previous statements we propose the following hypotheses:

H9a: A high degree of perceived product uniqueness positively affects an individual's perception of the preference fit.

H9b: A high degree of perceived product uniqueness positively affects an individual's feelings of pride of authorship.

Table 15: Measurement items for 'perceived uniqueness'

Construct	Items
Perceived Uniqueness (source: Franke and Schreier, 2008)	1. I perceive this self-designed [product] as highly unique. 2. This [product] is one of a kind. 3. My [product] design is really special.

Psychological ownership:

Ownership is generally attributed towards person-object relations. However, ownership can also be experienced towards non-physical articles such as ideas, words, artistic creations, and other people (Pierce et al. 2003). The starting point in MC is the idea of a customer for a particular design or creation. Therefore and because of the MC process, which leads to (1) investigating the self into the target, (2) coming to intimately know the target, and (3) controlling the ownership target, we argue that MC toolkits promote the emergence of psychological ownership. Besides the three routes to psychological ownership Pierce et al. (2003) mention that creating an object is probably the most powerful way to invest oneself into an object.

The existence of psychological ownership in the context of MC is of relevance since it is argued that ownership affects the value attributed towards an object. What is known as the endowment effect assumes that people assign a greater value to objects in their possession than to objects that they do not own. Thaler (1980) coined the term referring to people's behavior that deviates from classical economic understanding that people act in a rational way. A number of experiments illustrate that people prefer to keep an object once they possess it instead of trading it for another object. Also, experiments show that people who own something demand a higher price to give it up than they were initially disposed to pay. Furthermore, the results of various experiments provide evidence for the assumption that participants' preferences depend on the direction of the exchanges and that they weight the loss of an object they were initially given higher than obtaining an alternative object (for a summary see Kahnemann et al., 1991). Although empirical evidence for the existence of the endowment effect exists, some researchers question the disparity between the WTP and willingness to accept (WTA) described by the endowment effect. Kahneman et al. (1991), for example, mention Knez, Smith and Williams' (1985) argument that WTP and WTA disparity arise from bargaining habits,

where the potential seller initially asks a higher selling price and the potential buyer states a lower price in order to split the difference.

The behavior disclosed by research on the endowment effect illustrates what is also referred to as loss aversion (Kahneman and Tversky, 1984) or "status quo bias" (Samuelson and Zeckhauser, 1988). Kahnemann et al. (1991, p. 199) conclude that for risky choices "the significant carriers of utility are not states of wealth or welfare, but changes relative to a neutral reference point." This might be explained by the intimacy with the status quo and possible fears of risks that could arise from new situations. Kahneman et al. (1991) suggest that the main implication of the endowment effect is a certain loss aversion. This means that giving up a known situation is perceived less beneficial than staying with the status quo. In the context of customer collaboration this effect becomes relevant not only in terms of factual or legal ownership but also in terms of psychological ownership. The fundamental supposition is that customers who contribute in any kind of way to the development, production or design of a product, might develop a feeling of ownership and consequently become more attracted to that product.

So if customers come to develop psychological ownership for a product because they invest time and effort to get to know, control and create it, it means that they should attribute a higher value to that product. However, the fundamental question is whether a higher value for the customer will manifest in a higher WTP or whether the feeling of psychological ownership leads to a change in behavior or attitude toward the product or brand. Pierce et al. (2001) offer a conceptual examination of psychological ownership which provides important insights on its development, the processes that lead to the emergence of psychological ownership, its effects and the factors that influence it. Among others, they mention a willingness to make personal sacrifices and frustration as two consequences of psychological ownership. This is germane as personal commitment and identification with the firm and its mission are key in order to achieve knowledge creation (Nonaka, 1991). Even though Nonaka focuses on the firm and the organizational environment, it seems reasonable to argue that personal commitment and frustration are also crucial for customers engaging in MC activities.

In line with the endowment effect Pierce et al. (2001, p. 4) mention Beggan (1992) and Nuttin (1987) that "owned objects appear to be more attractive and rated more favorably than objects which are not owned". Further, they refer to Belk (1988) and Dittmar (1992) who state that psychological owned objects become a part of the 'extended self'.

Another important statement is that "feelings of ownership are said to be pleasure producing per se" (Pierce, 2002, p. 5) and further, that legal ownership is not a requirement for psychological ownership and vice versa. They continue that recognizing personal meaning in the object's symbolic properties is a prerequisite in order to experience feelings of ownership and mention efficacy and effectance, self-identity, and 'having a place' as three human motives that lead to psychological ownership. Drawing upon Levy (1959) they mention products, especially consumer goods, as a way to manifest personal values, qualities, attitudes, education, social affiliation, and accomplishments. In addition, they refer to Porteous (1976) stating that the personalization of objects is related to security, identity, and individualism which stand for freedom and self-determination. This implies that the attributes of an object influence the degree to which psychological ownership might develop. While personal differences influence the degree one attributes to possessions, Pierce et al. (2003) mention Prelinger (1959) and Dixon and Street (1957), who provide evidence for the stronger perception of objects as part of the self in dependence of the degree to which the objects are controllable, manipulable, or affect the self.

Moreover, Pierce et al. (2001, p.307) argue that in order to capture a customer's interest and attention the object must be visible and attractive as well as it must "possess certain characteristics so that the motives for efficacy and effectance, self-identity, and/or need for a place could be fulfilled." In the same line, we argue that not only product characteristics favor the development of such motives but also characteristics of the MC process. The perceived process effort and enjoyment as well as the perception about the end result contribute to the development of psychological ownership. Lastly, drawing upon previous research Pierce et al. (2003) argue that laws, norms, rules, and hierarchy may limit the capacity to engage in psychological ownership creating actions and that organizational structure may impede the development of behavior that leads to psychological ownership. For the design of MC toolkits this implies that restrictions on the autonomy granted to MC users might reduce the potential to develop psychological ownership. Due to the fact that no items to measure psychological ownership exist, we adapted items from interview excerpts presented by Franke et al., 2010. Accordingly to the previous statements we propose the following hypotheses:

H10a: A high degree of psychological ownership positively affects an individual's feelings of pride of authorship.

H10b: A high degree of psychological ownership positively affects an individual's WTP.

Table 16: Measurement items for 'feelings of psychological ownership'

Construct	Items
Feelings of Psychological Ownership (source: Franke et al., 2010)	1. There is something personal about the [product]. 2. I think I have developed an addiction to the [product]. 3. Because I designed/created it, it gained a very special dimension for me. 4. It is something of my own. 5. For me, the [product] has personal value.

Perceived pride of authorship:

Drawing upon the theory of the extended self the perception of feelings of authorship can be explained by the transformation of psychic energy from the self into an object. Important for the psychological need for competence, the feelings of accomplishment directly influence the perception of pride of authorship. Franke et al. (2010) explain that because of the investment of psychic energy in an object, in terms of effort, time and attention, it is regarded as a part of the self. In this way the created product embodies a customer's accomplishment endogenous to the process.

Schreier (2006) proposes the 'pride of authorship' effect as a relevant benefit from self-designing a product oneself, besides the preference fit, perceived uniqueness of the product and the process benefit. Franke et al. (2010) analyze 'feeling of accomplishment' as a mediator and 'perceived contribution to the design' as a moderator of the 'I designed it myself effect' and find clear evidence for the existence of a pride of authorship effect. Also, they find that this effect is superior when the perceived contribution of the customer to the end result and the feeling of accomplishment are higher.

On the one hand, Franke et al. (2010, p. 137) argue that "feelings of accomplishment arising from the process of self-designing largely impact the subjective value of the product". Similarly, Brabham (2008, p. 82) resumes findings from a number of other researchers that recognition by others and especially "the pursuit of the problem and the satisfaction in finding a better solution to the problem" are important non-financial

payments for innovators. Those findings provide evidence for the assumption that the motivation of customers to engage in MC is not necessarily grounded in tangible benefits solely but also in intangible social motives.

On the other hand, Franke et al. (2010) suggest that customers attribute additional value to products generated via MC because of the 'I designed it myself effect'. They mention that it is unclear to which extend the feeling of having made a contribution is beneficial and suggest that beyond a certain maximum additional contributions do not increase the value derived from the MC activity. We argue that a number of factors provoke the emergence of feelings of pride of authorship. On the one hand, feelings of pride are the result of an extraordinary accomplishment. Therefore, the perception of process effort and the product's uniqueness are necessary for the development of feelings of pride. Further, assuming that pride is perceived as a psychological benefit, we argue that the feelings of psychological ownership contribute to its development. Lastly, we hypothesize that a product's visibility further enhances feelings of pride of authorship because individuals receive recognition from others that gives them a feeling of competence.

Drawing upon the self-determination theory the need for competence is said to be one of the psychological needs that motivates individuals to act in a way to achieve psychological health and well-being. Franke et al. (2010) argue that the feeling of accomplishment serves the need for competence, which are deeply embedded in human nature. This implies that it is important to support MC users so that they can achieve a satisfactory result. Intrinsic rewards that induce feelings of competence are mentioned by Lakhani and von Hippel (2003) to be relevant for participants in Open Source software as well. Reichwald et al. (2004) also emphasize that the right balance of a task difficulty, between being challenging and doable, is important and that immediate feedback provides customers with a feeling of competence. If the right difficulty level is achieved customers are stimulated by the task they carry out and are motivated intrinsically.

Csikszentmihalyi (2002) as well as Hoffmann and Novak (1996) have described a 'state of flow' in which individuals are absorbed by a task and detached from their surrounding due to the profound satisfaction carrying out a task provides. Accordingly to Lakhani and Wolf (2003) the need for competence is central to the theory of intrinsic motivation and directly linked to feelings of interest and enjoyment, thus, playing an important role in the design of MC toolkits. We argue that a feeling of accomplishment may only emerge when a certain level of autonomy is given and that feelings of accom-

plishment only emerge if the MC process results in a satisfactory outcome. Accordingly we propose the following hypothesis:

H11: A high degree of feelings of pride of authorship positively affect an individual's perception of the preference fit.

Table 17: Measurement items for 'perceived pride of authorship'

Construct	Items
Perceived Pride of Authorship (source: Franke et al., 2010)	1. When I look at the [product] I have self-designed, the feeling I have can best be described by the word 'pride'. 2. I feel proud of having accomplished something. 3. I feel proud because I did a good job.

Willingness to pay:

The added value provided by customized solutions, which stems from increased functional and aesthetic benefits that meets customers' preferences better than the best off-the shelf product, justifies charging premium prices (Piller et al., 2004). Consumers' WTP estimates the price that can be obtained for a product on the market. Empirical studies have shown that customers' WTP for self-designed products can be significantly higher than for standard products (Franke and Piller, 2004; Schreier, 2006). We argue that the value increment of customized products emanates not exclusively from an increased preference fit but jointly from all the key value drivers of MC, namely the increased preference fit, the increased process enjoyment and effort, feelings of psychological ownership, feelings of pride of authorship, and a product's uniqueness.

Based on the use situation, for example, a product's uniqueness can be the main value driver, whereas the perceived pride of authorship is likely to be of greater relevance when the MC process itself has been laborious. However, conjointly the key value drivers of MC make customers willing to sacrifice more of their resources than for standard products. We argue that especially the WTP is affected by the value increment of MC, which is ultimately reflected in customers' willingness to pay a price premium.

In order to capture the value increment customers of mass customized products perceive, we asked respondents, as recommended by Franke and Piller (2004), to state their WTP for the mass customized product as well as for a comparable not customized

product. The difference between both measures was used to represent the value increment. In both cases, WTP was measured using the open-ended questions shown below.

Table 18: Measurement items for 'willingness to pay'

Construct	Items
Willingness to Pay (source: adapted from Franke et al., 2009)	1. How much would you be willing to spend for your customized product? 2. How much do you usually spend for a comparable not customized product?

3. Questionnaire Development

In order to validate the proposed conceptual model, items, obtained from academic literature, were partially adjusted. The operationalization of the theoretic relevant constructs was guided by established rules of thumb in order to assure that the participants of the survey understood the questionnaire in the same way. Questions were verbalized in the way that they are easy to understand, short and precise without the use of foreign words or technical terms. Further, suggestive, hypothetical and positive or negative phrasing was avoided keeping in mind that questions should neither overstrain participants nor appear trivial. Further, emphasis has been placed on the clearness of the formulation by avoiding the use of double negative formulations and only including one stimulus per question.

Regarding the operationalization of the theoretical constructs, which constitute the latent variables in the measurement model, the number of observed indicators used to measure the constructs is of special importance. On the one hand, a large number of indicators increase the reliability of the measurement. On the other hand, a large number of indicators increase the possibility that sub-categories develop and the constructs are led into a certain direction (Hair et al. 2006, p. 783). Moreover, additional parameters increase the minimum sample size and make the questionnaire longer, which is likely to lead participants to abandon the questionnaire. This has led to the recommendation to use at least three to four items per construct (ibid.). Further, indicators have to be unidimensional. That is, the indicators of a construct have to be similar and internally consistent. As a consequence indicators should highly correlate.

The items included in the questionnaire were translated into German. In order to assure that the translation was correct and had not changed the meaning of the items the German questionnaire was back-translated into English by a third person. After a thorough review of the literature on the subject of the study, items, which were used in the questionnaire, were adapted from the existing literature. Although the adequateness and comprehensibility of the items had been demonstrated in literature, assuring content validity, the meaning can be affected by the particular context of a survey. Therefore, a questionnaire pretest was carried out in order to determine whether the questionnaire was understandable and adequate for the measurement of the proposed constructs.

The final questionnaire (see Appendix A: Survey Instrument) contained 66 questions altogether, of which 63 were closed-ended and 3 were open-ended questions. The 3 open-ended questions addressed the product name of the customized product and the WTP for it as well as the WTP for its standard counterpart. Of the 63 closed-ended questions 52 were ranking scale questions using a 7-point Likert scale. The remaining 11 questions were, on the one hand, 5 multiple choice questions and, on the other hand, six questions with five-point semantic differential scales. The multiple choice questions addressed the purchase frequency of the product, the personal MC experience and the demographic factors gender, age, and level of education. The six questions with the five-point semantic scale measured the product involvement using statements anchored with "matters" vs. "does not matter", "important" vs. "unimportant", "useless" vs. "useful", "boring" vs. "interesting", "not needed" vs. "needed" and "essential" vs. "nonessential".

Finally, the questionnaire was completed with a short introduction letter explaining potential participants the objectives of the research. Further, it was mentioned that having personalized a product with the help of an online product configurator was the requirement for participation in the survey. Lastly, participants were informed that the survey was for academic purposes as well as that any data would be treated confidentially and analyzed anonymously.

Chapter Four: Empirical Research

The aim of this chapter is to describe how the empirical research was carried out. Specifically, data collection and analyses are portrayed. First, an overview of the general sample characteristics is given and differences in respondents' WTP are outlined.

Subsequently, we delve into data analyses. Structural equation modeling is employed in order to test the conceptual research model. In this way the significance and relevance of the proposed relations between constructs is validated. This reveals the construct specific importance for the customer driven value creation and provides the basis for the discussion of the results in chapter five.

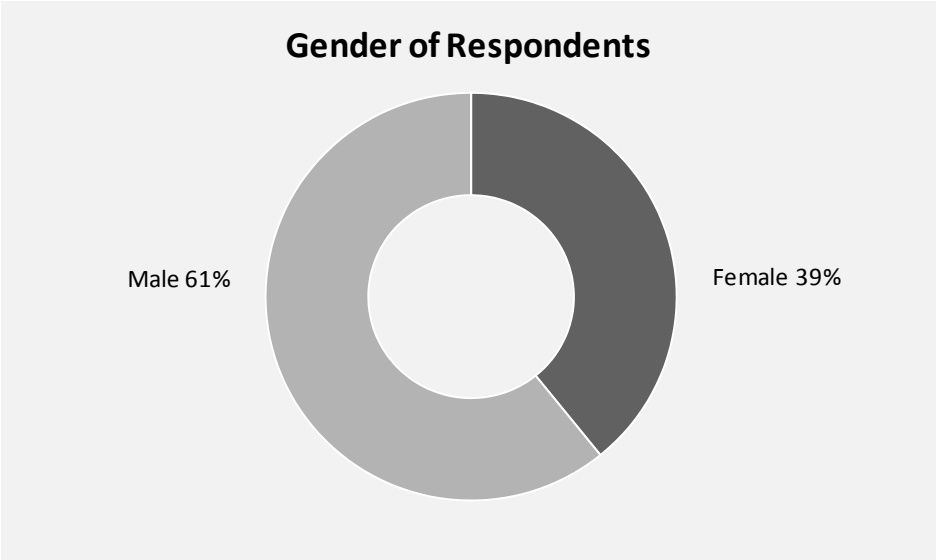
1. Sample Characteristics

Customers, who had made personal experience with MC toolkits, were confronted with the questionnaire. Rather than interviewing marketing or manufacturing managers, this provides the opportunity to directly capture the perception of value from the customers' point of view. This is important since value for the customer is often equated with customer satisfaction. However, in the literature, the concept of satisfaction is distinguished from value. Satisfaction is conceptualized as the fit between customers' expectations and products' performance, whereas value accounts for customers' overall assessment of products' utility with regards towards what is given up and what is received. Therefore, responses obtained directly from customers provide unbiased insights on how customers perceive the value of mass customized products. In the following, the sample, the data collection method, and the statistical analyses are described in detail.

Data were collected from customers with MC experience during a period of 60 days by conducting a web-based online survey. Given the fact that MC toolkits are widely used on the Internet, a web-based online survey seems appropriate as a survey method. After the questionnaire had been designed and pre-tested it was put online. In order to find customers, who had made experiences with MC previously, a short text explaining the context of the research was positioned along with the link to the questionnaire in blogs and forums concerned with MC. In addition, the same text was put onto the social networking sites of five different companies offering the customization of chocolate, coffee blend, belts, jewelry, and pralines. Due to a low response rate from the online questionnaire, the questionnaire was also administered to a convenience sample of students at a German university. Convenience samples of students have also been used by Franke and Piller (2004), Schreier (2006) or Franke and Schreier (2008 and 2010). No incentives were offered to the participants in the study.

The title page of the questionnaire included a short description of the survey. Respondents were asked to complete the questionnaire based on their experience as customers of self-designed products. In the case of the online questionnaire, responses from participants in the survey were automatically stored in a database. Responses from the convenience sample were manually added. A total of 105 customers responded to the survey. The data of 13 respondents were eliminated due to incomplete responses, resulting in a usable sample of 92 responses. The following figures illustrate the sample characteristics.

Figure 25: Sample characteristics: Gender of respondents



Of the 92 respondents 39% were females and 61% were males. The major part of the respondents, namely 90%, was within the range of 19 to 40 years old. More precisely, 42% were between 19 and 25 and 49% were between 26 and 40 years old. 9% of the respondents were between 41 and 65 years old. It is often argued that MC offerings are targeted at young individuals because they are especially receptive for MC offerings. Therefore, age groups of the sample represent well the potential MC customers.

