Prevailing service perspectives emphasize that value for customers unfolds during their individual use processes in terms of value-in-use. Although this view is widely recognized, value-in-use is often considered on a global and aggregated level. We argue that this approach is too narrow and suggest a more differentiated conceptualization to capture customers’ manifold use processes. Such an approach should enable firms to develop a detailed understanding of value-in-use and derive more effective marketing strategies. Therefore, this research investigates value-in-use as a multidimensional concept in relation to value-creating antecedents and relevant consequences. In a qualitative process-oriented study, we detect several value dimensions for a specific use context. We integrate the findings into a complex research model, which is tested with survey data gathered from 1,128 users of the same context. Building on service (-dominant) logic, we use firm and customer resources as relevant antecedents. Customer satisfaction and behavioral intentions serve as consequences of each value dimension. Results indicate that firm and customer resources have a strong influence on the value dimensions that constitute value-in-use. We show that a multidimensional understanding of value-in-use can serve as a strategic lever for firms to more precisely address their customers enhancing customer satisfaction and behavioral intentions.

1. Introduction

A service experience is unique to every individual customer (Heinonen et al. 2010; Sandström et al. 2008). The heterogeneous nature of the service experience is accompanied by an idiosyncratic value for the customer. This value unfolds during customers’ various use processes in terms of value-in-use (Macdonald et al. 2011; Vargo and Lusch 2004, 2008). For example, using mobile technologies may create social acceptance for one person, whereas for another person, entertainment aspects are more valued. Understanding and considering the distinct value for customers is vital for managers, given that value significantly affects customer satisfaction and behavioral intentions (e.g., Eggert and Ulaga 2002; Yang and Peterson 2004). Especially for the service sector, an extensive and multifaceted conceptualization of customer value is most relevant, due to the interaction between firms and customers and the related sociological and psychological aspects (Williams and Soutar 2005). With regard to prevailing service perspectives, such as service-dominant logic (SDL; Vargo and Lusch 2004) and service logic (SL; Grönroos 2006), this view applies not only to the service sector but to all industries and contexts as well.

Several researchers have called for more holistic conceptualizations and examinations of customer value (e.g., Leroi-Werelds et al. 2014; Ostrom et al. 2010; Sánchez-Fernández and Iniesta-Bonillo 2007; Woodruff and Flint 2006). However, empirical research that goes beyond the development of several value dimensions (e.g., Gummers and Pihlström 2011) or beyond the investigation of the relationships between customer value as an aggregated evaluation and other variables (e.g., Barrutia and Gil-sanz 2013) is limited. Little is known about the relative importance of each dimension of customer value in increasing further outcomes, such as customer satisfaction.
Moreover, customer value is mostly conceptualized in terms of value-in-exchange (e.g., Sheth et al. 1991). This view neglects the latest discussions about value being fundamentally derived and determined in use situations rather than in exchange (Vargo et al. 2008). Furthermore, this view ignores the crucial role of resource integration in value creation (Vargo and Lusch 2004).

A practical example may help to illuminate the difference between what is meant by value-in-use in contrast to value-in-exchange. A major European car manufacturer introduced a new model to its markets in 1998. The car was distinct from mainstream patterns for passenger cars in many respects but ever since remained substantially behind sales forecasts and volumes needed to financially break even (Preuß 2008). One possible explanation for the rejection by customers is a lack of customer value as inherent in the attributes of this car. Value from this perspective pertains to the car as an object of exchange, i.e., value-in-exchange. More recently, the very same car model was included in a car-sharing offering established by the same car manufacturer which received impressive levels of acceptance from market participants (Preuß 2010). Again, customer value is a possible explanation, yet with reversed signs. This time, the car is not an object of exchange but a resource provided by the supplier and used by a subscriber of the service in variable contexts. Hence, it is value-in-use that drives customer acceptance and market success. This value-in-use of the car model is different from its value-in-exchange. Apparently, for the marketer (car manufacturer) there is a need for thoroughly distinguishing between the two concepts and also for striving to better understand the mechanisms underlying value-in-use.

The objective of our research, therefore, is to develop a multidimensional concept of customer value in terms of value-in-use. With this conceptualization, we want to both investigate the effects of relevant determinants on dimensions of value-in-use and examine how each proposed value dimension contributes to further outcome variables. In accordance with the theoretical assumptions of SDL/SL, we particularly aim at analyzing the effects of customer and firm resources on value-in-use dimensions. In addition, we intend to gain insights into the relevance of each value dimension on customer satisfaction and behavioral intentions as important consequences of value-in-use. Thus, our research follows three concrete research questions: (RQ1) How can value-in-use be conceptualized? (RQ2) How does the integration of customer and firm resources influence the value-in-use on each value dimension? and (RQ3) What is the impact of each individual value dimension on customer satisfaction and behavioral intentions?

To answer these questions, we adopt a process-oriented perspective. In particular, we focus on customers’ own use processes rather than taking goods provided by the firm as a basis. This way, in an empirical qualitative study we generate several dimensions to specify value-in-use. These qualitative insights are then used in a subsequent quantitative study. More precisely, we link the identified value dimensions to customer and firm resources, as well as to customer satisfaction and behavioral intentions, and analyze their relationships accordingly. *Fig. 1* depicts our general research framework and provides a visual summary of the conceptual components, which we describe in more detail in the next section.

Our work contributes theoretically and practically in several important ways. (1) The use of a process-oriented study responds to the view that customer value emerges in use and complies with the theoretical directions of SDL/SL. Hence, we propose a suitable alternative to the rather transaction-based models of previous research. (2) We further contribute by proposing an operationalization of the identified value dimensions that constitute value-in-use in a specific context. (3) By analyzing these value dimensions in relation to value-creating antecedents and relevant consequences, we make an additional contribution by extending empirical research related to the prevailing service perspectives. Although empirical investigation of the relationship between customer and firm resources and value-in-use exists (Barrutia and Gilsanz 2013), this research is limited and neglects the multidimensional conceptualization of customer value. We refine such aggregated findings by analyzing the effects on a more disaggregated level. Moreover, to the best of our
knowledge, no research has examined value dimensions that follow a use process perspective with regard to their relative importance for customer satisfaction and behavioral intentions. Thus, the results of our research offer detailed insights for the development of future marketing strategies.

