Customization of B2B Services: Measurement and Impact on Firm Performance

By Michael Kleinaltenkamp, Ioana Minculescu and Sascha Raithel

Customization of services comprises the activities and results of a customer-specific adaptation of a provider's value-creation processes according to customers' requirements. As customized service offerings are supposed to better meet specific customers' needs, they should generate a higher willingness to pay and/or higher customer loyalty. However, customization also typically leads to increased costs, incurred from the customer-induced changes or adjustments in the specification, production and delivery of a service. With respect to this tradeoff, this paper examines how the degree of customization of business-to-business (B2B) services can be measured and how the degree of customization affects the generation of competitive advantages and firm performance. Using data from a large-scale quantitative study, the paper identifies three dimensions of customization of B2B services and shows the consequences of different degrees of customization on customer perceived value, cost-efficiency and thus firm performance.

1. Introduction

In his classic work on marketing in the 1950s, Wroe Alderson (1957) elucidated that suppliers could basically choose only between two strategic options when designing product/service offerings; they could customize and thus tailor offerings for each individual customer, or they could standardize and unify offerings for many customers (i. e. for markets or market segments). As the demand for customized offerings has risen in the past decades, it is not surprising that providers more often attempt to generate differentiation advantages through the customization of products and/or services (Åhlström and Westbrook 1999; Booz Allen Hamilton 2004; Ceci 2009; Ceci and Masini 2011). These supplier strategies are based on the assumption that through customization, customers' perceptions of being treated individually are intensified, leading to higher quality perceptions and greater customer satisfaction (Anderson et al. 1997) and thus offering opportunities for realizing price premiums. Furthermore, new technology-driven opportunities of implementing cost-efficient approaches of mass customization have accelerated this trend (Durray et al. 2000).

These developments can be observed especially in business-to-business (B2B) markets, in which the customization of offerings according to the needs of particular customers has always been, and still is, a common way to operate (Kleinaltenkamp and Jacob 2002). The main reason for this is that compared with consumer markets, product/service offerings in this field largely need to be adjusted to the conditions of the operational processes of the customer firm (Kleinaltenkamp 2015). This is even more so in B2B services, which are always customized, albeit to a different degree, as customers need to participate in their specification, production and delivery (Hau-

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mann et al. 2015). This customer participation thus reflects a customer's engagement in service specification, co-production and delivery (Cermak et al. 1994; Dabholkar 1990) and represents the "degree to which a customer contributes effort, preferences, knowledge, or other inputs to service production and delivery" (Dong et al. 2015, p. 160).

As customized offerings are supposed to better meet specific customers' needs, they should generate a higher willingness to pay and/or higher customer loyalty. Therefore, from a marketing perspective, these offerings are intended to increase or at least stabilize revenues. However, from an operations perspective, customization typically leads to increased costs incurred from related customer-induced changes or adjustments in processes of operations and delivery (Franke et al. 2009). This tradeoff between customization's superior customer perceived value (Dellaert and Stremersch 2005) and its decrease in cost-efficiency leads to the question of the degree to which B2B service offerings should be customized to meet both marketing objectives (i. e. high value for the customer) and operational objectives (i. e. high cost-efficiency) at the same time. In other words, when customizing B2B services, how can firms deliver superior value to customers in a cost-efficient way (Wang et al. 2010)?

As a consequence of this tradeoff, many B2B service providers do not offer services that are completely customized but rather offer those that are only partly adapted to customer-specific requirements (Bouwens and Abernethy 2000; Gwinner et al. 2005). This partial adoption is even more justified because customers often do not require fully customized services, and in many cases, they are not willing to pay higher prices for fully customized offerings (Anderson et al. 1997). Moreover, heterogeneity in demand typically varies across the business lines of a firm. Therefore, it is necessary not only to make decisions about the degree of customization in various business units but also to handle various degrees of customization across different business units.

Against this backdrop, the determination of the 'right' degree of customization in a specific context is of strategic importance and critical to firm success. Surprisingly, in many cases practitioners making these important strategic decisions may do so from a 'gut feeling' rather than following any systematic procedure. One reason for this seems to be that no practically useful and applicable tool exists to measure the degree of customization of B2B services. Beyond this backdrop, this paper addresses the following two research questions:

RQ1. How can the degree of customization of B2B services be measured?

RQ2. What is the impact of the degree of customization on the generation of competitive advantages and business performance in B2B service settings?

In addressing these questions, the study contributes to the current state of knowledge in three ways. First, it identifies the dimensions of customization of B2B services and thus lays the foundation for the development and application of a scale to measure the degree of service customization in this field. Second, it shows the consequences of different degrees of customization on customer perceived value on the one hand and cost-efficiency on the other hand – and, thus, on firm performance. Third, the results of the study should help guide firms in improving their service design to achieve firm performance.

The remainder of the paper is structured as follows: In Section 2, we build our research model by conceptualizing customization and developing testable hypotheses regarding the links among B2B service customization, customer perceived value, cost-efficiency and firm performance. Section 3 describes our empirical study, which is analyzed in Section 4. We discuss our results and link them to extant literature in Section 5, provide managerial implications in Section 6, and discuss the limitations of the study and offer future research avenues in Section 7.

2. Research Model

2.1 Customization

Designing the core offering of a firm, as a product, a service or a combination of both, is the fundamental basis for generating sustainable superior value for customers (Arora et al. 2008). One important decision in this regard is the extent of the customization of the offering. Basically, this decision lies between the two extreme poles of complete standardization on the one hand and complete customization on the other hand (Krasnikov et al. 2009) – in other words, from "fully customized for each customer" to "one-size-fits-all" (Pullman et al. 2001). In the case of complete customization, a provider completely adapts the selling and operation processes to customer-specific requirements to create a solution that is fully tailor-made to solve customer-specific problems (Krasnikov et al. 2009). To achieve a certain degree of customization, the provider must integrate customers' needs and wants into its service design, production and delivery processes (Lampel and Mintzberg 1996). For the provider to attain the required insights into specific customer needs (Peppers and Rogers 1995), the customers in turn need to transfer customer-specific information about the expected offering to the provider (Gwinner et al. 2005). Typically, the more infor-

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mation customers provide to specify their needs and wants, the more the provider can tailor the services accordingly.

Taking these considerations into account and following Kleinaltenkamp and Jacob (2002) and Bouwens and Abernethy (2000), we define 'customization' as *the activities and results of a customer-specific adaptation of a provider's value-creation processes according to customers' requirements*. Thus, in the case of customization, a firm's value proposition to a specific customer is co-created by the supplier with the support of the customer (Vargo and Lusch 2008). This presumably happens in a value-adding way that involves reciprocal promises of value – that is, a process of matching supplier and customer practices, which leads to the opportunity to achieve mutual value gains by both market actors (Ballantyne et al. 2011; Grönroos and Helle 2010). As a result, the substance of the supplier's value proposition is variable and dependent on the customer's co-creative activities. Therefore, a supplier firm offering customized services initially can only develop and offer more general value propositions based on the resources it owns or has access to. On that basis, it can then adapt and design a more concrete customized value proposition to meet the specific customer requirements and only those requirements (Johnson et al. 2008; Payne et al. 2008). This process of value proposition negotiation may take several iterations and may involve a deliberate facilitation process that allows for customers' more or less extensive participation by integrating own informational resources, such as intimate knowledge of their own needs and wants, likes and dislikes, and expectations of the usage of the supplier's productive resources. This supplier-customer interaction in particular makes customization a challenge for both operations and marketing (Kellogg and Nie 1995). Conceptualization of customization in service thus needs to integrate the ways suppliers and customers collaborate not only when specifying the value proposition but also when co-producing and delivering the service.

