Design practices contributing to meaning-changing innovations – Case study in Finnish boating industry

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Abstract
Innovation of meaning can be either radical or incremental. There is a gap in research concerning design practices contributing to meaning-changing innovations. The purpose of this paper is to identify patterns of design activities contributing to the radical change of meaning. This paper is based on a case study analysis of a research-based concept design project that focused on generating product and service concepts for the boat industry for the forthcoming 10-15 years. These concepts as well as the process were analyzed in order to identify different design activities contributing to the radical change of meaning. The paper suggests a framework for designers for selecting design activities when pursuing radically new meanings. The suggested framework explains the importance of framing activities when proposing radically new meanings.

Keywords: Framing, Meaning, Innovation

1 Introduction
Finnish companies operating in the boating industry are mainly conventional product-oriented companies. [1] Companies have been unable to perceive boating as a leisure time activity, which has narrowed the scope of identifying sources of innovation. The most significant changes driving the development of new products and services in the boating industry are related to future changes in the boater's daily life. These changes will have an impact on boating habits and consumer behavior. Companies that are able to effectively take advantage of changing customer needs and desires will succeed in the competition. [2]

User-centered design approach does not help designers to understand radical changes in meaning because its methodologies provide information that is in line with the current socio-cultural context [3]. In order to create genuinely new products, designers need to set aside the current meanings of products [3] and find the means to uncover opportunities by exploring people’s unmet and unarticulated needs in the present and utilize this insight in future-oriented design activity [4]. Verganti [3] suggests, that radical changes in meanings might only be understood by looking at long-term phenomena from a broader perspective.

When talking about changes in people's daily life, the general sociocultural development is in the spotlight. It is important to understand these dynamics because boating is just one area of
the leisure time activities, connected by the same behaviors, and values that guide the
behavior and preferences also in other fields of life [5].

However, there is a lack of research on how these meaning-changing innovations are created
in practice. For example, what kind of reasoning patterns should be applied when pursuing
meaning-changing innovation. Design thinking theory seems to provide useful concepts for
understanding design activities on the level of practice.

2 Theoretical framework
Relatively little past research has focused on design practices of meaning changing
innovation. The theoretical framework for this paper is based on two theories: Design driven
innovation suggested by Verganti [3] and Design thinking described by Dorst [6]. The aim of
applying management oriented (company-level) theory of meaning changing innovations to
the Design thinking theory (designer and design practice level) is to create understanding in
the design practices contributing to meaning changing innovations. Verganti’s framework was
used in order to identify appropriate concepts for the analysis. Design thinking theory was
used to identify the design activities contributing to the creation of these meaning changing
concepts.

2.1 Innovation of meaning
Öberg and Verganti [7] define the innovation of meaning as a change in the reasons why
people buy and use products. People do not buy products merely because of their functions
but also meaning. Meaning is something beyond features and functions. Instead it evokes a
profound emotional, psychological and sociocultural response. [8]

Understanding product meanings is about making sense of an experience of use, and therefore
it is connected to products or services and the system surrounding them [7]. In order to
innovate a meaning, there is a need to explore how the context in which people live is
evolving. As the larger socio-cultural context changes, the meanings are also adjusted to these
changes, and therefore the concept of meaning is always in motion.

Verganti [3] suggests that in the same way that the functional innovation may imply an
incremental or radical improvement of technical performance, the innovation of meaning can
also be either radical or incremental. Innovation of meaning is incremental when a product
adopts a design language and delivers a message that is in line with the current evolution of
sociocultural models. Innovation of meaning is radical when a product has a language and
delivers a message that proposes a significant reinterpretation of meaning. This paper focuses
on examining the meaning as a message, not as a language.

Traditional user research methods do not help designers understand radical changes in
meaning because they provide information that is in line with the current socio-cultural
context [3]. In order to create genuinely new products, designers need to set aside the current
meanings of products [3] and find the means to uncover opportunities by exploring people’s
unmet and unarticulated needs in the present and utilize this insight in future-oriented design
activity [4]. Verganti [3] suggests, that radical changes in meanings might only be understood
by looking at long-term phenomena from a broader perspective.

2.2 Design thinking
The predictions designers make about the future are an intrinsic part of the design process,
and a designer’s ability to envision and interpret possible futures is crucial to the success of
the design activity [9]. However, research findings such as user needs and information concerning the context of use are related to current use practices. They do not support designers who try to anticipate what users will consider desirable in the future. It seems that the future perspective makes the design problem more open.