This article proceeds as follows: We first present the conceptual framework of our proposed research model by reviewing relevant literature, after which we present our qualitative pre-study and the resulting value dimensions of value-in-use. The following part contains the development of hypotheses. We then describe our quantitative empirical study, including data collection, measurement model, and the results achieved. We conclude with a discussion of the findings and managerial implications.

2. Conceptual framework

2.1. Customer value conceptualization

Prevailing service perspectives (Grönroos 2006; Vargo and Lusch 2004) conceptualize customer value as the value the customer perceives and determines during the use of a product or service, i.e., value-in-use. The quest to look at value-in-use goes back to writings of the very early marketing theorist Wroe Alderson when he wrote: “Eventually marketing will have to look beyond consumer purchase to the stream of activities in which goods are consumed in order to achieve a more fundamental understanding of consumption requirements” (1965, p. 144). In a recent publication and building on previous literature (Woodruff 1997; Payne et al. 2008; Macdonald et al. 2011) Macdonald et al. define value-in-use as “all customer perceived consequences arising from [an offering] that facilitate or hinder achievement of the customer’s goals” (2016, p. 98). This view challenges the traditional view that value is embedded in a firm’s product that is exchanged, i.e., value-in-exchange (Grönroos 2008). With this shift in value perspective, the customer no longer serves as a passive recipient of goods but plays an active role in creating value (Vargo and Lusch 2004). This change further implies a process-based view of value creation, in which value is generated not at the point of sale but at the “point of use” (Weiber et al. 2011). This use perspective is underpinned by the view that value creation takes place at the so-called consequence level rather than at the attribute level (Woodruff 1997). Attributes (of a product) are characterized by tangible, physical features, such as shape, color, and size. Conversely, consequences (from product use) can be described as more subjective, intangible experiences, such as feeling good or connecting with friends (Gutman 1982). While attributes seem more important for purchase, consequences are pivotal when customers assess use. This view is anchored in conceptual assumptions of means-end theory (Gutman 1982; Woodruff 1997). The key premise underlying this theory is that customers are goal-oriented and use products as a mean to reach valued states of being (= ends). Woodruff (1997) refers to this suggested hierarchical relationship between products, product use, and goals, and articulates the means-end approach for understanding and capturing the essence of customer value.

The value literature offers different conceptualizations of customer value in general. While one-dimensional value models refer to an overall assessment of the utility of a product based on what is given and what is received (Zeithaml 1988), multidimensional models (e.g., Sheth et al. 1991; Sweeney and Soutar 2001) conceptualize value as a set of dimensions that offer a holistic presentation of a complex phenomenon (Sánchez-Fernández and Iniesta-Bonillo 2007). The latter view seems more closely related to the theoretical assumptions of value-in-use, because multidimensionality better covers customers’ diverse use processes (Lenke et al. 2011; Macdonald et al. 2011). Moreover, within SDL the creation of value is linked to higher-order needs by referring to means-end theory. Means-end theory further presents a foundation for understanding multidimensional approaches of customer value (Leroi-Welrds et al. 2014), providing additional support for a multidimensional conceptualization of value-in-use.

Most of the existing multidimensional value concepts, however, are based on purchase decisions and primarily focus on attributes and the time before use than on consequences resulting from use. An exception is Holbrook’s (1996, p. 138) value typology, which involves different types of customer value, defined as “an interactive relativistic preference experience.” This typology has been discussed with regard to the fundamental propositions of SDL and captures them to some extent (Holbrook 2006). The various value dimensions have yet been deductively developed and do not consider a specific use context. With regard to the contextual nature of value creation (Vargo and Lusch 2008), we would, however, expect the value dimensions of value-in-use to be highly context specific. Each context is likely to require qualitative exploration in the first place. Hence, to adequately conceptualize value-in-use, we do not draw on existing value conceptualizations but first qualitatively explore customers’ use processes in a specific context before embedding resultant value dimensions in our research model. Such an approach complies with the contextual view on value referred to by SDL (Vargo and Lusch 2008).

To conclude and in line with the perspective of Macdonald et al. (2016) we conceptualize value-in-use and distinguish it from value-in-exchange by (1) the active role of the customer in creating value, (2) its strong dependence on goals – and not product attributes, (3) its nature as necessarily multidimensional, and (4) its contextual or phenomenological character. After a comprehensive literature review Macdonald et al. (2016) state that the constructs behind value-in-use in that sense have yet to be explored. They list 17 empirical studies on customer value in extant literature and find that none of them except...
one includes a conceptualization of value-in-use that fully complies with this understanding. The one exception is their own study, which uses a similar approach as the current study but substantially differs in its research objective where a clear and exclusive focus on business markets and a specific type of service (solutions) dominates.

2.2. Value-creating antecedents

According to SL, value is either created independently by the customer in indirect interaction with the firm (customer sphere) or co-created in direct interaction with the firm (joint sphere). In addition, the firm may act as a value facilitator (provider sphere), generating potential value to the customer (Grönroos and Voima 2013). Because we focus on customer value evolving through the active role of customers in their own use processes, as originally emphasized by SDL, we conceptually classify our investigation as independent value creation in the customer sphere.

In accordance with SDL/SL and as outlined in Fig. 1, we view customer and firm resources as value-creating antecedents. In particular, with regard to independent value creation, the customer interacts with resources obtained from the firm, such as using an offering produced by the firm (Grönroos and Voima 2013). In such use processes, SDL views the customer as an operant resource (i.e., an active participant), who integrates own skills and knowledge to generate value (Vargo and Lusch 2004). Consequently, we view the customer’s knowledge as a direct influencing factor of value-in-use.