Figure 26: Sample characteristics: Age of respondents

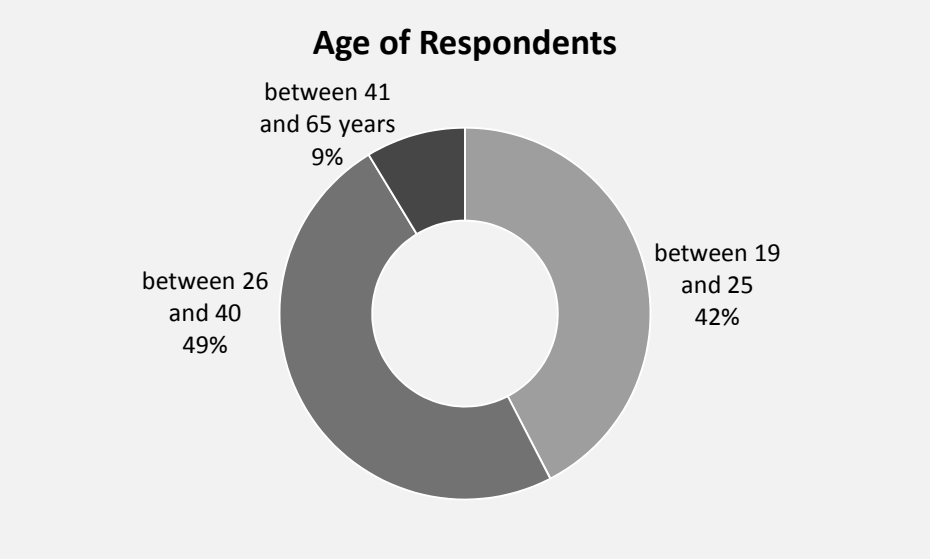
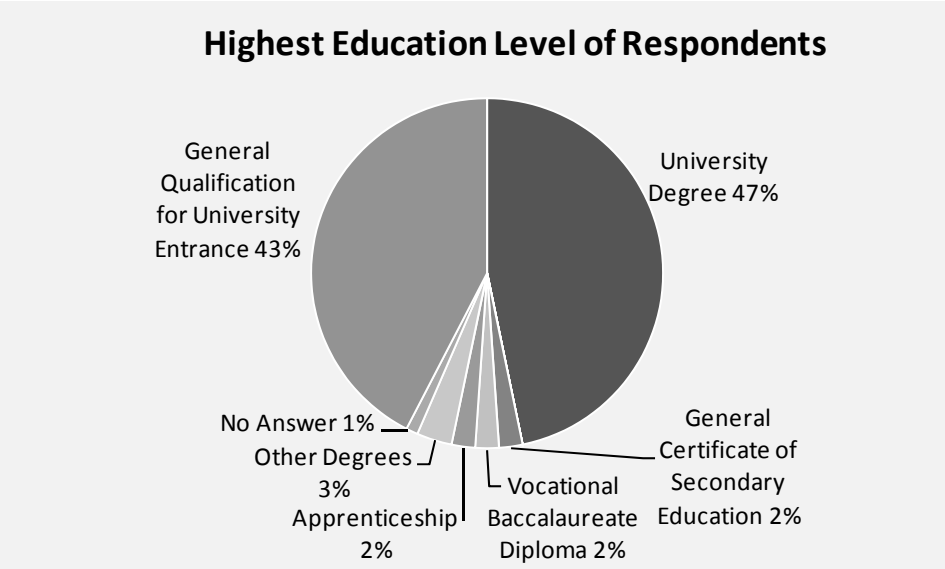


Figure 27: Sample characteristics: Highest education level of respondents



With respect to the educational level, 47% of the respondents had received a university degree and 43% of the respondents had achieved qualifications for university entrance. 6% had degrees in secondary education, 1% did not specify their highest educational level, and 3% answered to hold other than the indicated degrees. Note that definitions of the degrees were based on the German education system. Further, the collected data shows that 36% of the respondents had used a MC toolkit once, 16% twice, 36% between 3 and 5 times, 4% between 6 and 9 times, and 8% more than 10 times. This indicates that almost one half of the 92 respondents (48%) had a high degree of MC experience, having used a MC toolkit at least 3 times, whereas the other half (52%) had rather little MC experience, having used MC once or twice.

Figure 28: Sample characteristics: MC experience of respondents

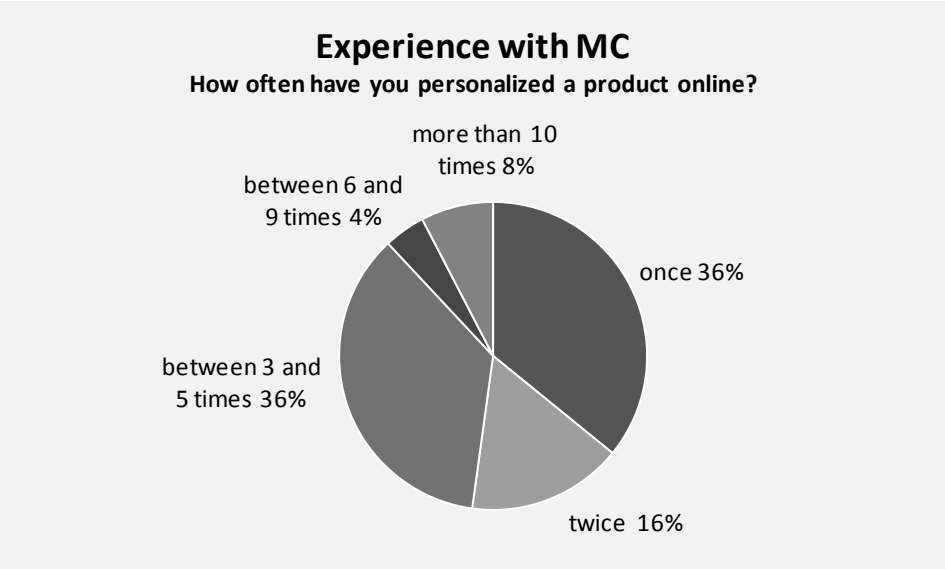
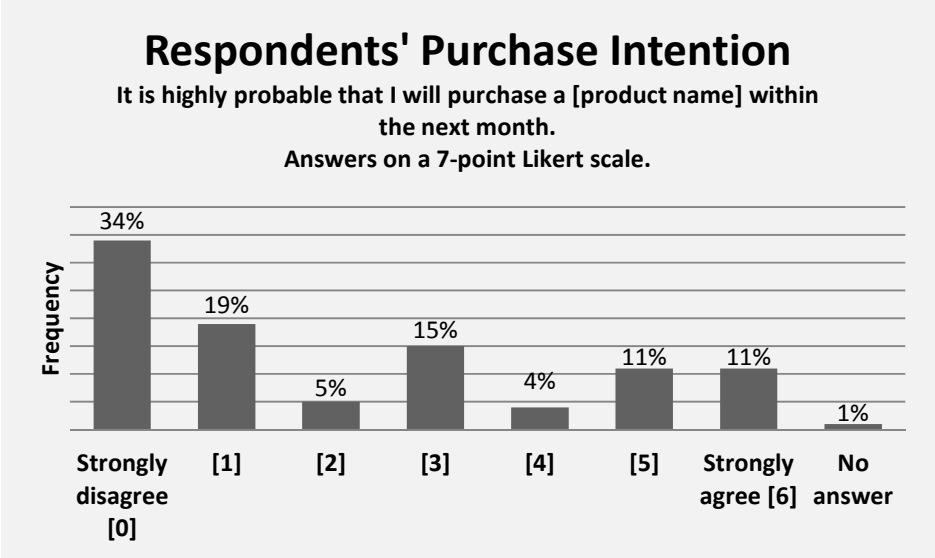
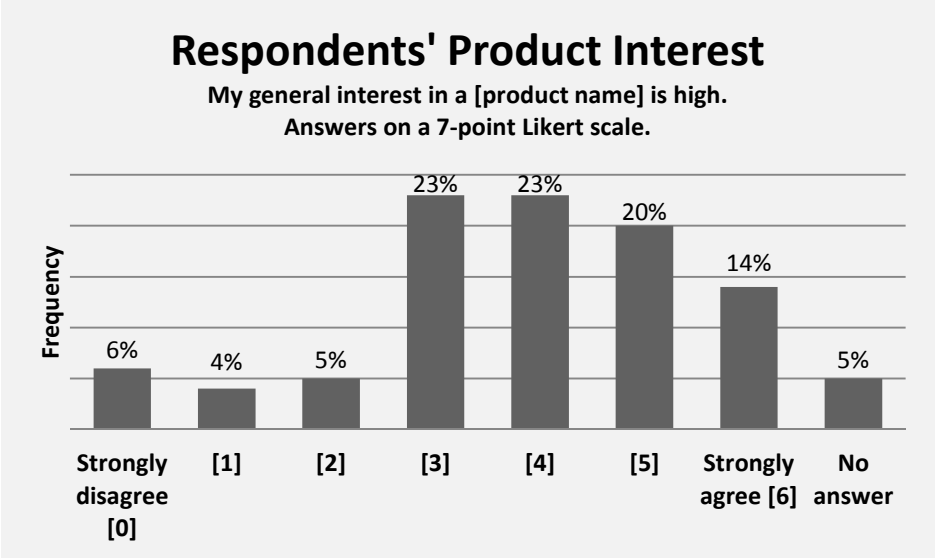


Figure 29: Sample characteristics: Respondents' purchase intention



Moreover, respondents' purchase intention and product interest were addressed. Regarding the purchase intention results suggest that the majority of the respondents (58%) did not have the intention to buy the product they mentioned within the next month. 26% stated that they had the intention to buy the product within the next month and 15% were neutral towards the given statement. The rather small degree of purchase intention can be explained by the mentioned products and their low purchase frequency. As shown in Figure 31 of the 92 mentioned products 72 were rather infrequently bought products such as computers, shoes, photo books, shirts, cars, or furniture. Consequently, it seems reasonable that respondents tended to state that they did not have the intention to purchase the product within the next month.

Figure 30: Sample characteristics: Respondents' product interest



Concerning respondents' product interest it can be observed that the majority (57%) indicated to be interested in the product they specified, whereas 15% stated the opposite. 23% of respondents neither agreed nor disagreed to be interested in the product. Those findings suggest that individuals seem to use MC for products they have an interest for.

Figure 31: Sample characteristics: Products mentioned by respondents

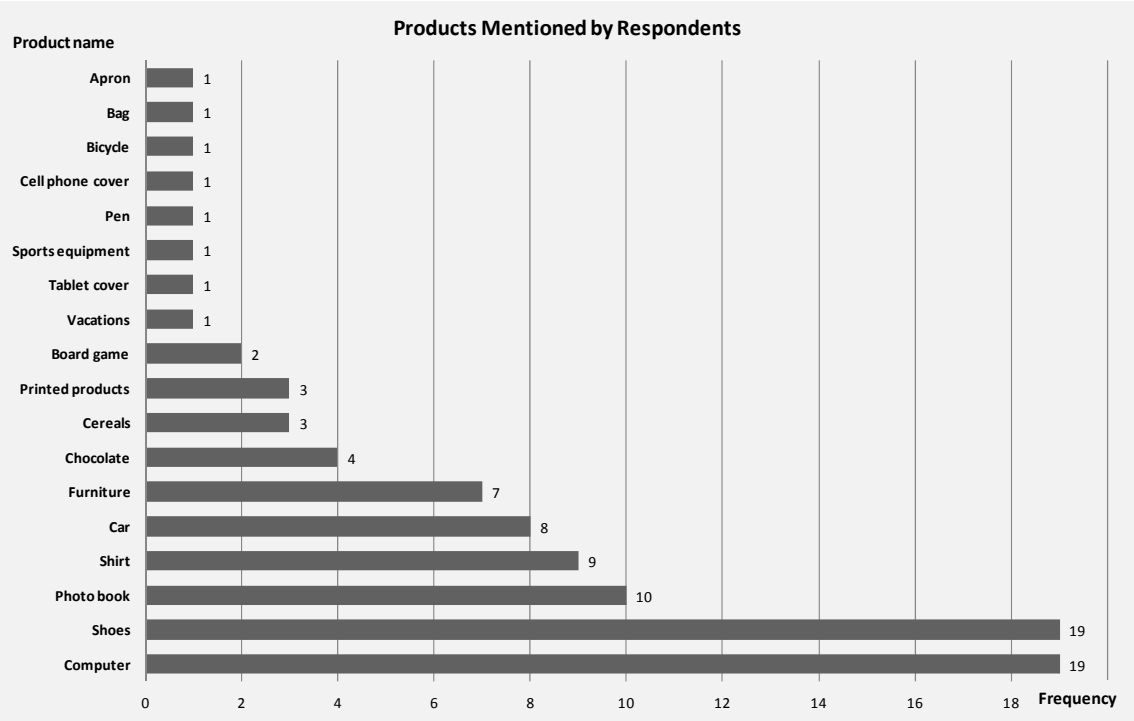
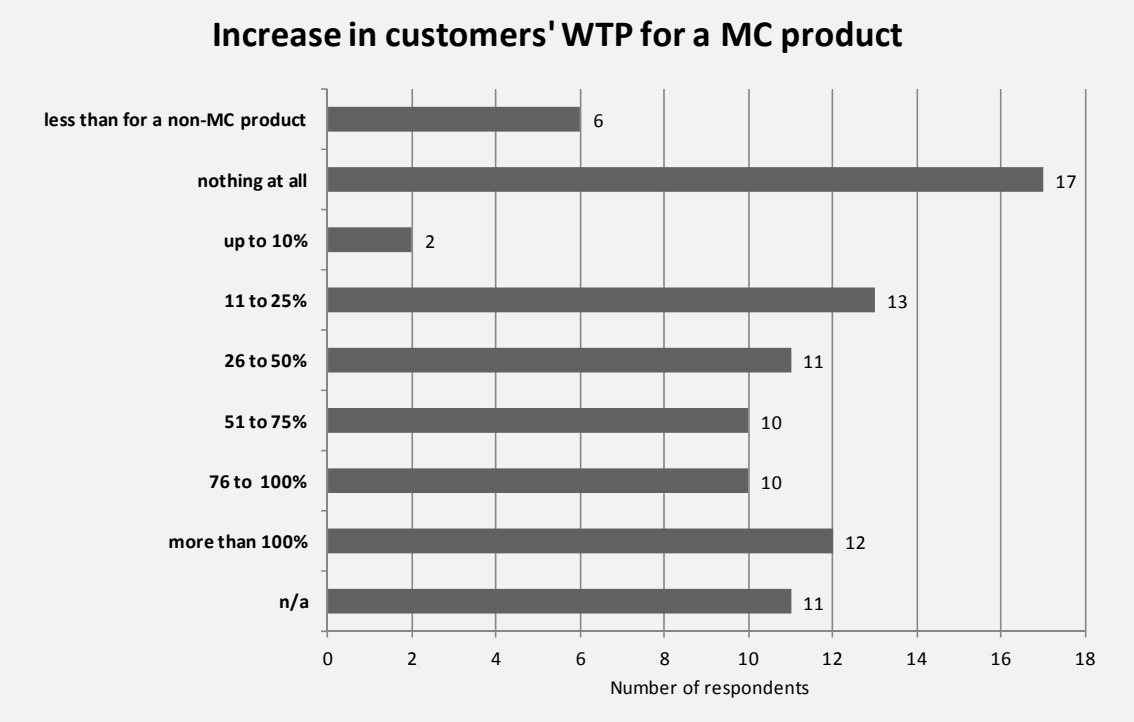


Figure 31 shows the products respondents indicated to have customized. The mentioned products were categorized and combined in 18 different product groups. The three most frequently mass customized products, namely computers, shoes, and photo books, account for 51% of the mentioned products. The product category 'computer' includes desktop, laptop, and tablet computers. The products that have been subsumed in the 'shoes' category include sneakers, football boots, thongs as well as formal footwear. The category 'shirt' accounts for t-shirts as well as dress-shirts. 'Printed products' include customized calendars, pillows, and stickers.

The differences between respondents' WTP for the mass customized product they mentioned and a comparable not mass customized product are displayed in Figure 33. Due to the prevalence of a few product categories in the sample a great part of the categories is represented by a small number of respondents. For example, the product categories 'apron', 'bag', 'bicycle', 'cell phone cover', 'pen', 'sports equipment', 'tablet cover, or

'vacations' are each represented by only one respondent. This results in more extreme values as the differences are not averaged. In cases where multiple respondents indicated their WTP for a mass customized and a non-mass customized product, the answers were averaged. For example, the average increase in the WTP for a mass customized computer is 20%, however, as can be observed in Table 31 (Appendix G), the answers from the 19 respondents range from -17% to 75%.

Figure 32: Categorization of the increase of customers' WTP

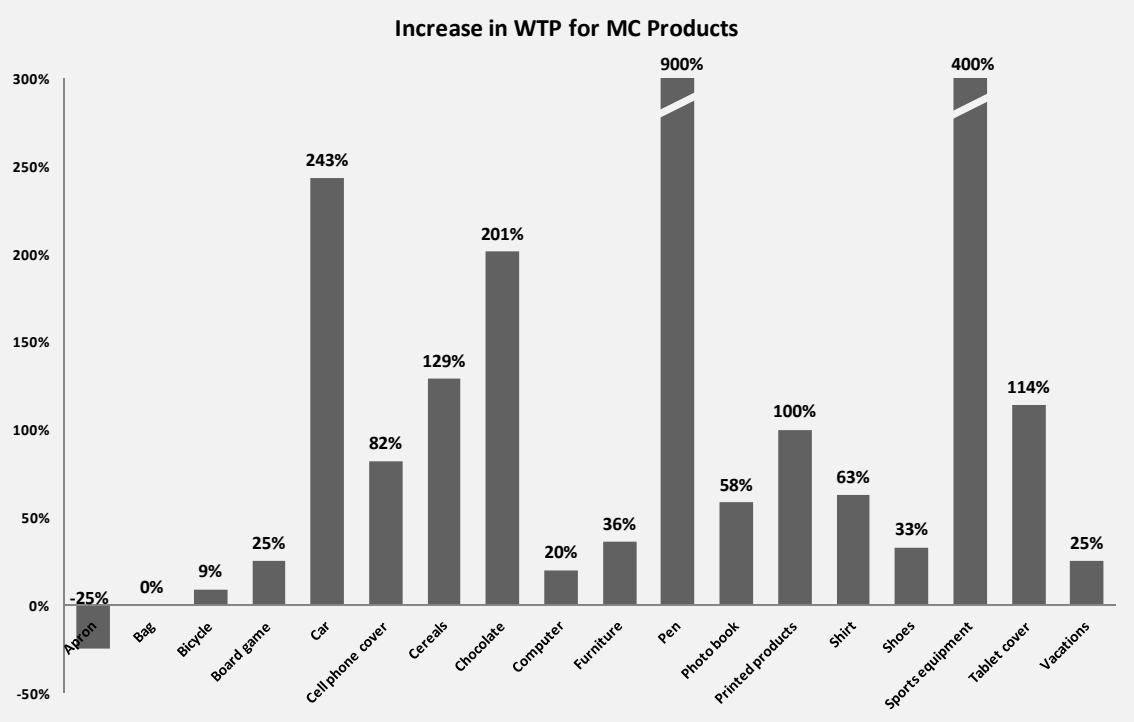


Further, the two most extreme increments of 900% and 400% can be explained, on the one hand, by the fact that each statement was of a single person and, on the other hand, by a relative low price for the standard product. Similarly, the average increase in respondents' WTP for a mass customized car is biased, on the one hand, by one extreme answer and, on the other hand, by the fact that two respondents did not specify a price for a comparable product, which results in a small sample size. Without the one extreme answer the average increase in the WTP for a mass customized car would be 112%. The strong increment in respondents' WTP for chocolate might also be founded in a general low price for the standard product.

In conclusion, it can be summarized that respondents mentioned a variety of products that differ substantially. The sample includes products that are both frequently and infrequently bought as well as high and low priced products. Further, the data provides

support for a highly varying value perception of customers, expressed as WTP. The mean increases in customers' WTP for a customized product compared to a non-customized product are shown in the following figure. It can be observed that customers' increases in WTP vary substantially. While the extreme increases in WTP for a pen and sports equipment are represented by only one respondent, it can be observed that some products categories exhibit moderate increases whereas other categories show rather high increases of over 100%.

