

## **END-USER KNOWLEDGE AS A TOOL FOR STRATEGIC DESIGN**

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### **Introduction**

The need for end-user knowledge has risen to the fore both within companies as well as in research. The need for design in companies has grown correspondingly. These changes have a common factor – social change. The concept of the end user, in terms of both product development and its related research, has broadened to embrace a socio-cultural dimension in addition to its physical and cognitive dimension. The amount of knowledge in end-user research has increased quantitatively and diversified qualitatively. Companies need end-user knowledge from the level of strategic management to operative product planning at the practical level. We have endeavoured to respond to this challenge by studying existing forms of leisure pursuits and by analyzing their structures and developing a design method to manage this knowledge.

This paper defines cultural awareness<sup>1</sup> as the key area of expertise in industrial design, which refers to making sense of the cultural significances of products and applying these to the characteristics of those products. These significances are initiated by end users, the environment, technology and companies alike. The appearance of a product is only the tip of the iceberg; a large quantity of dissimilar culturally significant structures lay concealed beneath the water. These structures are the foci of end-user research at the different phases of product development. The aim of design is to utilize these significances to incorporate cultural characteristics in products that are readily understood by end users<sup>2 3</sup>

### **Research environments**

The Emergence of Luxury project, a multidisciplinary approach to hidden values and pleasure factors in new design products in different societal communities is representative of fundamental design research. The first aim of the project, funded by the Academy of Finland, is to investigate and define the phenomenon of luxury at the theoretical level. At the empirical level, the project aims at increasing the understanding of end users' appreciations of luxury and high-level design products in Finnish and French contexts. Furthermore, the on-going research project attempts to produce knowledge on the creation of design products. The interoperability and transaction between the perspectives is essential in the project; it enables the creation of new areas of business and high-quality products as well as of the design competence and design skills these products require.

Luxury is a complex phenomenon, where numerous factors and processes are in transactional relation with each other<sup>4</sup>. It is also a multistratal and multidimensional phenomenon. Luxury has been viewed as being linked to new experiences and new types of products that are based on the

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<sup>1</sup> Wilenius Markku, Luovaan talouteen, 2004, Edita, 103.

<sup>2</sup> Klaus Krippendorf, On the Essential Context of Artefacts or on the Proposition that "Design is Making Sense (of things)" in Victor Margolin, Richard Buchanan (eds.), The idea of design: a design issue reader, 1995, Cambridge (MA), MIT press, 156-163.

<sup>3</sup> Laurel Brenda, Design Research, 2003, The MIT press, Cambridge, Massachusetts, 17.

<sup>4</sup> Reinmoeller, P. Emergence of Pleasure: Communities of Interest and New Luxury Products. In W. Green & P. Jordan (eds.), 2002, Pleasure with Products: Beyond Usability, 125.

distribution of tacit knowledge among small communities. According to Reinmoeller: '*Luxury is pleasure and products that emerge from communities.*' Economically, luxury combines strategic marketing, marketing communications, consumer behaviour and branding with the aspects of design management and strategy<sup>5</sup>.

The Strategic Design and Modelling Leadership project (FutureFinders) is representative of applied design research. It receives its funding from Tekes, the Finnish Technology Agency's DESIGN 2005 Industrial Design Technology Programme. A number of Finnish companies also contribute financially. The objective of the project is to develop a design method to manage multidimensional end-user knowledge. The background for developing the method has its roots in a project conducted earlier: Modelling the Socio-cultural Context (Mode)<sup>6</sup>.

Perfecting a design method focuses on the strategic level of product development, which refers to the starting point in product development where the aim is to identify product prospects and to produce information that can be put to good use in developing a product. The design method aims at producing transparent and easily assessable end-user knowledge in order to support decision-making. Information produced using the method is within reach and for the benefit of all parties.

When design is integrated into the method, the characteristics of the activity must be taken into consideration. Design is a creative activity where an individual, together with other actors, introduces cultural significances into products. These significances are prevalent in a social context and they are difficult to explain. In cases such as these, the method does not inherently produce design solutions; rather, it provides an accurate pointer as to where they may be sought and found. A further requirement is to facilitate cooperation and transparency. Justifying a design is frequently problematic. This method enables the documentation of solutions so consequently, solutions associated with a design may be examined in retrospect. When solutions are documented, representatives from different professional groups can participate in the work and provide their input.

### **Quality of end-user knowledge at the strategic level**

Design activity has branched out to all levels of business operations<sup>7</sup>. This has also been evidenced by the emphasis research places on the starting point for developing a product. End-user research is conducted at all levels of product development. There are as yet no answers to issues concerning the quality of end-user knowledge.

Product development can be broken down into three main areas: strategic, tactical and operative<sup>8</sup>. The aim of design at the strategic level is to seek new product prospects. The tactical level aims at creating product concepts. The aim of the operative level, i.e. the product design level, is to produce the final saleable product. These sub-areas combine to produce a company's design

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<sup>5</sup> See Moore, C.M. & Birstwistle, G. The Burberry business model: creating international luxury brand. In *International Journal of Retail & Distribution Management*. 2004, Vol. 32#8, 412-422.

<sup>6</sup> Modelling of Sociocultural context, Mode-project, [www.ulapland.fi/mode](http://www.ulapland.fi/mode)

<sup>7</sup> Järvinen, Juha; Koskinen, Ilpo, *Industrial Design as a Culturally Reflexive Activity in Manufacturing*, 2001, Gummerus.

<sup>8</sup> See Järvinen, Koskinen, *Industrial Design as a Culturally Reflexive Activity in Manufacturing*, 2001, Gummerus, 32.

<sup>9</sup> Hytönen, Jaana; Järvinen, Juha; Tuulenmäki, Anssi, *From design services to strategic consulting*, 2004, Designium, 32.

strategy that is closely affiliated with its marketing and production strategy<sup>10</sup>. The overall aim of a design strategy is to direct the search for product prospects and to rapidly produce product design solutions<sup>11</sup>.

In recent years, end-user research into design has focused on the tactical level. The objective has been to find design drivers that serve as the foundation for developing the final product. The focus of research is a product that is part of the culture in which it is utilized and the result of this work has produced varying definitions of requirements for products under design<sup>12</sup>. Largely, end-user research at the tactical level produces information primarily about a product and the context linked with the product is also presented alongside it. A context may be physical, social or cultural. End-user research at the operative level focuses solely on a product. By its very nature, this research takes the form of testing, such as usability tests, functionality and ergonomics. Here, the objective is to put the finishing touches to the final product ready for the markets.

The aim of our research is to develop activity and expertise at the strategic level. The quality of research information is selected to support this activity. We have concentrated on studying end users' activity cultures, such as snowmobiling or sailing. The products used in these cultures are not the primary focus of research; rather, the focus is on the ways of doing things, phenomena and social interaction. This has enabled us to achieve a quality of information that is ideally suited to the starting point of product development. The aim of strategic activity is to find new product prospects where the development of a culture surrounding an activity or genre plays a key role. The genres are examined from the perspective of the end user.

<b>Product level</b>	<b>development</b>	<b>Focus of end-user research</b>	<b>Outcome</b>
strategic		activity culture	product prospects
tactical		product in culture	product concept
operative		product	product

FIGURE 1. Levels of product development and end-user research

End-user research creates the foundation for product design throughout the entire development process. It is important to bear in mind that information follows the development of a product right to the finish. Another important aspect is who collects and analyzes this information. Workshops conducted during our studies have produced the best results when there has been all-round representation of actors from a company.

### **End-user research focuses on activity culture/genre**

The representatives of companies and research institutes alike are unanimous when it comes to the importance of end-user research. The contribution of end-user knowledge in product development has vastly increased over the past ten years<sup>13</sup>. The impetus came from personal IT equipment, such as mobile phones and pocket computers that were introduced onto the mass market during the 1990s. Product usability first focused on the importance of end-user

<sup>10</sup> Stoll Henry W., Product design methods and practises, Marcel Dekker, Inc, 1999, 9.

<sup>11</sup> Gross Nigel, Engineering design methods, John Wiley & Sons, LTD., 2000, 186.

<sup>12</sup> see Wikberg, Harri; Keinonen, Turkka, Design driver in off-line wearability; in Miten käytettävyys muotoillaan, Keinonen, Turkka, UIAH, 2000, 193.

<sup>13</sup> Battarbee, Katja, Co-experience, understanding user experiences in social interaction, UIAH, 2004, 20.

knowledge. The perspectives of end-user knowledge spread rapidly and today, end-user research stands for a relatively comprehensive human concept.

Social change also has a decisive role in the rise to the fore of end-user knowledge. Individuation may well be the key characteristic of post-modern society, which has resulted in the fragmentation and re-formation of large end-user groups. The use of products and technologies is structured along lines defined by social interaction<sup>14</sup>. This change has led to researchers seeking answers ever more deeply from usage cultures and their phenomena. Ethnography has become a prevalent method in the acquisition of knowledge for product development<sup>15</sup>. The foci of research are end users' understanding, experiences and pleasure, in other words, phenomena that are formed socially.

Pro-Am culture is a good example of the way in which research has brought end users' demands and activities to the fore. Pro-Am cultures comprise enthusiasts who take a professional view of their activities and the products required for those activities. They put in personal time and money for a leisure pursuit without receiving financial remuneration. Networking and innovation are characteristic of these cultures.<sup>16</sup> A vibrant social network that adopts its own ways of doing things, and one that forms its own terms and conditions, exists within these cultures. However, the enlightenment of end users may also be the issue.

Snowmobiling and golf were the focus of research in the FutureFinders project whereas hunting, sailing and golf were the targets in the Emergence of Luxury project. Both projects used the same materials concerning golf. The projects concentrated on the modes of activity created through social interaction. Other leisure pursuits, such as hunting and sailing have long historical backgrounds. They were an integral part of man's survival and development. The historical background of golf relates essentially to sport and competition, which largely produce experiences – they are activities that heighten the social dimension of life. Snowmobiling obviously has the shortest historical background; it has been a leisure pursuit for just under twenty years. The snowmobile has progressed from being a mere tool to become a piece of equipment for the extreme leisure pursuits of today. A common denominator in all these leisure pursuits is that they have not remained stationary in their development; rather their development will surge ahead in future and it will primarily be end-user centred. The key features in this trend can be maximized in product development and design. The cultural characteristics of a genre/leisure pursuit and new modes formed by social interaction rise to the fore as the foci of research. End-user research is beginning to see the formation of a new perspective on cultural competence, where the focal point is on cultural ways of doing things and systems such as leisure pursuits<sup>17</sup>.

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<sup>14</sup> See Rule James B., From mass society to perpetual contact, in *Perpetual Contact Mobile Communication*, Private talk, Public performance, James E. Katz and Mark Aakhus (ed.), Cambridge University Press, 2002, 242.

<sup>15</sup> Plowman Tim, *Ethnography and Critical design Practice in Design research*, Brenda laurel (ed.), 2003, The MIT press, 30.

<sup>16</sup> Leadbeater Charles, Miller Paul, *The Pro-Am Revolution*, Demos, 2004.

<sup>17</sup> See Aula Pertti, Information technology for the elderly, in *Designing for the future*, Anna-Maija Ylimaula (ed.) UIAH, 2002, 256.

## The SCC model - a way of managing end-user knowledge

The SCC model has its roots in the Modelling Socio-cultural Context project that took place in 2002-2004. It was funded by TEKES, the Finnish Technology Agency, and Finnish companies. The project conducted six case studies that were used as the basis to create a tool for modelling end-user knowledge.

One factor to the background of the SCC model is the future study and development of the scenario method<sup>18</sup>. The basic idea of the design model has been adapted from the elements of the scenario method in future studies. There are three elements in the scenarios in future studies: a description of the present status of the target, a description of the future and a description of the process that connects an original state to that of a latter one. There are two main parts in the SCC model (Figure 2): a description of the present situation of a product and a description of the future situation of that product. The determination of the present situation is based on studies (a user study and/or market research) carried out during product development. The future situation of the product takes shape as the result of the design work. The future situation of the product is based on the conclusions concerning the present situation and on the strategies of the company. The central part of our model covers the elements of these situations. These elements have been named: product, usage, person, physical surroundings, context of social interaction and cultural context (Figure 2). This wholeness is called the elements of the context. The starting point is that this structure is used to describe both situations (the present and the future). This way design brings about transparency.

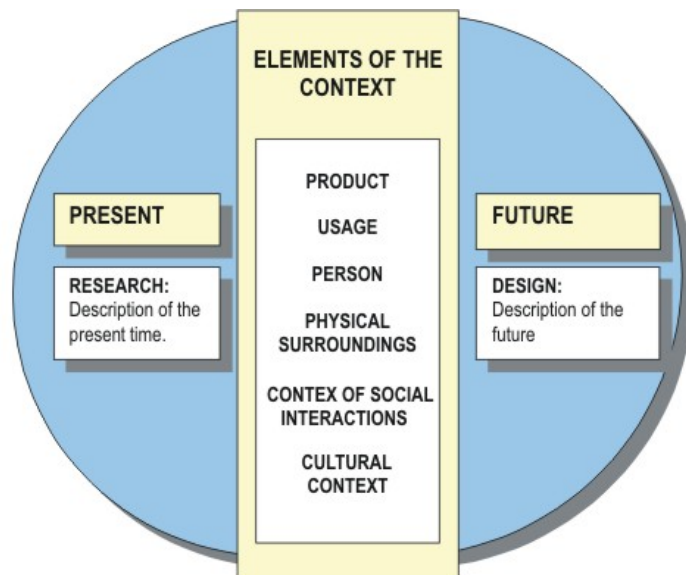


FIGURE 2. SCC model

The context has been divided into six elements. The element below partly includes the element above. For example, the product-element is partly included in the usage-element and so on. In the SCC model, it is the task of the research to produce the more exact qualifiers to the elements of

<sup>18</sup> Mannermaa, Mika, Tulevaisuuden hallinta - Skenaariot strategiatyöskentelyssä, 1999 WSOY, 57.