Customer knowledge comprises two major components: familiarity and expertise. Familiarity refers to the number of product-related experiences, and expertise involves the ability to perform product-related tasks successfully (Alba and Hutchinson 1987). Alba and Hutchinson (1987) also suggest that an increase in product familiarity leads to improved customer expertise. Expertise as the resultant variable thus serves as our concrete value-creating antecedent. Following previous research on customer expertise and value-in-use (Barrutia and Gilsanz 2013), we resort to Alba and Hutchinson (1987) for a more differentiated understanding of customer expertise. The authors distinguish among five expertise dimensions: analysis, cognitive effort, cognitive structure, elaboration, and memory. Analysis reflects the ability of a customer to access all and only that information relevant for a specific task. Cognitive effort refers to the effort related to this task. Experts will perform these tasks with minimal effort because of their higher degree of automaticity stemming from task repetition. Cognitive structure generally involves the factual knowledge (i.e., beliefs) customers have about products and the ways they organize this knowledge. Elaboration refers to the number of intervening facts, which a customer evaluates to draw a conclusion. Finally, memory represents the ability to accurately remember product-related information. Thus, we consider customer expertise as a multidimensional concept in our model influencing value-in-use.

In addition to these customer resources, firm resources play a role in independent value creation. In particular, the firm integrates its resources in terms of produced offerings into customers’ use processes (Grönroos and Voima 2013). These offerings represent potential value for the customer, i.e., they serve as a means to derive benefits for customers from their value-creating processes (Arnould et al. 2006). Offerings must fulfill at least some basic requirements so that this value emerges. For example, a smartphone cannot be used, and a customer cannot extract value from using a smartphone, without access to basic technical functionalities. The customer’s judgment about a firm’s products and services is generally reflected in the perceived quality (Zeithaml 1988), which can further contribute to customer value (Cronin et al. 2000). Customers do not expect the firm to monitor the value they receive in use but to deliver the promised embedded value through product and service quality (Lemke et al. 2011). Thus, in line with previous research (Barrutia and Gilsanz 2013), we use the quality perceived by the customer as a suitable measure of firm resources. More precisely, we include the perceived quality as another relevant construct in our model influencing value-in-use.

2.3. Consequences of value-in-use

Earlier studies examine general customer value in relation to different variables, such as customer satisfaction, word of mouth, or repurchase intentions. For example, empirical evidence shows that customer value contributes to an improvement in customer satisfaction (Eggert and Ulaga 2002), which in turn influences behavioral intentions, such as word of mouth or repurchase intention (Wang et al. 2004). Furthermore, customer value was found to directly influence behavioral intentions (e.g., Cronin et al. 2000; Pura 2005; Wang et al. 2004).

Satisfaction is a well-established construct in marketing literature. Studies by Oliver (1980), Tse and Wilton (1988), Woodruff et al. (1983), Swan and Trawick (1981), and Churchill and Surprenant (1982) link benefit expectations and observations to customer evaluations of supplier offerings. However, the perspective taken in our research differs from those studies since benefits would be merely related to objects of exchange. SDL/SL, in contrast to that, explicitly separates use from exchange (Vargo and Lusch 2004). This implies our shift away from (object) benefits to (use) value dimensions and their effect on customer satisfaction.

Some of the previous studies conceptualize customer value as multidimensional. Yet, most either neglect the use perspective as important for customer value or still relate value as an aggregated assessment to further variables not analyzing the influence of single value dimensions. However, customers may have different goals for using offerings and therefore vary in their value percep-
tion resulting from individual and idiosyncratic use processes (Macdonald et al. 2011; Sandström et al. 2008).
Since both customer satisfaction and behavioral intentions are viewed as key indicators of a firm’s overall market performance (e. g., Anderson et al. 1997; Gotlieb et al. 1994; Morgan and Rego 2006), it is essential to know what type of value is important in increasing customer satisfaction and behavioral intentions. This knowledge provides specific direction on how to improve these variables. In particular, it can contribute to guide effective marketing strategies and the development of future service offerings (Pura 2005). Therefore, we view customer satisfaction and behavioral intentions as relevant consequences of the value dimensions constituting value-in-use in our research model. In the following section, we introduce these value dimensions by presenting our qualitative study.

3. Model development and hypotheses

3.1. Relevant value dimensions

Our investigation is likely to be relevant to service experiences of many kinds. However, we test the proposed model in a context that is characterized by extensive use processes and an intensive integration into customers’ daily routines – i. e., use of an application (app) for weight loss and fitness tasks on a smartphone. Furthermore, mobile app use is a typical case for indirect value creation because usually the customer reverts to an offering provided by the firm and integrates own knowledge and skills to generate value.

We conducted an initial qualitative study, to test valid and context specific value dimensions in our research model. To identify relevant value dimensions of value-in-use, we resorted to the repertory grid method, a form of structured interviewing originating from Kelly’s (1955) personal construct theory, which is theoretically and methodologically related to means-end theory (Gutman 1982; Hinkle 1965). This connection corresponds with our conceptualization of value-in-use. Furthermore, the repertory grid method has already been applied to the context of smartphone use and has specifically been adapted to use processes in that context (Bruns and Jacob 2014). In line with the shift from value-in-exchange to value-in-use, we follow this suggestion and also adapt the method in a way that the basis of investigation is no longer formed by attribute-related elements provided by the firm but rather by customers’ own processes during the use of the specific smartphone app.

We carried out ten qualitative personal interviews with customers of the underlying service (i. e., users of the weight loss/fitness app) in Germany. Interviews were conducted by telephone and lasted between 25 and 60 minutes, totaling about five hours of material. Participants ranged from 25 to 56 years of age, and both genders were equally represented.

