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## Approach to describe knowledge sharing between producer and user

Stefan Wellsandt\*, Klaus-Dieter Thoben

*University of Bremen, Badgasteiner Straße 1, 28359 Bremen, Germany*

\* Corresponding author. Tel.: +49-421-218-50166; fax: +49-421-218-50007. E-mail address: [wel@biba.uni-bremen.de](mailto:wel@biba.uni-bremen.de)

### Abstract

A common strategy of producers to cope with increasing competition is to involve users in their business processes. User integration happens, among other reasons, because producers seek knowledge about product usage. In order to access this knowledge, a plethora of approaches and methods can be applied. Many of these are discussed in different but related domains, such as Open Innovation and Design Thinking. The goal of this paper is to start an investigation of these different approaches and structure them according to a single context. This single context is provided by a model describing the sharing of knowledge between user and producer. In this paper, the sharing is based on the mutual exchange information. Knowledge sharing is facilitated by two strategies: user integration and producer integration. Paradigms such as mass production, mass customization and servitization are put into the context of the model. Within the discussion, more specific approaches like Social Media exploitation, Product Embedded Information Devices, Design for X, product takeback and product services are structured according to the proposed model and the two strategies. The conclusion of this paper names open questions, such as the role of information quality and rewarding users for sharing their information with producers.

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### 1. Introduction

As a consequence of global competition among producers, today's customers can select their purchase from an extensive range of products. The same product type is offered at different prices, with different technical qualities and service portfolios. Examples concern the automotive sector and mobile computers but also industrial goods, such as production machines. Consequently, purchasers become more powerful as they have more choices to satisfy their current needs. It becomes a prime objective of producers to offer products that meet user requirements.

One approach of producers to cope with this situation is the involvement of users into product design processes [1]. Herein, user involvement ranges from pure information provision to active participation in design activities [2]. In any of these cases, the idea is that the user is in possession of knowledge relevant for the producer. One part of this knowledge is embodied (tacit) and thus difficult to articulate [1], [3]. Another part is available in an explicit form through information

channels like weblogs, discussion forums, log files, questionnaires, interview protocols and service reports.

Accessing and exploiting knowledge is an important goal in product design/innovation [4]. Users' knowledge plays an important role for several reasons. For one, the knowledge can help designers to better understand user requirements [2]. Second, the user may contribute knowledge about current shortcomings of the product and related innovative solutions [5]. Further, the user's knowledge is a form of external knowledge [6] that cannot be replicated by the producer – assuming that products are not used by the producer.

In order to access the user's knowledge, a producer may take strategic decisions, such as the establishment of a complaints handling process [7], or the installation of specific design approaches like Design Thinking [8]. Benefits and challenges of different approaches, strategies, methods, tools and alike, have been and are still discussed regularly in literature. Examples concern studies in the fields of user involvement [1], requirements elicitation [9], Open Innovation [10] and knowledge management [11]. The fact that knowledge sharing

between user and producer is discussed in different domains indicates that the topic is fairly complex.

Therefore, the purpose of this paper is to start a systematic investigation of this complexity. The guiding question of this paper is: ‘How does a structure look like that can put approaches from different domains into the context of knowledge sharing’. In order to structure approaches from different domains, a model is introduced in section 2 of this paper. In the following section, the model is used to put knowledge sharing into the context of paradigms like mass production, mass customization and servitization. Afterwards, different approaches related to these paradigms are structured according to the proposed model. The paper is concluded in section 5.

## 2. Materials and Methods

In order to create a model that describes knowledge sharing between producer and user, the most relevant elements of the model are outlined in the following. For reasons of a better understanding, the complete model is illustrated in Figure 1. Each element will be described in the following, along with the reasons why it is important. Starting point of the model building is the identification of the main actors. As mentioned in the introduction, the main actors of knowledge sharing are the producer and the user. The clarification will further explain what kind of product is targeted in this paper.

### 2.1. The concepts of producer and user

In this paper, a **product** is assumed to be a physical artefact that is durable. A durable product isn’t consumed during use. It degrades over time, due to influences like wear, corrosion and overload. In addition, durable products may become outpaced by other products with better performance or appearance. The impression that a product is outpaced by another depends on the user. Besides the attribution of “durability”, products may be part of a system of other products and/or value-adding services. Such a system is called Product-Service System [12]. Durable products may incorporate embedded information devices enabling them to monitor and communicate their own state and the state of their environment. Products of this kind are called Cyber-Physical Systems [13].

The **producer** (left side of the model) can be characterized as an organization or a single person interested in creating a product (similar to [14]). Creation of the product concerns product planning and product realization. *Planning* answers what will be created and how this will be realized. Activities of planning include, among others, ideation, product design, prototyping and production design [15, p. 949, 992 and 998]. *Realization* covers, for instance, the deployment and operation of manufacturing machines enabling the actual creation of the planned product from material constituents [15, p. 947]. The realization creates discrete products that can be tested and finally brought to market. Once the product is marketed, it can be purchased or otherwise received. The receiver is stated as **customer** [7] but may be a user at the same time. Situations where products are received by people that aren’t users are not considered in this paper – thus, the terms “user” and

“customer” are used synonymously. A further scope of this paper is on producers conducting planning activities. Producers limited to realization are not in scope of this paper. In order to sustain global competition, producers must continuously create products. Therefore, the creation of the product is represented in the model by a circle.

A **user** (right side of the model) is an organization or person that expects satisfaction from a product. Organizational users are found in business-to-business markets, while users in the sense of individual persons are found in consumer markets. Satisfaction with a product is highly subjective and depends on user needs [16]. Depending on how well the product was created, these needs are satisfied with different intensity. Getting satisfaction may depend on user-product interaction, as well as the context of the interaction (e.g. product environment and motivation of the user). If users are satisfied with products, they might be interested in purchasing products from the same producer again. This continuous process might end, for instance if the perceived quality of the product decreases or the price increases beyond a personally defined threshold. Therefore, product usage is represented as a circle.

### 2.2. Knowledge sharing and information exchange

As already mentioned, the purpose of the model in Figure 1 is to support systematic discussion about the sharing of knowledge between producers and users. Sharing knowledge is a complex cognitive process that cannot be covered in detail in this paper – an attempt to create a model of knowledge sharing is made by Nonaka [17]. Further, this paper is not meant to discuss different perspectives on and shortcomings of concepts like knowledge, information and data [18]. For the purpose of this paper, the knowledge sharing process is simplified as explained in the following.

Knowledge sharing depends on **information exchange** between the user and the producer. Following the idea of Shannon and Weaver, information is conveyed through an information channel [19], [20]. Channels include verbal, written or otherwise codified messages (digital and analog). Within the proposed model, the information exchange is illustrated as the plane of the intersection between the cycles of product creation and product usage. The larger the plane is, the more information is exchanged among the two actors. The

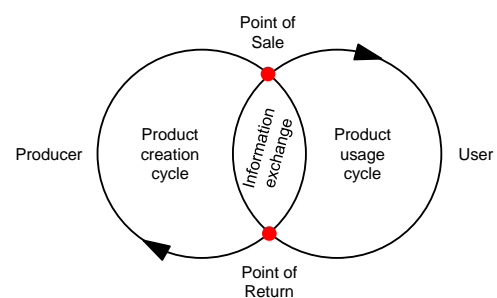


Figure 1: Information exchange during product realization and product usage

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