Thus, customization comprises the following three peculiarities. First, customization may only occur if there are heterogeneous customer wants and demands. The fulfilment of these customer needs is the customer-intended result of customization. Second, to achieve this result, a certain amount of customer-specific information must be transferred from the customer to the provider's processes. To do so, customers need to provide the necessary informational inputs containing the specifications of the required service outcome (Durray et al. 2000), and providers need to design service processes that enable such information transfer. Third, to make this possible, adequate and typically flexible firm resources that can provide customized service offerings are necessary (Jacob 2006; Skaggs and Youndt 2004; Tu et al. 2001; Zhang et al. 2014).

This threefold structure of customization is reflected in the concept of customer integration (Kleinaltenkamp et al. 1996). It divides the provisioning of products and services into three stages: (1) a resource or facilitating stage, (2) a transactional or transformation stage and (3) a result or usage stage (Kleinaltenkamp and Jacob 2002; Moeller 2008, 2010). This structure thus highlights the three key aspects through which customization is translated into service provisioning: (1) the flexibility of resources (McCutcheon et al. 1994); (2) the interaction between customer and provider during service specifications, operation and delivery (Syam and Kumar 2006); and (3) the provisioning of customer inputs based on their needs (Franke et al. 2009). Consequently and related to RQ 1, any measurement of B2B service customization must take into account both the complexity and the multi-dimensional nature of the construct that encompasses the three mentioned dimensions.

2.2 Linking B2B Service Customization and Firm Performance

From a provider's perspective, customization is only of interest if it leads to positive economic outcomes, such as higher revenues, market share or profitability. Following RQ 2, our research model thus focusses on analyzing the impact of (B2B service) customization on competitive advantages and thus firm performance (see Fig. 1).

According to Hunt and Morgan (1995), a firm's superior financial performance is due to sustainable competitive advantages. Thus, to analyze the impact of customization on firm performance, it is necessary to investigate how customization helps achieve competitive advantages (Lampel and Mintzberg 1996; Wang et al. 2010). Broadly speaking, competitive advantages can be gained either by differentiation advantages or by cost advantages (Bharadwaj et al. 1993; Porter 1998), as both may lead to higher customer perceived value (Zeithaml 1988). Differentiation advantage entails the customers perceiving consistent positive differences between important attributes of a firm's offering and those offered by competitors, resulting in increased firm success (Palmatier et al. 2007). One important aspect of such a differentiation is the design of the services offered (Kotha and Vadlamani 1995). In contrast, cost leadership means that a firm is able to perform the activities necessary to produce and deliver a service at lower costs than competitors can, thus leading to a higher cost-efficiency while offering the same or a similar service. Accordingly, we hypothesize:

H1: The higher the customer perceived value of a B2B service offering, the higher is the firm performance.

H2: The higher the cost-efficiency of B2B service offering, the higher is the firm performance.

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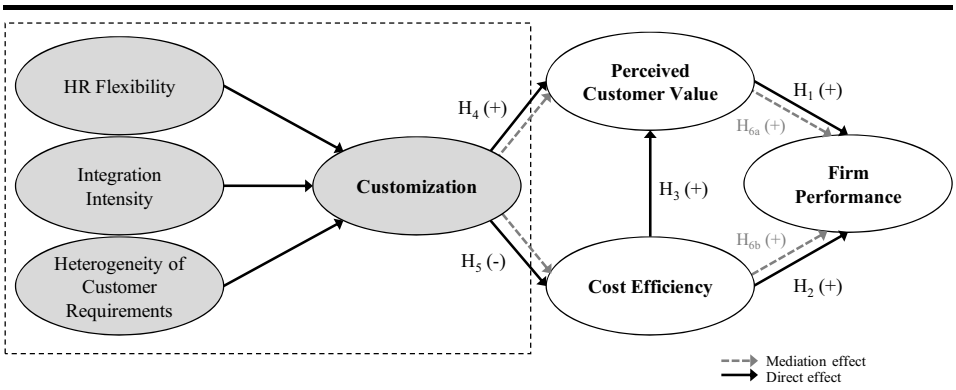

Fig. 1: Research model

As cost advantages may also derive from process improvements (Plinke and Wilkinson 2015), cost-efficiency can have a positive effect on customer perceived value. Especially in a service setting, process improvements that focus on the deletion or reduction of activities that do not create value for the customer may lead to faster service provisioning or to process designs that reduce the necessary inputs, efforts or temporal expenditures of customers. These betterments may increase the value of the offering as perceived by customers. Thus, we hypothesize:

H3: A higher cost-efficiency leads to higher customer perceived value.

Through customization, providers aim at creating a superior service quality compared with competitive offerings and, thus, at generating differentiation advantages. As customized offerings are provided from customer-specific information, they are tailored, at least partially, according to the needs of an individual customer. Therefore, customized offerings are supposed to meet the specific needs of customers better than standardized offerings and thus provide a higher value to them (Gwinner et al. 2005; Lam et al. 2004; Lapierre 2000; Piller et al. 2004; Sigala 2006; Squire et al, 2004; Stump et al. 2002). Moreover, specification of customers' needs and wants leads to a higher degree of customer participation. This enhances customers' sense of identity and strengthens the connection between customer and service provider (Turpeinen and Saari 2004). Last, with an increasing level of customization, the service also becomes highly specialized from the customers' standpoints and thus more difficult to obtain elsewhere (Wang et al. 2010). Considering these factors, we hypothesize:

H4: The higher the degree of customization of a B2B service offering, the higher is customer perceived value.

Regarding cost-efficiency, customization often leads to higher operational costs because it is associated with customer-induced processes of different intensity. By customizing services, a provider loses scale advantages of mass production (Pine et al. 1993), while complexity in operation, delivery and after-sales services increases (Dellaert and Stremersch 2005; Piller et al. 2004; Piller and Müller 2004). Furthermore, customization requires better-skilled and better-trained employees to achieve the flexibility necessary to deal with the different customer requirements and to facilitate the customer-specific processes (Krasnikov et al. 2009). This, in turn, also leads to higher costs. Following this stream of research, we hypothesize:

H5: The higher the degree of customization of a B2B service offering, the lower is the firm's costs efficiency.

In contrast with customer perceived value and cost-efficiency, customization per se does not affect a firm's performance directly. Its impact only occurs in an indirect way through the effects of higher or lower degrees of customization on customer perceived value and/or cost-efficiency. Therefore, we assume that the effects of varying degrees of B2B service customization are fully mediated through their impact on customer perceived value and cost-efficiency. Thus:

H6a: The relationship between customization and firm performance is mediated through customer perceived value.

H6b: The relationship between customization and firm performance is mediated through cost-efficiency.

3. Empirical Study

3.1 Measurement Items

To capture the sub-dimensions of customization – (1) the flexibility of resources; (2) the interaction between customer and provider during service specifications, operation and delivery; and (3) the provisioning of customer inputs based on needs – it is appropriate to operationalize the customization of B2B services as a second-order construct with three latent variables that represent the three dimensions of customization at the first level and are measured through separate scales. Moreover, existing approaches to measure the degree of customization are characterized by a reflexive measurement of the construct.