In accordance with the approach of the repertory grid technique, we carried out four main steps. First, users had to name five use processes that they associate with the use of the smartphone app and that are of high importance to their personal lives (e. g., setting up personal training, logging meals/calories). The choice of five use processes, or “elements” in the repertory grid terminology, was guided by Jankowicz’s (2004) recommendation of at least five but no more than twelve elements. Second, the participants compared three of these randomly presented processes with each other with regard to the perceived value during use (interviewer question: “In what way are two of these processes similar to each other and different from the third one in terms of the value that you perceive during the use situation?”). This triadic comparison resulted in value aspects, originally called personal constructs, in the third step (e. g., interaction with other users, enhancement of knowledge). Fourth, participants had to assign poles to each identified value aspect – one construct pole reflecting the similarity between two use processes and one contrast pole representing the opposite of the construct pole (e. g., interactive use vs. isolated or unilateral use). This step offers a better understanding of the detected value aspects. The triadic comparison and value aspect elicitation were repeated until no further aspects could be identified by the participants.

On completion of all interviews, we standardized and categorized the value aspects, in line with the work of Jankowicz (2004) and Lemke et al. (2011). In total 84 value aspects had been detected by the participants. Some of them appeared in more than one interview. Thus, we carefully examined the data to identify such repetitions and assigned standardized names to them. This step resulted in 26 standardized value aspects. Next, these value aspects were categorized, using multiple coders and inter-coder reliability checks. We conducted the first categorization, and then after naming and defining the categories, asked an independent scholar to also categorize the value aspects. This step resulted in an inter-coder reliability index of 75 % showing the level of agreement of the two categorizations. We discussed differences with this coder and agreed on a revised allocation of value aspects to categories and adjusted their definitions accordingly. Another independent scholar was then asked to allocate the value aspects to the defined and described categories. The inter-coder reliability index after this step accounts for more than 90 %, thus reaching the benchmark of 90 % agreement (Jankowicz 2004). Finally, the categorization process resulted in seven higher-order dimensions for customer value-in-use which are labeled taking into account value dimensions from similar contexts identified in previous research (e. g., Bruns and Jacob 2014; Pura 2005): hedonic value, proficiency, personal self-fulfillment, productivity, professionalism, self-expression, and social value. Some of the dimensions seem to overlap slightly in meaning, such as hedonic value and personal self-fulfillment. We report...
value dimensions. These seven dimensions inform about the value perceived by the user of the service, not only with regard to the magnitude but also, and more importantly, with regard to the content.

A customer with greater expertise has the necessary knowledge structure to grasp this content and understand the meaning of a product or service better than non-experts (Alba and Hutchinson 1987). That is, expert customers better understand the use processes and consequently can more easily experience value in all its facets. Compared with customers with less expertise, experts are more engaged in satisfying higher-order needs (Falk et al. 2010). Their comprehensive knowledge enables them to use the offering in such a way that their various needs are met as well as possible (Arnould et al. 2006). This argumentation is in line with the previously discussed means-end hierarchy (Gutman 1982) and with our multidimensional conceptualization of value-in-use. It should be stressed here again that this research here looks at value-in-use, in contrast to the more traditional perspective of value-in-exchange (Macdonald et al.}

As discussed in our conceptual framework, customer and firm resources are understood as relevant value-creating antecedents. In particular, we assume that these two types of resources have an influence on the value dimensions that constitute value-in-use. Barrutia and Gilsanz (2013) find that both resources positively affect value-in-use, conceptualized as a one-dimensional construct. Regarding customer resources, they show a significant, positive effect of customer expertise on this aggregated value. According to our qualitative preliminary study, the value of using a weight loss/fitness app comprises seven value dimensions. These seven dimensions inform about the value perceived by the user of the service, not only with regard to the magnitude but also, and more importantly, with regard to the content.

Tab. 1 gives an overview of the final seven value dimensions and their corresponding value aspects.

### 3.2. Development of hypotheses

The central assumption of our study is that a multidimensional conceptualization of value-in-use contributes to a better understanding of the heterogeneous service experience. More precisely, we claim that a refined analysis of value-in-use will provide substantial insights into how firms can more adequately address customers to enhance their satisfaction with the firm’s offering and behavioral intentions. Building on relevant theory, in the following section we present the hypotheses that form our research model.
The research extends previous work on the exchange perspective, expertise, in fact, could impact value in both directions, i.e., positively or negatively. More expertise may then lead to a more negative evaluation of object attributes (Söderlund 2002). As for dimensions of a process-based value-in-use, the logic is that customer resources have a reinforcing impact (Vargo and Lusch 2004, 2008). Hence, we suppose a consistently positive link between expertise as a customer resource and those value dimensions. Consequently, we hypothesize that the value-in-use for customers with more expertise is higher than that for customers with less expertise with regard to all value dimensions. Tab. 2 provides an explicit formulation of our hypotheses for each value dimension.

We propose a similar influence of firm resources on value-in-use. The firm provides resources in terms of the smartphone app, facilitating customers’ value creation (Grönroos and Voima 2013). As mentioned previously, we use customers’ perceived quality as a proxy for firm resources. More precisely, firm resources are reflected in our study through customer beliefs on features of objects (tangible or intangible) that the supplier feeds into the customer use process. Applicable to our underlying research context, we follow the conceptualization of quality suggested by Barrutia and Gilsanz (2013). Building on the hierarchy of operant resources (Madhavaram and Hunt 2008), Barrutia and Gilsanz (2013) view scales from ESQ literature as an adequate measure of “a competence, capability, or higher order resource of the firm” (p. 234). In line with the reasoning of these authors, for SDL/SL inspired research in an IT context ESQ reflects resource-related customer beliefs and, hence, qualifies as the appropriate proxy for firm resources. Reviewing existing ESQ scales, they infer that there are two major components comprising ESQ scales: process quality and outcome quality. Process quality refers to customers’ use processes, i.e., the quality perceived during interacting with the firm’s products or services. Outcome quality involves the fulfillment of promises made by the firm (Barrutia and Gilsanz 2013). In summary, we hypothesize that the perception of process and outcome quality (i.e., ESQ) positively affects value-in-use regarding all value dimensions (again, for the detailed formulation of our hypotheses, see Tab. 2).