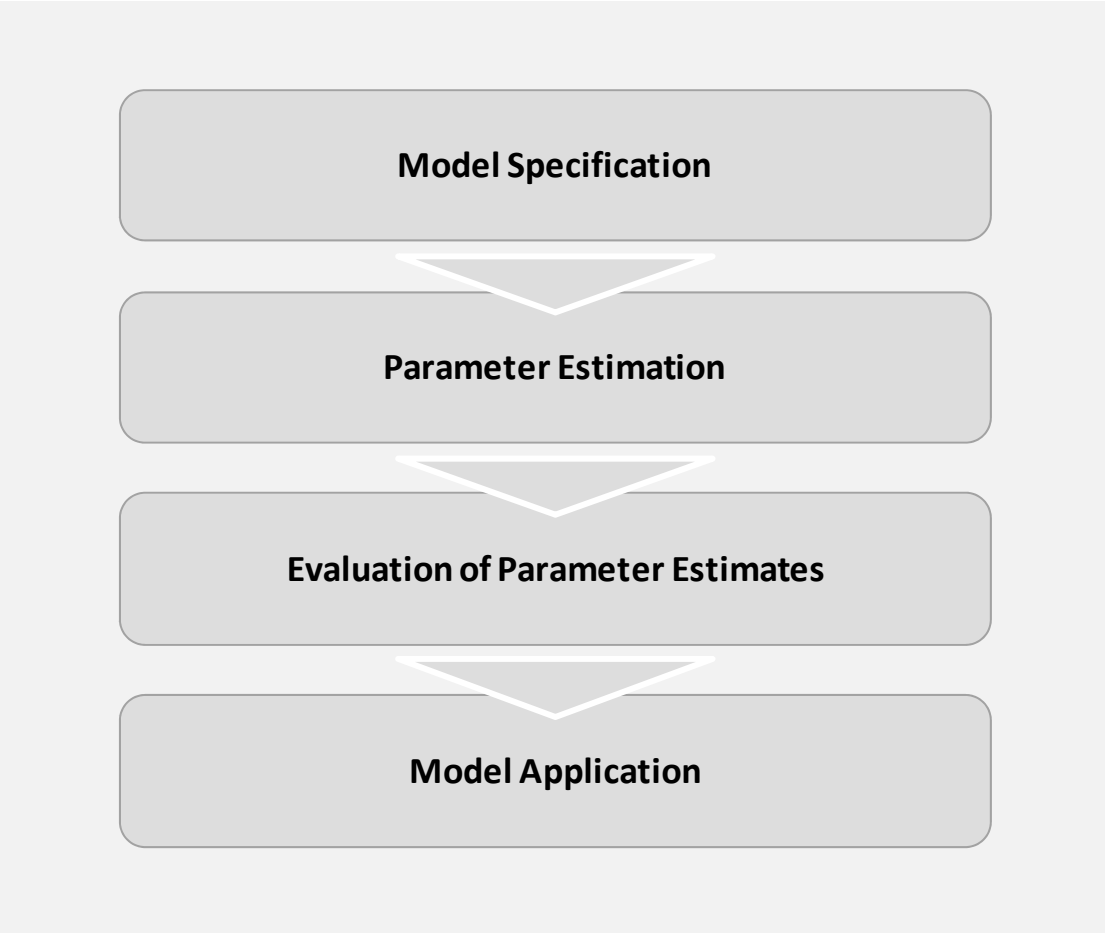
Figure 33: Increase in WTP for MC products



2. Applied Statistical Methods

As suggested by the motivational theories discussed earlier, the behavior of individuals is unlikely to be explained by a single factor. Therefore, the approach used to examine the relevance of the different factors illustrated in the research model aims at evaluating which of the number of hypotheses is best. This approach has been referred to in the literature as the method of competing hypotheses. Compared with the approach of analyzing one dominant hypothesis in order to make a null hypothesis invalid, in this way objectivity is enhanced, since various hypotheses are assessed and factors, which explain individuals' behavior best, are determined (Kaplan et al., 2007).

Figure 34: General modeling procedure; source: Wold, 1989



In addition, due to the complexity of individuals' behavior, it is likely that some factors do not only have a direct but also a moderating effect. That is, the direction or the strength of a relation between an independent and dependent variable might be affected by a third moderating factor. Therefore, in order to achieve a comprehensive understanding of the factors influencing customers motivation to use MC the set of competing

hypotheses developed in the previous section and moderating impacts will be examined. The approach taken to do so is based on SEM, since "[…] Structural Equation Modeling (SEM) enables researchers to answer a set of interrelated research questions in a single, systematic, and comprehensive analysis by modeling the relationships among multiple independent and dependent constructs simultaneously (Gerbing and Anderson, 1988 in Gefen et al., 2000, p. 3&4)."

The structural model relates the theoretical construct to each other, whereas the measurement model relates the constructs to their measures. Latent constructs or research constructs are variables that cannot be measured directly. In order to capture latent constructs items, which measure the construct, have to be developed. Through the measurement items latent constructs are represented and the empirical data gathered either reflect or form latent constructs. Therefore, items are referred to as either reflective or formative. Arrows pointing to a latent variable indicate that the measurement variables form the construct. Arrows pointing away from a latent variable indicate that the measurement variables reflect the construct. That is to say, formative variables cause a latent construct whereas reflective variables represent it.

Usually, latent variables are estimated based on several observed variables. However, some of the constructs included in the research model are explained by single items. This is adequate for constructs that are based on established scales with known reliability or when construct can be measured with only one item, which is assumed to have little or no measurement error as it is the case for gender or age (Hair et al., 1998). More specifically in the analyzed model, the constructs representing customers' MC experience, WTP, and the product purchase frequency are reflected by one item. Customers' WTP a price premium, however, is based on two questions addressing customers' WTP for a mass customized and a comparable non-mass customized product. The price premium is calculated as the difference between the two answers and used to represent customers' increased WTP.

The determination of the appropriate relationships between measures and constructs is of great relevance, since the proper specification of the measurement model is a prerequisite for the meaningful interpretation of the structural model (Jarvis et al., 2003). In order to correctly specify the latent variables as formative or reflective, we followed the decision rules presented in the following table.

Table 19: Decision rules for determining whether a construct is formative or reflective; source: Jarvis et al., 2003

Formative model	Reflective model
Direction of causality is from items to construct. Indicators are defining characteristics of the construct. Changes in the indicators should cause changes in the construct. Changes in the construct do not cause changes in the indicators.	Direction of causality is from construct to items. Indicators are manifestations of the construct. Changes in the indicator should not cause changes in the construct. Changes in the construct do cause changes in the indicators.
Indicators need not be interchangeable. Indicators need not have the same or similar content. Indicators need not share a common theme. Dropping an indicator may alter the conceptual domain of the construct.	Indicators should be interchangeable. Indicators should have the same or similar content. Indicators should share a common theme. Dropping an indicator should not alter the conceptual domain of the construct.
Not necessary for indicators to covary with each other. A change in one of the indicators should not necessarily be associated with changes in the other indicators.	Indicators are expected to covary with each other. A change in one of the indicators should be associated with changes in the other indicators.
Nomological net for the indicators may differ. Indicators are not required to have the same antecedents and consequences.	Nomological net for the indicators should not differ. Indicators are required to have the same antecedents and consequences.

The election of the appropriate method to analyze the data was guided by a number of considerations. First, the proposed conceptual model consists of 17 latent variables which make it fairly complex. Second, the sample size (n=92) was relatively small. Third, a rather great number of hypothesis and causal relations between constructs were suggested. Ringle et al. (2012, p. vii) state that "[…] PLS-SEM overcomes problematic model identification issues and that it is a powerful method to analyze complex models using smaller samples." Therefore and, more importantly, because PLS-SEM is primarily used for explorative work and predictions (ibid.) we decided to employ this approach in order to analyze the obtained data.

"[…] SEM not only assesses the structural model – the assumed causation among a set of dependent and independent constructs – but, in the same analysis, also evaluates the

measurement model – loadings of observed items (measurements) on their expected latent variables (constructs) (Gefen et al., 2000)." This makes SEM a powerful tool that allows analyzing the measurement errors of the observed variables and carrying out factor analysis jointly with hypothesis testing.

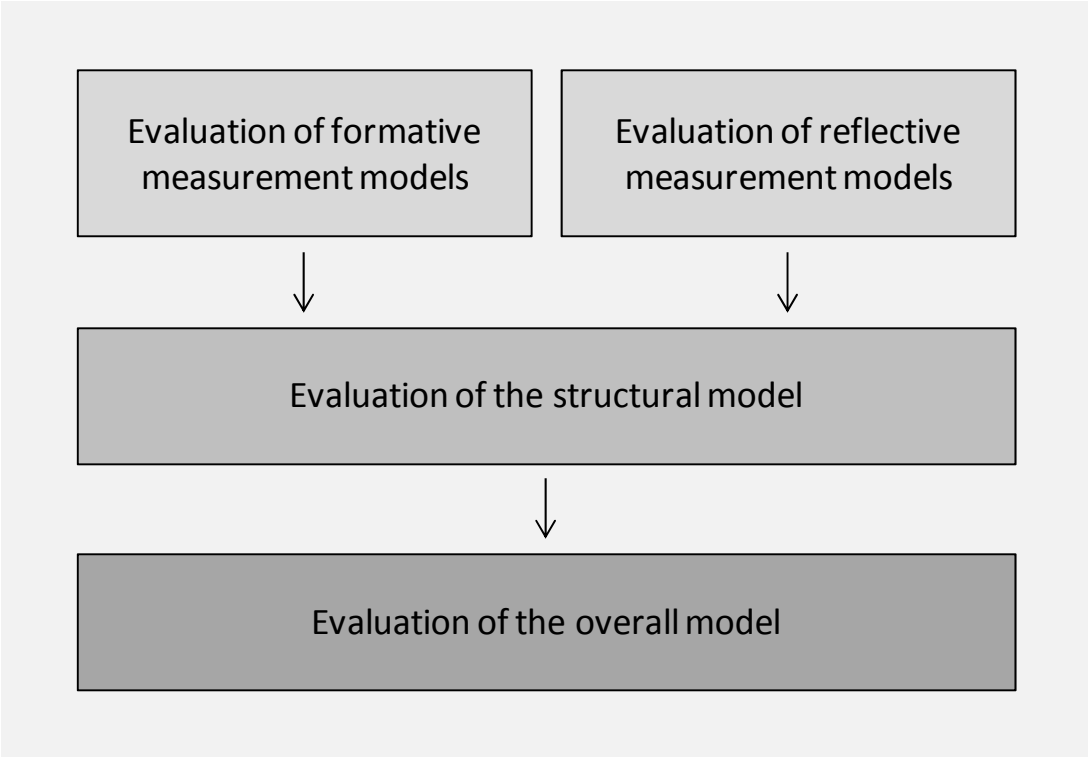
Table 20: Comparative analysis between techniques; source: Gefen 2000

Issue	LISREL	PLS	Linear Regression
Objective of overall Analysis	Show that the null hypothesis of the entire proposed model is plausible, while rejecting path-specific null hypotheses of no effect.	Reject a set of path-specific null hypotheses of no effect.	Reject a set of path-specific null hypotheses of no effect.
Objective of variance analysis	Overall model fit, such as insignificant χ^2 or high AGFI.	Variance explanation (high R-square)	Variance explanation (high R-square)
Required theory base	Requires sound theory base. Supports confirmatory research.	Does not necessarily require sound theory base. Supports both exploratory and confirmatory research.	Does not necessarily require sound theory base. Supports both exploratory and confirmatory research.
Assumed distribution	Multivariate normal, if estimation is through ML. Deviations from multivariate normal are supported with other estimation techniques.	Relatively robust to deviations from a multivariate distribution.	Relatively robust to deviations from a multivariate distribution, with established methods of handling non-multivariate distributions.
Required min. sample size	At least 100-150 cases.	At least 10 times the number of items in the most complex construct.	Supports smaller sample sizes, although a sample of at least 30 is required.

The recommendation for the minimum sample size of the PLS approach is to have at least 10 times the number of items in the most complex construct (see Gefen, 2000). The most complex construct in our proposed research model has six items. Following

the recommendation suggests a minimum sample size of 60. The actual sample size of 92, after the elimination of incomplete data sets, exceeded the required minimum. Therefore, the actual sample size was adequate for analyses with the PLS approach. Figure 35 illustrates the general evaluation procedure for PLS-model estimates that we followed.

Figure 35: Procedure to evaluate PLS-model estimates; source: Nitzl, 2010



3. Data Analyses and Results

The proposed research model was tested conducting data analyses for the measurement and the structural model. The hypothesized structural model was estimated using SmartPLS 2.0 with partial least squares (PLS)-method (Ringle et al., 2005). Before the models were analyzed, data were examined for out-of-range responses and missing values. Missing values were replaced by means and data sets with more than 15% missing values were eliminated. For significance testing the bootstrapping resampling method was used. The number of bootstrap samples was set to 200 and the number of cases was specified accordingly to the sample size (n=92). Further, the algorithmic parameter settings were completed by selecting the 'no sign changes' option. The following table shows the recommended ranges for the quality criteria for model evaluation. Specifically, we analyzed discriminant validity, internal consistency reliability, and convergent validity.

Table 21: Evaluation criteria for reflective measurement models; source: Nitzl, 2010

Quality criterion	Description	Recommended range
Indicator reliability	Degree to which the indicator's variance is explained by the construct	Loading $\lambda_i \geq 0,7$
Construct reliability	Degree explaining the correlation between indicators belonging to the same construct	Construct reliability $\rho_c \geq 0,6$
Average variance extracted (AVE)	Degree explaining the amount of variance that is captured by the latent variable in relation to the measurement error	AVE $\geq 0,5$
Discriminant validity	Degree of measurement difference of different constructs	Square root of AVE should be higher than the value of the latent variable's correlation with other latent variables

In order to assess the measurement model for reliability, internal consistency needs to be estimated. For the assessment of construct validity, tests of convergent and discriminant validity have to be carried out (Kim et al., 2008). Internal consistency was calculated using Cronbach's α and Fornell's composite reliability. The obtained results are shown in Table 22.

Table 22: Assessment of measurement model

	Average Variance Extracted	Composite Reliability	Cronbach's Alpha	Communality	Redundancy
Ability to express preferences	0,5932	0,8133	0,6552	0,5932	0,0442
Autonomy	0,6367	0,8973	0,8574	0,6367	0,0320
Effort	0,7573	0,9035	0,8405	0,7573	0,0438
Effort * Psy. ownership	0,6721	0,9608	0,9555	0,6721	0,0000
Existing solutions	0,5552	0,6928	0,2572	0,5552	0,0000
Feedback	0,6484	0,8799	0,8236	0,6484	0,0000
Fit	0,5418	0,8224	0,7118	0,5418	0,0566
Frequency	1	1	1	1,0000	0,0000
Joy	0,5842	0,8467	0,7588	0,5842	0,1332
Luxury level	0,5189	0,8088	0,6904	0,5189	0,0000
MC experience	1	1	1	1,0000	0,0000
Preference insight	0,6242	0,7631	0,4348	0,6242	0,0000
Pride of authorship	0,8155	0,9299	0,887	0,8155	-0,3769
Product involvement	0,7902	0,9575	0,9465	0,7902	0,0000
Psy. ownership	0,5731	0,8423	0,7493	0,5731	0,1159
Psy. ownership * Enjoyment	0,5838	0,9571	0,955	0,5838	0,0000
Uniqueness	0,626	0,8333	0,7145	0,6260	0,1351
Visibility	0,6025	0,8561	0,7796	0,6025	0,0000
WTPPP	1	1	1	1,0000	0,0010

The Cronbach reliability coefficients of two constructs ('preference insight' and 'existing solutions') had lower scores than the minimum cutoff score of 0,60. However, the composite reliability score for both constructs were greater than 0,60 implying internal consistency. Composite reliability is said to be a better measure of internal consistency due to the fact that it relies on the actual loadings, contrary to Crombach's α, which assumes that all items have the same weight (Nitzl, 2010). The slightly below 0,7 score of 'existing solutions' is a critical but acceptable value. It exceeds the benchmark of 0,60 recommended by Fornell and Larcker (1981). Therefore, the indicators suggest that a high internal reliability for the data exists.

Moreover, construct validity was examined by assessing convergent and discriminant validity. Convergent validity is given when the t-values of the outer model loadings are above 1,96 (Gefen and Straub, 2005). Table 28 (Appendix C) indicates that this is the case. Subsequently, the Average Variance Extracted (AVE) was examined. AVE explains the degree to which the variance of the measurement items can be accounted for by the constructs. AVE should be greater than 0,5. All construct exhibit scores for AVE greater than 0,5. Furthermore, communality and redundancy have been analyzed. Communality is "the ratio of the variance associated with the common factor to the total variance of an observed variable" (Fuller, 1987 in Ree and Caretta, 2006, p. 108). Communality may be interpreted as the reliability of the indicator. No guide values exist for communality, however, practical evidence suggests that values should be above 0,4. Redundancy refers to a construct's variance that is shared by its predictors and should take low values. As can be observed in Table 22 values for communality and redundancy are adequate.

Discriminant validity was evaluated according to the Fornell-Larcker criterion. Correlations between the variables should be lower than the square root of the corresponding AVE. As can be observed in Table 30 (Appendix E) this is the case for all variables except the moderating effect psychological ownership*enjoyment, which correlates higher with psychological ownership. Moreover, examining cross loadings, namely the correlation between manifest variables and other latent variables included in the model, is another criterion for determination of discriminant validity. Indicators should load highest on their corresponding construct. That is to say factor loading of manifest variables and their construct should be higher than their cross loadings. As can be observed in Table 27 (Appendix B) this is the case. Therefore, discriminant validity is given.

Given the positive results for the analysis of discriminant validity, internal consistency reliability, and convergent validity the structural model, in which the assumed relationships between latent variables are specified, can be evaluated. In order to do so we estimate the coefficients of determination (R^2), path coefficients, and effect sizes. In Table 23 the fundamental criteria for the evaluation of the structural model are summarized in order to provide guidance. The coefficients of determination (R^2) and the path coefficients give information about how well the model performs. More specifically, the coefficients of determination indicate the portion of explained variance in relation to overall variance. Values for R^2 can be between 0 and 1. A value of 0 signifies that the variance

of the endogenous variable is not explained by their corresponding latent variables. In turn, a value of 1suggests, that the variance of the endogenous variable is completely explained by the latent variables that are assigned to it. For the interpretation of a path coefficient not only its value needs to be taken into account but also whether it is significant and whether its value is positive or negative. Standardized path coefficients can take values ranging from -1 to 1 which indicate a strong negative, respectively positive, influence of the latent variable on the construct it points to. A value of 0 suggests that the latent variable does not have an impact on its causal successor.