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Thus, they capture the effects of customization but not its antecedents. As the measurement tool, with regard to its managerial application, should also serve to adjust the degree of customization, it is appropriate to measure the first-level dimensions as drivers of overall customization. As a result, this approach not only ensures that the identified sub-dimensions are antecedents of customization but also makes it possible to show the extent to which they contribute to the degree of customization. Therefore, the specification of the second-order construct is formative on the second level (the first-level construct drives the second-level construct) and reflective on the first level (see *Fig. 1*).

According to the previous discussion, we develop a new measurement model of the construct that, as best possible, integrates already-existing measurement approaches. As a first step, we conducted semi-structured interviews with key informants in several B2B service sectors to glean deeper insights into the dimensions and drivers of service customization as well as its consequences. Informed by the results of this qualitative study as well as prior conceptual and empirical work in marketing and operations, we developed the measurement model.

3.1.1 Heterogeneity of Customer Requirements (First-level Construct)

Existing scales related to the heterogeneity of customer requirements focus on the heterogeneity or homogeneity of customers or products (e. g. Achrol and Stern 1988; Kim 2001; Reimann et al. 2010) but not on the heterogeneity of customer needs. Moreover, no scales exist to measure the heterogeneity of information transferred from the customer to the supplier. Therefore, it was necessary to develop new items to measure this dimension. We based their formulation on theoretic-conceptual considerations and the results of expert interviews. The aim was to capture both the intra- and inter-heterogeneity of the customer requirements. As a result, the items reflect differences in customer expectations of the service outcome and the process of service co-production, differences in the quality understanding of customers and their buying behavior, and differences in the importance of specific modules (see Appendix 1).

3.1.2 Integration Intensity (First-level Construct)

Informational customer integration encompasses all processes of service provisioning that customers at least partially control and co-design. Therefore, the items need to capture the transfer of information from the customer to the provider and the interaction that takes place between customers and providers during service provisioning. Here, we derived items from Homburg and Stock's (2004) scale and then modified them slightly according to the research context. In addition, we added two further items from Hildenbrand (1997) and Skaggs and Youndt (2004). We self-developed another item with respect to information transfer (see Appendix 1).

3.1.3 Human Resource Flexibility (First-level Construct)

As humans are the most important resource for service production (Skaggs and Youndt 2004), the flexibility of human capital, in contrast with other resources, is most relevant for customization. Human resource (HR) flexibility encompasses the skills and behaviors of a firm's employees that are necessary to adjust the services offered according to the customer requirements. Therefore, items need to capture both skills of the employees and behaviors they show in this regard. Here again, we used items derived from existing scales and modified them slightly according to the research context. Specifically, the items measuring the skills of employees came from Gwinner et al. (2005) and Bhattacharya et al. (2005) and those measuring employee behavior came from Bhattacharya et al. (2005) and Ketkar and Sett (2010) (see Appendix 1).

Overall, we identified 25 items to measure the antecedents of customization, eight for heterogeneity of customer requirements, 10 for integration intensity and seven for HR flexibility. We pre-tested the developed measurement items using two samples. The first consisted of 17 experts: 11 marketing academics and six people representing the targeted respondents. These people were asked to allocate items assigned to them randomly to the construct dimensions they believed they belonged to. This led to more or less uncritical results with respect to the unambiguousness of the allocation as well as the relevance of the content of the items. As a result, we needed to change the formulation of only two items. In the second pre-test, the questionnaire was presented to 35 managers participating in an executive Master's program in business marketing. Informed by the results, we conducted a first test of the validity and reliability of the scales. As the tests did not show any critical values for the scales, we used these items for the main study without any changes. The variables are measured with seven-point Likert scales (1 = *strongly disagree*, 7 = *strongly agree*) (see Appendix 1).

3.1.4 Customization (Second-level Construct)

To examine the validity of the first-level constructs of customization, we collected seven global reflective indicators for the second-level construct. The particular problem was the selection of a suitable set of instruments. While the three first-level constructs measure the antecedents of customization, use of a measurement scale of the second-level construct helps directly capture customization. This has three advantages. First, it allows us to calibrate the extent to which each driver construct contributes to customizati-

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on. Second, we can examine whether the first-level constructs measure customization in a comprehensive measure. Third, the second-level measurement model allows managers to assess their firm's global level of customization parsimoniously. Appendix 2 shows the indicators used for the global measurement of customization. As the appendix shows, the term "customization" is deliberately not used directly but is only circumscribed. To counter the problem of a similar measurement of the first- and second-level constructs, the indicators of the global construct cover the adaptation to individual customer-specific peculiarities. We took the indicators from already-established scales. The majority of indicators came from the scales of Hildebrand (1997) and Skaggs and Youndt (2004). In addition, we used two self-developed indicators.

3.2 Sample

Data collection was an online survey. To reach a sufficient level of realism, potential respondents of B2B service firms were approached through a professional social media network that operates in Germany, Austria and Switzerland. Moreover, because the focus is on the relationship between the degree of customization and the success of B2B service firms, the selected respondents were familiar with or responsible for the process of service provisioning in their firm or business unit. These people were mainly high-level managers, who tend to have the necessary comprehensive overview and experience to evaluate the matters of interest (i. e. the skills of firm employees, the variations of customer requirements, the processes of customer participation, the competitiveness of the market and the profitability of the firm or business unit).

To ensure that the questionnaires were filled out by qualified key informants, we took various measures. In addition to a pre-selection of addresses from the personal criteria available through the professional social media network, we tracked several criteria in the last part of the questionnaire, which served as indicators for the ability of the respondents to provide the desired information. On that basis, we excluded individual data sets if we had an overall impression that a specific person was not qualified enough to answer the questions.

Of the 5,250 people in the target group, 627 participated in the online study, representing a response rate of 12.2 %. Owing to inconsistencies, we excluded some data sets, which left 577 cases remaining for data analysis. Thus, the corrected response rate is 10.9 %, which, according to Baur and Florian (2009), is sufficient for a B2B context. The respondents were from logistics and transportation, consulting, financial and insurance services, IT services, facility services, and advertising and marketing services, thus representing a wide variety of B2B service industries (see *Tab. 1*). Moreover, the main departmental affiliations of the respondents were operations, sales and project management, 92.8 % of whom had a leading position in their department (see *Tab. 1*). The average age of the respondents was 44.7 years, their average duration of employment was 8.2 years, and on average, they held their current position for 4.9 years.

4. Results

The analysis uses partial least squares structural equation modelling (PLS-SEM) with SmartPLS 3 to test the model (Ringle et al. 2015). Variance-based SEM has several advantages over covariance-based SEM (e. g. Chin 1998; Hair et al. 2011, 2012; Sarstedt et al. 2014). In particular, we were interested in predicting a key target construct (customization), identifying its key 'driver' constructs and its impact on relevant outcomes. We therefore selected variance-based SEM (Hair et al. 2011).[1] We apply bootstrap procedure with 5,000 replications and interpret the 95 % bias corrected confidence intervals to test significance of model parameters. We first discuss the reliability and validity of the measurement models and then discuss the main model and hypotheses tests results. Finally, we examine observed and unobserved heterogeneity in our data.

4.1 Model Evaluation

To evaluate the reflective measurement models, we consider three criteria: convergent validity, internal consistency reliability and discriminant validity. Appendices 1 and 2 present the specific results. We deleted some items because of unsatisfactory factor loadings (<.60) and average variance extracted (<.50). In the final model, all the outer loadings are above .60, and constructs' average variance extracted values are higher than .50. For internal consistency reliability, we examine Cronbach's alphas and composite reliabilities, which should be higher than .70 (Nunnally 1978) and .60 (Bagozzi and Yi 1988), respectively. All constructs fulfil these criteria (see Appendices 1 and 2). To test discriminant validity, we follow the suggestion of Henseler et al. (2015) and analyze the heterotrait-monotrait ratios. We find that for all constructs, the maximum ratios are below .80 and none of the bias corrected upper confidence bounds are above one. These results indicate satisfactory discriminant validity.

We also tested for common method variance. First, we applied Harman's (1976) single-factor test. The first factor accounts for only 23.9 % of the overall variance, which indicates that common method variance likely does not affect the results (Podsakoff and Organ 1986; Sattler et al. 2010). In addition, we applied the procedure Liang et al. (2007) describe to assess common method variance in the PLS model. Of 43 common factor indicator loadings, 27

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		N	%
Industry	IT Services	109	18.9
	Management Consulting	89	15.4
	Logistic & Transportation	64	11.1
	Financial Services	58	10.1
	Telecommunication Services	52	9.0
	HR Services	45	7.8
	Facility Services	41	7.1
	Marketing & Advertising	32	5.5
	Technical & Engineering Services	29	5.0
	Auditing & Tax Consulting	26	4.5
	Market Research	17	2.9
	Education Services	12	2.1
	Translation Services	3	0.5
Firm revenue	< 1 Mio EUR	56	9.7
	1-5 Mio EUR	58	10.1
	5-10 Mio EUR	58	10.1
	10-50 Mio EUR	90	15.6
	50-100 Mio EUR	43	7.5
	100-500 Mio EUR	63	10.9
	500-1,000 Mio EUR	44	7.6
	>1,000 Mio EUR	165	28.6
Number of employees	<50	128	22.2
	51-100	47	8.1
	101-500	103	17.9
	501-1,000	29	5.0
	1,001-5,000	77	13.3
	5,001-10,000	44	7.6
	>10,000	147	25.5
	Missing	2	0.3
Position	Executive	124	21.5
	Product Management	25	4.3
	Project Management	103	17.9
	Sales	111	19.2
	Operations & Production	107	18.5
	Other	36	6.2
	Marketing	9	1.6
	Division/Unit Head	48	8.3
	Key Account Management	14	2.4
Average age of respondent in years		44.7	
Average years in company		8.2	

Tab. 1: Sample characteristics (N = 577)

are not significant ($p > .10$). More important, the substantially explained average variance is 58.4 %, while the average variance due to the common method is only 1.8 % (ratio of 38:1). Given the small magnitude of common method variance, we contend that the method has only a mild, if any, influence on our findings.

The standardized root mean square residual of the model is .079 and below the threshold of .08 (Hu and Bentler 1999). This indicates a good global fit for the model. *Fig. 2* and *Tab. 2* show the results for the structural (inner) model, which we discuss next.

4.2 Hypotheses Tests

First, we examine the second-order measurement model of customization. The three antecedents, HR flexibility, integration intensity and heterogeneity of customer requirements, explain 43.7 % of the variance of customization. Although this R^2 is clearly above average (Chin 1998), we cannot say that customization is comprehensively explained by the three first-order driver constructs. Using the blindfolding procedure, we also obtain the Stone-Geisser's Q^2 value (Geisser 1974; Stone 1974) as a criterion of predictive relevance. The Q^2 value is .231, indicating a medium predictive relevance of the three driver constructs. This finding can be attributed to two reasons. On the one hand, we are missing some driver constructs, and on the other hand, there is unobserved heterogeneity. We discuss these issues subsequently. Regarding the three driver constructs, we find that all three are significantly associated with customization: HR flexibility has a significantly positive effect of .492 ($p < .05$). Its f^2 of .338 indicates an almost substantial effect size, according to Chin (1998). Integration intensity has a significantly positive effect of .224 ($p <$

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Direct effects [95% confidence interval]	*Customization*	*Perc. Cust. Value*	*Cost-Efficiency*	*Firm Performance*
HR Flexibility	.492 [.415; .562]			
Integration Intensity	.224 [.145; .295]			
Heterogeneity of Customer Requirements	.107 [.037; .178]			
Customization		.264 [.199; .324]	.180 [.089; .263]	
Perceived Customer Value				.313 [.226; .399]
Cost-Efficiency		.587 [.529; .636]		.280 [.184; .365]

Indirect effects [95% confidence interval]	*Customization*	*Perc. Cust. Value*	*Cost-Efficiency*	*Firm Performance*
HR Flexibility		.182 [.135; .229]	.088 [.042; .137]	.082 [.053; .112]
Integration Intensity		.083 [.050; .119]	.019 [.006; .038]	.037 [.021; .056]
Heterogeneity of Customer Requirements		.040 [.013; .069]	.019 [.006; .038]	.018 [.006; .033]
Customization		.106 [.052; .157]		.166 [.114; .218]
Perceived Customer Value				
Cost-Efficiency				.184 [.131; .239]

Total effects [95% confidence interval]	*Customization*	*Perc. Cust. Value*	*Cost-Efficiency*	*Firm Performance*
HR Flexibility	.492 [.415; .562]	.182 [.135; .229]	.088 [.042; .137]	.082 [.053; .112]
Integration Intensity	.224 [.145; .295]	.083 [.050; .119]	.019 [.006; .038]	.037 [.021; .056]
Heterogeneity of Customer Requirements	.107 [.037; .178]	.040 [.013; .069]	.019 [.006; .038]	.018 [.006; .033]
Customization		.369 [.291; .441]	.180 [.089; .263]	.166 [.114; .218]
Perceived Customer Value				.313 [.226; .399]
Cost-Efficiency		.587 [.529; .636]		.464 [.386; .530]

Tab. 2: Main results (N = 577)

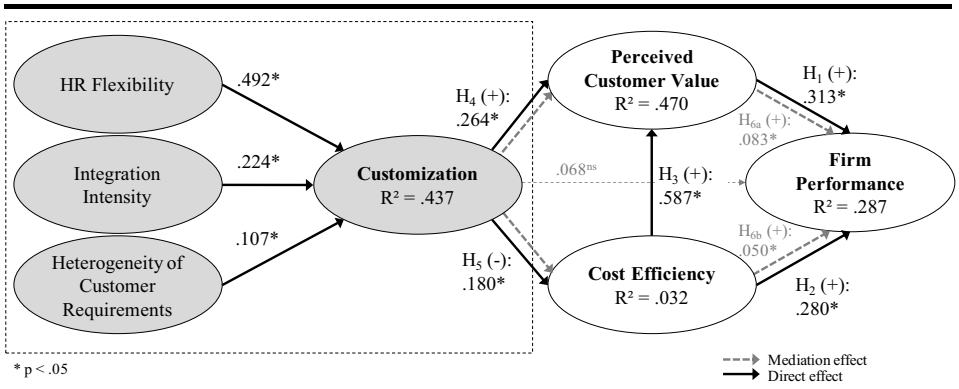

Fig. 2: Main results

.05), with an f^2 of .070, indicating weak influence. Heterogeneity of customer requirements has a significantly positive effect of .107 ($p < .05$), with a very weak influence on customization ($f^2 = .019$). Comparing these effects, we find that HR flexibility is significantly more important than the other two drivers (confidence intervals do not overlap; see *Tab. 2*).

Second, we examine the results from the hypotheses tests. In support of H1 and H2, we find that perceived customer value (.313, $p < .05$) and cost-efficiency (.280; $p < .05$) are significantly associated with firm performance. Both variables explain 28.7 % of the variation in firm performance. Part of the effect of cost-efficiency on firm performance is mediated by perceived customer value. Confirming H3, we find that the coefficient of cost-efficiency on perceived customer value is .587 ($p < .05$). For the key construct, we find contradictory findings. In support of H4, we find a positive association of customization with perceived customer value (.264; $p < .05$). However, contradictory to the prediction in H5, we do not find a negative effect between customization and cost-efficiency but rather a significantly positive effect of .180 ($p < .05$). Finally, we assessed the mediation effects. Confirming H6a and H6b, we find that the relationship between customization and firm performance is mediated through customer perceived value (.083; $p < .05$) and that the relationship between customization and firm performance is mediated through cost-efficiency (.050; $p < .05$). We confirm these findings by measuring customization as a formative construct using the factor scores HR flexibility, integration intensity and heterogeneity of customer requirements as formative indicators ($p < .05$).

4.3 Test of Measurement Invariance

As our focus is on developing and testing a generalizable measurement instrument for customization, it is necessary to examine whether the theoretically derived conceptualization and operationalization fulfil this goal and whether the empirical findings for the various relationships we presented are stable across different contexts. This "measurement invariance", i. e. "the absence of measurement

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bias with respect to groups" (Wicherts, Dolan & Hessen 2005, p. 696) is an essential aspect of valid measurement (e.g. Millsap & Everson 1993). In business literature, it is assumed that measurement invariance may be challenged by factors that are related to industries, to the firm, or to respondents (Knoppen et al. 2015). Hence, to test the generalizability of the measurement tool, we conducted pairwise group comparisons using the following measured variables (all based on respondents' self-ratings):

- Industry specific: industry, competition intensity, market dynamic, customer power and homogeneity of customization strategies.
- Firm specific: firm revenue and number of employees.
- Respondent specific: age of respondent, respondent's tenure at company and respondent's position at company.

We split the data using the median of variables measured on a metric or Likert scale. For nominal variables (industry and position; see *Tab. 1*), we compare each pair of observed values unless a group has fewer than 50 observations, to ensure that estimated parameters in each group are based on a sufficiently large sample size. Given the large number of pairwise comparisons, we adjust α levels to avoid the α-inflation trap. As we conduct 24 group comparisons in total, we regard group differences as meaningful only if the p-value of the difference in model parameters is smaller than the Bonferroni-adjusted α of .05/24 ($\sim$ .0021). For space reasons, we present results in detail only for group comparisons for which we found a significant difference. (Detailed results for the group comparisons without any significant differences in structural model coefficients are available on request.)

Overall, we find only a few differences. For two grouping variables (i. e. competition intensity and customer power), we find two notable differences regarding the effect of HR flexibility on customization (see *Tab. 3*). When competition intensity is low, the effect is .573 ($p < .05$), and when competition intensity is high, the effect is only .357 ($p < .05$). The difference of .216 is significant ($p = .002$). When customer power is low, the effect of HR flexibility on customization is .612 ($p < .05$), and when customer power is high, the effect is only .383 ($p < .05$). The difference of .229 is significant ($p = .001$). All other model parameters are not affected by group differences, which means that we find stability of structural model parameters for the following

Competition intensity

Structural model parameters			Low (N = 345)	High (N = 232)	Effect difference	p-Value
HR Flexibility	→	*Customization*	.573*	.357*	.216*,Δ	.002
Integration Intensity	→	*Customization*	.237*	.212*	.024	.373
Heterog. of Custom. Requirem.	→	*Customization*	.055	.173*	.118	.062
Customization	→	*Cost Efficiency*	.212*	.139	.073	.212
Customization	→	*Perc. Custom. Value*	.296*	.214*	.081	.113
Cost Efficiency	→	*Perc. Custom. Value*	.554*	.634*	.080	.056
Perceived Customer Value	→	*Firm performance*	.272*	.355*	.083	.180
Cost Efficiency	→	*Firm performance*	.315*	.247*	.068	.243

Customer power

Structural model parameters			Low (N = 235)	High (N = 342)	Effect difference	p-Value
HR Flexibility	→	*Customization*	.612*	.383*	.229*,Δ	.001
Integration Intensity	→	*Customization*	.153*	.291*	.139*	.032
Heterog. of Custom. Requirem.	→	*Customization*	.076	.144*	.068	.166
Customization	→	*Cost Efficiency*	.245*	.119*	.126	.079
Customization	→	*Perc. Custom. Value*	.229*	.295*	.066	.155
Cost Efficiency	→	*Perc. Custom. Value*	.602*	.585*	.017	.371
Perceived Customer Value	→	*Firm performance*	.215*	.357*	.142	.069
Cost Efficiency	→	*Firm performance*	.286*	.289*	.003	.488

Latent Classes

Structural model parameters			LC1 (N = 274)	LC2 (N = 303)	Effect difference	p-Value
HR Flexibility	→	*Customization*	.674*	.248*	.426*,Δ	.000
Integration Intensity	→	*Customization*	-.034	.733*	.767*,Δ	.000
Heterog. of Custom. Requirem.	→	*Customization*	.198*	-.033	.231*,Δ	.000
Customization	→	*Cost Efficiency*	.067	.339*	.272*,Δ	.001
Customization	→	*Perc. Custom. Value*	.131*	.441*	.310*,Δ	.000
Cost Efficiency	→	*Perc. Custom. Value*	.570*	.549*	.021	.347
Perceived Customer Value	→	*Firm performance*	.212*	.379*	.167*	.034
Cost Efficiency	→	*Firm performance*	.440*	.196*	.245*	.006

Tab. 3: Results for group comparisons

* $p < .05$ Δ $p < .05/24$ (Bonferroni-adjusted)

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grouping variables: industry, market dynamic, homogeneity of customization strategies, firm revenue, number of employees, age of respondent, respondent's tenure at company, and respondent's position at company. Consequently, we can assume model stability to a large degree for the observed factors and thus a broad applicability of the developed instrument to measure B2B service customization.

4.4 Unobserved Heterogeneity

The results of the above analysis might be limited because it assumes that we have been able to measure all potential sources of group differences. Further, the analysis of the second-order measurement model showed that it explains only 43.7 % of the variance of customization. Hence, there might exist unmeasured (i. e. unobserved) heterogeneity with respect to the importance of the three construct dimensions within the sample. As a consequence, this heterogeneity might also be reflected in a different importance of the various construct dimensions for gaining competitive advantage and thus achieving firm performance.