We view customer satisfaction and behavioral intentions as relevant consequences of customer value (see also Cronin and 2000; Wang et al. 2004; Yang and Peterson 2004). In particular, we assume that all identified value dimensions of value-in-use contribute to customer satisfaction and behavioral intentions. Previous research (Purua 2005; Wang et al. 2004) has examined the influence of several value dimensions on other variables. Some of the value dimensions uncovered in our qualitative study overlap with dimensions of these previous studies. Although these studies do not explicitly conceptualize value as value-in-use in terms of SDL/SL, we still draw on

<table>
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<th>Relationship</th>
<th>Concrete hypothesis</th>
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<td>ESQ, as perceived by the customer, and value-in-use (H2)</td>
<td>ESQ positively affects hedonic value. ESQ positively affects proficiency. ESQ positively affects personal self-fulfillment. ESQ positively affects productivity. ESQ positively affects professionalism. ESQ positively affects self-expression. ESQ positively affects social value.</td>
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Note. ESQ = electronic service quality.
their findings to confirm our assumptions. For example, social value and emotional value (referred to as hedonic value in our study) have a significant, positive influence on customer satisfaction (Wang et al. 2004). In another study, these value dimensions positively contribute to commitment (Pura 2005). From these findings, we hypothesize that all value dimensions of value-in-use positively influence customer satisfaction and behavioral intentions. *Tab. 2* depicts these and the other assumptions in more detail.

*Fig. 2* presents the proposed research model and a visual overview of our hypothesized relationships. We use the relationship between customer satisfaction and behavioral intentions to test the nomological validity in our research model.

### 4. Methodology

#### 4.1. Data collection and sample

The data were obtained through self-administered online questionnaires from users of the weight loss/fitness app that we have already based our qualitative study on. We consider this research context as suitable for analyzing the effects on and of value-in-use as a multidimensional concept because it provides a glimpse into customers’ daily routines. That is, this context most likely covers a wider range of higher-order needs than smartphone apps with a shorter or less committed use period. Research recommends targeting surveys only to respondents who have experience with the service or product of interest (Marshall 1996). Thus, the link to the online survey was sent only to registered users of the app and was not publicly accessible. As an incentive, respondents had the chance to participate in a lottery. Through our survey we obtained 1,128 usable responses. No values were missing, as all questions were compulsory. The sample was 77% female and 23% male, with ages ranging from 14 to 76 years (average age 35 years). Most respondents stated Realschule (German high school degree after ten years) (32%) as their highest education, followed by university degrees (30%) and Abitur (German high school degree after twelve years) (28%).

#### 4.2. Measures of relevant constructs

For the measurement of latent variables in our research model, we used established scales both for the constructs of customer and firm resources and for customer satisfaction and behavioral intentions. Specifically, we borrowed items for these constructs from the following scales. In line with Barrutia and Gilsanz (2013), we followed Kleiser and Mantel (1994) in their understanding of customer expertise as a higher-order formative construct and used their measure to capture the dimensions of customer expertise (Alba and Hutchinson 1987). Their measure includes the four constructs analysis, cognitive effort, elaboration, and memory. They omitted the fifth dimension (cognitive structure) after a confirmatory factor analysis.

Regarding firm resources, we also followed Barrutia and Gilsanz (2013), who refer to scales from the ESQ literature (e.g., Fassnacht and Koese 2006; Parasuraman et al. 2005). As suggested, we integrated the two components process and outcome quality in our research model. Process quality consists of the four dimensions efficiency, design, information accuracy, and system availability (Barrutia and Gilsanz 2013). As mentioned in the results of our qualitative study, efficiency refers to the effortless use (convenience) and system availability relates to the constant access and proper technical functioning (flexibility) of the app (Parasuraman et al. 2005). Design describes the graphical quality and clarity of the layout, and information accuracy covers the extent to which complete, accurate, and timely information is provided (Fassnacht and Koese 2006). Outcome quality is captured by one dimension that refers to the firm’s reliability and ful-
fillment of promises (Fassnacht and Koese 2006; Parasuraman et al. 2005). In line with Fassnacht and Koese (2006), we treat ESQ as a higher-order construct with the reflective dimensions outcome and process quality and the reflective sub-dimensions described previously. For the measure of customer satisfaction, we use a subset of items from Oliver (1980). Behavioral intentions are captured with the construct word of mouth and measured with the scales provided by Zeithaml et al. (1996). We slightly adapted the items of all measures to our research context.

To measure the value dimensions of our value-in-use conceptualization, we needed to develop items. The generation of these items is based on the findings of our qualitative study and enriched by existing scales from similar contexts, i.e., smartphone and mobile services use (e.g., Bruns and Jacob 2014; Pura 2005). To validate that the single value dimensions are related to customer value, we included a global value-in-use construct in our survey as a criterion variable. For face validity of the value dimensions, an initial set of items was discussed and evaluated together with two experts from practice (similar to Hardesty and Bearden 2004). Subsequently, 13 additional scholars conducted an item-sort task for substantive validity using Anderson and Gerbing’s (1991) procedure. To increase discriminant validity, we also included the items of all the other constructs of our model in this task. This procedure resulted in replacing several items or refining their wording (for scale wording, see Tab. 3).