context. Based on studies in the Mode and FutureFinders projects, the following factors rose to the fore:

Product: technology, the price of the product, the appearance of the product, properties, traditions, acquisition, purpose, services

Usage: duration, character, purpose of use, motivation, target, density, usability, peripheral activity

Person: consumer type, age, sex, values social station, experience, achievements, rules, competition, equipment, life situation, skills, other leisure pursuits

Physical surroundings: season, time of the day, size of the area of operation, context of the activity (home, job, hobby), weather, nature, services, recording experiences, the built-up environment

Context of social interactions: present, privacy of the product, social character of use, cultural background, social motivation of the activity, purpose of the activity, other events related to the activity, clubs, stimulus, network

Cultural context: safety, legislation, social trends, consumer trends, technology trends, cultural and historical background, change in activity, genre, participation, general attitude, technological development, social situation.

The information required to describe the present situation is obtained mainly through research. Several methods can be used to collect the research information. In the Mode and FutureFinders projects, the focus was on group interviews. When there is a question of user-centred product development, methods related to user-centeredness (ethnographic methods) are employed as the means of research and data collection.

It must be remembered that every method determines the information to be obtained. The best results can be obtained when several methods are used simultaneously. It must also be born in mind that a model can link both qualitative and quantitative research methods. The second source of information is the expertise of the company about the target for development. The information the staff of a company has accumulated from earlier product development projects, customer feedback and claims can also be used. Social factors, such as legislation and the safety regulations, affect the present situation and they can be obtained from companies. In the SCC analysis model (Figure 3), the description of the present situation has been divided into two: the factors of the present situation and the variables of the present situation. It is a question of a hierarchical model in which the attempt is to name the elements more distinctly. These factors can be dealt with at a deeper level by using partition. This partition is also in the description of the future situation.

Description of the present time				ELEMENTS OF THE CONTEXT	Description of the future			
Variables of the present time					FACTORS OF THE FUTURE			
FACTORS OF THE PRESENT TIME				Variables of the future				
				PRODUCT				
				USAGE				
				PERSON				
				PHYSICAL SURROUNDINGS				
				CONTEXT OF SOCIAL INTERACTIONS				
				CULTURAL CONTEXT				

FIGURE 3. SCC analysis model

The description of the future situation is the result of the design process. The factors and variables of the future situation are formed based on the description of the present situation. The scenario method was used as the instrument of design in the Mode project. Working a scenario refers in this study to a tree phased process: (1) researching the socio-cultural context, (2) modelling the analysed information and (3) designing the use scenarios. In the study of the socio-cultural context, the information is gathered from the users and the company. The descriptions of the present and future situations are built at the stage of modelling. The descriptions of the future situation are changed into a visual form during the design of use scenarios. The future situation can also be described in other ways, as multimedia presentations or stories for example. The FutureFinders project is developing a presentation method that utilizes visual materials alongside text. The visual materials could be described as “flashes” that illustrate future moments in line with the perspectives of the context model.

When perceiving the future, we are transferred from research to the area of design, when the truth-value of the information changes. The certainty acquired through research becomes uncertainty. However, the presentation of the present situation that has been produced through research serves as the basis for evaluation and provides direction for designing the future situation.

### The future of the SCC model

At present, the SCC model requires a vast amount of work in order to be fully functional. The challenge facing future development will be to deepen the understanding of cultural ways of doing things and to perfect the SCC model.

The qualitative materials that have been collected through group interviews are currently utilized for developing and testing the SCC model. The aim in future is to apply the various research materials to the tool. The utilization of visual materials is one target in particular. We view the application of qualitative materials as another potential. In this manner, the tool and its section currently under study, in particular, will achieve increased credibility.

Collaboration with companies provided the impetus for developing the function of the tool. We have worked with company design, research and marketing departments. One course of action would be to develop a so-called “lite” version, where the aim would be to develop a concept model of the SCC model or a checklist method where applications would be found in products or product concepts under development. However, we also see a need for developing a full model that would be seen through to completion using a large amount of research material.

### **In conclusion**

Several studies have indicated the underlying necessity of design methodology research and development. Close collaboration between research institutes and companies is of utmost importance in order to direct research towards the correct targets. However, fundamental academic research draws attention to perspectives that day-to-day product development has no time to address.

When taken into overall consideration, the standpoints of our project are strategically well selected. Our work has brought to the fore new phenomena for deliberation, such as the necessity for luxury in everyday products. The two current foci of our research are fundamental academic research and applied research. Both areas endeavour to develop know-how in strategic design. End-user knowledge is at the core of strategic design expertise. This knowledge is also an essential requirement for other areas of a company’s know-how, and these interfaces will doubtless become the foci of future research.