# CONSIDERATIONS CONCERNING THE USER'S INVOLVEMENT IN THE PROCESS OF THE PRODUCTS DESIGN

**Ana-Andreea Mihartescu, Anca Draghici, George Draghici**
**"Politehnica" University Of Timisoara, a_mihartescu@yahoo.com**

**Key words:** user-centred design (UCD), extended product.

**Abstract.** The objective of any organisation is to competitively compete within the area of the global market. For this reason, it is necessary to develop new methods for the design of products meant to ensure market competitivity, taking into consideration the produsct life cycle. This paper presents essential principles, key activities and methods which define the user centred design process and techniques employed in gathering information from the final beneficiaries. Finally, the paper presents a model of extended product which illustrates the users requirements implications in the final product design.

## 1.The user involvement concept in the products design process

The manifold informational possibilities at the level of the society – as well as the change of the mentality at the level of the individual – have resulted in the awareness concerning some complex needs and wishes whose satisfaction implies efort and organisation both at the level of the individual and at the level of the organisation and also the efficient conjugation of their efforts.

The role of the organisation is to satisfy, as well as possible, the users' needs and requirements. Thus, there appeared the concept of the user involvement in the products design process, because the organisation has to know the user's needs and wishes ever since the product design stage. The user has to be treated individually, with peculiar offers for each market segment and for each customer, if possible.

The user involvement concept in the products design process is the systematic way of improving the performances of the whole design and production system by bringing together the user and the designer for decision making in the products design and manufacture.

The user and the designer are those who define the product tangible atributes. This can be accomplished due to the fact that it is the beneficiary who expresses his expectations from the new product, and it is he who also assesses the product existing option. Such information being already known, the designer may conceive the product in compliance with the parameters requested by the user. The requested visual and descriptive forms connected with the technical features (geometrical forms etc.) are explained by the tangible and intangible attributes of the product. There should be a permanent connection between the producer and the user.

The stages defining the concept of the user involvement in the product design are illustrated in fig. 1

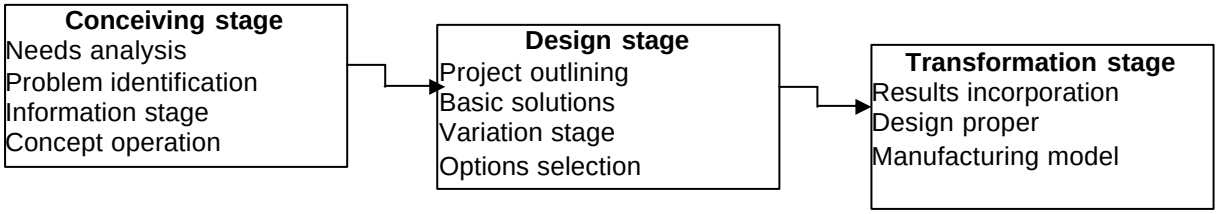
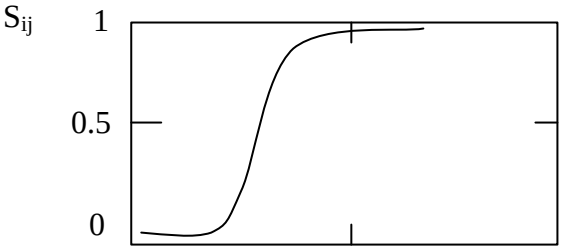



***Fig 1. The stages of the concept of the user involvement in the product design [3]***

After covering the three stages, there follows “the market confrontation” to enable quantizing the impact of the product manufactured according to the user supplied information.

The result of the user involvement in the product design process is reflected by the level of the user satisfaction.

Figure 2 presents the increase of the user satisfaction ($S_{ij}$) as a result of the concept accomplishment in accordance with his requests ($C_{ij}$). The importance levels ($G_{ij}$) for each attribute of the manufactured product determines the slope for each individual user or group of users.




