Smart Products for Adaptive Customization in the Usage Stage

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The objective of this research project is to test consumers' acceptance of a novel concept to achieve customized and user-specific products. Contrarily to the existing concept of utilizing user toolkits during the point of sales, a new class of smart products (enabled by recent digital technologies and Internet of Things) allows for adaptive customization during the usage stage.

Mass customization is seen in many practices and in numerous researches as an important driver of consumer value by meeting diverse preference and individual needs with customized products (Franke et al., 2009; Franke and Piller, 2004). In the conventional customization mode, a manufacturer presents its customers a possible solution space and later involves consumers via a trial-and-error design process of selecting the preferred option via toolkits or configurators (Franke and Hipple, 2003; Franke und Piller, 2003; Piller, 2010). In this way, consumers can gain benefit not only from preference fit and perceived uniqueness because of the customized product (Franke and Schreier, 2007), but also from the co-design process in which consumer can acquire hedonic value (enjoyment, fun) and feeling of accomplishment (Franke et al., 2009). After collecting the final design created by consumers, the company produces and delivers the product to the consumer.

However, due to the uncertainty of their own needs and low insight into their own preference at the moment of decision (Franke, 2009), consumers often feel difficulties when making a decision in a toolkit at the time of purchase. Especially in internet based customization, consumers cannot see the product beforehand. Hence, consumers may be dissatisfied with what they get or regret when the product arrives. Prior literature has explored these and related difficulties of mass customization from a users' perspective.

As an alternative, we propose to combine the concepts of Adaptive Customization (AC) and Smart Products (SP). The idea of AC has been to postpone some specifications of the product into the usage phase by making some features of the product adjustable and adaptive to the preference of a specific user, as they evolve during the usage of that product (Gilmore and Pine, 1997). AC can better address fast changing needs and also resolve the problem of needs uncertainty. Smart products (SP) are a core concept discussed today in the context of the Internet of Things (Kortuem et al., 2010). SP are products that contain ICT in form of, for example, microchips, software, and sensors and that are therefore able to collect, process, and produce information (Rijsdijk and Hultink, 2009). SP possess different degree of smartness (capabilities) in terms of, e.g., autonomy, adaptability, multi-functionality, ability to cooperate, or personality (Rijsdijk and Hultink, 2009).

We propose to achieve a higher quality of AC by combining this idea with the features of SPs. Earlier research in this domain is the concept of embedded toolkits for customization (Piller et al., 2010). In an exploratory study, the authors studied the employment of an embedded toolkit in a product, but did not deploy most functions and abilities of SP (like autonomy, multi-functionality, etc.). In this paper we hence suggest a new type of SPs which we call Adaptive customizable smart product (ACSP). We see two possible scenarios of ACSP: In the first, product smartness is utilized to save the entire configuration effort for consumers. The
product automatically adapts to a user's requirements without any dedicated user action. However, this may bring the feeling of loss of control and risk (Folkes, 1988; Rijsdijk and Hultink, 2009). Often, SP are just a black box from the user's perspective, working silently and automatically without an indicator of what is going (Rijswijk and Hultink, 2009). In addition, the process value of “I did it myself” and the enjoyment of the co-creation process may be lost by the automatic adaption by a SP (Frank et al., 2010). Hence, the second scenario is to integrate product customization possibility (in terms of, e.g, an embedded toolkit) into SP to balance both its benefits and disadvantages for AC.

In our research we want to systematically explore consumer’s response to this idea and the possible occurrences of ACSP. Specially, we are interested into consumers' perception of ACSP with regard to their intention to use and value generated from ACSP, but also with regard to the desired span of control and involvement in the adaptation activity.

Based on the wide literatures on mass customization, smart objects, and technology adoption, we first develop a conceptual framework representing different dimensions of SP capabilities and their possible interactions with customizability and their integral influence on the consumer’s attitude towards ACSP. Then, two research activities are planned. First, in-depth interviews are planned to define possible levels of AC from a consumer perspective, and to learn about consumers' perception of SP. From this, scenarios of ACSP with different levels of smartness and adaptive customizability are derived. Secondly, we use a choice based conjoint experiment to test the main effect and interaction effect of smartness capabilities and adaptable customizability on consumer’s perception of ACSP.

Overall, our study contributes to research in the domain of user co-creation and customization by extending our conventional understanding of customization and user toolkits by a new perspective of SPs and the proposed concept of ACSP. For practice, our results may be used as a basis for the design of actual ACSP that convey appropriate value for consumers.

Keywords: Adaptive Customization (AC); Adaptive Customizable Smart Product (ACSP); Consumer Perception; User Co-creation

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Table 1. Research progress of research project: Smart Products for Adaptive Customization in the Usage Stage.  
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Reference:


