# Customer Communities to support Product Configuration

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## Abstract

More and more enterprises use Internet and WWW to improve their contacts to customers and to enhance customer relationships. The link between e-commerce and customer relationship management is well-known and is discussed in different publications (e.g. Hagel/Armstrong 1996, Shaw 1999, etc.). But Internet and WWW can offer even more: It can be an enabler for new and innovative business strategies, like for example Mass Customization (Piller 2001, Pine 1993). Supported by online configurator tools customers are entitled to virtually assemble a product, by adapting values for the product's «degrees of freedom» in accordance to their individual preferences and needs. But often the disadvantage of many degrees of freedom is confusion and uncertainty for the customer (Helander/Jiao 2002). Additionally in many cases customers do not clearly know, what they want (Wind et al. 2002) and the pure configurator tool does not really help them in making informed decisions. Therefore the main idea of this paper contribution is to overcome such problems by enhancing configurator tools with community support functionality. The paper discusses, how the community influences individual decision making and how different community functionalities could support customers in virtually specifying their individual products.

## Introduction

«Mass Customization» is an innovative business strategy and it all is about the mass production of individually customized goods and services (Piller 2001, Pine 1993). This means, that manufacturers try to offer enough variety and customization, so that nearly everyone finds exactly what she wants.

The basic idea of customizing products is well-known, for instance from the fashion industry: Everyone can go to a dressmaker and buy an individualized pair of trousers or a customized shirt. In Mass Customization this idea is applied to other kinds of commodity goods, like wristwatches, cellular phones, vacuum cleaners or whatever. The main difference between custom-made products and individualized products in Mass Customization is that the last-mentioned should be provided for the same prize as standardized products of today. Obviously when following the strategy of Mass Customization companies face tremendous problems. In addition to the challenges in manufacturing and logistics, another fundamental issue is how to let the customer participate in the design and development phase of a specific product instance. For this purpose the customer needs to become aware of the product family and the product's characteristic properties and functionalities. Additionally the customer needs methods and tools to finally adapt the product in accordance to her individual preferences and needs.

First technical approaches for these requirements are online configurator tools (e.g. Ardissono 2002, Sabin/Weigel 1998), which can be found, for instance, on the homepages of the large automakers. Normally such configurator tools are based on some kind of product model, which represents the product's physical and logical structure. This also allows the configurator tool to check the correctness of the configuration model, which was modified by the customer. In some respects, configurator tools allow the customer to virtually and interactively assemble an individualized product. The main advantage of configurator tools is that the customer is entitled to specify her product wish in a structured form, which can be easily processed in the downstream elements of the process chain, e.g. manufacturing, support etc. In this way the customer can be integrated into the manufacturer's system of information management.

But there are also great shortcomings with configurator tools, namely for example the experience, that in many cases customers abort the configuration process. One reason for this has to do with the necessary effort. It simply is too much work for the customer to configure everything manually. Besides the result of many «degrees of freedom» is great uncertainty for the customer, due to her limited knowledge and experience in developing and customizing products. In fact, too many choices can even confuse the customer (Helander/Jiao, 2002). Also in many cases customers do not exactly know what they want, until they see it (Wind et al. 2002). With configurator tools this can become a problem, because the customer is enabled to configure something complete new, which of course she cannot see, feel or test until she buys it.

To overcome these difficulties it is necessary to provide additional support to customers, which helps them to reduce complexity and to overcome uncertainties. A first approach is the usage of personalization techniques to recommend a specific, personalized product to the customer or at least to restrict the degrees of freedom in the user interface to the customer's desires and capabilities (Leckner/Lacher 2003, Stegmann et. al. 2003). Another approach, which will be discussed in more detail in the following, is the concept of collaborative product configuration, where customers can benefit from a virtual community to interact with other customers or even with professional product designers during the configuration process.