Table 23: Evaluation criteria for structural model; source: Nitzl, 2010

Quality criterion	Description	Recommended range
Coefficients of determination (R^2)	Portion of explained variance of an endogenous variable	$R^2 \geq 0{,}67$ 'substantial' $0{,}33 \leq R^2 < 0{,}67$ 'moderate' $0{,}19 \leq R^2 < 0{,}33$ 'weak'
Path coefficients	Dimension and significance of causal relations between constructs	$t \geq 1{,}65$ ~ confidence interval of 90% $t \geq 1{,}96$ ~ confidence interval of 95% $t \geq 2{,}58$ ~ confidence interval of 99%
Effect size	Influence of exogenous variables on endogenous variables	$f^2 \geq 0{,}35$ 'strong' $0{,}15 \leq f^2 < 0{,}35$ 'moderate' $0{,}02 \leq f^2 < 0{,}15$ 'weak'
Predictive relevance (Q^2)	Measure of goodness with which the values observed are reconstructed by the model and its parameters	$Q^2 > 0$ Predictive power is given $Q^2 \geq 0{,}35$ 'strong' $0{,}15 \leq Q^2 < 0{,}35$ 'moderate' $0{,}02 \leq Q^2 < 0{,}15$ 'weak'

Table 24 shows the values obtained for the coefficients of determination and the path coefficients. In general, R^2 values should exhibit high scores in order to confirm that the proposed model represents the variance of an endogenous variable adequately. However, this requires that all relevant parameters are included in the model. Before a detailed discussion of the findings is given in the last chapter, it should be noted that a rather low R^2 value for customers' WTP a price premium can be explained by the fact that the WTP measure is only one of many determinants of 'value for the customer'. The perception of value might also be reflected in other sacrifices such as time and energy invested in the elaboration of the customized product. Nevertheless, high R^2 values for perceived preference fit, perceived product uniqueness, feelings of psychological ownership, and feelings of pride of authorship indicate that the model provides good expla-

nations for their variance, whereas somewhat lower R^2 values for perceived process enjoyment and perceived process effort indicate a weaker representation.

Table 24: R^2 of latent variables

Latent variable	R^2	Indicators of the LV	Coefficient & (t-value)
Preference fit	0,408	Ability to express	0,2876 (3,6454**)
		Feedback	0,0884 (2,0837*)
		MC experience	0,0583 (1,8453)
		Pride of authorship	0,2208 (2,121*)
		Product involvement	0,2094 (2,0262*)
		Product uniqueness	0,3361 (3,6912**)
		Visibility	0,1586 (3,3761**)
Process enjoyment	0,259	Autonomy	0,452 (4,0957**)
		Feedback	0,1117 (2,0671*)
Process effort	0,242	Autonomy	0,1721 (1,7492)
		Existing solutions	0,4291(5,2249**)
Product uniqueness	0,419	Autonomy	0,4952 (6,1878**)
		Feedback	0,1135 (2,2254*)
		Preference insight	-0,32 (2,4285*)
		Product visibility	0,3483 (4,7034**)
Psy. ownership	0,581	Autonomy	0,3111 (2,7203**)
		Luxury level	0,3057 (3,941**)
		Product visibility	0,393 (4,5982**)
Pride of authorship	0,546	Existing solution	-0,228 (2,086*)
		Feedback	0,2349 (2,6352**)
		Preference insight	-0,076 (1,7215)
		Process effort	-0,531 (2,1857*)
		Product uniqueness	0,2384 (2,6804**)
		Product visibility	0,2711 (2,7184**)
WTP	0,180	Autonomy	-0,403 (2,3426*)
		Purchase frequency	-0,2 (3,0205**)
		Luxury level	-0,27 (2,4529*)
		Psy. ownership	-0,884 (3,5824**)
		Product visibility	-0,354 (2,6439**)

*: p-value=0,05; **: p-value=0,01

Regarding the path coefficients values inferior to -0,2 or superior of 0,2 are said to be meaningful. The significance of the path coefficients can be determined with the help of the pseudo t-statistics from the bootstrapping procedure. In Table 23 the confidence

intervals and their corresponding t-values are shown. Path coefficients that are negative imply that the preceding construct influences its successor negatively. The obtained path coefficients can be observed in Table 25.

Table 25: The result of testing the proposed model

Hypothesis	Path	Coefficient & (t-value)	Results
H1a	Ability to express preferences → preference fit	0,2876 (3,6454**)	S
H1b	Existing solutions → process effort	0,4291 (5,2249**)	S
H1c	Availability of feedback → pride of authorship	0,2349 (2,6352**)	S
H1d	Availability of feedback → autonomy	0,2292 (2,3327*)	S
H2a	Product involvement → preference fit	0,2094 (2,0262*)	S
H2b	Luxury level → psy. ownership	0,3057 (3,941**)	S
H2c	Purchase frequency (negatively) → WTP	-0,2 (3,0205**)	S
H3a	Preference insight → ability to express preferences	0,4866 (4,6279**)	S
H3b	Preference insight → product uniqueness	-0,32 (2,4285*)	S
H3c	MC experience → ability to express preferences	0,2028 (2,0829*)	S
H4a	Product visibility → product uniqueness	0,3483 (4,7034**)	S
H4b	Product visibility → pride of authorship	0,2711 (2,7184**)	S
H4c	Product visibility → psy. ownership	0,393 (4,5982**)	S
H5a	Autonomy → preference fit	0,1644 (1,277)	R
H5b	Autonomy → process enjoyment	0,452 (4,0957**)	S
H5c	Autonomy → psy. ownership	0,3111(2,7203**)	S
H5d	Autonomy → process effort	0,1721 (1,7492)[1]	S
H5e	Autonomy → product uniqueness	0,4952 (6,1878**)	S
H6	Process effort → pride of authorship	-0,531 (2,1857*)	S
H7a	Preference fit → process enjoyment	0,16 (1,5739)	R
H7b	Preference fit → WTP	-0,04 (0,3006)	R
H8	Process enjoyment → WTP	-0,285 (1,4642)	R
H9a	Product uniqueness → preference fit	0,3361(3,6912**)	S
H9b	Product uniqueness → pride of authorship	0,2384 (2,6804**)	S
H10a	Psy. ownership → pride of authorship	-0,011(0,0588)	R
H10b	Psy. ownership → WTP	-0,884 (3,5824**)	R
H11	Pride of authorship → preference fit	0,2208 (2,121*)	S

[1]: p-value=0,1; *: p-value=0,05; **: p-value=0,01; S=hypothesis supported; R= hypothesis rejected

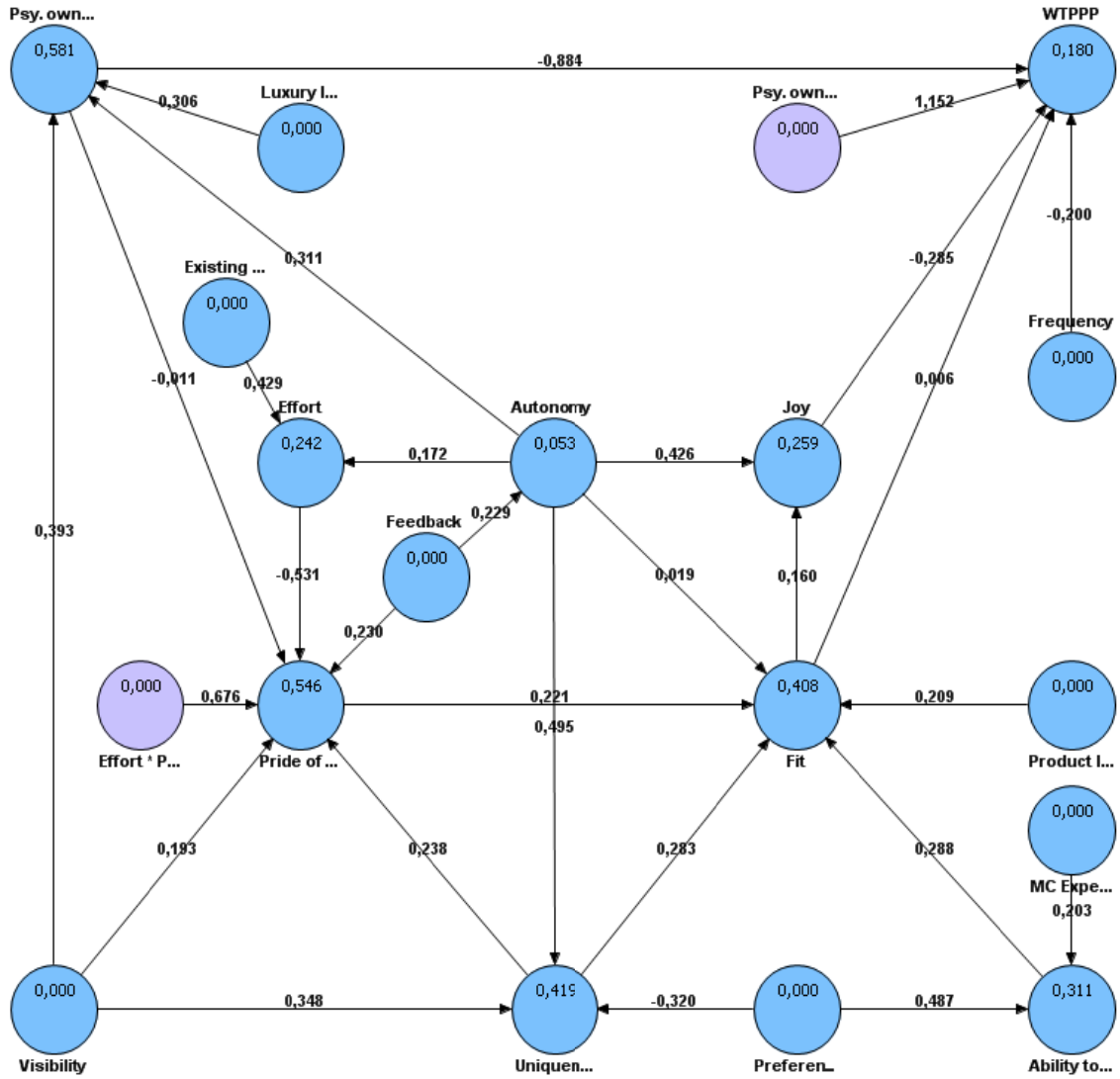
Lastly, the analysis of the model is completed with the cross-validated redundancy index (Q^2) or Stone-Geisser test (Stone, 1974; Geisser, 1975) in order to evaluate the predictive power of the investigated model. Although, the aim of PLS analysis is to explain variance in a sense of regression, which is done by examining R^2 and path coefficients values, Q^2 values provide additional evidence of how well the model performs. The obtained results can be observed in Table 26. The Q^2-communality values refer to the measurement model wherease the Q^2-redundancy values refer to the structural model. Q^2 values should be greater than zero in order to indicate that the model has predictive relevance. A negative Q^2 value suggests that the corresponding relation is misleading. Taking into account the recommended ranges for Q^2 shown in Table 23 the results suggest that especially the constructs of pride of authorship, process effort, and autonomy as well as the moderating effect of effort*psychological ownership have a strong influence on the predictive power of the model. Given the good results for both Q^2 and R^2 values we can conclude that the proposed model has predictive capacity.

Table 26: Construct crossvalidated communality and redundancy

	Construct Crossvalidated Q^2-Communality	Construct Crossvalidated Q^2-Redundancy
Ability to express preferences	0,2045	0,1489
Autonomy	0,46	0,0294
Effort	0,4986	0,1597
Effort * Psy. ownership	0,6136	
Existing Solutions	-0,0301	
Feedback	0,4113	
Fit	0,2613	0,1783
Frequency	0	
Joy	0,3143	0,1335
Luxury level	0,2186	
MC Experience	0	
Preference insight	0,0277	
Pride of authorship	0,5939	0,3923
Product Involvement	0,5682	
Psy. ownership	0,2883	0,3161
Psy. ownership * Enjoyment	0,5378	
Uniqueness	0,2735	0,2033
Visibility	0,3498	
WTPPP	0	0,097

In conclusion, it can be asserted that of the proposed hypotheses 6 are rejected and 19 are supported by the empirical data. The R^2 scores for the key value drivers of MC suggest that explanatory power of the estimated model is good. The suggested causal relationships between product and MC process factors as well as customer characteristics are validated. The structural model and the obtained R^2 values as well as path coefficients are portrayed in the following figure. For an illustration of the measurement model refer to Appendix F. The implications of the results are discussed more in detail in the following.

Figure 36: Estimated model with values for R^2 and path coefficients



Chapter Five: Discussion, Implications, Limitations, and Future Research

Throughout this chapter the results of the empirical data analyses are discussed in detail. The findings are related to the proposed research model and implications for theory and practice are deduced. Further, the confirmations or disconfirmations of the proposed hypotheses are debated.

Lastly, limitations of the research are addressed and suggestions for future research are made. Especially, the results that conflict with the findings of existing research or are contrary to the hypothesized relations are regarded interesting research opportunities that should receive further attention.

1. Conclusions

The objectives of this research were (1) to establish a comprehensive framework that offers explanations for customers' motivation to use MC, (2) empirically validate the framework, and (3) deduce implications of key motives for the design of MC toolkits. The essential assumption that underlies this research is that the value concept adequately captures the aspects relevant to customers and can consequently be employed to explain customer behavior. However, due to the contingent nature of value and the fact that markets of one are highly heterogeneous the findings from the market research conducted throughout this thesis should be seen as suggestions rather than general conclusions.

Nevertheless, the findings of this research contribute to the body of existing research in several ways. On the one hand, the empirical research did not build on a hypothetical scenario. Respondents of the questionnaire were customers that had used a MC toolkit at least once. The participants expressed their perception of the value of the mass customized product based on their actual experience. Therewith, significant insight has been gained about real world consumer behavior.

On the other hand, in the proposed research model causal relations between the key value drivers of MC and characteristics of products, MC processes, and customers are conceptualized. This provides a comprehensive view of the relevant aspects that determine customers' perceptions and behaviors. In this way the particular relevance of individual factors within the collective has been analyzed and interdependencies between factors have been examined. The empirical validation of the suggested relations provides evidence of the effectiveness of the factors that precede the key value drivers. This is a crucial finding since knowledge about the influence of product, MC process, and customer characteristics allows targeting the key value drivers more efficiently. The particular findings for each key value driver are discussed more in detail in the following.

The results of the data analyses suggest that an individual's perceived preference fit is influenced directly or indirectly by seven factors. Those factors include an individual's ability to express preferences, MC experience, feelings of pride of authorship, product involvement, the provision of feedback, the perceived product uniqueness, and the product's degree of visibility. An individual's ability to express preferences (effect size: 0,288), feelings of pride of authorship (effect size: 0,221), product involvement (effect

size: 0,209), and perceived product uniqueness (effect size: 0,283) influence a customer's perception of the preference fit in a moderate way. A product's degree of visibility (effect size: 0,159) and an individual's MC experience (effect size: 0,058) have a rather weak indirect impact on the perceived preference fit. Surprisingly, the initially proposed effect of the degree of (design) autonomy on the preference fit has not been supported by the data. Nevertheless over 40% of the variance of the perceived preference fit construct is explained by its exogenous variables. This indicates a reasonable explanation supporting well the suggested causal relationships.

Those findings imply that emphasize should be put, on the one hand, on increasing customers' ability to express preferences and product involvement and, on the other hand, delivering unique products and fostering the emergence of feelings of pride. Naturally that leads to the questions what stimulates feelings of pride and what provokes customers to perceive a product as unique. Moreover, what influences one's product involvement and ability to express preferences? The estimated model supports the assumption that MC experience positively influences the ability to express preferences. However, MC experience influences the perceived preference fit only indirectly and in a negligible way. For product involvement no precursor has been conceptualized. Therefore, no causal relationship can be established that would explain an individual's product involvement.

Concerning the perceived product uniqueness, data shows that four factors affect it, namely the degree of (design) autonomy, an individual's preference insight, the provision of feedback, and the product's degree of visibility. The indirect effect of the provision of feedback on the perceived product uniqueness is significant (t-value: 2,2254) but rather weak (effect size: 0,1135). The strongest impact on perceived product uniqueness has the degree of (design) autonomy (effect size: 0,4952), which is accompanied by a fairly strong effect of the degree of product visibility (effect size: 0,3483). Further, an individual's level of preference insight negatively affects the perceived product uniqueness (effect size: -0,32). This implies that customers tend to perceive products as unique when the degree of (design) autonomy is high, a product is rather visible, and customers have a low degree of preference insight. Overall, 41% of the variance of the perceived product uniqueness construct is explained by its exogenous variables.

With respect to the feelings of pride of authorship construct it can be said that it is influenced by the availability of existing solutions, the provision of feedback, an individual's

preference insight, the perceived process effort, the perceived product uniqueness, and the degree of product visibility. Whereas the degree of preference insight exhibits a weak negative effect (effect size: -0,076) on the development of feelings of pride of authorship, the existing solutions construct shows a moderate negative effect (effect size: -0,228) and the perception of the process effort a strong negative effect (effect size: -0,531). This means that the availability of existing solutions prevents in some way that feelings of pride of authorship arise. In the same way the data suggests that a laborious MC process strongly diminishes feelings of pride. Contrary, the provision of feedback influences feelings of pride of authorship in a moderate positive way (effect size: 0,2349).

Those findings suggest that customers should be provided with feedback but not with existing solutions, while attempts should be made to reduce the perception of the process effort in order to facilitate the emergence of feelings of pride of authorship. Further, the findings provide support for moderate positive relations between the feelings of pride of authorship and the perceived product uniqueness as well as products' visibility. That means that customers will be proud to be the author of a mass customized product when the product is visible and they perceive it to be unique. Moreover, feelings of psychological ownership act as a moderator together with the perceived process effort. This implies, contrary to the aforementioned, that a high degree of perceived process effort strongly affects feelings of pride of authorship when feelings of psychological ownership are present. The high explained variance of 54% indicates that the pride of authorship construct is well represented by the variables indicating it.

Regarding customer's perception of the process enjoyment the model estimate suggests that it is strongly influenced by the degree of (design) autonomy (effect size: 0,426) and in a weak indirect way by the provision of feedback (effect size: 0,1117). Our initial assumption that a positive perception of the preference fit would affect the perception of the process enjoyment has not been supported. Due to the small number of exogenous variables indicating the perceived process enjoyment, its R^2 value is rather low. This indicates that the portion of the variance of the perceived process enjoyment is represented in a weak way by the variables pointing to it.

With respect to the construct of perceived process effort the findings provide support for the assumption that it is positively influenced by a high degree of (design) autonomy and the provision of existing solutions. Whereas the degree of (design) autonomy af-

fects the perception of the process effort in a moderate way (effect size: 0,1721), the provision of existing solutions has a strong impact (effect size: 0,4291). But again, the fact that only two exogenous variables indicate the perceived process effort results in a rather low R^2 value (0,242).

Regarding the feelings of psychological ownership the data suggests that the degree of (design) autonomy, a product's luxury level, and the degree of visibility determine it. The degree of visibility exhibits a strong positive effect (effect size: 0,393). The degree of luxury level as well as the degree of (design) autonomy exhibit a high moderate effect (effect size: 0,3057 respectively 0,3111) on the development of feelings of psychological ownership. Although only three variables point towards the construct the relatively high R^2 value suggests that the three exogenous variables explain 58% of the variance of feelings of psychological ownership.

The construct we suggested to measure the additional value provided by MC in its totality is the increase in customers' WTP. The intangible nature of the value concept makes it hard to capture and quantify it. However, our argument is that an increase in the value customers perceive should ultimately be reflected in an increased WTP. The sample data indicates that customers' WTP is influenced by a product's purchase frequency, luxury level, visibility, the degree of (design) autonomy, and a customer's feelings of psychological ownership. Surprisingly, the hypothesized impacts of the perception of the preference fit and the process enjoyment on customers' WTP have not been supported by the data sample.

