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Design Thinking for Innovation in Offshore Ship Bridge Development

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ABSTRACT

The purpose of this paper is to investigate how innovations in ship bridge design may benefit from design competency in the fields of e.g. industrial design. The Ulstein Bridge Concept (UBC) research project imply that having a strategic focus on design in a conceptual design process in front of a traditional development process has led to a radical, award winning vision of a future offshore ship bridge, acknowledged by the maritime industry of Norway. Through active participation and observation in the project by the author, research findings suggest that applying design based methods and techniques support the overall process of doing innovation in the maritime domain. The conceptual design process is here described in the core activities of domain insight, interpretation, translation, and presentation. The designed externalisations of future design visions also foster the important design discussion among the various disciplines of designers, engineers, management, and users, needed in order to fully understand the requirements for further commercialisation. The conceptual design proposals presented in the UBC project have initiated several patents, ideas for new products ready for launch, and a complete new understanding of how to design for the mariners work environment on a ship bridge.

1. Introduction

Development of new design concepts for ship bridges on modern offshore vessels is a considerable challenge for engineering and design professions. The global maritime ship building industry also tends to be dominated by the experience and expertise of engineering, implying an innovation focus that is mainly technology-driven. Norway has a long tradition in shipbuilding, but has experienced an increased competition from low cost countries. This has led to a concentration on specialized market segments, e.g. offshore service ships, or platform anchor handlers. The competitiveness of such ships is believed to be built on innovation and knowledge-intensive products tailored for this demand (Jenssen, 2003).

Although the ship building industry is dominated by the disciplines of engineering, maritime research has also focused on issues regarding safety and the human element (Hetherington et al., 2006), human factors (Grech et al., 2008), or decision support systems and technological development (Koester et al., 2009). This has led to researchers argue there is a need for a better understanding of how mariners needs to adapt to the complicated equipment of todays vessels (Lützhöft & Nyce, 2008), and thereby imply that innovation and development should take on a stronger user approach (Petersen & Lützhöft, 2009). In this respect, integrated bridge design has shown promising impact on navigation (Motz et al., 2009). But little research seems to focus on how the competency of e.g. industrial design can influence the process of doing innovation in the maritime industry. Linder (2008) discussed possible contribution to innovation by industrial designers through exemplifications from the offshore ship industry in and around Aalesund on the west coast of Norway, and in resent years, design competency targeted the maritime industry has been an increased focus at The Oslo School of Architecture and Design (AHO) (Luras, 2012; Sevaldson et al., 2012).

Someone (e.g. a ship-owner or user) coming up with an idea for a new solution to a given problem seems to characterise the most common approach to innovation in the maritime industry today. Such ideas are often taken right into development by an engineering team, using their heuristic insight and competence.

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Although this approach has worked for years, and has even led to ground-breaking innovations in the field of offshore operations, it also inherits a large extent of risk. Such risks include the uncertainty regarding when, or even if, a new idea occur in the first place, and the soundness of this idea. These ideas are often of an incremental nature, and typically technical oriented improvements. Furthermore, time pressure often entail a missing analysis whether this idea can be commercialised in the first place, and eventually what time and costs are needed for the development process. If, as is often the case, the development is part of a contract for a new vessel, this approach inherits an additional risk of a delayed delivery, or a delivery where major shortcuts have to be taken in order to succeed.

Buxton (2007) claims that in e.g. software development, a considerable part of todays offshore ship bridge development, there seems to be a missing up-front design phase before giving a project a green light. He argue this design phase should be based on the traditions and competencies of e.g. industrial or interaction design, which takes on a very different mind-set and training than does engineering. It's important to emphasize that the up-front design phase is something that comes in addition to traditional ship bridge engineering, and should take on a complementary aspect of human competencies rather than be seen as conflicting. Buxton (2007) argues that design and engineering are very different skill sets, and each skill set is essential for the production of quality products, but neither is sufficient on its own.

The purpose of this paper is to investigate how innovations in offshore ship bridge design may benefit by the design competency as in the fields of e.g. industrial or interaction design. This purpose is met by an extensive single case study of the Ulstein Bridge Concept (UBC), a case that started as a design-driven innovation research project aiming at redesigning the entire offshore ship bridge. It is important to clarify that the contribution to innovation is here limited to the conceptual level, that is the theoretical conception phase of a total innovation process that ultimately translate an invention into a commercial exploitation (Trott, 2012).