## Individualization and Communities

At first glance it may surprise, that communities and individualization have something in common. It seems that individualization actually is quite the opposite philosophy towards community, because every customer is somehow different from others. The differences between customers can be of (a) measurable, physical nature, like body height or place of residence. Also (b) immeasurable but personally well-known and easily descriptive differences are possible, like interests or hobbies. Finally also customers can differ in (c) immeasurable and «vague» aspects like experiences, preferences and taste. All these differences between customers can influence their individual product wish. In the following it will be focused on the customer's immeasurable and «vague» aspects. In concerns of the customer's product wish, such «vague» aspects are assumed to correlate with the customer's unarticulated needs, which often depend on temporal moods or circumstances.

Additionally customers are likely to take into account opinions and experiences of other people during selecting and configuring a product. Social studies, like for example reported in (EuroShoe Project 2002) show that especially taste often is influenced by peers and the taste of a community. This means that even if unconscious, a customer normally wants to get a product, which also is liked by persons of her «social network». Even with products off the shelf customers usually take into account, what others might think about them. One reason for this behavior is that it will become harder to resell or repair a product, the more specialized it is (Wind et al. 2002). Another reason has to do with attitudes towards style and beauty, which usually are not defined by a single person alone. It always has something to do with «mainstream» and the attitudes of the community. The consideration of what others think gets even more important, when the product is likely to express a customer's individual character. In this case the customer identifies herself with the product design and offers others the chance to use the product to get an idea about the customer's personality.

In the consequence, especially the customer's «vague» peculiarities are often related to her social environment. For this reason a virtual customer community can support the customer, by offering a technical representation of her social environment. Customers have the chance, to get an idea about what others think and they are enabled to explicitly ask others about their opinions and attitudes. Additionally the customer community supports «knowledge transfer» between customers (Ishida, 1998) by providing the single customer access to the knowledge and experience of others. Also within the community space customers can provide direct advice towards other customers. This may help customers to overcome uncertainties, which are likely to occur while customizing a product with many degrees of freedom, like described earlier in this paper and in (Huffman/Kahn 1998).

Before some community functionalities are discussed in more detail, basic characteristics for virtual communities are described: Following the research of (Hagel/Armstrong 1997) the most important criteria are (a) the support for different ways of communication between the community-members, (b) the motivation of community-members, to actively create own content for the community, (c) the possibility for community-members to establish and take care of relationships towards other members and finally (d) the goal to build up loyal community members. Summarized in the scenario of product configuration, community support systems can provide functionalities, which enable customers to easily communicate with others and to take into account their opinions and experiences for making decisions. By doing so, on the one hand the customer can ensure that her product also will be liked by others. On the other hand the customer can receive more confidence for the correctness and usefulness of her individual selections and adaptations (Piller et al. 2003).

In the following, more detailed examples for asynchronous and synchronous customer collaboration functionalities are described.

## Asynchronous collaboration

In the scenario of a collaborative configurator tool, customers can collaborate in asynchronous and synchronous ways. A first example for asynchronous collaboration can be provided by the database of previously configured products and components, which can be presented to the customer by «participatory catalogues» (cp. Schubert, 2000). Such catalogues are enriched with ratings and/or comments of community members and additionally its elements can be filtered and arranged in special orders, like for instance by name of its authors, by the average rating of certain groups etc. In this way the customer gets information about what others think of previously configured products or components and can take into account these opinions and experiences for her individual decision making.

Another example of asynchronous collaboration is that customers can actively ask other community members for their experiences and opinions, e.g. by sending e-mails to them. Such a method is possible, because in the community space the authors of information items and the purchasers of products are stored and can be made accessible.

## Synchronous collaboration

Further on the integration of community support functionalities can enable synchronous collaboration between community members. The idea is to provide some sort of a computer-based «shared workspace» (Miles/McCarthy/Dix/Harrison/Monk 1993) to customers, which enables them to collaboratively design and develop an individualized product. In such a shared workspace all participating users can simultaneously access the configurator tool and modify degrees of freedom, which are not explicitly locked by the initiating customer or by other participating users that are currently modifying them. The shared workspace can be supported by different awareness tools that show, which other customers are currently participating in the process of collaboratively configuring the product (e.g. Schlichter et. al. 1998). Additionally all members of the shared workspace can be supported by a private online chat, to be able to communicate with each other. Only participants of the collaborative session should have access to this tool. Also we assume that only the customer herself has rights to invite other customers to the session of collaboratively designing a product. Accordingly the shared workspace is only accessible for users explicitly entitled by the initiating customer.