The openness and complexity of design problems is linked to the concept of wicked problems. Rittel & Melvin [10] introduced the concept of wicked problems to describe the vagueness of social system problems in contrast to the clear, ‘tame’ problems in natural sciences and engineering. An essential feature of wicked problems is that an exhaustive formulation of the problem is impossible. This is due to the fact that the formulation of the problem and the solution emerge in parallel, i.e. it is not possible to define the problem until the solution has been found.

The reasoning patterns described by Dorst [6] seem to be useful in helping to understand how to tackle the openness of the design problem. As the aim of design is to create value for others, the basic reasoning pattern is abduction [6]. In fact, Dorst suggests that abduction comes in two forms (Figure 1 and 2). Abduction-1 is a form of conventional, ‘closed’ problem solving. In this form, the ‘value’ to be created and the ‘working principle’ to achieve the aspired value are already known in the beginning of the design process. What is missing, and needs to be created, is a ‘thing’ (an object, a service, a system).

![Figure 1. Abduction 1 (Dorst, 2011).](image)

In the second reasoning form, Abduction-2 (Figure 2), the only known thing in the beginning of the process is the ‘value’ to be created. A ‘working principle’ that would certainly work is unknown. Therefore, a ‘working principle’ and a ‘thing’ have to be created in parallel. This struggle with two unknowns leads to a special kind of design practice. Dorst [6] suggests that this type of ‘open’ reasoning is closely associated with conceptual design and solving open, complex problems.

![Figure 2. Abduction 2 (Dorst, 2011).](image)

One strategy to create a ‘what’ and a ‘working principle’ in parallel is to develop a ‘frame’ that tackles both unknowns. The concept of framing was presented by Schön [11]. He defines frames as statements that include a specific perception of a problem situation. Framing is about creating a novel standpoint from which the design problem can be tackled. It imposes a view on the design problem that implies the solution. Framing is about looking at the design
problem from a certain viewpoint and adopting certain concepts to describe the problem. [12, 6] For example, traditional frame for a berth is ‘a safe docking place for a boat’. Seeing a berth as ‘a cozy place to spend leisure time’ is a new frame, which introduces new concepts to structure the problem situation. When using this new frame, aspects such as privacy, relaxation and versatility become important. Through the new frame and concepts, novel solution for berth can be proposed, as explained later in detail.

The process of tackling an open, complex problem starts from the only known subject in the equation: the ‘value’ that needs to be created. Then, a frame that seems to potentially create the aspired value is developed. Proposing a frame is a form of inductive thinking, reasoning back from the consequence, the value. The next step then is to go back to the Abduction-1 model to design a ‘thing’ that completes the equation. The last step is to reason forward to find out and test if the ‘thing’ and the ‘working principle’ actually perform to create the aspired value. [6] (Figure 2)

![Frame connects a 'how' to the 'value' (Dorst, 2011).](image)

Dorst [6] has illustrated where frames originate. Designers engage with the broader problem situation to understand what makes the problem so hard to solve (‘the central paradox’). Gathering clues may lead to the emergence of ‘themes’, which in turn assist the development of a frame that tackles the central paradox. The engagement with a context can be seen as a process of analysis to make sense of underlying phenomena. Respectively, ‘themes’ offer a sense-making tool to capture these phenomena. As Dorst [6] describes, “Distilling themes from a complex situation is described as a process of insightful invention, discovery and disclosure,” and continues, “in design practice we see that ‘themes’ which could (from a problem solving perspective) be judged peripheral to the central paradox become the triggers for the creation of new frames that allow the central paradox to be approached in a new and interesting way.”

3 Method
The purpose of this paper was to identify the design activities used in the case project and to analyze how they contribute to a radical change of meaning. This paper is based on an academic concept design project that focused on generating product and service visions for the boat industry for the forthcoming 10-15 years. Visions were created by combining user research data (interview, observation, survey) with the results of trend mapping data, which covered trends in areas such as leisure time, travelling and consumer buying behavior.

The aim of the case project was to produce radically new boat and service concepts that illustrate at a concrete level, the kind of boating-related products and services that could be available if certain elements of sociocultural change are predominant. A total of 18 product, service and system concepts were created. Concepts varied from accessory product solutions to boating service concepts. A variety of presentation tools, such as use scenarios and product visualizations, were applied in order to describe the key features of the concepts and the value for the user.

The core of the design team in the case project included industrial designer and consumer researcher. During the case project the core design team was influenced by actors such as
technical specialists, other designers in the project organization, representatives of the participating companies and the board members.