$S_{ij}$ – satisfaction level
$C_{ij}$ – user requirements
i –product characteristics
j - individual user or group of users

***Fig.2. The user level of satisfaction based on the present design parametersand user requirements***

The satisfaction level (of the individual user or of the group of users) ($G_{ij}$) is influenced by other factors as well, such as: the easiness of the product usage (handling), its maintenance, as well as by marketing strategies connected with the product price, promotion and selling.

The concept of the user involvement in the process of product design can be successfully applied within the developed economies, where the users have a good financial situation, they (either individuals or organizations) being primarily interested by the quality of the products and services, as well as by the degree of novelty and uniqueness of the products. This is how personalized products have appeared, products which can be obtained mostly from standard components, but also from components differing from mass production.

In order to manufacture a personalized product, the producer asks the user tens of questions. Any profitable release of new products is based on a thorough documentation from the part of the producer, but also on a well thought and sustained promotion campaign. The producer has to offer the user complete information concerning his products to enable him to know the present offer to see if it complies with his needs and requirements.

## 2.Key activities of the user centred design

The bibliography and the standards [1, 6] take into account four key activities of the user centred design process which should be carried out as the utilization requirements are added along the product development process. The activities are brought to an end in a frequentative way and are presented in figure 3, the cycle being repeated until the particular objectives for the products usage are carried out.

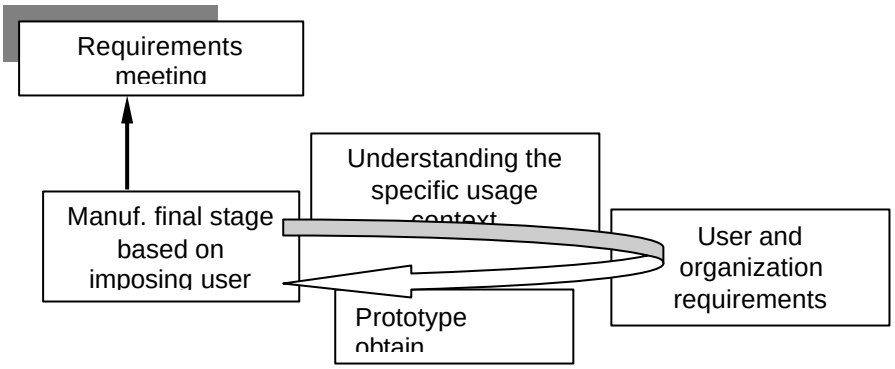



***Fig.3 Key activities of the user centred design [6]***

They are as follows:

**a. Understanding and stating the usage context.** The quality system relating the product usage includes the usefulness, but also the user's health and safety, depending very much on the context for the product usage. The following aspects are important:

- Characteristics intended for the users;
- Users performance requirements;
- The environment where the users will use the product.

Such information can be reached at through interviews and questionnaires, the analysis of the requirements. The result of these activities will be initially presented in documents which describe the context where the product proposal will be used. The details referring to the characteristics required by the users, to their request and to the environment have to highlight the important aspects of the product design. The contents of such a document may need to be updated to mirror the changes that can appear during the product development.

**b. Stating the user and organization requirements.** The planning methods, the standard directions and methods can help defining these requirements. The detailed presentation of the directions, by specifying the user and organization requirements, and objectives should be covered by a list containing the following:

- The identification of a relevant category of users involved in the design;
- The indication of the priorities corresponding to various requirements;
- The measurement of the level of satisfaction following the design result testing;
- The proof of the requirements accepting by investors or their representatives;

**c. Design and prototype execution.** This stage consists in the study of the design solutions and the execution of some simple models as proposal of products which will be presented later as representative samples to the user. The first example of design solution can be based on the previous experience or on standards. The initial design will be improved following the receipt of the user feedback. The aim of this activity is the simulation of the solutions obtained by means of computer aided design, after the execution of the experimental prototype for testing. In order to represent the prototype of the newly created product there can be used virtual design methods.

**d. Products final execution by user ideas imposing.** When deciding to implement a change which may be expensive, it is recommended to complete the execution by previously assessing the opportunities. There are several stages in the development of this activity whose progress originates in the assessment planning, in results collecting, analysis and reporting.

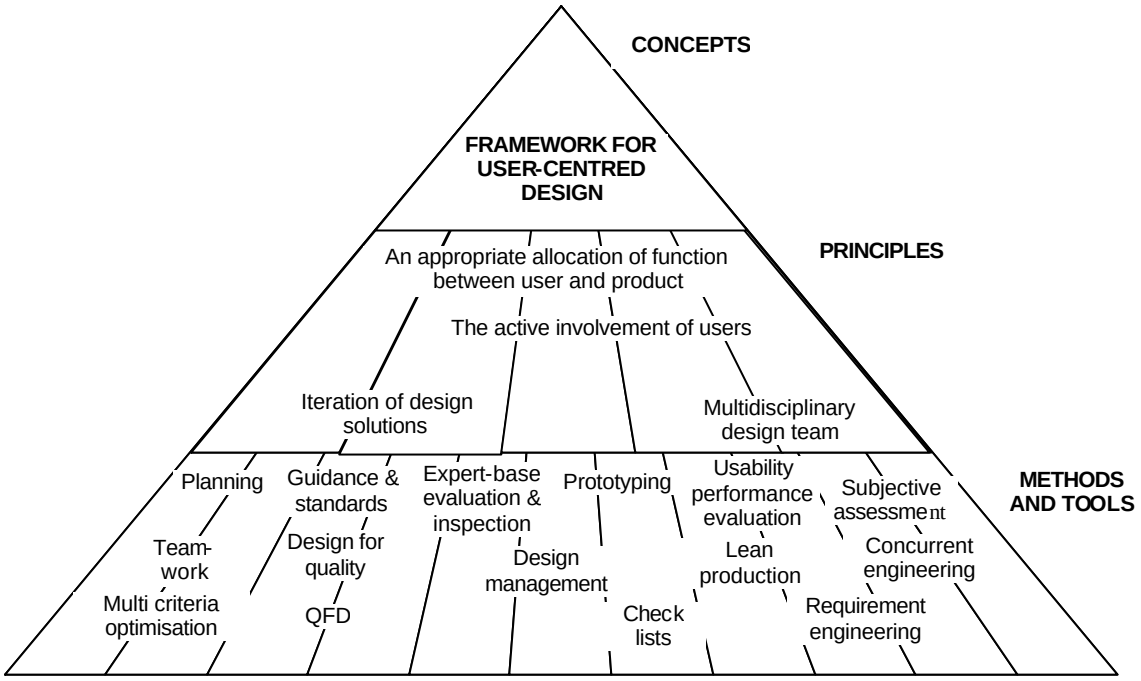



***Fig.4. Principles, methods and tools for user-centred design – synthesis. [2]***

Figure 4 presents the synthesis of the methods, principles and instruments that can be used for the achievement of user centred design. Although it is not an exhaustive description of the frequently employed methods, the hereby mentioned methods represent successful practical applications ones [1, 4].

## 3. Extended product

Nowadays, the business climate is dominated by economic, political, social and technological congestions which entail uncertainty, risk and complexity. Because the evolution of technology, the users expectations and the market echos continue to change the rate of development, it is necessary to adjust the products and services in due time to avoid users insatisfaction.

In the past, it was the user who analysed the products offer available on the market through the study of catalogues. In modern economy, the products variety and their assortments cover a large diversity, and more and more users need consultancy to make the correct choice due to the permanent increase of the present-day products complexity.

The extended product can any time contribute to the fulfillment of the latest and most complex requirements of the user.

The extended product is represented by the physical product and the associated services and accessories under the form of an attractive package to be purchased by the user.

The product can be three-dimensionally presented, as follows:

- **The basic product** (central advantage) which represents the essential level, the level highlighting, beyond the particular features, the benefits requested by the user. The central product refers to the basic function.
- **The tangible product** represents a particular materialization of the basic product presenting several characteristics: features, style, brand, package, quality etc. The tangible characteristics differ from one producer to the other.
- **The global product** comprises the additional services complementary to the offered tangible product.

The last two levels of a product contain the tangible and intangible support through which the user is remitted the advantages he is expecting. The components delineating levels two and three can be at the same time assessed as structural (commodities features), functional (performances) and aesthetical (style, color, design) characteristics.

The main objective for the product market competitivity obtaining is the need to understand and develop the extended product (through marketing, management, design and quality) [5]. All these aspects should help the members of the design team to elaborate innovative methods and instruments for the development of the product's functions. In this case, the product's functions should be elaborated on the basis of such requirements and constraints: the satisfaction of the users' and users' needs, the application of technologies and the development of methods, the availability of the companies (networks of enterprises) for innovation, market trends etc. As far as this system of "constraints" is concerned, the members of the design team have to find a niche "without risks" for innovation, with a strong impact over the increase of the product quality (mostly from the point of view of the user) and over the product competitivity all during its life cycle.

Figure 5 also illustrates the difference between products in a narrow sense and a product in a broader sense. By narrow we consider the product as a tangible entitz which is offered in the market whereas the broader gives an indication about the objective of the product which means solving a problems of the users or satisfying a demand. This differentiation is the basic motivation behind the three levels of the product.

The concept of Extended Products, represent to look at the user's requirement from needs perspective and the solutions thet fulfil the needs. A structure of needs fulfilment process is depicted in Figure 6.

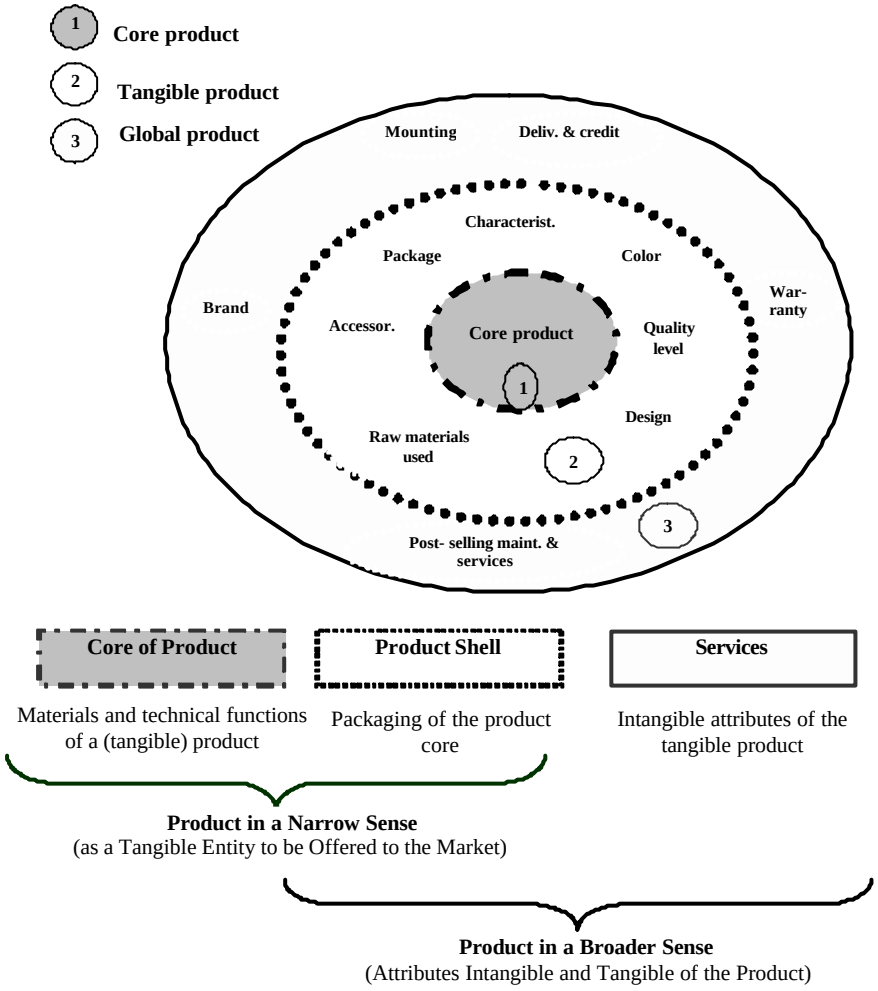



***Fig 5. Extended product model for the market life cycle***

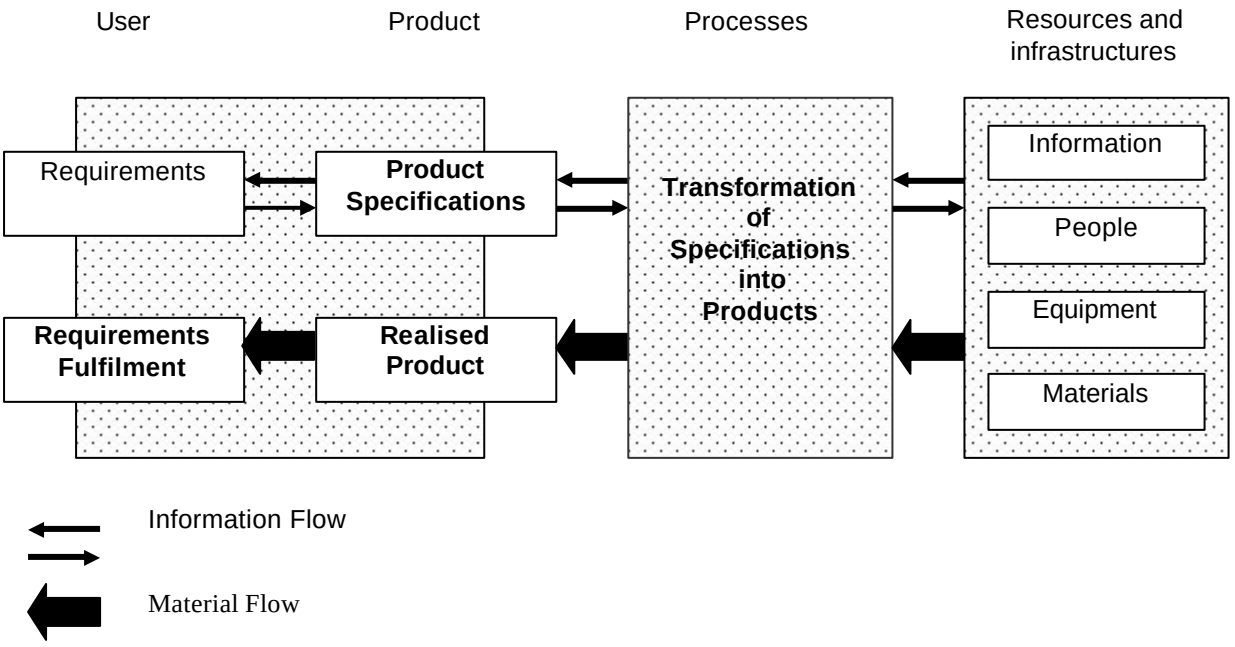