Further, feelings of psychological ownership show the strongest negative effect (effect size: -0,884) on customers' WTP. Moreover, the results for a product's luxury level and degree of visibility suggest a moderate negative (effect size: -0,27) and a strong negative effect (effect size: -0,354) on customers' WTP. The degree of (design) autonomy also exhibits a strong negative effect (-0,403) on customers' WTP. This is puzzling since it is contrary to findings from other research. However, the strongest effect on customers' WTP by far, has the feelings of psychological ownership construct when moderated by feelings of process enjoyment (effect size: 1,15). Further, a product's purchase frequency seems to impact negatively customers' WTP in a moderate way.

Though customers' WTP a price premium exhibits a rather low R^2 value, explaining 18% of the variance in consumers' WTP for mass customization, we consider this an

acceptable result. In the light of the fact that customers' WTP is influenced by a multitude of factors, it seems reasonable that the additional value of mass customized products accounts only for a portion of the price premium. Michel et al. (2009) explained 16% of customers' WTP with their model, in which they conceptualize the three constructs of 'avoidance of negative attributes', 'desire for unique products', and 'use of products for self presentation' as antecedents of customers' WTP. Other factors that are likely to affect customers' WTP a price premium include an individual's disposable income, brand awareness, risk perception, need perception, or problem awareness. Since those factors were not included in the estimated model they are not accounted for. Further, the low explained variance in customers' WTP could also be founded in the usage of the two direct measurement items.

While the results of the analyses for the key value drivers mainly confirm the hypothesized relations between constructs, an interesting finding is that customers' WTP a price premium for mass customized products varies considerably throughout the mentioned product categories (see Figure 33). As can be observed in Table 31 the data from the sample suggests that customers are not always willing to pay a price premium for a mass customized product. Some extreme increases in customers' WTP might only be applicable to low priced products or be an exception. While most respondents indicated to be willing to pay a price premium for a mass customized product, 17 respondents (18%) stated that they were not willing to pay more than for a not-customized product. Moreover, 6 respondents manifested to be willing to pay less than for a standard product. This indicates that the additional benefits of MC are not always reflected in an increased WTP. A possible explanation could be that the perceived process effort and the invested time reduce customers' WTP.

Further, the product categories that exhibit an increase in customers' WTP of over 100% (pen, sports equipment, chocolate, car, cereals, printed products, and tablet cover) predominantly represent low price products, with 'cars' being an exception. High priced products such as computers, furniture, or bicycles do not exhibit such extreme increases in WTP. This suggests that the increase in customers' WTP for low price products is relatively higher than for high price products. This is exemplified, on the one hand, by the fact that one respondent, who indicated to have customized a pen, stated a WTP for the customized pen that surpassed the WTP for the non-customized pen by 900%. On the other hand, another respondent indicated a WTP for a customized sports accessory

that exceeded the regular WTP by 400%. Respondents that indicated to have customized chocolate also exhibit rather high increases in WTP (mean 201%). Although respondents that indicated to have customized a car also specified relatively high increases in their WTP (mean 243%), this number is somewhat biased by one respondents extreme increase in WTP of 900%. Without that answer the average increase in respondents WTP for a customized car would be 112%. This is still a high increase especially when considering car prices in absolute terms. These findings are important, since they suggest that not all customers are willing to pay for mass customized products in the same way.

Concerning the characteristics of the MC process, namely the degree of (design) autonomy, provision of feedback, and existing solutions the following can be said: Although the degree of autonomy shows a negative relation to customers' WTP it is a central determinant of the perceived process effort, perceived process enjoyment, feelings of psychological ownership, and perceived product uniqueness. In the same way, the provision of feedback during the MC process influences, in a statistically significant way, both the emergence of feelings of pride of authorship and the perceived (design) autonomy during the MC process. Further, to some weaker extent the provision of feedback influences the perceived process enjoyment and the perceived product uniqueness. The availability of existing solutions, on which customers can further build their individual product, positively affects customers' perception of the process effort and negatively impacts the perceived preference fit and feelings of pride of authorship. Taken together, this suggests that the design of MC toolkits should aim to establish a high degree of autonomy and incorporate mechanisms that provide feedback to customers. Further, providing existing solutions to customers does not seem to be advisable since it increases the perceived process effort and reduces feelings of pride of authorship and, to some weaker extent, the perception of the preference fit.

Regarding the relevance of the product characteristics for the value perception of customers the analyzed data suggests the following: A product's degree of visibility is a crucial determinant of customers' value perception as it influences customers' feelings of pride of authorship, feelings of psychological ownership, perception of the preference fit, and perception of the product's uniqueness. Surprisingly, the effect of the degree of visibility on customers' WTP is negative. This means that the positive effects of the degree of visibility do not manifest in an increased WTP. A product's luxury level, on

the other hand, is less influential. The data further suggests that it has a positive influence on the development of feelings of psychological ownership and a negative effect on customers' WTP. Moreover, a product's purchase frequency affects customers' WTP in a negative way. Those findings provide evidence for the assumption that products with a high degree of visibility, luxury level, and purchase frequency are more adequate in order to generate (intangible) value for the customer.

Lastly, regarding the customer characteristics the following can be summarized: A customer's product involvement positively influences the perception of the preference fit. The degree of MC experience further influences a customer's ability to express preferences and to a smaller degree the perception of the preference fit. Further, one's ability to express preferences influences the perceived preference fit positively. With respect to customers' preference insight construct the data suggests that it strongly influences customers' ability to express preferences in a positive way and that it affects the perception of the product's uniqueness negatively. In summary, those findings suggest that customers, who exhibit a high degree of product involvement and a high degree of ability to express preferences, perceive the preference fit of the mass customized product in a superior way. Further, the precursors of one's ability to express preferences are the degree of MC experience and preference insight. However, it should be taken into account that a high degree of preference insight also leads customers to perceive the mass customized product as less unique.

In conclusion, it can be said that the additional value of MC is not only founded in product related benefits but also in the MC process and characteristics of the customer. In this research we have shown which factors precede the key value drivers of MC, how they influence the key value drivers, and how the key value drivers affect customers WTP. The strong influence of feelings of psychological ownership on customers' WTP when moderated by a high perceived process enjoyment suggests that their antecedents should receive special attention in the design of MC offerings. Especially the degree of (design) autonomy in the MC process has been found to be a crucial characteristic of the MC process. Summarizing the results of the analyses it can be said that the estimated research model represents well the causal relations between the constructs. However, the explorative nature of this research should be considered and the findings should be seen as suggestions rather than definite conclusions.

2. Conclusiones en Castellano

Los objetivos de esta investigación han sido (1) plantear un marco extenso que ofrezca explicaciones para la motivación de los clientes a usar MC, (2) validar empíricamente el marco y (3) deducir implicaciones de los motivos principales para el diseño de los 'MC toolkits'. La suposición esencial en la que está basada esta investigación, es que el concepto de valor capte adecuadamente los aspectos relevantes para los clientes y por lo tanto pueda ser empleado para explicar el comportamiento de los clientes. No obstante, dada la naturaleza contingente de valor y el hecho de que las preferencias de los individuos son altamente heterogéneas, los resultados del estudio del mercado realizado a lo largo de esta tesis deberían ser considerados como sugerencias en vez de conclusiones generales.

Sin embargo, los resultados de esta investigación contribuyen a las investigaciones existentes de varias maneras. Por una parte, la investigación empírica no estaba basada en un escenario hipotético. Las personas que han contestado al cuestionario habían usado un 'MC toolkit' por lo menos una vez. Los participantes han expresado su percepción del valor del producto individualizado basándose en su experiencia real. Con ello se han generado conocimientos considerables sobre el comportamiento de clientes reales.

Por otra parte, en el modelo de investigación propuesto, quedan conceptualizadas tanto las relaciones causales entre los factores clave, que determinan el valor de MC, y las características de los productos, del proceso de MC y de los clientes. Eso proporciona una vista comprensiva de los aspectos relevantes que determinan la percepción y el comportamiento de los clientes. De esta manera se ha analizado la relevancia particular de factores individuales en un colectivo y también se han examinado las interdependencias de los factores. La validación empírica de las relaciones propuestas proporciona evidencia del modo de acción de los factores que preceden los factores clave. El resultado es de interés para optimizar las decisiones empresariales en relación a la posibilidad de incorporar clientes a los procesos de innovación porque los conocimientos sobre la influencia de las características del producto, proceso y cliente permiten que se dirijan recursos a los factores clave más eficientes. A continuación presentamos los resultados particulares de cada factor clave más detalladamente.

Los resultados de los análisis de los datos sugieren que la percepción de un individuo de la 'satisfacción de preferencias' (preference fit) queda afectada de manera directa o indirecta por siete factores. Los factores incluyen la 'habilidad de expresar sus preferencias' (ability to express preferences), la 'experiencia con MC' (MC experience), los 'sentimientos de orgullo de autoría' (feelings of pride of authorship), 'involucración del producto' (product involvement), 'disponibilidad de feedback' (provision of feedback), 'percepción de la unicidad del producto' (perceived product uniqueness) y 'nivel de visibilidad' (degree of visibility). La percepción de la 'satisfacción de preferencias' está moderadamente influida por la 'habilidad de expresar preferencias' (tamaño del efecto: 0,288), los 'sentimientos de orgullo de autoría' (tamaño del efecto: 0,221), la 'involucración del producto' (tamaño del efecto: 0,209) y la 'percepción de la unicidad del producto' (tamaño del efecto: 0,283). El nivel de visibilidad de un producto (tamaño del efecto: 0,159) y la experiencia de un individuo con MC (tamaño del efecto: 0,058) tienen un efecto indirecto débil en la percepción de la satisfacción de preferencias. Sorprendentemente el efecto propuesto inicialmente del 'nivel de autonomía' en la percepción de la percepción de la satisfacción de preferencias no ha sido respaldado por los datos. No obstante el 40% de la varianza del constructo 'percepción de la satisfacción de preferencias' está explicado por sus variables exógenas. Eso indica una explicación razonable respaldando adecuadamente las relaciones causales propuestas.

Estos resultados implican que las organizaciones deberían de poner más énfasis a la hora de identificar y poner en marcha mecanismos que aumenten en sus clientes la 'habilidad de expresar preferencias' y la 'involucración del producto', para proporcionar el sentimiento de productos únicos y promover sentimiento de orgullo. Naturalmente eso lleva a las preguntas: ¿qué estimula los sentimientos de orgullo? ¿Qué provoca a los clientes el percibir un producto como único? ¿Qué factores influyen en la 'involucración del producto' y en la 'habilitad de expresar preferencias' de un individuo? El modelo estimado respalda la suposición que la experiencia con MC afecta positivamente la 'habilidad de expresar preferencias'. Sin embargo la experiencia con MC afecta a la percepción de la 'satisfacción de preferencias' sólo de una manera indirecta y leve. Para la 'involucración del producto' no se ha sido conceptualizado ningún precursor. Por lo tanto no se puede establecer ninguna relación causal que pueda explicar la 'involucración de un individuo en el producto'.

Con respecto a la percepción de la unicidad del producto, los datos demuestran que está afectada por cuatro factores, los cuales son, el 'grado de autonomía', el 'conocimiento de preferencias' de un individuo (preference insight), la disponibilidad de 'feedback' y el grado de 'visibilidad' de un producto. El efecto indirecto de la disponibilidad de 'feedback' en la percepción de la unicidad del producto es significativo (t-valor: 2,2254) pero débil (tamaño del efecto: 0,1135). El impacto más fuerte en la percepción de unicidad del producto se da por el nivel de 'autonomía' percibida (tamaño del efecto: 0,4952), el cual está acompañado por un efecto bastante fuerte del grado de 'visibilidad del producto' (tamaño del efecto: 0,3483). Además, el nivel de 'conocimiento de las propias preferencias' de un individuo afecta negativamente a la percepción de la 'unicidad del producto' (tamaño del efecto: -0,32). Eso implica que los clientes tienden a percibir productos como únicos cuando el nivel de autonomía en el proceso de MC es alto, el producto es visible y los clientes tienen pocos conocimientos de sus preferencias. En total el 41% de la varianza del constructo de la percepción de la unicidad del producto queda explicada por sus variables exógenas.

En referencia al constructo 'sentimientos de orgullos de autoría' se puede decir que está afectado por la 'disponibilidad de soluciones existentes' (availability of existing solutions), la disponibilidad de 'feedback', 'conocimientos de las propias preferencias', 'esfuerzo del proceso percibido' (perceived process effort), 'percepción de unicidad del producto' y 'grado de visibilidad del producto'. Mientras que el nivel de 'conocimientos de las propias preferencias' exhibe un débil efecto negativo (tamaño del efecto: -0,076) en el desarrollo de 'sentimientos de orgullos de autoría', el constructo de 'soluciones existentes' muestra un efecto moderado negativo (tamaño del efecto: -0,228) y la percepción del 'esfuerzo del proceso' un efecto fuerte negativo (tamaño del efecto: -0,531). Eso significa que la 'disponibilidad de soluciones existentes' previene de alguna manera el surgimiento de 'sentimientos de orgullo de autoría'. Igualmente los datos indican que un proceso de MC costoso reduce fuertemente los sentimientos de orgullo de autoría. Por lo contrario la disponibilidad de feedback afecta a los sentimientos de orgullo de autoría de manera moderada y positiva (tamaño del efecto: 0,2349).

Estos resultados señalan que se debería proporcionar feedback a los clientes pero no bocetos o soluciones existentes, mientras que se debería intentar reducir la percepción del 'esfuerzo del proceso' para facilitar la formación de 'sentimientos de orgullo de autoría'. Además, los resultados demuestran que hay relaciones moderadas y positivas

entre ‘sentimientos de orgullo de autoría’, la ‘percepción de unicidad del producto’ y la ‘visibilidad del producto’. Eso significa que los clientes van a estar orgullosos de ser los autores de un producto individualizado, si el producto es visible y lo perciben como único. Además, los ‘sentimientos de propiedad psicológica’ (feelings of psychological ownership) actúan como un moderador junto con la percepción del ‘esfuerzo del proceso’. Eso implica, contrariamente a lo anteriormente citado, que un alto nivel de percepción del ‘esfuerzo del proceso’ afecta fuertemente a los ‘sentimientos de orgullo de autoría’ cuando los ‘sentimientos de propiedad psicológica’ están presentes. El alto porcentaje de la varianza explicada (54%) indica que el constructo de ‘orgullo de autoría’ está bien representado por las variables que lo indican.

En referencia a la percepción del ‘placer de proceso’ (process enjoyment) por parte de los clientes, la estimación del modelo insinúa que está fuertemente afectado por el grado de ‘autonomía’ (tamaño del efecto: 0,426) y de manera indirecta y débil por la disponibilidad de ‘feedback’ (tamaño del efecto: 0,1117). Nuestra hipótesis inicial, de que la percepción positiva del ‘satisfacción de preferencias’ afecta a la percepción del 'placer de proceso', no ha sido confirmada. Dado el escaso número de variables exógenas que indican la percepción del ‘placer de proceso’, su valor de R^2 es más bien bajo. Ello indica que la cuota de la varianza de la percepción del ‘placer de proceso’ está representada de manera débil por las variables que la indican.

Con respecto al constructo de ‘esfuerzo del proceso percibido’ los resultados respaldan la suposición que está afectado positivamente por un alto grado de autonomía y la disponibilidad de soluciones existentes. Mientras que el grado de autonomía afecta la percepción del 'esfuerzo del proceso' de manera moderada (tamaño del efecto: 0,1721) la disponibilidad de soluciones existentes tiene un efecto fuerte (tamaño del efecto: 0,4291). Pero el hecho que solo dos variables exógenos indican el ‘esfuerzo del proceso percibido’ resulta en un R^2 bien bajo (0,242).

Acerca de los ‘sentimientos de propiedad psicológica’ los datos sugieren que están determinados por el grado de ‘autonomía’, ‘lujo’ y ‘visibilidad’. El grado de ‘visibilidad’ demuestra un fuerte efecto positivo (tamaño del efecto: 0,393). Tanto el grado de ‘lujo’ como el grado de ‘autonomía’ exhiben efectos altamente moderados (tamaño del efecto: 0,3057 y 0,3111) en el desarrollo de ‘sentimientos de propiedad psicológica’. A pesar de que solamente tres variables apuntan hacia el constructo, el alto

valor de R^2 sugiere que las tres variables exógenas explican el 58% de la varianza de 'sentimientos de propiedad psicológica'.

El constructo que hemos propuesto para medir el valor añadido de MC en su totalidad es el incremento en la 'disposición a pagar' (WTP) de los clientes. La naturaleza intangible del concepto de valor lo hace difícil de captar y cuantificar. No obstante, en nuestra opinión, el aumento en el valor percibido por los clientes se debería reflejar en una mayor 'disposición a pagar'. Los datos de la muestra indican que la 'disposición a pagar' de los clientes está afectada por la frecuencia de compra (purchase frequency), el grado de 'lujo', la 'visibilidad', la 'autonomía' y los 'sentimientos de propiedad psicológica'. Sorprendentemente, los impactos previstos de la percepción de la 'satisfacción de preferencias' y del 'placer de proceso' no se han confirmado con los datos que contamos.

Además, los 'sentimientos de propiedad psicológica' demuestran el efecto negativo más fuerte (tamaño del efecto: -0,884) en la 'disposición a pagar' de los clientes. A parte de eso, los resultados del grado de 'lujo' y del grado de 'visibilidad' indican un efecto negativo moderado (tamaño del efecto: -0,27) y un efecto negativo fuerte (tamaño del efecto: -0,354) en la 'disposición a pagar' de los clientes. El 'grado de autonomía' también presenta un fuerte efecto negativo (tamaño del efecto: -0,403) en la 'disposición a pagar'. Eso sorprende porque es contrario a los resultados de otras investigaciones. No obstante el efecto más fuerte en la 'disposición a pagar' de los clientes tiene el constructo de 'sentimientos de propiedad psicológica' cuando está moderado por los sentimientos de 'placer de proceso' (tamaño del efecto: 1,15). Además la 'frecuencia de compra' de un producto afecta negativa y moderadamente a la 'disposición a pagar' de los clientes (tamaño del efecto: -0,2).

Aunque el constructo de 'disposición a pagar' exhibe un valor de R^2 bajo, el cual explica el 18% de la varianza de la 'disposición a pagar' de los clientes, consideramos que este resultado es aceptable. Teniendo en cuenta que la 'disposición a pagar' de los clientes influyen una multitud de factores, parece razonable que el valor añadido de los productos individualizados cause solamente una parte del incremento del precio. Michel et al. (2009) explican el 16% de la 'disposición a pagar' de los clientes con su modelo, en el cual proponen los tres constructos de 'avoidance of negative attributes', 'desire for unique products' y 'use of products for self presentation' como antecedentes de la 'disposición a pagar'. Otros factores que pueden afectar a la disposición a pagar un

precio elevado son la renta disponible de un individuo, la consciencia por la marca (brand awareness), la percepción de riesgos, la percepción de necesidades o el conocimiento de problemas. Como estos factores no han sido incluidos en el modelo estimado, no han sido considerados. Además, el bajo grado de la varianza explicada de la 'disposición a pagar' puede proceder de la utilización de los dos ítems de medición directos.

Mientras que los resultados de los análisis para los factores clave confirman esencialmente las relaciones previstas, un resultado interesante es que la 'disposición a pagar' de los clientes varía considerablemente entre las categorías de los productos mencionados (véase figura 33). Los datos de la muestra sugieren que los clientes no siempre están dispuestos a pagar un precio elevado por un producto individualizado (véase tabla 31). Algunos incrementos extremos en la 'disposición a pagar' de los clientes se aplican solamente a productos de bajo coste o ser una excepción. Mientras que la mayoría de los clientes indica que estarían dispuestos a pagar un precio elevado por un producto individualizado, 17 personas (18%) han manifestado que no estarían dispuestas a pagar más que por un producto convencional. Además, 6 personas han indicado que pagarían menos por un producto individualizado que por un producto estándar. Eso indica que el beneficio adicional de MC no siempre se refleja en una 'disposición a pagar' elevada. Una posible explicación puede ser que la percepción del 'esfuerzo del proceso' y el tiempo invertido reduzcan la 'disposición a pagar' de los clientes.