To explore these important questions, we use the finite mixture PLS approach to conduct response-based segmentation and to assess possible unobserved heterogeneity in our data (Hahn et al. 2002; Sarstedt et al. 2011). This method uses the data to cluster observations into latent classes with high within-class homogeneity and high between-class heterogeneity in terms of the empirical relationships in the research model. The challenge, however, is specifying the optimal number of classes to avoid both under- and over-segmentation while retaining a managerially meaningful number and sizes of classes. We test solutions for one to five classes. *Tab. 4* shows the fit criteria and segment sizes for these classes.

Literature presents several selection criteria to determine the optimal number of classes. Sarstedt et al. (2011) propose using AIC4 (Akaike's Information Criterion) because it shows the highest success rate in their simulation study, especially when model complexity is high. Furthermore, the BIC (Bayesian Information Criterion) performs well if the number of observations is large. In our case, the AIC4 suggests a three-cluster solution ($AIC4_{min}$ = 5,653.621), and the BIC suggests a two-cluster solution (BIC_{min} = 5,713.457). We selected a two-cluster solution because the difference between fit criteria for the two- and three-cluster solution is much smaller in the case of the AIC4 than the BIC. Moreover, the three segments are substantially smaller (15.6 % of observations) than the other two segments. Finally, the two-cluster solution produces two almost equally sized latent classes, thus facilitating interpretation and managerial meaningfulness.

Unlike with the observed heterogeneity, which we investigated to test measurement invariance (see 4.3), we find several notable differences between the two latent classes LC1 and LC2 (see *Fig. 3* and *Tab. 3*). While the R^2 of customization is comparable to the full sample for LC1 (R^2 = .472), it is substantially higher for LC2 (R^2 = .667). The comparably small R^2 of customization in the full sample is due to unobserved heterogeneity. The effect of customization drivers is also diverging. HR flexibility (.674; $p < .05$) and heterogeneity of customer requirements (.198; $p < .05$)

		Number of segments				
		1	**2**	**3**	**4**	**5**
Fit criteria	AIC	5,661.231	5,604.511	5,577.621	5,555.007	5,554.134
	AIC3	5,673.231	5,629.511	5,615.621	5,606.007	5,618.134
	AIC4	5,685.231	5,654.511	5,653.621	5,657.007	5,682.134
	BIC	5,713.525	5,713.457	5,743.219	5,777.257	5,833.036
	CAIC	5,725.525	5,738.457	5,781.219	5,828.257	5,897.036
	HQ	5,681.624	5,646.995	5,642.198	5,641.675	5,662.894
	MDL5	6,018.702	6,349.241	6,709.611	7,074.257	7,460.643
	LnL	-2,818.616	-2,777.255	-2,750.811	-2,726.503	-2,713.067
	EN		.268	.407	.538	.581
	NFI		.308	.397	.476	.515
	NEC		422.160	342.061	266.461	241.919
Segment sizes (%)	**1**	100.0%	52.6%	48.0%	48.9%	54.5%
	2		47.4%	36.4%	33.4%	15.1%
	3			15.6%	16.6%	15.0%
	4				1.1%	13.7%
	5					1.7%

Tab. 4: Fit criteria and segment sizes of latent-class analysis

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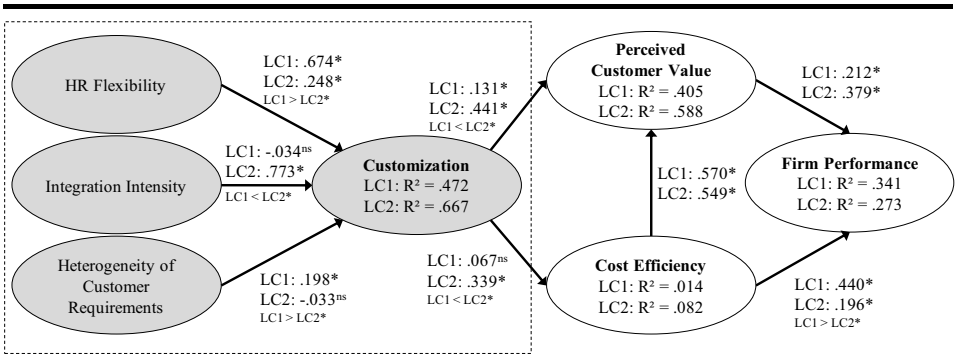

* p < .05 (significance tests of parameters and group differences based on group analysis)

Fig. 3: Latent-class analysis results (two-segment solution: $N_{LC1} = 303$; $N_{LC2} = 274$)

are significantly more important for LC1 ($p < .05$) than for LC2 (.248; $p < .05$ and –.033; $p > .10$, respectively). The effect differences are .426 ($p < .05$) and .231 ($p < .05$), respectively. Integration intensity, however, is more important for LC2 (.773; $p < .05$) than for LC1 (–.034; $p > .10$; effect difference is .767; $p < .05$).

Furthermore, we find that the effect of customization on perceived customer value is stronger for LC2 (.441; $p < .05$) than for LC1 (.131; $p < .05$; effect difference is .310; $p < .05$). The effect of customization on cost-efficiency is also stronger for LC2 (.339; $p < .05$) than for LC1 (.067; $p > .10$; effect difference is .272; $p < .05$). Thus, customization is significantly more important for LC2, which in turn is predominantly driven by integration intensity. In line with this finding, we show a difference in the effect of perceived customer value on firm performance: the effect is more pronounced for LC2 (.379; $p < .05$) than for LC1 (.212; $p < .05$; effect difference is .167; $p < .05$). By contrast, LC1 is more dependent on cost-efficiency: the effect of cost-efficiency on firm performance is higher for LC1 (.440; $p < .05$) than for LC2 (.196; $p < .05$; effect difference is .245; $p < .05$). The last model parameter (cost-efficiency on perceived customer value) is not significantly different between latent classes and replicates the effect of the pooled model.

Finally, we used all available information (i. e. industry, firm, and respondent specific variables measured in our survey as well as latent variable scores) to explain these differences. We conducted a logistic regression using these variables as potential predictors for latent-class membership. We find four notable latent-class differences ($p < .05$; detailed results are available on request): LC1 observations are more likely to come from financial services, have lower levels of customization and integration intensity, and have a higher level of HR flexibility. These findings make sense given that customization and integration intensity have a lower relevance for LC1 than LC2, while HR flexibility is more relevant for LC1 than LC2. However, the predictive value of this model is low (McFadden R^2 = .051; only 61.4 % of observations are assigned correctly to their latent classes), which hinders a more meaningful and comprehensive characterization of the two latent classes with the data at hand, thus opening up an avenue for further research.

5. Discussion

With respect to RQ 1, the study shows that the three theoretically deduced dimensions, HR flexibility, integration intensity and heterogeneity of customer requirements, are important facets of the latent customization construct in B2B service contexts. Overall, they explain 43.7 % of the variance of the construct. Moreover, the analysis shows that HR flexibility represents the most important dimension of the construct. It thus reflects to the greatest extent the realization of customization in a B2B service firm. Consequently, success of customization depends especially on the qualification and the behaviors of a service firm's employees as well as the flexible working practices in the firm. In addition, the integration of customer information has a strong and significant impact on the extent of customization. Without such a transfer of customer-specific information, no customization of services is possible. Therefore, this information transfer needs to be set up effectively and efficiently in the processes of customer participation. Finally, the heterogeneity of customer requirements determines the degree of customization. Although the rather low strength of the path coefficient and its low significance show that this dimension affects the degree of customization only to a small extent, it should not be neglected as it serves as the starting point of all service customization.

In addition, our multi-group comparisons show that the developed measurement tool can be applied without any changes to a great variety of B2B service contexts. All three dimensions show the same relevance for the extent of customization across industries, firm sizes, pursued strategies or market constellations as well as across the various groups of respondents according to their age, tenure or position at company.

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Related to RQ 2, the study reveals that the relationship between customization and firm performance is mediated through customer perceived value and cost-efficiency (H6a/H6b). Both have a positive effect on a firm's performance (H1/H2); the first opens up opportunities to achieve price premiums and higher customer loyalty, whereas the latter leads to better input-output ratios. Moreover, cost-efficiency enhances customer perceived value (H3) because it may lead, for example, to a reduction of production and delivery time, in turn increasing customer perceived value.

As expected, the degree of customization of a B2B service has a positive impact on customer perceived value (H4). However, we could not empirically confirm the theoretically assumed negative relationship between a high degree of customization and cost-efficiency (H5). The firm representatives participating in the study obviously do not believe that an increase in customization automatically leads to a decrease in efficiency. A possible explanation is that companies that customize B2B services are, to a larger extent, conscious of the possible cost increases and thus successfully try to avoid them. We assume that this reflects the so-called economies of customization. These economies may be achieved through the installation and application of information and communication technologies for two reasons. First, use of such technologies can help smooth the transfer of customer information at the customer-firm interface. Second, as customers need to actively participate in customization, they may take over certain tasks that would otherwise need to be fulfilled by the supplier, which also reduces the supplier's costs of operation and delivery (Piller and Müller 2004). These assumptions also receive support in our empirical study. Nearly 80 % of the interviewees indicated that their service production and delivery is characterized by an intensive application of information and communication technologies.

Moreover, this result corresponds to the important differences between the two identified latent classes, which may not only explain the comparably small R^2 of customization in the full sample. In addition to the substantially higher R^2 for LC2, we found a divergent importance of the drivers of customization. Whereas for LC1, HR flexibility and heterogeneity of customer requirements were significantly more important, integration intensity was of greater importance for LC2. Moreover, the effects of customization on perceived customer value and cost-efficiency were stronger for LC2 than for LC1. Therefore, for LC2 customization has a significantly greater impact on gaining competitive advantage and, thus, on firm performance. As this is predominantly driven by integration intensity, we can assume that these companies see the importance of integrating customer information efficiently and effectively and that they have taken appropriate measures to do so.

6. Managerial Implications

Customization builds an important mechanism for differentiation and thus can serve as a tool to achieve competitive advantage. However, from a practical perspective, implementing customization strategies successfully remains a challenge. For this purpose, the measurement of the degree of customization represents a necessary prerequisite. The more refined and practically applicable this measurement is, the better firms can design and evaluate customization strategies. The measurement tool developed and validated herein allows such an assessment based on the three identified components: HR flexibility, integration intensity and heterogeneity of customer requirements. At the same time, these dimensions help fine-tune the degree of customization possible. Thus, this paper identifies important directions to adjust the offered degree of customization. Overall, as our results show, HR flexibility and integration intensity are of major importance, while the heterogeneity of customer requirements is not as essential – and, at the same time, not easy to influence. However, our results also show that companies that have higher levels of customization and especially integration intensity (those of LC2) search for ways to compensate for the high level of HR flexibility by means of process management so that cost-efficiency remains under control. Moreover, when competition intensity is low, HR flexibility is more important for customization, as employees have greater freedom to design customized services and, thus, to engage customers in customized service offerings. Furthermore, when customer power is low, the effect of HR flexibility on customization is stronger, as customers probably know what they need and want. Thus, personnel need to be able to react to customer requirements.

Suppliers that want to successfully offer customized services primarily need to increase HR flexibility. This begins with the recruitment of personnel who can respond to the corresponding challenges. Furthermore, internal training measures should be offered to strengthen the necessary competences of the employees who must deal with the effects of customization so that they are better able to react to customer-specific requirements (Bhattacharya et al. 2005; Ketkar and Sett 2010). Moreover, the willingness to customize should be anchored within the organizational structures and processes. Only if they support employees' work design and work flows can firms implement customization successfully (Vickery et al. 1999). Furthermore, supplier processes need to ensure smooth integration of customer-specific information into supplier operations. Technically, this means that the necessary customer interfaces need to be established (Fließ 2009; Piller 2006; Reichwald and Piller 2006). In addition, qualified personnel are important; if employees do not have the necessary exper-

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tise, customers' uncertainty might come to the fore (Child et al. 1991; Mayer 1993). Not only do employees need to be able to record, translate and disseminate the customer requirements correctly, but they also need to be able to consult with customers on which specifications fit their requirements best. Thus, customer-contact personnel need to have comprehensive knowledge about the services and operational processes. Moreover, relevant technical devices such as machinery, software, customer touch points, and so on, need to aid these processes.

The heterogeneity of customer requirements lies at the starting point of any customization, but according to the results of this study, it does not determine the degree of customization from suppliers' standpoints. Moreover, influencing this dimension is difficult because it resides in the customer sphere. Nevertheless, suppliers can take certain measures such as selecting the types of customer problems they want to solve (i. e. which customer requirements they want to process). The more selective a supplier is, the lower the heterogeneity of customer requirements will be.

Furthermore, the economic effects of customization found herein indicate the necessity of considering objectives related to customer perceived value and cost-efficiency. Because offered solutions in B2B markets need to be adjusted to customers' specific operational processes, in many cases customization alone will not lead to competitive advantages, as most suppliers pursue such a strategy. In addition, because of competitive intensity, efficiency needs to be at the center of strategic considerations. From our results, we can assume that increased efficiency not only improves a supplier's input-output ratio but also positively contributes to customer perceived value, as both generation and delivery times are reduced. Our results show that practitioners know about these challenges and try to face them by taking appropriate measures.

7. Limitations and Further Research

The study has limitations as it only concentrated on the effects of customization to show its relevance for business performance. However, we do not investigate how the three identified dimensions influence the relationship between customization and performance. Organizational structures and organizational climate also play a major role in this regard. Moreover, the impact of training measures to increase employees' capabilities deserves deeper analysis.

Another avenue for research would be to investigate the impact of context factors on the degree of customization and business success. For example, our study showed significant differences in terms of the importance of the three dimensions of customization and their effects on the two latent classes LC1 and LC2. However, we were not able to identify certain context factors related to the specific constellations. Therefore, it is necessary to obtain deeper knowledge about the contexts in which firms can pursue a customization strategy more successfully and on how they should adjust the degree of customization according to context to achieve success. Moreover, based on the results of the latent class analysis we can also assume that firms differ with respect to their sensitivity toward the challenges of customer-driven integration intensity as well as to their capabilities to reduce the resulting costs. As we only know little about the possible drivers of this specific sensitivity and capabilities, investigating these drivers opens up another avenue for further research.

Extension of the model to the customer's perspective would be another opportunity for research, especially to gain further insights into the effects of customization on customer perceived value. In a similar vein, a dynamic analysis of the changes of the dimensions of customization and their effects would help capture the long-term strategic effects. With the development of market processes, competition likely leads to an adjustment of the degree of customization over time. Thus, it would be worthwhile to investigate how suppliers react to such developments and how they can gain and maintain competitive advantages throughout the course of such processes.