The in-depth analysis of concepts included 11 concepts out of the total 18. Concepts were selected based on three criteria: the description of the concept (1) gives enough information, and (2) is coherent enough, to evaluate the principles it is based on, and (3) describes the key features of the concept related to the applied technology, value for the user, functional features and appearance of the solution. Only those concepts were included in the analysis, which matched all of these criteria.

In order to identify the patterns of design activities contributing to the change of meaning, the design process and the qualities of the final concepts were analyzed. The analysis was made in two phases. In the first phase, the question was, how are the concepts located in the innovation framework suggested by Verganti? In the second phase of the analysis, the issue was, what design practices are identified in creating meaning changing concepts?

3.1 Allocation of concepts to the innovation framework
In the first phase, concepts were evaluated and placed in the dimensions of innovation framework suggested by Verganti. Two aspects were considered: (1) Does the concept adapt to the current meaning structures, or does it propose a new meaning? (2) Is the concept based on the incremental or radical change in technology? How much new technology is needed to realize the concept? Concepts were evaluated by authors, who had also been involved in the research phase and creating the concepts. The results of the analysis of concepts are presented in Figure 1.

![Figure 4. Allocation of concepts into Verganti’s (2008) innovation framework.](image)

Concepts in the upper left corner in Figure 1 aimed at optimizing the current product performance pushed by technology [8]. These concepts are based on the findings from the user research, and were enabled by technology that was eminently new to a product/service category. Most of the concepts were singular or accessory product solutions supporting a safe and convenient boating experience. These concepts were adapted to the current meanings of boating.

As an example, concept number 7 in Figure 4, was a device for safe and convenient docking (Figure 5). The concept was based on findings from user research. Traditionally, steering the boat takes place at the control board during the docking procedures. The control board is
usually located in the middle of the boat. This causes problems related to the approximation of distances and avoiding collisions, and it may even cause safety issues, such as falling out of the boat. In addition, it may hinder the docking of larger boats without crew members and cause difficulties when docking in windy weather conditions. Wireless technology would enable the skipper to move around the boat to all necessary positions during the docking. The concept does not propose a new meaning, but optimizes the docking procedures as they are by applying new technology.

![Figure 5. Device for safe and convenient docking.](image)

Concepts placed on the right-hand side of the framework propose a change in the current meaning of boating. These concepts are driven by new experiences that significantly deviate from the current boating experiences. Concepts on the lower right corner propose a new user experience without applying a new technology. The two concepts allocated to this segment extend the current meanings of boating to new related domains, such as harbors.

As an example, concept number 2 in Figure 6, was a private space in the harbor (Figure 6). Instead of being just a docking place for a boat, the berth was seen as a cozy place to spend leisure time. This new meaning introduced radically new product features to pursue: privacy and versatility. In the concept, the berth provides space to relax, cook and socialize near the water and services. The new meaning was achieved without applying new technology to the domain.

![Figure 6. Private space in the harbor.](image)

Concept proposals in the upper right corner in the framework were driven by a new boating experience, which was achieved by applying new technology. Most of these concepts were integrative in their nature – proposed boats and services comprised multiple new solutions that were integrated into coherent unity by underlining a certain user experience.
As an example, concept number 4 in Figure 1, was a boat concept specially designed for ‘family boaters’ (Figure 7). It was driven by two themes: boating with kids, and the boat as an extension of the home. From the children's point of view, the boat should have plenty of room to move and play as well as to experience the surrounding nature. From the parents' point of view, the boat should be safe for the children. Considering a boat as a home-like space also introduced new product features: one-level dock, modifiable furnishing and smart windows that enable privacy and customization of the interior. Technologies such as electrochromic windows and a multihull structure were applied to achieve these new features.

The allocation of concepts into the framework revealed that the process and methods used in the case project provided not only concepts that adapt the current meaning of boating but also concepts that propose a radical change in meaning.

3.2 Identifying design practices
In the second phase of the data analysis, design practices contributing to the meaning changing proposals were identified. The allocation of concepts into the framework revealed that certain design activities seemed to lead to concepts that were in line with current product and service meanings, while the other activities supported a change of meaning. Design activities contributing to the change of meaning included the following: (1) Initial framing, (2) Evaluating the value changing potential of themes, (3) Reframing and (4) Creation of concepts based on redefined meaning. These activities are presented in Figure 8.
3.2.1 Initial framing
The case design project was expected to explore future product and service opportunities for the boating industry. The aim was to create new solutions that would attract new hobbyists, as the popularity of traditional leisure boating had decreased. Therefore, conventional frames that lead to traditional solutions had to be challenged and a new frame proposed.