Además, las categorías de productos que exhiben un aumento en la 'disposición a pagar' de los clientes de más de 100% (bolígrafo, equipamiento deportivo, chocolate, coche, cereales, productos impresos y funda para tableta) representan predominantemente productos de bajo coste, siendo el 'coche' una excepción. Los productos de alto coste como ordenadores, muebles o bicicletas no exhiben incrementos en la 'disposición a pagar' tan extremos. Eso sugiere que el incremento en la 'disposición a pagar' de los clientes para productos de bajo coste es relativamente más alto que el incremento para productos de alto coste. Por un lado, si nos fijamos en el ejemplo de la persona que había individualizado un bolígrafo, podemos comprobar que estaba dispuesta a pagar un 900% superior por el producto personalizado con respecto al precio del producto estándar. Por otro lado, se da el caso de una persona que ha estado dispuesta a pagar un 400% superior del precio original por un equipamiento deportivo

personalizado. Las personas que han indicado haber individualizado chocolate también exhiben un incremento en la 'disposición a pagar' bastante alto (media: 201%). Aunque las personas que han indicado haber individualizado un coche también han especificado un incremento en la 'disposición a pagar' bastante alto (media: 243%), este número está algo distorsionado por un incremento extremo del 900% que ha especificado una persona. Sin esta respuesta, el incremento medio en la 'disposición a pagar' de las personas que han individualizado un coche sería de un 112%. Eso es todavía un incremento alto especialmente teniendo en cuenta los precios de coches en términos absolutos. Estos resultados son importantes porque sugieren que no todos los clientes están dispuestos a pagar por productos individualizados de la misma manera.

Con respecto a las características del proceso de MC, como son el 'grado de autonomía', la 'disponibilidad de feedback' y la disponibilidad de 'soluciones existentes', se puede decir lo siguiente: aunque el 'grado de autonomía' demuestra una relación negativa con la 'disposición a pagar' es una determinante crucial la percepción del 'esfuerzo del proceso', la percepción del 'placer de proceso', los 'sentimientos de propiedad psicológica' y de la percepción de la 'unicidad del producto'. De la misma manera, la disponibilidad de 'feedback' durante el proceso de MC influye de manera significativa en el desarrollo de 'sentimientos de orgullo de autoría' y en la percepción de la 'autonomía'. Además, la disponibilidad de 'feedback' influye, con menor magnitud, en la percepción de 'placer de proceso' y en la percepción de la 'unicidad del producto'. La disponibilidad de 'soluciones existentes', que sirven a los clientes para que los desarrollan a su manera, afectan de manera positiva a la percepción del 'esfuerzo del proceso' y de manera negativa a la percepción de 'la satisfacción de preferencias' y a los sentimientos de 'orgullo de autoría'. En conjunto, eso sugiere que en el diseño de los 'MC toolkits' se debería perseguir establecer un alto grado de autonomía e incorporar mecanismos que suministran el 'feedback'.

Con referencia a la relevancia de las características del producto para la percepción de valor, los datos analizados sugieren lo siguiente: el grado de 'visibilidad' de un producto es un determinante crucial en la percepción de valor porque influye en los sentimientos de 'orgullo de autoría', los sentimientos de 'propiedad psicológica', la 'satisfacción de preferencias' y la percepción de la 'unicidad'. Sorprendentemente el efecto del grado de 'visibilidad' en la 'disposición a pagar' de los clientes es negativo. Eso quiere decir que los efectos positivos del grado de 'visibilidad' no se manifiestan en

una ‘disposición a pagar’ elevada. El grado de ‘lujo’ de un producto, por otro lado, es menos relevante. Los datos también indican que tiene un efecto positivo en el desarrollo de los sentimientos de ‘propiedad psicológica’ y un efecto negativo en la ‘disposición a pagar’ de los clientes. Además, la ‘frecuencia de compra’ de un producto afecta a la ‘disposición a pagar’ de los clientes de manera negativa. Estos resultados respaldan la suposición de que productos con un alto nivel de visibilidad, lujo y frecuencia de compra son más adecuados para generar valor para el cliente.

Últimamente, con referencia a las características de los clientes, se puede decir lo siguiente: La ‘involucración del producto’ de un cliente influye positivamente en la percepción de la ‘satisfacción de preferencias’. El nivel de experiencia con MC influye en la ‘habilidad de expresar preferencias’ de un cliente y menos intensamente en la percepción de ‘satisfacción de preferencias’. Además, la ‘habilidad de expresar preferencias’ de un individuo influye positivamente en la percepción de la ‘satisfacción de preferencias’. Con respecto al constructo de ‘conocimientos de preferencias’ de los clientes los datos sugieren que influye positiva y fuertemente en la ‘habilidad de expresar preferencias’ de los clientes y que afecta a la percepción de la ‘unicidad’ de manera negativa. En resumen, los resultados indican que aquellos clientes que tienen un alto nivel de ‘involucración del producto’ y ‘habilidad de expresar preferencias’, perciben la ‘satisfacción de preferencias’ del producto individualizado de manera superior. Además, los antecedentes de la ‘habilidad de expresar preferencias’ son el nivel de experiencia con MC y los ‘conocimientos de las propias preferencias’. No obstante se debería recordar que un alto nivel de ‘conocimientos de preferencias’ también hace que los clientes perciban los productos individualizados menos únicos.

En resumen se puede concluir que el valor adicional de MC proviene no solamente de beneficios relacionados con el producto, sino también del proceso de MC y de las características de los clientes. En esta investigación hemos demostrado qué factores preceden a los factores clave que determinan el valor de MC, cómo influyen en los factores clave y cómo los factores clave afectan a la ‘disposición a pagar’ de los clientes. El fuerte efecto de ‘sentimientos de propiedad psicológica’ en la ‘disposición a pagar’ cuando están moderados por una alta percepción del ‘placer de proceso’, sugiere que sus antecedentes deberían recibir especial atención en el diseño de los ‘MC toolkits’. Especialmente el grado de ‘autonomía’ en el proceso de MC ha resultado ser una característica crucial en el proceso de MC. Recapitulando los resultados de los

análisis, se puede decir que el modelo de investigación estimado representa bien las relaciones causales entre los constructos. No obstante, se debería considerar la naturaleza exploratoria de esta investigación y los resultados deberían considerarse sugerencias en vez de como conclusiones definitivas.

3. Limitations and Future Research

The research provides significant insight into the motives of customers engaging in MC. However, the empirical investigation conducted in this research has several limitations that impede the generalizability of the findings to other populations. First, the research was conducted interviewing German speaking persons. Cultural differences between Western and other societies are likely to influence the underlying value drivers of MC. In a more general way Ryan and Deci (2000, p. 75) state that "[…] need satisfaction is facilitated by the internalization and integration of culturally endorsed values and behaviors suggests that individuals are likely to express competence, autonomy, and relatedness differently within cultures that hold different values." Therefore, we recommend conducting further research also in non-Western settings. Collectivism, role obligations and other differences are likely to affect the relevance of the underlying value factors. In order to overcome the uncertainties about the influence of cultural differences, it would be of interest to conduct additional research comparing the motives to use MC in a cross-cultural analysis. For example, differences between low and high context cultures could be examined. The relevance of a product's uniqueness and an individual's desire to differentiate from others, among other factors, are likely to be different.

Second, 42% of the respondents were between 19 and 25 years and 48% of the respondents were between 26 and 40 years old. Only 9% of the respondents were between 41 and 65 years old and no one was over 65 or under 18 years old. This signifies that the sample reflects mainly the opinions of persons between 19 and 40 years. Although it is often argued that the target groups for MC are composed of young individuals, it should be taken into account that the fundamental idea of MC is to serve markets of one. In this context, it should be interesting to determine whether there are differences between different age groups and the relevance of the motives to use MC. Moreover, the Internet might not be equally appropriate to target different age groups. Alternative distribution channels should be explored in order to deliver the benefits of mass customized products to customers of different age groups.

Third, 18 different product groups have been mentioned by the respondents. Those include products that are bought rather frequently such as cereals or shirts as well products that are bought rather infrequently such as furniture or computers and cheap products such as chocolate or expensive products such as cars. Rather than drawing general conclusions, the aim of this research was to determine the context-specific value drivers

of MC. Fundamental insight has been gained by the differentiation and categorization of the product-specific parameters that affect the value perceived by customers. However, more in-depth study is required in order to consolidate the observed tendencies. Especially comparing the relevance of the product characteristics more in depth should provide interesting insights on the adequateness of different products for MC.

Fourth, it should be critically examined whether customers' WTP is an adequate measure of the value customers perceive and whether direct measurement items are appropriate to capture it. Due to the fact that customers' WTP for mass customized products varies considerably, future research should further investigate the causes for the discrepancies. The proposed categorization of product, MC process, and customer characteristics provide a useful approach to determining the roots of the increases in customers' WTP and their impact.

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Appendix A: Survey Instrument

Survey: Why are products being personalized?

Dear Sir or Madam,

In the context of a research project at the Faculty of Social Science we investigate the question: **What causes customers to adjust products to their preferences?** The objective of the following survey is to determine the relevance of the motives for online product personalization.

Different products such as computers (Dell), shoes (mi adidas, NIKEiD), cars (Audi, BMW), food (MyMuesli), or furniture (Ikea) can be personalized with the help of online configurators. **Have you personalized a product online in the past?** Then we would be happy, if you participated in the following survey (approx. 10 min.).

The survey is of an academic nature and does not pursue any commercial goals. The given information will be treated confidentially and analyzed anonymously. Thank you for your assistance in advance!

If you have questions concerning the survey, feel free to contact us.

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1. **Please name the product that you have personalized online.**

Should you have personalized more products, please decide for one product.

2. **How often do you normally buy the mentioned product?**

Answers: daily, weekly, monthly, every 2-3 month, once a year, every couple of years

3. **How often have you personalized products online?**

Answers: once, twice, 3-5 times, 6-9 times, more than 10 times

Concerning the product personalization of the mentioned product, please indicate to which extent you agree with the following statements.

4. **I perceive this self-designed product as highly unique.**
5. **I thought designing this product was quite enjoyable.**
6. **I perceived designing this product as time-consuming.**
7. **The design of my customized product looks really great.**
8. **My self-designed product is really special.**
9. **I like the design of my customized product.**
10. **I enjoyed this design activity very much.**
11. **The product is one of a kind.**
12. **I am very satisfied with my self-designed product.**
13. **Designing this product required much effort.**
14. **Designing was fun.**
15. **Compared to the products available at conventional stores, I prefer my self-designed product.**
16. **Designing this product was very interesting.**
17. **Designing this product was exhausting.**
18. **My self-designed product reflects my idea of an ideal product.**

Answers: 7-point Likert scale from 0 (strongly disagree) to 6 (strongly agree)

Concerning the personalized product, please indicate to which extent you agree with the following 6 statements.

19. For me a [product] (is)…

"matters" vs. "doesn't matter"

"important" vs. "unimportant"

"useless" vs. "useful"

"boring" vs. "interesting"

"not needed" vs. "needed"

"essential" vs. "nonessential"

Answers: five-point semantic differential scales anchored with the above

Concerning the product personalization process, please indicate to which extent you agree to the following statements.

20. I evaluated many different ideas for [product] designs before I started to design my custom product.

21. I had a great deal of control over the design process.

22. I received feedback on my design from people.

23. Tips from other people were very important in the further improvement of my design.

24. I feel proud of having accomplished something.

25. My final [product] design is based on recommendations from other people.

26. When I look at the product I have self-designed, the feeling I have can best be described by the word 'pride'.

27. The customization process allowed me to make a lot of decisions on my own.

28. The customization process gave me considerable opportunity for independence and freedom in how I design the product

29. I started to design the product by adapting an existing design.

30. I had a significant influence over the outcome of the (design) process.

31. An existing design served as a starting point for my own design.

32. I considered suggestions from other people on how to improve the design of the product.

33. I feel proud because I did a good job.

34. The customization process allowed me to decide on my own what to do.

Answers: 7-point Likert scale from 0 (strongly disagree) to 6 (strongly agree)

35. **How much would you be willing to spend for your customized product?**
36. **How much do you usually spend for a comparable not customized product?**

Answers: [€] open-ended question

Concerning the customized product, please indicate to which extent you agree to the following statements.

37. **When I purchase a [product], I find it easy to choose among different alternatives.**
38. **The customized product is something of my own.**
39. **Regarding [product], I know exactly what I want.**
40. **The product can only be bought by a minority.**
41. **When I use the product, it generates a lot of attention.**
42. **When I use the product, it stands out.**
43. **It would be easy for me to describe what an ideal [product] should look like.**
44. **Because I customized it, it gained a very special dimension for me.**
45. **The product represents luxury.**
46. **If I had three minutes time to explain to someone else what I like and what I dislike, this person could theoretically choose a [product] for me that would meet my requirements.**
47. **This is a very expensive product.**
48. **When I use the product, it is highly visible to people.**
49. **When I use the product, people close by notice it.**
50. **It would be no problem for me to name those attributes of a [product] which are most important to me.**
51. **There is something personal about the product.**
52. **I could easily explain to someone else what kind of [product] I like best.**
53. **When I purchase the product, I usually know quite soon what I prefer.**
54. **This is a select product.**
55. **Very few people own this product.**
56. **I think I have developed an obsession to the product.**

Answers: 7-point Likert scale from 0 (strongly disagree) to 6 (strongly agree)

Concerning the product in general, please indicate to which extent you agree to the following statements.

57. My general interest in [product] is high.

58. It is highly probable that I will purchase a [product] within the next month.

Answers: 7-point Likert scale from 0 (strongly disagree) to 6 (strongly agree)

59. What is your gender?

Answers: male/female

60. How old are you?

Answers: under 18, 19-25, 26-40, 41-65, over 65 years

61. What is your highest educational degree?

Answers: left school without degree, in school, secondary school, intermediate Secondary School, apprenticeship, entrance diploma for universities of applied science, university entrance diploma, university degree, others

Appendix B: Cross Loadings

Table 27: Sample cross loadings

	Ability to ex	Autonomy	Effort	Effort * Psy.	Existing Solu	Feedback	Fit	Frequency	Joy	Luxury level
AbiEx1	0,7801	0,1157	-0,07	0,1029	0,0435	0,0254	0,3183	-0,0714	0,0051	0,161
AbiEx3	0,8223	0,2725	0,0134	0,0902	0,1891	-0,0634	0,1919	-0,0034	0,1202	-0,0072
AbiEx4	0,7035	0,2057	0,0261	0,0877	-0,0523	-0,1645	0,2707	0,1515	0,1731	0,0836
Auto1	0,2664	0,767	0,1565	0,2537	0,0659	0,0854	0,2188	0,0755	0,3436	0,0604
Auto2	0,192	0,8811	0,1564	0,3434	0,1206	0,1829	0,3114	-0,0879	0,4586	0,1814
Auto3	0,2227	0,7967	0,1863	0,3451	0,1491	0,2274	0,2797	-0,1454	0,4333	0,217
PerCon1	0,2715	0,758	0,1808	0,2807	0,3062	0,1966	0,3082	0,0388	0,3536	0,0905
PerCon2	0,116	0,7808	0,3181	0,3975	0,1347	0,2005	0,4	-0,0594	0,3433	0,3236
Effrt1	0,0727	0,2292	0,8642	0,6585	0,4573	0,2694	-0,0041	0,0707	-0,0134	0,0615
Effrt1*PsyOw1	0,045	0,3767	0,6027	0,7807	0,3355	0,1995	0,2492	-0,0523	0,2605	0,3657
Effrt1*PsyOw2	0,2532	0,3768	0,6005	0,8013	0,429	0,3183	0,3186	-0,031	0,176	0,4101
Effrt1*PsyOw3	0,0921	0,3687	0,6507	0,8256	0,3618	0,2343	0,218	-0,0186	0,2089	0,362
Effrt1*PsyOw4	0,2921	0,341	0,6861	0,7305	0,5646	0,3057	0,3041	0,0652	0,0686	0,3483
Effrt2	-0,0805	0,2113	0,8619	0,7362	0,3313	0,277	-0,0197	0,1017	0,0892	0,1525
Effrt2*PsyOw1	-0,0484	0,3125	0,6802	0,8157	0,2523	0,2092	0,1212	0,0134	0,2648	0,3161
Effrt2*PsyOw2	0,1177	0,3255	0,6819	0,849	0,3288	0,3073	0,2199	0,0616	0,167	0,41
Effrt2*PsyOw3	-0,0212	0,2933	0,6981	0,8299	0,2583	0,2355	0,0945	0,0542	0,2122	0,3161
Effrt2*PsyOw4	0,1401	0,2685	0,7447	0,7738	0,4053	0,2822	0,1848	0,1368	0,1018	0,3157
Effrt3	-0,0403	0,2228	0,8843	0,7742	0,4063	0,3273	0,0528	0,0736	-0,171	0,2901
Effrt3*PsyOw1	-0,0116	0,3631	0,6841	0,8686	0,327	0,2664	0,2165	-0,0225	0,1092	0,4413
Effrt3*PsyOw2	0,1442	0,3412	0,6785	0,8595	0,3849	0,3433	0,2827	0,0363	0,0078	0,4834
Effrt3*PsyOw3	0,0105	0,3547	0,7247	0,8965	0,3207	0,2839	0,1933	0,0263	0,0394	0,4532
Effrt3*PsyOw4	0,2058	0,3256	0,7477	0,7921	0,471	0,3196	0,2653	0,0824	-0,0315	0,4258
ExSol1	0,1422	0,1836	0,4518	0,4253	0,9399	0,4144	0,1571	0,1176	-0,0829	0,2437
ExSol3	-0,1143	0,0843	0,1754	0,2102	0,4764	0,3219	-0,0116	-0,0968	0,0719	0,0996
Fdbck1	-0,0406	0,1353	0,2209	0,283	0,3838	0,7495	0,0679	-0,1885	-0,0528	0,0385
Fdbck2	-0,1961	0,2071	0,342	0,2744	0,3828	0,8854	-0,0441	-0,0578	0,0063	0,0539
Fdbck3	-0,1708	0,0613	0,2718	0,2394	0,3695	0,7221	-0,1034	0,0622	-0,0908	0,1629
Fdbck4	0,0677	0,2857	0,2673	0,2749	0,4054	0,8523	0,0817	-0,0156	0,0373	0,0917
Fit1	0,2473	0,3146	0,091	0,3187	0,2352	0,0581	0,8627	0,0679	0,1955	0,4184
Fit2	0,1958	0,3276	-0,0213	0,2135	0,0137	-0,0341	0,8004	0,0273	0,2772	0,3534
Fit3	0,2057	0,2508	0,0288	0,109	0,1167	0,0532	0,6341	0,0054	0,1782	0,2071
Fit5	0,332	0,2379	-0,0598	0,1235	0,0301	0,0025	0,6165	-0,0808	0,2952	0,2377
Frequency	0,0264	-0,0571	0,0927	0,0328	0,0712	-0,0861	0,0097	1	-0,1444	0,0657
Joy1	0,0446	0,3242	-0,1934	0,0207	-0,0886	-0,0252	0,2574	-0,2141	0,8516	-0,0052
Joy2	0,1004	0,2955	0,1147	0,2097	-0,0421	0,0321	0,1632	-0,0282	0,6812	-0,0181
Joy3	0,0643	0,4772	-0,124	0,0813	-0,0763	-0,001	0,3198	-0,1943	0,8603	0,1001
Joy4	0,2061	0,3689	0,158	0,2176	0,0797	-0,0687	0,219	0,0605	0,6382	0,1781
LuxLev1	-0,1026	0,1313	0,0873	0,3106	0,1622	0,1529	0,2604	-0,0378	-0,0079	0,6702
LuxLev2	0,2468	0,0778	0,1273	0,2397	0,13	-0,0702	0,2108	0,2218	0,2059	0,5893
LuxLev4	0,1824	0,2246	0,1922	0,4578	0,2445	0,0652	0,4725	0,147	0,113	0,8658
LuxLev5	0,0068	0,2008	0,1512	0,3194	0,16	0,0668	0,2124	-0,1083	-0,0117	0,7275
MCEx	0,2846	0,1858	0,2493	0,297	0,2461	0,0835	0,0866	-0,0125	-0,0728	0,0832
PreIns2	0,2943	0,2243	0,0546	0,1383	0,1443	-0,016	0,0943	-0,0885	0,149	0,0836
PreIns3	0,4973	0,308	0,0766	0,1815	0,1255	-0,0547	0,11	-0,1086	0,3005	0,0128
Pride1	0,1329	0,3465	0,179	0,4526	0,3144	0,3511	0,3606	-0,0392	0,1834	0,3623
Pride2	0,1355	0,3029	0,1169	0,4173	0,144	0,2429	0,5133	0,0001	0,252	0,4258
Pride3	0,2017	0,3789	0,1621	0,4458	0,171	0,342	0,4262	-0,0713	0,2175	0,4621
ProInv1	0,0811	0,277	0,1042	0,1389	0,0886	0,2227	0,3001	0,0508	0,2597	0,0653
ProInv2	0,0502	0,326	0,1159	0,1613	0,0727	0,2175	0,2711	0,0785	0,2443	0,062
ProInv3	0,091	0,2969	0,1007	0,141	0,0955	0,1309	0,2557	0,018	0,2788	0,1081
ProInv4	0,0322	0,329	0,1369	0,2104	0,1559	0,1872	0,3537	0,0066	0,2492	0,1717
ProInv5	0,011	0,3686	0,0548	0,0892	0,0575	0,0726	0,3388	0,0062	0,3138	0,1004
ProInv6	0,187	0,3328	0,0872	0,1426	0,1302	0,1019	0,3401	-0,0373	0,3078	0,1884
ProVis1	0,1317	0,1681	0,0659	0,3718	0,2848	0,1938	0,3336	-0,0927	0,1341	0,5396
ProVis2	0,1547	0,2212	-0,0486	0,3053	0,1339	0,0869	0,355	-0,148	0,246	0,453
ProVis3	0,3049	0,3114	0,1662	0,3343	0,2125	0,0466	0,2858	-0,0159	0,2968	0,303
ProVis4	0,1422	0,042	-0,0221	0,153	0,1535	0,0928	0,3074	0,007	0,1737	0,3672