In the following chapters, some basic characteristics of design thinking and conceptual design are outlined before presenting the applied research method. Furthermore, the research findings of the innovation work of the UBC project is presented and discussed, that ultimately ends in some concluding remarks.

2. Design Thinking - The Reasoning of Designers

Designers, as those trained in the traditions of industrial design or interaction design, are often said to apply what's referred to as design thinking (Rowe, 1987), and to have a reasoning of design that is far more disorderly compared to their counterparts in design engineering (Rittel, 1987). Design engineering is here understood as design with particular emphasis on the technical aspects of a product (Robinson, 2012). Most design problems in the maritime industry are also what designers refer to as wicked or ill-defined problems, the kind of challenges where there are no meaningfully correct or false solutions (Rittel & Webber, 1973). Rittel (1987 pp. 2) says, "...learning *what* the problem "is" IS the problem". When designers approach these wicked or ill-defined problems, they argue there is no clear separation between the activities of problem understanding, problem definition, synthesis, and evaluation (Rittel, 1987). Dorst (2011) describe design reasoning as the challenge of abduction; figure out what to create while there is no known or chosen working principle, a *how*, that we can trust lead to some new object, service or system.

The response to this challenge involve the development or adoption of a frame, implicating that by applying a certain working principle will create a specific value (Dorst, 2011). In this abduction process good designers tend to build, test, and refine artefacts for exploration rather than refining a perfect theoretical plan (Ulrich, 2011). In the early phase of the design process, often referred to as conceptual design (Nordby, 2010), designers engage in a continuous discussion and reflection through externalisations of design ideas using tools such as sketching, mock-ups, or prototyping, a way of building, testing and critiquing potential possibilities and limitations of design ideas as a means to better understand what the problems really are (Schön, 1991). Externalisations through e.g. prototypes are also powerful boundary objects for the mediation of design collaboration, both amongst designers, and when the collaboration includes other professionals like engineers or users (Star & Griesemer, 1989). An effective boundary object will establish a shared language for individuals to represent their internal knowledge, and facilitate the process of transforming this knowledge to others (Huybrechts et al., 2009).

In recent decades, designers have increasingly moved closer to potential users in order to better understand what they need and desire, a class of design exploration now commonly known as human-centred design (HCD) (Norman & Draper, 1986). Seeing and hearing with your own eyes is believed to be a critical first step in creating breakthrough products. This is based on the argumentation that careful observations will open up all kinds of insights and opportunities that might lead to new ideas for commercial innovation (Kelley, 2004). But acquired domain insight and understanding needs to be transferred into design ideas, externalised in conceptual design proposals. This conceptual design phase can then be said to be the visualisation of a future design vision, acting as an inspiration for further innovation and development, as often seen it its most extreme when the car industry are making concept cars (Buxton, 2007).

Designers are also characterized to focus on solutions, while the more scientific scholars, like engineering, are said to be problem oriented (Lawson, 2006), and while the natural science are concerned with how things are, design is concerned with how things ought to be (Edeholt, 2007). According to Edeholt, this is why a designer's approach to ambiguous or wicked problems is to come up with solutions that can be explored, tested and critiqued, as a contrast to traditional problem formulation and definition directly followed by a rational, logical, and systematic design process of optimization, as in engineering. Edeholt argues that the strength of designers is their reasoning, methods, and tools especially developed for the purpose of exploring several and diverse sets of alternative solutions. And these design tools, including rapid prototyping, CAD-based simulation, high-fidelity renderings, and real-time graphics, makes it possible to generate a wide array of ideas for further selection, fast, cheap and plentiful (Kristiansen & Nordby, 2013). Designers may even suggest comprehensive holistic proposals while still in the early phase of the design process (Edeholt, 2007).

Design thinking has gained increased attention and interest amongst e.g. business researchers, especially innovation management, inspired by great innovation companies as e.g. Apple, IDEO and Nintendo. Those that are said to practice it are associated with having a human-centered design (HCD) ethos, using an iterative process that moves from generating insights, to idea generation and testing, to implementation (Brown, 2008). Complementary to this view, Verganti (2009) has described what he calls design-driven innovation. Here the argument is that design as a driver for innovation should be recognized as a strategic resource in a process that goes beyond technology and user needs, and also emphasize product language (Verganti, 2003). Trough his research of design intensive Italian firms, he argue radical innovation stems from the understanding of design as making sense of things, that is how users may be led or proposed to a complete new interpretation of a technology, product, or service (examples: the Nintendo WII, or the Apple iPhone redefining the understanding of a mobile phone).