Finally, since B2B service customization has been conceptualized, operationalized and measured in this study for the first time, there is a need for conducting replication studies in order to enhance construct development and measurement. Moreover, by expanding the research context into non-German-speaking areas, cultural similarities and differences could be analyzed.

Note

[1] To examine the robustness of our main findings, we also used the covariance-based SEM technique. Although effect sizes are not exactly the same, the main findings and hypotheses test results remain qualitatively the same (model fit of the main model: $\chi^2(934) = 2702.745$; RMSEA = .057; SRMR = .069; CFI = .862; TLI = .853; all effects have the same sign and are significant at the 10 % level compared with the variance-based SEM).

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Construct	*Measures* (Scales: 1- strongly disagree to 7 - strongly agree)	Initital model		Final measurement model				
		Loading	AVE	Loading	Alpha	CR	AVE	HTMT-Ratio$_{max}$
Heterogeneity of customer requirements Self-operationalized	*HCR1 Our customers' understanding of quality varies very much by each customer*	0.683	0.586	0.684	0.884	0.908	0.586	0.287
	HCR2 The buying behavior of our customers with respect to our service varies mostly very much by each customer.	0.775		0.778				
	HCR3 The importance customers attribute to specific service modules varies mostly very much by each customer.	0.756		0.759				
	HCR4 The requirements customers have with respect to our service vary mostly very much by each customer.	0.841		0.842				
	HCR5 The requirements customers have with respect to the process of our service delivery vary mostly very much by each customer.	0.784		0.778				
	HCR6 Overall, the requirements of customers vary mostly very much from situation to situation.	0.827		0.827				
	HCR7 Often there is a necessity to change the process of service delivery for single customers.	0.674		0.674				
Integration intensity Homburg and Stock 2004, Hildebrand 1997, Skaggs and Youndt 2004, Self-operationalized	*II1 Usually, our service provisioning is influenced very much by our customers.*	0.616	0.436	(excl.)	0.856	0.885	0.525	0.479
	II2 Overall, the provisioning of our service requires a high degree of customer participation.	0.631		0.753				
	II3 Our customers need to integrate themselves into the provisioning of our service from the very beginning	0.713		0.678				
	II4 The provisioning of our service requires a regular exchange of views with our customers.	0.623		0.835				
	II5 Overall, we conduct an intensive dialogue with our customers in order to discover the specific requirements related to the service to be delivered	0.791		0.760				
	II6 Usually the amount of information we receive from single customers with respect to the service provisioning is high.	0.730		0.761				
	II7 Our customers actively provide us with information.	0.711		0.640				
	II8 During service delivery, the contact with our customers is usually characterized by a flow of information from our customers to us as a supplier.	0.613		(excl.)				
	II9 During service delivery, we receive information mainly through individual exchange (personal interview, e-mail, telephone call, ...) with the respective customer.	0.502		(excl.)				
	II10 During service delivery, we receive numerous performance-related information from each individual customer.	0.623		0.620				
HR flexibility Gwinner et al. 2005, Bhattacharya et al. 2005, Ketkar/Sett 2010 *These employees…*	*HRF1… are usually able to adjust our service o the specific requirements of single customers.*	0.820	0.611	0.820	0.894	0.917	0.611	0.697
	HRF2 … are able to react to changed conditions within a very short time	0.793		0.794				
	HRF3 … are able to suggest a number of different service variations in order to fulfill customer requirements.	0.821		0.820				
	HRF4 … are able to adjust the core service for single customers with respect to various dimensions (e.g. specification and/or compilation of modules, order of activities).	0.802		0.802				
	HRF5 … are able to change their behavior to react to customer wishes.	0.759		0.758				
	HRF6 … show flexible working practices that help us to react to customer wishes accordingly.	0.774		0.774				
	HRF7 …can decide which additional resources are necessary for each customer-specific service delivery.	0.698		0.699				

Appendix 1: Measurement models for customization drivers

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Appendix 2: Measurement models for customization and other constructs

Construct	***Measures*** *(Scales: 1- strongly disagree to 7 - strongly agree)*	Initital model		Final measurement model				
		Loading	**AVE**	**Loading**	**Alpha**	**CR**	**AVE**	**HTMT-Ratio$_{max}$**
Customization Hildebrand 1997; Skaggs/Youndt 2004; Self-operationalized	*C1 Our customers determine how the service is provided.*	0.489	0.480	(excl.)	0.851	0.890	0.574	0.697
	C2 We offer tailor-made solutions to our customers.	0.474		(excl.)				
	C3 We are able to satisfy many of our clients' special requirements within the framework of the service provision.	0.760		0.767				
	C4 Our service is geared to the requirements of our customers.	0.739		0.753				
	C5 Our main task is to work together with our customers to develop the best solution for their specific needs.	0.745		0.744				
	C6 All in all, our services are tailored to each customer individually.	0.794		0.797				
	C7 Each individual customer order has special features.	0.795		0.804				
	C8 The characteristics of our service are determined to a high degree by our customers.	0.657		0.675				
Customer perceived value Swink/Song 2007, Ulaga/Eggert 2005, Menon et al. 2008, Self-operationalized *Compared to our competitors…*	*CPV1 … we offer a superior service to our customers.*	0.810	0.521	0.831	0.852	0.894	0.630	0.744
	CPV2 … the monetary costs for our customers (e.g. price, follow-up costs, …) are lower for the same benefit.	0.561		(excl.)				
	CPV3 … the non-monetary costs for our customers (e.g. expenditure of time, expenses for information transfer during service provisioning, …) are lower for the same benefit.	0.603		(excl.)				
	CPV4 … our service offers a better cost-benefit ratio to our customers.	0.802		0.751				
	CPV5 … our service offers a unique customer benefit to comparable costs.	0.753		0.788				
	CPV6 … our service is by far superior with respect to the fulfillment of customer requirements.	0.811		0.852				
	CPV7 … we have reached a quality leadership position in our industry.	0.668		0.741				
Cost efficiency Reimann et al. 2010, Self-operationalized *Compared to our competitors…*	*CE1 … our costs of service provisioning are lower than those of our competitors'*	0.594	0.494	(excl.)	0.777	0.846	0.524	0.744
	CE2 … we provide our services mostly in less time.	0.711		0.694				
	CE3 … the input/output ratio of our service provisioning is more advantageous.	0.791		0.809				
	CE4 … our economy of scale enables us to achieve a cost advantage	0.704		0.707				
	CE5 … we continuously improve our processes in order to keep costs low	0.718		0.741				
	CE6 … we have achieved a cost-leadership position in the industry	0.683		0.661				
Firm success Deshpandé et al. 1993; Jaworski/Kohli 1993; Matsuno/Metzner 2000; Morgan/Vorhies 2005 *Compared to our competitors…*	*FP1 … the overall success of our business unit …*	0.836	0.563	0.837	0.869	0.900	0.563	0.568
	FP2 … our return-on-investment …	0.782		0.782				
	FP3 … our return on sales …	0.776		0.776				
	FP4 … our market share…	0.740		0.742				
	FP5 … our sales growth …	0.777		0.776				
	FP6 … our revenues with existing customers …	0.654		0.652				
	FP7 … the acquisition of new customers	0.673		0.672				

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