	MC Experien	Preference i	Pride of auth	Product Invo	Psy. ownersl	Psy. ownersl	Uniqueness	Visibility	WTPPP
AbiEx1	0,2046	0,3719	0,2536	0,0534	0,3188	0,2738	0,0302	0,3745	0,0105
AbiEx3	0,182	0,5149	0,0433	0,048	0,2583	0,2543	-0,1023	0,087	0,0528
AbiEx4	0,2819	0,301	0,1105	0,1	0,0729	0,1971	-0,0392	0,048	-0,0041
Auto1	0,024	0,3154	0,2176	0,1469	0,2513	0,313	0,3248	0,1295	0,0651
Auto2	0,1222	0,2237	0,3609	0,1552	0,4149	0,4536	0,4872	0,2353	-0,061
Auto3	0,1757	0,2833	0,3456	0,2028	0,4214	0,4709	0,3663	0,1383	-0,0272
PerCon1	0,1871	0,3513	0,2873	0,3024	0,3875	0,4039	0,1973	0,2587	0,0174
PerCon2	0,2059	0,2202	0,2798	0,6035	0,4012	0,3501	0,4533	0,2029	-0,0808
Effrt1	0,182	0,1603	0,0573	0,1184	0,0472	0,0036	0,1188	-0,0504	-0,1769
Effrt1*PsyOw1	0,0861	0,2138	0,3953	0,1405	0,5205	0,4558	0,4116	0,3697	-0,1136
Effrt1*PsyOw2	0,2572	0,2237	0,3614	0,225	0,5719	0,4569	0,3307	0,3473	-0,1284
Effrt1*PsyOw3	0,1425	0,2339	0,4116	0,1674	0,5586	0,4579	0,381	0,3112	-0,1314
Effrt1*PsyOw4	0,419	0,2492	0,3752	0,2909	0,4584	0,4026	0,1859	0,2382	-0,0138
Effrt2	0,2048	0,0623	0,1401	0,0809	0,1005	0,0845	0,2242	0,0156	-0,11
Effrt2*PsyOw1	0,1434	0,145	0,327	0,045	0,3927	0,3773	0,4283	0,2784	-0,0798
Effrt2*PsyOw2	0,2609	0,157	0,3541	0,1297	0,4699	0,3813	0,3603	0,3001	-0,1046
Effrt2*PsyOw3	0,1655	0,1487	0,3428	0,0512	0,4111	0,3636	0,3822	0,2373	-0,0901
Effrt2*PsyOw4	0,3652	0,1556	0,3317	0,1677	0,3408	0,321	0,2302	0,1962	-0,0012
Effrt3	0,2608	-0,0025	0,2382	0,091	0,1795	0,0326	0,2556	0,1428	-0,1862
Effrt3*PsyOw1	0,162	0,1166	0,4781	0,0637	0,5163	0,395	0,4785	0,4213	-0,1059
Effrt3*PsyOw2	0,3091	0,1034	0,4404	0,1374	0,5136	0,3418	0,3907	0,3832	-0,1422
Effrt3*PsyOw3	0,1987	0,1278	0,4768	0,0557	0,5268	0,3634	0,4439	0,3746	-0,1522
Effrt3*PsyOw4	0,4375	0,1505	0,4124	0,1883	0,4113	0,3107	0,2585	0,2764	-0,0615
ExSol1	0,3013	0,1605	0,2226	0,1697	0,2466	0,1393	0,1394	0,2026	-0,0797
ExSol3	-0,063	0,052	0,0903	-0,1041	0,1933	0,1733	-0,0041	0,2107	-0,0204
Fdbck1	0,1327	-0,1303	0,3905	0,1772	0,1636	0,1391	0,1822	0,2096	-0,0371
Fdbck2	-0,0025	-0,0471	0,2323	0,0803	0,038	0,0094	0,1139	0,0131	-0,1114
Fdbck3	-0,0358	-0,0934	0,1814	0,048	0,076	0,0083	0,0393	0,1343	-0,0477
Fdbck4	0,108	0,091	0,2426	0,1954	0,1924	0,1315	0,1501	0,0879	-0,1244
Fit1	0,1109	0,0737	0,4736	0,3536	0,4423	0,4524	0,4166	0,4264	0,0324
Fit2	0,1107	0,0005	0,3431	0,3322	0,4138	0,4415	0,3657	0,3557	0,0853
Fit3	0,0676	0,0472	0,2034	0,1185	0,1601	0,2222	0,2228	0,2188	0,0048
Fit5	-0,0385	0,2469	0,3437	0,1829	0,3506	0,3942	0,2465	0,1781	0,1331
Frequency	-0,0125	-0,1239	-0,0407	0,0199	-0,1338	-0,1327	-0,1201	-0,0979	-0,1928
Joy1	-0,0053	0,1419	0,2216	0,232	0,2997	0,6358	0,2549	0,2446	0,3345
Joy2	0,0042	0,1579	0,1082	0,1477	0,1908	0,4585	0,1915	0,1246	0,0672
Joy3	-0,1753	0,3618	0,2078	0,2242	0,3991	0,6242	0,2538	0,2279	0,1936
Joy4	0,0002	0,2287	0,1807	0,3513	0,2457	0,4813	0,2179	0,1916	0,1011
LuxLev1	-0,1193	0,007	0,247	0,0222	0,4392	0,2662	0,2724	0,3985	-0,1782
LuxLev2	0,1123	-0,004	0,2124	0,1586	0,2364	0,3236	0,1538	0,3801	-0,0203
LuxLev4	0,1292	0,1284	0,4808	0,1561	0,5681	0,4754	0,363	0,454	-0,0528
LuxLev5	0,1389	-0,056	0,3283	0,0692	0,375	0,2449	0,4845	0,3635	0,0415
MCEx	1	0,1682	0,1507	0,2365	0,2051	0,1526	0,0218	0,0596	-0,0664
PreIns2	0,1996	0,6399	0,1568	0,0291	0,2299	0,2332	0,0707	0,1407	0,0143
PreIns3	0,106	0,916	0,0409	-0,0032	0,4128	0,3751	-0,1758	0,0719	0,0192
Pride1	0,0983	0,0784	0,8997	0,1876	0,5385	0,499	0,427	0,5257	-0,0204
Pride2	0,1496	0,1398	0,8974	0,2102	0,5165	0,5343	0,4794	0,4698	0,0797
Pride3	0,1572	0,0468	0,9121	0,2877	0,4717	0,4859	0,531	0,5205	-0,0176
ProInv1	0,2026	-0,0515	0,2307	0,875	0,1358	0,2041	0,1222	0,0688	-0,0122
ProInv2	0,1894	-0,0738	0,2091	0,8629	0,1477	0,186	0,1755	0,1279	0,0522
ProInv3	0,2202	0,013	0,2062	0,9353	0,198	0,2501	0,1261	0,0806	0,0345
ProInv4	0,2392	-0,0238	0,3144	0,94	0,2673	0,2845	0,2352	0,1181	0,0133
ProInv5	0,1898	0,0608	0,1775	0,9029	0,163	0,2113	0,2095	0,0533	0,0556
ProInv6	0,2143	0,1052	0,2044	0,8107	0,2205	0,2949	0,1876	0,1624	0,0303
ProVis1	0,0741	-0,1283	0,5186	0,116	0,5036	0,4501	0,4924	0,8324	0,0347
ProVis2	0,0606	0,062	0,5447	0,0522	0,5827	0,5591	0,4058	0,8864	0,0967
ProVis3	0,0422	0,4945	0,2923	0,0788	0,5206	0,4724	0,1211	0,606	0,0577
ProVis4	-0,0197	0,0619	0,2901	0,1338	0,3342	0,3621	0,2122	0,751	0,1804

	Ability to ex	Autonomy	Effort	Effort * Psy.	Existing Solu	Feedback	Fit	Frequency	Joy	Luxury level
PsyOw1	0,0501	0,4244	0,093	0,4343	0,1368	0,0401	0,2843	-0,1458	0,4134	0,3996
PsyOw1*Joy1	0,0892	0,4274	-0,0074	0,3389	0,069	0,0188	0,3502	-0,1739	0,6594	0,3179
PsyOw1*Joy2	0,0928	0,3483	0,154	0,4157	0,0227	0,0281	0,2995	-0,0625	0,6125	0,2644
PsyOw1*Joy3	0,1086	0,4635	-0,0645	0,3218	0,0287	0,0164	0,4672	-0,1728	0,6397	0,426
PsyOw1*Joy4	0,1761	0,4135	0,0985	0,3981	0,0923	-0,0479	0,3796	-0,0232	0,5956	0,4521
PsyOw2	0,3008	0,3097	0,0033	0,4115	0,1907	0,1653	0,4695	-0,1238	0,2083	0,5211
PsyOw2*Joy1	0,2677	0,3689	-0,1046	0,305	0,13	0,161	0,4688	-0,19	0,566	0,3531
PsyOw2*Joy2	0,3035	0,3776	0,0872	0,4111	0,1189	0,1467	0,3822	-0,0896	0,5777	0,2876
PsyOw2*Joy3	0,312	0,4617	-0,0297	0,3787	0,1489	0,1509	0,4873	-0,1841	0,564	0,4231
PsyOw2*Joy4	0,3853	0,4398	0,1126	0,4449	0,2009	0,0907	0,4597	-0,0598	0,5552	0,4571
PsyOw3	0,1076	0,394	0,1254	0,4806	0,1356	0,057	0,2642	-0,11	0,3613	0,3964
PsyOw3*Joy1	0,1568	0,4048	-0,0084	0,3648	0,0682	0,0235	0,3436	-0,1705	0,666	0,2858
PsyOw3*Joy2	0,1743	0,3555	0,1653	0,4444	0,0234	0,0448	0,2912	-0,0576	0,6128	0,2308
PsyOw3*Joy3	0,1797	0,446	-0,0405	0,3642	0,0233	0,0296	0,4624	-0,1579	0,6234	0,3947
PsyOw3*Joy4	0,2617	0,4067	0,1334	0,4444	0,1025	-0,0283	0,3689	-0,0128	0,5876	0,4202
PsyOw4	0,3795	0,3196	0,1631	0,4326	0,3795	0,1986	0,4293	-0,0281	0,1997	0,459
PsyOw4*Joy1	0,3045	0,3446	-0,0173	0,3268	0,2445	0,1482	0,4464	-0,1216	0,5465	0,3471
PsyOw4*Joy2	0,284	0,3118	0,1695	0,4035	0,169	0,1471	0,342	-0,0267	0,5014	0,2562
PsyOw4*Joy3	0,3514	0,417	0,0116	0,3463	0,247	0,1715	0,5079	-0,0905	0,5016	0,4129
PsyOw4*Joy4	0,4098	0,3797	0,1904	0,4214	0,2969	0,1079	0,4467	0,0405	0,4468	0,4326
Uniq1	-0,106	0,3722	0,1386	0,2748	0,0983	0,1973	0,3197	-0,1747	0,2479	0,2781
Uniq2	0,0502	0,4234	0,1259	0,3431	0,1348	0,1498	0,4591	-0,0654	0,2149	0,4518
Uniq3	-0,1208	0,3015	0,3522	0,4805	0,0294	0,0184	0,1921	-0,0481	0,2904	0,317
WTPPP	0,0277	-0,031	-0,1848	-0,1179	-0,0779	-0,1015	0,0924	-0,1928	0,2435	-0,0814

	MC Experien	Preference i	Pride of auth	Product Invo	Psy. owners	Psy. owners	Uniqueness	Visibility	WTPPP
PsyOw1	-0,0385	0,4502	0,347	0,0686	0,7768	0,6681	0,3449	0,4937	-0,0039
PsyOw1*Joy1	-0,0154	0,3942	0,3565	0,1123	0,7086	0,7957	0,3655	0,4887	0,1528
PsyOw1*Joy2	0,0321	0,194	0,2906	0,0987	0,4853	0,6487	0,3838	0,3675	0,0443
PsyOw1*Joy3	-0,1048	0,3337	0,4361	0,142	0,7156	0,7869	0,4413	0,5363	0,1205
PsyOw1*Joy4	-0,0203	0,2604	0,4186	0,2365	0,6	0,7257	0,4279	0,4936	0,1045
PsyOw2	0,2307	0,0829	0,4466	0,2146	0,6893	0,5826	0,3791	0,5263	-0,0248
PsyOw2*Joy1	0,1957	0,1559	0,4383	0,2344	0,6729	0,7764	0,3621	0,5133	0,1303
PsyOw2*Joy2	0,1683	0,2355	0,3487	0,1876	0,5951	0,7087	0,3065	0,4157	0,0167
PsyOw2*Joy3	0,0895	0,3336	0,4148	0,2077	0,7628	0,7844	0,3498	0,5038	0,0714
PsyOw2*Joy4	0,1652	0,287	0,4128	0,3121	0,6774	0,7575	0,3428	0,487	0,0701
PsyOw3	0,021	0,4797	0,3703	0,0743	0,8359	0,6801	0,2757	0,4384	-0,0058
PsyOw3*Joy1	0,0427	0,4358	0,3824	0,1235	0,7667	0,8398	0,3126	0,4489	0,1954
PsyOw3*Joy2	0,0845	0,2421	0,3168	0,116	0,5341	0,6798	0,338	0,3444	0,0656
PsyOw3*Joy3	-0,0516	0,3764	0,4552	0,1514	0,7736	0,8142	0,3872	0,4776	0,1411
PsyOw3*Joy4	0,0434	0,3063	0,4392	0,2538	0,6548	0,7574	0,3753	0,4493	0,1046
PsyOw4	0,3686	0,3013	0,5139	0,2718	0,7177	0,6783	0,1138	0,453	0,1265
PsyOw4*Joy1	0,2877	0,2806	0,5272	0,2566	0,7063	0,8618	0,2171	0,5069	0,3014
PsyOw4*Joy2	0,2427	0,2345	0,3893	0,2056	0,5186	0,6875	0,217	0,3654	0,1376
PsyOw4*Joy3	0,179	0,3627	0,5386	0,2709	0,7329	0,8231	0,2309	0,5059	0,2166
PsyOw4*Joy4	0,2813	0,3055	0,4795	0,3623	0,6185	0,7411	0,2054	0,4393	0,1488
Uniq1	-0,0414	-0,1362	0,3412	0,0724	0,2264	0,2647	0,8038	0,2823	-0,0008
Uniq2	0,0569	-0,0763	0,5757	0,2832	0,3466	0,3428	0,8486	0,448	0,1347
Uniq3	0,0234	-0,0495	0,2641	0,0583	0,2942	0,3349	0,7155	0,2428	-0,0266
WTPPP	-0,0664	0,0213	0,0165	0,0322	0,0327	0,2078	0,0665	0,1068	1