In the next step, the online questionnaire was created. We conducted in-depth pretests with two respondents familiar with the app, to ensure and optimize the clarity of the wording. We applied cognitive interviewing (Dillman 2000), a form of think-aloud technique. Thus, the two participants were asked to respond to the questionnaire in our presence and directly tell us what they thought while answering the questions. This procedure allowed us to better assess whether questions were perceived and interpreted as intended. Only minor adjustments of our questionnaire resulted from this step. Finally, after releasing the online survey, we analyzed the first 100 answered questionnaires with regard to internal consistency. All constructs showed acceptable values (Cronbach’s \( \alpha > .70 \)), and therefore we continued the survey.

5. Results

5.1. Measurement model

We analyzed our data following the standard procedures employed in marketing research (Gerbing and Anderson 1988). That is, first the measurement model was estimated and then the structural model and path coefficients were analyzed. Thus, in the first step we assessed the reliability of each construct using Cronbach’s alpha coefficient and examined the item-to-total correlations. Except for cognitive effort, the alpha values for all constructs were higher than .70. After eliminating the item with the lowest item-to-total correlation, we conducted an exploratory factor analysis with all remaining items. As a result, additional items were deleted. We omitted one item that pertained to the value dimension productivity due to its low factor loading. For the self-expression dimension three of the four items were also excluded in consequence of low factor loadings and one item was assigned to the social value dimension because of its higher loading on that factor. We considered this in our subsequent analysis.

Because the measures of the other constructs in our model are based on well-established scales, we integrated all of them in the further evaluation of our measurement model, regardless of possible low factor loadings. For this purpose, we used partial least squares (PLS), which is the preferred approach in our study; previous research recommends this method in the early stages of theoretical development to test and validate exploratory models (Henseler et al. 2009). To assess the goodness of our proposed measurement model, we carefully evaluated factor loadings and their significance level, composite reliability, average variance extracted (AVE), and convergent and discriminant validity. As a result, another six items were eliminated (one each from the constructs analysis, cognitive effort, memory, efficiency, and system availability and the last self-expression indicator) because of low factor loadings. We followed Herrmann et al. (2006), who suggest a factor loading of more than .80 because of PLS’ tendency to overestimate loadings. Tab. 3 and the Appendix provide the factor loadings (ranging from .825 to .959) and additional results. As Baggozzi and Yi (1988) recommend, all AVEs exceed the .50 cutoff. The composite reliabilities (> .70 in all cases) of all constructs are higher than the AVE values, indicating convergent validity. The discriminant validity test proposed by Fornell and Larcker (1981) is also positive. The AVE of each construct exceeds the squared correlation of all construct pairs.

5.2. Structural model

We also tested the hypothesized relationships in our research model using PLS. The evaluation of our measurement model resulted in the value dimension self-expression being completely eliminated. Therefore, we included only six of the seven value dimensions in the structural model. As Tab. 4 shows, customer expertise significantly influences all of the remaining value dimensions in the proposed direction. Thus, \( H1 \) is supported. Firm resources have a significant, positive effect on all value dimensions except for social value. Consequently, \( H2 \) is partially supported. All of the significant path coefficients exceed the required threshold value of .20 (Chin 1998), with the exception of the relationship between ESQ and personal self-fulfillment. This path coefficient (.19), however, is just below the cutoff value and also exceeds the threshold value (>.10) required by Lohmöller (1989). Apart from social value, a substantial proportion of the variance in each value dimension is explained, indicated by \( R^2 \) values above 19 % (Chin 1998).
For H3 and H4, a more complex picture emerges. Of the six value dimensions, three have a significant, positive impact on customer satisfaction (hedonic value, proficiency, professionalism). The remaining three value dimensions have no such effect. Furthermore, four of the value dimensions have a significant, positive effect on word of mouth, and two dimensions have no effect (personal self-fulfillment, professionalism). Thus, H3 and H4 are only partially supported. The significant paths between the value dimensions and customer satisfaction all exhibit path coefficients beyond the threshold value of .20. The significant paths between value dimensions and word of mouth are slightly below the required 10%; however, they still exhibit significance levels of p < .01 or even p < .001. The variances for customer satisfaction and word of mouth are also reasonably explained, presenting R² values of 35% and 51%, respectively. The relationship between customer satisfaction and word of mouth is significant as well, showing a path coefficient of .56.

In previous studies, customer value as an aggregated judgment has a positive and significant effect on customer satisfaction and behavioral intentions (e.g., Lin et al. 2005; Yang and Peterson 2004). Therefore, we further investigated the relationship of all six value dimensions with the global value-in-use construct using Pearson's correlation coefficient as a criterion. In this way, we wanted to determine whether all concrete value dimensions are related to the global customer value-in-use construct, despite the non-significant effects on either customer satisfaction or word of mouth. All dimensions significantly and positively correlate with global value, indicating a strong relationship and criterion validity (see Tab. 5). The significant, positive correlations strengthen the findings of our qualitative study. That is, customer value-in-use consists of several value dimensions.

To better understand the non-significant findings of H3 and H4, we also examined the goals that customers pur-
### Relationship and Hypothesis