## Phases of customer collaboration

The whole process of customer collaboration can be divided into four phases, all of which have to be supported by the collaborative configurator tool (Leckner 2003): (a) First of all the *initiation phase*, where the main task is to recognize and identify potential partners. (b) After the customer has found potential partners she needs methods for agreeing upon goals and for safeguarding these goals. Therefore in the *phase of agreement* the common goals have to be clearly defined and negotiated with partners, including an agreement about certain rewards for positive collaboration and penalties for faulty ones. (c) After this there is the *execution phase*, where the actual collaboration takes place, might it be synchronous in some kind of collaborative workspace or asynchronous with exchange of opinions and experiences via ratings, comments and maybe even e-mail. (d) Finally in the *phase of termination* the whole collaboration ends and the achieved goals and the quality of collaboration can be evaluated. This means that the previously agreed rewards or penalties can be given to the partners of the collaborative configuration process.

Especially the technical support of the agreement phase is something novel, which might highly influence the customers' motivation to support others, especially in respects of agreeing upon rewards and penalties for the whole collaboration process. In common groupware applications such methods are not prominent, because usually there are institutional secured goals between the collaboration partners. Other main differences towards familiar systems are described in the following.

## Differences to existing approaches

As far as the author knows, existing *configurator tools* for customers do not support any collaboration functionality. Usually the customer is completely alone during the process of virtually configuring a product. The described approach provides collaborative product configuration, where customers can be supported by others during the process of virtually assembling the product. Compared with pure *community support systems* the most important difference is the link to the product model on the one hand. In some respects the product model helps in structuring the information space of the community, because all community contents and items can be related to elements of the product model, e.g. ratings for certain components, opinions about specific degrees of freedom etc. On the other hand, for the purpose of collaboratively configuring a product, customers can «ad-hoc» agree upon a common project, at least temporarily. Therefore the collaborative product configurator tool must also provide mechanisms for negotiating, agreeing upon and safeguarding goals. This is also an important difference towards existing *groupware applications* (Greenberg/Roseman, 1996). The concept of «shared workspace» is quite common in groupware, but in difference to these tools, which support professional designer teams in the B2B-area already, the users of a collaborative product configurator tool normally do not know each other personally and they are typically not familiar in using a groupware system. And even more important, the community of customers does not have agreed to an institutional secured goal, like it is the fact for users of most groupware systems.

Summarized the collaborative configurator tool combines functionalities of pure product configurators, community support systems and groupware, but additionally it also offers some extra-functionality, covering all phases of customer collaboration, like for instance agreeing upon common goals.

## Conclusion

This paper presented some ideas and concepts from a project, which aims at creating a web-based system for customers to support them during the interactive adaptation and specification of individualized products. First of all it was discussed, how the customer can interactively specify a product with configurator tools

and how she can be supported during this task by the virtual community of customers. For this purpose the link between community and individualization was described in more detail. Based on this, examples of synchronous and asynchronous customer collaboration functionalities were given, also illustrating major requirements for the framework of a collaborative configurator tool. Finally differences to similar systems were sketched out, leading to the conclusion that especially the product model is an important backbone for nearly all the functionalities of the proposed system. Additionally it was pointed out that the collaborative configurator tool should provide support methods for all different phases of the whole customer collaboration process, whereas especially for the agreement phase innovative methods are necessary.

Despite all discussed potentials of the collaborative configurator tool one should not forget that the success and usefulness of such a tool extremely depends on active community members. Therefore the motivation for customers to comment and rate their products and to share their knowledge with others is an important issue also for further investigations.

Up to now all presented functionalities are only a proposal and need to be empirically investigated. So far only parts of the whole system are realized. Currently we are implementing a model-based online configurator tool, which will be enriched by community support functionalities in future work.

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