Appendix C: Outer Loadings

Table 28: Overview of outer loadings

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
AbiEx1 <- Ability to express preferences	0,7801	0,7723	0,0913	0,0913	8,5445
AbiEx3 <- Ability to express preferences	0,8223	0,8211	0,0441	0,0441	18,662
AbiEx4 <- Ability to express preferences	0,7035	0,701	0,1079	0,1079	6,5183
Auto1 <- Autonomy	0,767	0,7704	0,0754	0,0754	10,1753
Auto2 <- Autonomy	0,8811	0,8872	0,025	0,025	35,2351
Auto3 <- Autonomy	0,7967	0,8007	0,0447	0,0447	17,8203
Effrt1 <- Effort	0,8642	0,8697	0,0342	0,0342	25,3002
Effrt1*PsyOw1 <- Effort * Psy. ownership	0,7807	0,7924	0,0427	0,0427	18,2655
Effrt1*PsyOw2 <- Effort * Psy. ownership	0,8013	0,8027	0,0509	0,0509	15,7411
Effrt1*PsyOw3 <- Effort * Psy. ownership	0,8256	0,8355	0,0334	0,0334	24,7237
Effrt1*PsyOw4 <- Effort * Psy. ownership	0,7305	0,7316	0,0637	0,0637	11,4607
Effrt2 <- Effort	0,8619	0,8744	0,0543	0,0543	15,8859
Effrt2*PsyOw1 <- Effort * Psy. ownership	0,8157	0,8181	0,0739	0,0739	11,0401
Effrt2*PsyOw2 <- Effort * Psy. ownership	0,849	0,8394	0,0554	0,0554	15,3122
Effrt2*PsyOw3 <- Effort * Psy. ownership	0,8299	0,8302	0,0703	0,0703	11,8046
Effrt2*PsyOw4 <- Effort * Psy. ownership	0,7738	0,7633	0,0734	0,0734	10,547
Effrt3 <- Effort	0,8843	0,8818	0,0333	0,0333	26,5464
Effrt3*PsyOw1 <- Effort * Psy. ownership	0,8686	0,8727	0,0281	0,0281	30,9065
Effrt3*PsyOw2 <- Effort * Psy. ownership	0,8595	0,856	0,0427	0,0427	20,1368
Effrt3*PsyOw3 <- Effort * Psy. ownership	0,8965	0,8982	0,0206	0,0206	43,4153
Effrt3*PsyOw4 <- Effort * Psy. ownership	0,7921	0,7858	0,0563	0,0563	14,0678
ExSol1 <- Existing Solutions	0,9399	0,9355	0,0559	0,0559	16,8169
ExSol3 <- Existing Solutions	0,4764	0,4345	0,2024	0,2024	2,3533
Fdbck1 <- Feedback	0,7495	0,7475	0,0952	0,0952	7,8745
Fdbck2 <- Feedback	0,8854	0,8627	0,0983	0,0983	9,0072
Fdbck3 <- Feedback	0,7221	0,6993	0,1106	0,1106	6,532
Fdbck4 <- Feedback	0,8523	0,8356	0,1078	0,1078	7,903
Fit1 <- Fit	0,8627	0,8521	0,0366	0,0366	23,5685
Fit2 <- Fit	0,8004	0,8014	0,0549	0,0549	14,5912
Fit3 <- Fit	0,6341	0,696	0,1224	0,1224	5,1806
Fit5 <- Fit	0,6165	0,637	0,0767	0,0767	8,0396
Frequency <- Frequency	1	1	0	0	0
Joy1 <- Joy	0,8516	0,853	0,0396	0,0396	21,495
Joy2 <- Joy	0,6812	0,7065	0,1613	0,1613	4,2239
Joy3 <- Joy	0,8603	0,8741	0,0338	0,0338	25,4369
Joy4 <- Joy	0,6382	0,6437	0,1409	0,1409	4,528
LuxLev1 <- Luxury level	0,6702	0,6751	0,0695	0,0695	9,6463
LuxLev2 <- Luxury level	0,5893	0,5842	0,103	0,103	5,7231
LuxLev4 <- Luxury level	0,8658	0,8623	0,0269	0,0269	32,1753
LuxLev5 <- Luxury level	0,7275	0,7249	0,0969	0,0969	7,5048
MCEx <- MC Experience	1	1	0	0	0
PerCon1 <- Autonomy	0,758	0,7586	0,0538	0,0538	14,0922
PerCon2 <- Autonomy	0,7808	0,7841	0,0558	0,0558	13,985
PreIns2 <- Preference insight	0,6399	0,6368	0,1749	0,1749	3,6583
PreIns3 <- Preference insight	0,916	0,9078	0,0521	0,0521	17,5831

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
Pride1 <- Pride of authorship	0,8997	0,8995	0,0253	0,0253	35,5261
Pride2 <- Pride of authorship	0,8974	0,8977	0,0329	0,0329	27,3128
Pride3 <- Pride of authorship	0,9121	0,9132	0,0193	0,0193	47,2205
ProInv1 <- Product Involvement	0,875	0,8393	0,1036	0,1036	8,445
ProInv2 <- Product Involvement	0,8629	0,8139	0,1333	0,1333	6,4749
ProInv3 <- Product Involvement	0,9353	0,9049	0,0781	0,0781	11,9748
ProInv4 <- Product Involvement	0,94	0,9206	0,0529	0,0529	17,7791
ProInv5 <- Product Involvement	0,9029	0,8747	0,0756	0,0756	11,9456
ProInv6 <- Product Involvement	0,8107	0,7554	0,1503	0,1503	5,3948
ProVis1 <- Visibility	0,8324	0,8343	0,0385	0,0385	21,6099
ProVis2 <- Visibility	0,8864	0,8857	0,0289	0,0289	30,6429
ProVis3 <- Visibility	0,606	0,62	0,1213	0,1213	4,9974
ProVis4 <- Visibility	0,751	0,7532	0,0827	0,0827	9,0794
PsyOw1 <- Psy. ownership	0,7768	0,7815	0,0498	0,0498	15,5891
PsyOw1*Joy1 <- Psy. ownership * Enjoyment	0,7957	0,7719	0,1148	0,1148	6,9339
PsyOw1*Joy2 <- Psy. ownership * Enjoyment	0,6487	0,6293	0,203	0,203	3,1951
PsyOw1*Joy3 <- Psy. ownership * Enjoyment	0,7869	0,774	0,1074	0,1074	7,3238
PsyOw1*Joy4 <- Psy. ownership * Enjoyment	0,7257	0,7067	0,0997	0,0997	7,2804
PsyOw2 <- Psy. ownership	0,6893	0,6999	0,1088	0,1088	6,3362
PsyOw2*Joy1 <- Psy. ownership * Enjoyment	0,7764	0,7476	0,1076	0,1076	7,2179
PsyOw2*Joy2 <- Psy. ownership * Enjoyment	0,7087	0,6682	0,1612	0,1612	4,3955
PsyOw2*Joy3 <- Psy. ownership * Enjoyment	0,7844	0,7592	0,0986	0,0986	7,9552
PsyOw2*Joy4 <- Psy. ownership * Enjoyment	0,7575	0,7241	0,0921	0,0921	8,2242
PsyOw3 <- Psy. ownership	0,8359	0,8401	0,0468	0,0468	17,8752
PsyOw3*Joy1 <- Psy. ownership * Enjoyment	0,8398	0,8185	0,0957	0,0957	8,7782
PsyOw3*Joy2 <- Psy. ownership * Enjoyment	0,6798	0,6653	0,2034	0,2034	3,3421
PsyOw3*Joy3 <- Psy. ownership * Enjoyment	0,8142	0,8027	0,0854	0,0854	9,5293
PsyOw3*Joy4 <- Psy. ownership * Enjoyment	0,7574	0,7387	0,0956	0,0956	7,922
PsyOw4 <- Psy. ownership	0,7177	0,7009	0,0924	0,0924	7,769
PsyOw4*Joy1 <- Psy. ownership * Enjoyment	0,8618	0,8584	0,0539	0,0539	15,9803
PsyOw4*Joy2 <- Psy. ownership * Enjoyment	0,6875	0,6759	0,16	0,16	4,2964
PsyOw4*Joy3 <- Psy. ownership * Enjoyment	0,8231	0,8253	0,0681	0,0681	12,0781
PsyOw4*Joy4 <- Psy. ownership * Enjoyment	0,7411	0,7298	0,1051	0,1051	7,0514
Uniq1 <- Uniqueness	0,8038	0,8183	0,0615	0,0615	13,0799
Uniq2 <- Uniqueness	0,8486	0,8538	0,0309	0,0309	27,4548
Uniq3 <- Uniqueness	0,7155	0,7269	0,1221	0,1221	5,8626
WTPPP <- WTPPP	1	1	0	0	0

Appendix D: Path Coefficients

Table 29: Path coefficients (mean, STDEV, T-values)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
Ability to express preferences -> Fit	0,2876	0,2813	0,0715	0,0715	4,0198
Autonomy -> Effort	0,1721	0,1808	0,0887	0,0887	1,941
Autonomy -> Fit	0,0189	0,0321	0,121	0,121	0,1566
Autonomy -> Joy	0,4256	0,4039	0,1202	0,1202	3,541
Autonomy -> Psy. ownership	0,3111	0,3054	0,1018	0,1018	3,0558
Autonomy -> Uniqueness	0,4952	0,4919	0,0745	0,0745	6,6471
Effort -> Pride of authorship	-0,5314	-0,4746	0,2295	0,2295	2,3161
Effort * Psy. ownership -> Pride of authorsh	0,6761	0,6344	0,3081	0,3081	2,1948
Existing Solutions -> Effort	0,4291	0,4337	0,0967	0,0967	4,4391
Feedback -> Autonomy	0,2292	0,2531	0,1029	0,1029	2,2273
Feedback -> Pride of authorship	0,2296	0,229	0,0907	0,0907	2,5321
Fit -> Joy	0,16	0,1842	0,1032	0,1032	1,5504
Fit -> WTPPP	0,0056	-0,0112	0,1344	0,1344	0,0415
Frequency -> WTPPP	-0,1995	-0,191	0,0688	0,0688	2,9017
Joy -> WTPPP	-0,2854	-0,2424	0,1805	0,1805	1,5814
Luxury level -> Psy. ownership	0,3057	0,3247	0,0755	0,0755	4,0481
MC Experience -> Ability to express prefere	0,2028	0,183	0,0883	0,0883	2,2977
Preference insight -> Ability to express pre	0,4866	0,554	0,1028	0,1028	4,7351
Preference insight -> Uniqueness	-0,32	-0,2928	0,1171	0,1171	2,734
Pride of authorship -> Fit	0,2208	0,2052	0,0986	0,0986	2,2388
Product Involvement -> Fit	0,2094	0,2064	0,0992	0,0992	2,1104
Psy. ownership -> Pride of authorship	-0,0113	0,0081	0,1879	0,1879	0,0601
Psy. ownership -> WTPPP	-0,8837	-0,8024	0,2578	0,2578	3,4277
Psy. ownership * Enjoyment -> WTPPP	1,1517	1,0933	0,3368	0,3368	3,4197
Uniqueness -> Fit	0,2835	0,3076	0,0949	0,0949	2,9877
Uniqueness -> Pride of authorship	0,2384	0,2364	0,0913	0,0913	2,6101
Visibility -> Pride of authorship	0,1925	0,1904	0,1028	0,1028	1,872
Visibility -> Psy. ownership	0,393	0,3826	0,071	0,071	5,5375
Visibility -> Uniqueness	0,3483	0,3592	0,0662	0,0662	5,2616

Appendix E: Latent Variables' Correlations

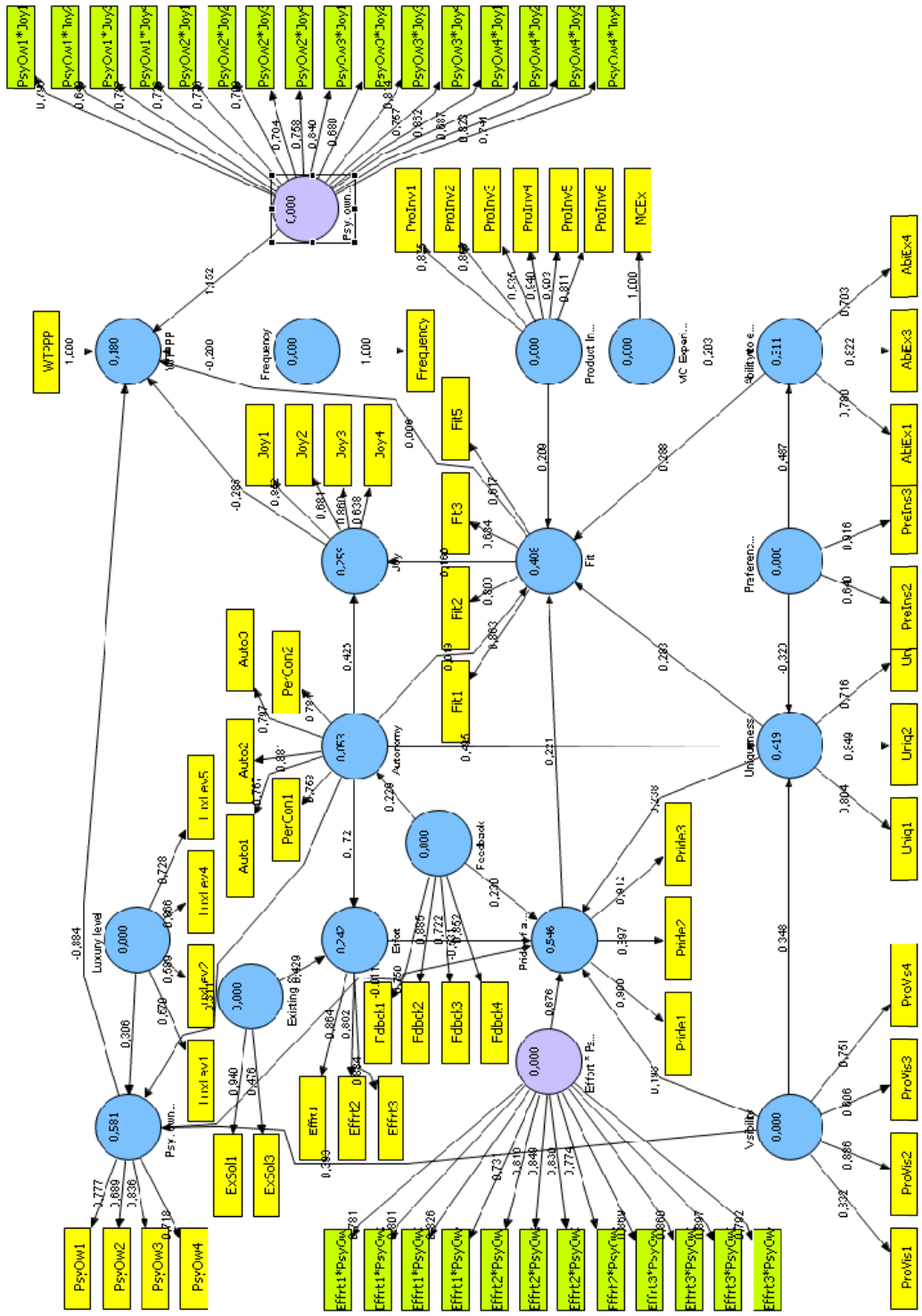
Table 30: Correlations of latent variables and square roots of corresponding AVE

	Ability to express preferences	Autonomy	Effort	Effort*Psy. ownership	Existing Solutions	Feedback	Fit	Frequency	Joy	Luxury level	MC Experience	Preference insight	Pride of authorship	Product Involvement	Psy. ownership	Psy. ownership*Enjoyment	Uniqueness	Visibility	WTPPP
Ability to express preferences	**0,77**																		
Autonomy	0,2583	**0,80**																	
Effort	-0,014	0,2546	**0,87**																
Effort*Psy. ownership	0,1214	0,4134	0,8299	**0,82**															
Existing Solutions	0,0869	0,1924	0,4622	0,4507	**0,75**														
Feedback	-0,083	0,2292	0,3359	0,3366	0,4795	**0,81**													
Fit	0,3346	0,3869	0,0137	0,2736	0,1356	0,0236	**0,74**												
Frequency	0,0264	-0,057	0,0927	0,0328	0,0712	-0,086	0,0097	**1**											
Joy	0,1261	0,4876	-0,047	0,153	-0,049	-0,022	0,3247	-0,144	**0,76**										
Luxury level	0,0997	0,2328	0,1955	0,4781	0,251	0,094	0,4275	0,0657	0,0876	**0,72**									
MC Experience	0,2846	0,1858	0,2493	0,297	0,2461	0,0835	0,0866	-0,013	-0,073	0,0832	**1**								
Preference insight	0,5207	0,3401	0,0841	0,2029	0,1606	-0,05	0,1274	-0,124	0,3026	0,0451	0,1682	**0,79**							
Pride of authorship	0,1742	0,3794	0,1682	0,4852	0,229	0,3442	0,4821	-0,041	0,2421	0,4631	0,1507	0,0982	**0,90**						
Product Involvement	0,0848	0,3648	0,1122	0,1664	0,1149	0,1726	0,3543	0,0199	0,3119	0,1351	0,2365	0,0096	0,2543	**0,89**					
Psy. ownership	0,2885	0,478	0,1267	0,5834	0,2859	0,1584	0,4882	-0,134	0,3865	0,5943	0,2051	0,4262	0,5626	0,2159	**0,76**				
Psy. ownership*Enjoyment	0,3155	0,5032	0,0429	0,4692	0,1836	0,106	0,5321	-0,133	0,7291	0,4634	0,1526	0,3975	0,561	0,2716	0,8659	**0,76**			
Uniqueness	-0,05	0,4712	0,2281	0,4402	0,1225	0,1671	0,438	-0,12	0,3029	0,4538	0,0218	-0,111	0,5321	0,2027	0,3683	0,3934	**0,79**		
Visibility	0,2231	0,2435	0,0441	0,3866	0,2528	0,1425	0,4132	-0,098	0,2655	0,55	0,0596	0,1162	0,5589	0,1157	0,6369	0,6003	0,4317	**0,78**	
WTPPP	0,0277	-0,031	-0,185	-0,118	-0,078	-0,102	0,0924	-0,193	0,2435	-0,081	-0,066	0,0213	0,0165	0,0322	0,0327	0,2078	0,0665	0,1068	**1**

Note: Diagonal elements are the square root of average variance extracted. These values should exceed the inter-construct correlations for adequate discriminant validity.

Appendix F: Measurement Model

Figure 37: Measurement model results



Appendix G: Delta WTP

Table 31: Differences between WTP for mass customized and non-mass customized products

Product	WTP non-MC [€]	WTP MC [€]	Difference
Apron	20	15	-25%
Bag	20	20	0%
Bicycle	2750	3000	9%
Board game	50	50	0%
Board game	20	30	50%
Car	50000	50000	0%
Car	-	50000	n/a
Car	15000	40000	167%
Car	5000	20000	300%
Car	15000	25000	67%
Car	5000	50000	900%
Car	-	30000	n/a
Car	20000	25000	25%
Cell phone cover	11	20	82%
Cereals	5	6	20%
Cereals	3	5	67%
Cereals	1,5	6	300%
Chocolate	2	4	100%
Chocolate	2	5	150%
Chocolate	1	2	100%
Chocolate	0,9	5	456%
Computer	500	800	60%
Computer	1100	1500	36%
Computer	500	700	40%
Computer	600	500	-17%
Computer	1000	1000	0%
Computer	900	1000	11%
Computer	900	1400	56%
Computer	700	700	0%
Computer	3500	4000	14%
Computer	1200	1200	0%
Computer	-	500	n/a
Computer	1000	1500	50%
Computer	800	800	0%
Computer	900	500	-44%
Computer	850	800	-6%
Computer	500	800	60%
Computer	1200	1200	0%
Computer	-	-	n/a
Computer	800	1400	75%
Furniture	2000	2500	25%
Furniture	1000	2000	100%
Furniture	1300	2000	54%
Furniture	-	-	n/a
Furniture	300	300	0%
Furniture	80	80	0%
Furniture	-	-	n/a
Pen	1	10	900%
Photo book	20	15	-25%

Photo book	10	30	200%
Photo book	30	30	0%
Photo book	-	30	n/a
Photo book	20	35	75%
Photo book	-	20	n/a
Photo book	15	30	100%
Photo book	-	30	n/a
Photo book	10	10	0%
Photo book	-	15	n/a
Printed products	0	1	n/a
Printed products	15	30	100%
Printed products	10	20	100%
Shirt	13	15	15%
Shirt	8	20	150%
Shirt	50	50	0%
Shirt	50	100	100%
Shirt	15	15	0%
Shirt	15	20	33%
Shirt	30	100	233%
Shirt	30	30	0%
Shirt	30	40	33%
Shoes	100	150	50%
Shoes	120	150	25%
Shoes	400	750	88%
Shoes	200	120	-40%
Shoes	80	100	25%
Shoes	110	150	36%
Shoes	125	180	44%
Shoes	200	300	50%
Shoes	100	100	0%
Shoes	100	100	0%
Shoes	70	120	71%
Shoes	130	200	54%
Shoes	100	120	20%
Shoes	150	160	7%
Shoes	80	100	25%
Shoes	150	200	33%
Shoes	120	150	25%
Shoes	170	200	18%
Shoes	40	80	100%
Sports equipment	2	10	400%
Tablet cover	70	150	114%
Vacation	800	1000	25%