<table>
<thead>
<tr>
<th>Customer expertise and value-in-use (H1)</th>
<th>Standarized Estimate</th>
<th>t-Value</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer expertise on hedonic value</td>
<td>.36</td>
<td>11.26***</td>
<td>√</td>
</tr>
<tr>
<td>Customer expertise on proficiency</td>
<td>.33</td>
<td>11.18***</td>
<td>√</td>
</tr>
<tr>
<td>Customer expertise on personal self-fulfillment</td>
<td>.38</td>
<td>13.20***</td>
<td>√</td>
</tr>
<tr>
<td>Customer expertise on productivity</td>
<td>.31</td>
<td>9.95***</td>
<td>√</td>
</tr>
<tr>
<td>Customer expertise on professionalism</td>
<td>.36</td>
<td>11.28***</td>
<td>√</td>
</tr>
<tr>
<td>Customer expertise on social value</td>
<td>.38</td>
<td>13.59***</td>
<td>√</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ESQ and value-in-use (H2)</th>
<th>Standarized Estimate</th>
<th>t-Value</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESQ on hedonic value</td>
<td>.35</td>
<td>12.11***</td>
<td>√</td>
</tr>
<tr>
<td>ESQ on proficiency</td>
<td>.37</td>
<td>12.09***</td>
<td>√</td>
</tr>
<tr>
<td>ESQ on personal self-fulfillment</td>
<td>.19</td>
<td>5.60***</td>
<td>√</td>
</tr>
<tr>
<td>ESQ on productivity</td>
<td>.23</td>
<td>6.89***</td>
<td>√</td>
</tr>
<tr>
<td>ESQ on professionalism</td>
<td>.21</td>
<td>6.56***</td>
<td>√</td>
</tr>
<tr>
<td>ESQ on social value</td>
<td>.00</td>
<td>.07</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value-in-use and customer satisfaction (H3)</th>
<th>Standarized Estimate</th>
<th>t-Value</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedonic value on customer satisfaction</td>
<td>.26</td>
<td>7.10***</td>
<td>√</td>
</tr>
<tr>
<td>proficiency on customer satisfaction</td>
<td>.23</td>
<td>6.55***</td>
<td>x</td>
</tr>
<tr>
<td>Personal self-fulfillment on customer satisfaction</td>
<td>.04</td>
<td>1.12</td>
<td>x</td>
</tr>
<tr>
<td>Productivity on customer satisfaction</td>
<td>.01</td>
<td>.14</td>
<td>x</td>
</tr>
<tr>
<td>Professionalism on customer satisfaction</td>
<td>.20</td>
<td>5.32***</td>
<td>√</td>
</tr>
<tr>
<td>Social value on customer satisfaction</td>
<td>-.02</td>
<td>.93</td>
<td>x</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value-in-use and word of mouth (H4)</th>
<th>Standarized Estimate</th>
<th>t-Value</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedonic value on word of mouth</td>
<td>.09</td>
<td>2.88**</td>
<td>√</td>
</tr>
<tr>
<td>Proficiency on word of mouth</td>
<td>.06</td>
<td>2.05**</td>
<td>√</td>
</tr>
<tr>
<td>Personal self-fulfillment on word of mouth</td>
<td>-.02</td>
<td>.53</td>
<td>x</td>
</tr>
<tr>
<td>Productivity on word of mouth</td>
<td>.09</td>
<td>3.07**</td>
<td>√</td>
</tr>
<tr>
<td>Professionalism on word of mouth</td>
<td>.01</td>
<td>.22</td>
<td>x</td>
</tr>
<tr>
<td>Social value on word of mouth</td>
<td>.07</td>
<td>3.15***</td>
<td>√</td>
</tr>
</tbody>
</table>

**Note.** ESQ = electronic service quality.

The effects on and of self-expression have not been further explored due to the elimination of this value dimension.

*p < .05 (one-tailed), **p < .01 (one-tailed), ***p < .001 (one-tailed).

### R² values:
- Hedonic value = .38
- Proficiency = .36
- Personal self-fulfillment = .25
- Productivity = .22
- Professionalism = .25
- Social value = .14
- Customer satisfaction = .35
- Word of mouth = .51

### Table 4: Structural parameter estimates and explained variance

<table>
<thead>
<tr>
<th>Hedonic value</th>
<th>Proficiency</th>
<th>Personal self-fulfillment</th>
<th>Productivity</th>
<th>Professionalism</th>
<th>Social value</th>
</tr>
</thead>
<tbody>
<tr>
<td>.58**</td>
<td>.52**</td>
<td>.50**</td>
<td>.49**</td>
<td>.53**</td>
<td>.28**</td>
</tr>
</tbody>
</table>

**Note.** Displayed is Pearson’s correlation coefficient.

*p < .05, **p < .01, ***p < .001.

### Tab. 5: Correlations between global value and value dimensions

### 6. Discussion and implications

#### 6.1. Theoretical implications

Customer value has often been conceptualized, measured, and analyzed at a one-dimensional, aggregated level or in terms of value-in-exchange. According to the

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theoretical framework of SDL/SL, however, value is conceptualized as value-in-use, which requires a broader approach for investigation. Our study takes a first step towards a consequent implementation, investigation, and validation of this holistic perspective on value-in-use. In this article, we develop several value dimensions to better capture and understand the value-in-use of a specific use context. Furthermore, we integrate this multidimensional value concept into a complex research model, relating it with important antecedents and consequences. Our investigation provides empirical evidence that customers consider various value-defining dimensions during their use processes. Moreover, both customer and firm resources create value by significantly influencing these value dimensions. We also show that the dimensions contribute to customer satisfaction and behavioral intentions differently.

From a theoretical perspective, our value conceptualization extends research on value within the context of SDL/SL (Grönroos 2006; Vargo and Lusch 2004). The factor structure of the identified value dimensions validates our proposed operationalization of value-in-use. Furthermore, it provides support for the methodological approach applied in our qualitative study as an adequate means to detect relevant value dimensions. The operationalization of our value dimensions fulfills the theoretical assumptions of the SDL/SL and offers an appropriate basis for further studies. Especially in the context of other information technologies (e.g., communication or networking technologies), we expect similar value aspects to be important during use.

With regard to resource integration as a relevant part of value creation, our study confirms previous findings that interpret resource integration as directly affecting value-in-use (Barrutia and Gilsanz 2013). We even extend such findings by taking a broader perspective on value-in-use and examining the relationship of resources with multiple value dimensions. Thus, we show that both customer and firm resources significantly and positively affect all value dimensions belonging to value-in-use apart from the relationship between firm resources and social value.

Furthermore, the dimensional conceptualization of value-in-use offers differentiated insights into the effects on customer satisfaction and word of mouth as relevant consequences of value. While hedonic value, proficiency, and professionalism significantly influence customer satisfaction, the dimensions productivity, personal self-fulfillment, and social value have no significant impact. The results of our additional analysis of goals pursued by the respondents suggest that the overall importance of goals serves as a possible explanation for the differing influences of value dimensions on customer satisfaction. Since the goals can vary among customer segments, it is necessary to analyze all of the corresponding value dimensions to better comprehend the drivers of customer satisfaction.

Another reason for considering all value dimensions is their relationship to constructs other than customer satisfaction. Empirical evidence suggests that, despite their non-significant relationship to customer satisfaction, productivity and social value are significant dimensions for influencing behavioral intentions. In addition, hedonic value and proficiency have a significant and positive effect on behavioral intentions. Previous research also finds support for significant and positive influences of value dimensions on behavioral intentions (Pura 2005). We moreover favor a dimensional conceptualization of value-in-use to a one-dimensional or aggregated approach because it allows differentiating between customer value and customer satisfaction. Earlier research suggests dropping customer satisfaction when customer value is conceptualized on an aggregated level (Lin et al. 2005). Capturing value-in-use on the basis of different dimensions, thus, paves the way to still include both customer satisfaction and customer value within the same research model.

In summary, the results empirically underpin recent marketing developments that increasingly exploit the heterogeneity of customers. This current transformation of marketing is especially caused by advances in information technologies (Rust and Huang 2014). With respect to such developments, we suggest specific implications for marketing managers in the following section based on our underlying research context.

6.2. Managerial implications

The results of our study provide several implications for firms in general and for marketing managers of mobile technologies in particular. Appropriate conceptualization and measurement of customer value are crucial for an effective management given that value is an important determinant of customer satisfaction (Eggert and Ulaga 2002) and behavioral intentions (Wang et al. 2004). Especially within the context of information and communication technologies (ICT), such as mobile technologies, users likely show various needs resulting from multifaceted use processes, which must be addressed by the firm. Our study provides empirical evidence for the existence of multiple value dimensions that need to be considered by marketers. These various dimensions offer specific directions on how to better satisfy customers and positively influence behavioral intentions, such as word of mouth.

Moreover, paying attention to the multiple value dimensions enables marketers to recognize how firm resources affect the perceived customer value with regard to the specific dimensions of value-in-use. However, firms must keep in mind that value-in-use is also created through the integration of customer resources. These two types of resources may have different impacts on the individual value dimensions. For example, in the case of the underlying research context (i.e., weight loss/fitness app), personal self-fulfillment is influenced by customer expertise twice as much as by ESQ (path coefficients .38 and .19, respectively). To increase this value dimension, firms should consider customer expertise as a useful val-
ue driver. In particular, they could try to educate their customers by including a short introduction video on how to use the app or send customer-specific hints on how to use specific features that are currently not used.

Furthermore, with a focus on multiple dimensions of value-in-use, firms can better address their customers' needs and consequently increase customer satisfaction and behavioral intentions. Recent ICT developments create growing opportunities for firms to differentiate their customers according to their individual needs (Rust and Huang 2014). Firms could develop concrete and content-based communication strategies in line with specific value dimensions instead of applying a standardized strategy based on a global value measurement. If so, as our results showed, customer satisfaction and behavioral intentions can be enhanced.

In addition to more effective communication strategies, further development of offerings or pricing can also benefit from such knowledge. In the underlying context of our study (i.e., weight loss/fitness app), we find that customer satisfaction is mostly affected by hedonic value, followed by proficiency and professionalism. In this specific case, firms could include more entertaining elements in their offering, combined with enough information on nutrition and sports to cognitively stimulate customers. Professionalism might be implemented in terms of features that report the desired performance for the day or encourage users to take up new challenges. Because social value and productivity play important roles in behavioral intentions, here word of mouth, marketers should also address these kinds of values. For example, integrating social networking features or features that facilitate sharing of success stories with friends and family could contribute to social value. Improving the usability of training plans and daily tasks or offering the capability of connecting these plans with other digital calendars might further enhance productivity. By successfully implementing such measures, the relationship between the firm and the customer could be strengthened in the long run.

7. Limitations and future research opportunities

This study also has some limitations to report. In fact, one of our contributions also constitutes a limitation, i.e., integrating context dependence for the emergence of value-in-use. While this is conceptually desirable it also inhibits the direct transfer of some of the findings made here to different use contexts. For example, the value dimensions identified by the qualitative preliminary study cannot simply be transferred to other contexts, and the developed scale needs to be adapted to future research areas. However, in the context of other information technologies or further smartphone applications, we expect similar value dimensions and, therefore, easier transferability of the value-in-use scale. Yet, considering the contextual nature of value creation (Vargo and Lusch 2008), we call for a context-specific approach in the first place. We therefore recommend future studies to qualitatively explore each context first, preferably by means of the adapted repertory grid technique as applied here. This indirect questioning method favors the development of value dimensions and corresponding scales by facilitating the depiction of unconscious dimensions and the respondent's subjective reality (Kelly 1995).

As is in most quantitative studies, the model developed in our study is based on a cross-sectional sample. To fully consider the idiosyncratic and dynamic creation of value (Grönoos and Voima 2013; Heinonen et al. 2010), our research could be enhanced with a longitudinal study. Within the scope of quantitative surveys, value dimensions could be examined at different points in time to better capture the changes in value-in-use.

In line with previous research (Barrutia and Gilsanz 2013), we used a subjective measure of customer expertise. Further research might additionally apply a more objective measure, for example, by considering the average age of a customer to perform a task or asking factual knowledge questions about the offering. In addition, investigating the underlying relationships in other context settings could foster generalizing our recommendation for a multidimensional conceptualization of value-in-use. Finally, relating identified value dimensions to other constructs of interest, such as retention or commitment, can also offer further interesting insights.

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Keywords
Customer value, value-in-use, service-dominant logic, co-creation, resource integration.


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