With the initial frame boating was perceived in the context of consumers’ leisure time. This frame emphasized the consumers’ points of view, in which boating is regarded in relation to other leisure time activities. The ‘leisure time’ frame revealed the importance of understanding the boating experience more in detail, what is valued in leisure time and how these values are anticipated to change. In response to these key considerations, user research and trend analysis were conducted. In other words, the initial frame strongly influenced and directed the research [13]. The initial frame defined the scope of designers’ engagement within the problem context and led to the emergence of themes in user research.

With the initial frame, the user was taken to the center of all design efforts. According to Hentinen et al. [1] Finnish companies in this field still lack the capacity to see boating from the users’ and customers’ point of view. Through the initial framing, conventional frames, working principles and aspired values are questioned. This case study implies the essential role of analyzing the existing working principles and values applied in the industry in order to understand what frames are new in the design situation at hand. It seems that current values and working principles can be identified through the analysis of existing boats, services and how these are developed within the industry.

3.2.2 Evaluating the value changing potential of themes emerging from user research
In Verganti’s [3] terms, innovations can either adapt to current meaning (current ‘why’ of use) or propose a new meaning (new ‘why’ of use). In our case study, themes emerging from user research were evaluated in relation to their potential to create a novel user experience, i.e. to propose a new meaning.

Evaluation of the meaning changing potential of themes can also be regarded as a search for a new value of boating. In practice, each theme was examined by analyzing its capability to act as a new reason for boating, a ‘novel why to boat’. As a result, themes were classified as those proposing value adapting to the current meaning and those proposing a new meaning of boating.

An example of the theme where the aspired value is based on the current meaning, is the theme ‘difficult and dangerous docking procedures in harbors’, which obviously cannot be regarded as a reason for boating. However, this theme has a high potential to create value for the user by increasing the performance of safe and convenient boating. In the later design phases, these kind of themes, were treated as simple and well-defined design problems. The aspired value was known, and the working principle to create solutions was widely used in the industry; the safety and convenience of docking could be achieved by applying new technology. In other words, frames to create solutions remained unchanged. Concepts based on current frames (example: Figure 5) do not propose a new meaning. These concepts can be characterized as technology-driven product and service opportunities fulfilling current user needs.

Instead, themes such as ‘boating with kids’ or ‘furnishing a boat’ were interpreted to provide potential novel reasons for boating. In these cases, the value was based on a new meaning of
boating. The core of the aspired value was known, but needed to be focused. However, the working principle for how to transfer the novel meaning through a product or service was unclear. In order to tackle the missing link between the aspired value and the working principles, new frames had to be proposed.

3.2.3 Reframing
In the case study, sociocultural trends were used for crystallizing and reformulating the aspired value. In practice, the sensitivity matrix was used for analyzing, how sociocultural trends may affect themes. For example, emergent phenomena such as wellbeing and homing were interpreted to intensify the theme of ‘furnishing a boat’. In this theme, factors such as privacy, customizability and autonomy were selected to describe the change of value.

As the aspired value was defined, a new frame was proposed in order to find applicable working methods for creating new solutions. In the case project, ‘design drivers’ [14] were used as a tool to reframe the link between a working method and a value. The theme ‘boating with kids’ led to a design driver paraphrased as ‘children-oriented boating’. Respectively, ‘furnishing a boat’ led to the design driver ‘boat as an extension of home’.

Frames paraphrased by a metaphor captured the missing link between the working principle and the aspired value. For example, the frame ‘spending time in a boat as comfortably and privately as in one’s own home’ simultaneously defined the working principle ‘design a boat as if you are designing a home for someone’. In other words, a new meaning emerged in parallel with a working principle: the frame (‘boat as an extension of home’) defined both the new meaning for boat, (‘boat as a home’), and the working principle to design a boat (‘design a boat as if you are designing a home’).

Reframing redefined the aspired value in terms of new boating experience and led to proposals of new frames to find appropriate working principles to create the aspired value. In the following phases of the design project, new working principles were applied to create concepts of new solutions. These concepts proposed a change in the current meaning of boating, with or without the use of new technology.

4 Conclusions
The purpose of this paper was to operationalize the practice of meaning changing innovation. This was achieved by applying design thinking theory to the management-oriented theory of meaning changing innovations.

The framework describing design activities contributing to the radical change of meaning was presented in this paper. This framework contributes to design research by improving the understanding of design practices related to meaning changing innovations. Specifically, it introduces a set of concepts and thinking models for the different phases for of the meaning changing innovation process.

Future research could validate the suggested framework (Figure 8). For example, researchers could measure designers’ perceptions on the suggested design practices in creating radical meaning changing innovations.

References