***Fig. 5. Requirements Fulfilment Process***

## 4. Conclusions

Within the present context of the world economy, where mass production has been replaced by order production, personalized products have become an active presence on the international market. Consequently, the user's involvement in the stage of products design is compulsory.

At present, the information technology, mainly the Internet, enable the users to contact the companies and specify their unique requirements, they being automatically collected by the system [5].

Whatever its name, either 'Customer Oriented Design' or 'User Centred Design', the products design process takes into account the user/final user behaviour, his wishes, the product limits and abilities [3].

Many designers think that they know what products to design and that they do not need to be influenced from the outside. This opinion is no longer justified at present, when there is the tendency to pass from mass production to personalized production, according to the user 's requirements. This tendency is quite attractive but it needs time and additional costs to collect data from the users and use them in the process of the products design. Besides the universal resource, i.e. *time,* which will be longer, and the greater financial resources which have to be allotted, there is another disadvantage of the user's involvement in the products design process, namely the product cannot be kept secret before it is released. The disclosure of the product design to the potential users may lead to the product compromise ever since its release stage.

The user involvement in the product design process ensures the product a longer life cycle, and its life cycle extension through re-design.

The above mentioned methods and instruments are not the most performant ones, but they offer the general application framework.

Starting from these considerations, the authors will further develop a user-centered design methodology as far as the products manufacture is concerned.

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