3. Research Methods

The empirical part of this study consists in an extensive single case. Case study is useful here because the issues taken into examination are very much linked to their contexts (Hartley, 2004). Primary data has been collected through participative observation, document studies, video recordings, field and reflection notes, in-depth interviews, and conversations with techniques like the unstructured and semi-structured interview as proposed by Kvale (1996). The longitudinal data (Pettigrew, 1990) were obtained through the close monitoring of the research project over a period of almost 2 years. Additionally I also took the role as an active participant of the design project with my background and skills as an engineer and Human-Computer Interaction (HCI) specialist. This research approach is based on research-by-design, a special research mode where design practice plays a crucial role, and where the researcher also reflects upon his own design work (Sevaldson, 2008).

The research approach was to enter the project with no predefined hypothesis or research questions in order to be open for the richness of design processes constituting this particular project. This approach can be compared to an anthropologist going into the field with no anticipation or predefined opinion of what to find. The basic research methods were therefore based on ethnography, where the researcher gets immersed in a social setting for an extended period of time, making regular observations, listens to and engage in conversations, interviews informants, collects documents about the group, develops an understanding within the context of the groups culture, and writes up a detailed account of these settings (Bryman, 2008). In addition to observe and collect data, as a recorder, the basic premise is that observation and interpretation are inextricable, meaning the observer is also an interpreter (Lipshitz, 2005).

4. Findings and Discussion

4.1. Conceptual Design as a Driver for Innovation

The Ulstein Bridge Concept (UBC) research project started out as a research pilot in a Design-driven Innovation Program (DIP) developed by the Norwegian Design Council. The pilot resulted in an internal presentation of high quality renderings of design concepts showing an early vision of a futuristic redesign of the entire offshore ship bridge. The project was taken further into a user-driven innovation project financed by The Research Council of Norway and Ulstein Power & Control.

In the UBC project, the approach of doing innovation was taken into a conceptual design process based on the design processes and competencies of industrial and interaction design. The fundamental assumption was that a strategic focus on design in such a conceptualisation process would foster ideas for innovation that are new, and even radical. Further the project's main focus was on creating new design visions for a possible future offshore ship bridge that may lead to the sparks of new commercial ideas for further innovation. The UBC research and design manager, Kjetil Nordby, argues that a ship building company like Ulstein should have a continuous process of making new visions like the conceptual innovation process used in the UBC project, as can be learned from the car industry making concept cars for a visionary future. The project's work led to radical, award winning new concepts for how an offshore ship bridge could be in the future. These visions have been presented both internally in Ulstein, and externally to the offshore industry through high-quality images, an animated film, and a demonstrator. The visionary work has also entailed several patents, and new commercial products, now taken into engineering, and soon to be launched by Ulstein Power & Control.

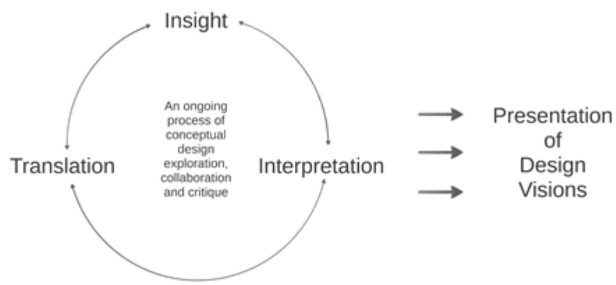
A simplified model of the conceptual innovation process of the UBC project is shown in figure 1, and is here characterized as a highly unstructured and iterative process constituting four main activities; 1) Insight, 2) Interpretation, 3) Translation, and 4) Presentation. It is very important to emphasize the necessity of continuously going back and forth between the various activities, acknowledging what Rittel (1987) argued about the close relations between problem understanding, problem definition, synthesis, and evaluation. The model tries to describe the way designers often do their design work, and has its basis in design thinking, but it is by no means the only way to model it.

In the following sections I will describe and discuss the activities of this process based on the findings and experience in the case UBC.

4.2. Gain Insight

Designers are trained to be user centred in all their approach to a design challenge. As a response to this, users and use situations need to be investigated in order to understand their needs and desires. This was also a natural approach of the UBC project, as described and discussed by Luras and Nordby

Figure 1: The conceptual innovation process of the UBC project



Source: Authors

Figure 2: Manoeuvring an offshore supply vessel in harbour.

Source: UBC

(2014), and one of the early field studies is reported upon by Nordby, Komandur, Lange, and Kittilsen (2011). Throughout the whole project period, 12 design researchers have spent a total of 1800 hours on the bridge of various offshore vessels in operation in order to gain a thorough insight into this special work domain. When doing such fieldwork, the researchers where inspired by techniques and tools from the field of ethnography, getting immersed in the social settings of the users, observe their behaviour, and listen to and engage in conversations. Large amounts of data were collected through the use of pictures, video recordings, and notes (figure 2). Reports from the field trips have been written with thick descriptions in order to explain the context in which the observations are done.

Based on the experience of the UBC project, this work of going "into the wild" or into the real world was essential as a basis for the conceptual design process. Learning about the problem domain is the main challenge of design. You may interview your users (e.g. a master or a 1st officer) asking them how they work, what are their struggles, and what could be suggestions for improvements. But talking to them is how we see it not sufficient in order to understand their use situation. Users may tell one thing about how they work, but actually do something complete different in real action. This has to be observed. Often it was also experienced that when users where asked to explain what is wrong, what is missing, or suggest what could be improved, they seemed to both lack the vocabulary to explain it in a natural way, and be able to actually spot any problems in the first place. They were eager to contribute, and tried to be as helpful as possible, but it is probably not that easy to reflect upon your work situation when it has become a routine. It is not their job either to be visionary. That is what designers are trained to do. At the same time they are the experts, and we need to facilitate their knowledge through observational dialogues.

Another issue investigating the real world is the very nature of a maritime work environment. No explanations, work descriptions or even videos can match the actual feeling of being present in such work domains, completely different from anything alike our everyday experience. By being present at the offshore ship bridge together with the mariners for days, in real complex offshore operations, the design researchers where able to get the necessary understanding of this environment, and spot potential opportunities for improvements, noticing even the small and not so obvious issues like where to put your mobile phone or coffee cup. The design team of the UBC project also argue that it is beneficial with the design researchers' fresh view and perspectives. This makes it easier to explore awkward work situations to which an experienced mariner would be accustomed to, and thereby be able to ask the necessary "stupid" questions that may lead to new ideas or understandings.

ut investigating the use domain, and being user centred, is in our opinion not sufficient for a successful innovation process. Getting information about what the user needs or desires doesn't guarantee the generation of new or radical changes that will actually be a success. The design team of the UBC project argue that the users don't necessarily know, see, or understand what they really need before they get proposed to it. Because of this, there has also been researched knowledge from other sources of competency in the maritime domain, like marketers, engineers, sales, business, and management. Further a thorough investigation was made of the descriptions of today's technologies and work procedures, in addition to a continuous search for new trends in technological development as seen in e.g. the gaming industry. The latter was necessary in order to spot complete new possibilities of interaction not presently known to the maritime industry, and apply this knowledge to challenge today's user experience of system interaction. In the UBC project, technology has been seen as equal important as being user centred, arguing both focuses are important in design innovation. However, the focus should not be on technology per se, e.g. the use of a touch screen on the ship bridge, but rather a more abstract view of technology as a design material, as clay is a design material in the making of a jar. This approach in the project has been informed by research into technology seen as materials (Nordby, 2010). In this understanding different technologies are investigated as the means for better use experiences in contrast to just focusing on how to use a chosen technology in a specific work situation. This has been a fundamental view of technology in the UBC project.

Profound domain knowledge among the design team made the design discussions and work done in the activities of interpretation and translation far more knowledge based. It gave a possibility to take on a view of both holistic, the ship bridge as a coherent workplace, and detailed when investigating radical new ways of designing the mariners use experiences. When understanding the mariners' work, and the offshore vessels' operations, the designers could ask the right questions when design issues where unclear or confusing. Nevertheless, some members of the design team could not make it on a boat for several days due to practical reasons or limited resources. This made it of vital importance to pass on the research findings of our field trips through thorough reports, individual briefings and workshops.

Thorough user understanding, market empathy, technological comprehension, and an investigation of future technological possibilities, sparked the creative process of transforming this knowledge base into what later became a radical new vision of what the meaning of an offshore ship bridge is, a command centre for maritime offshore operations.

The extensive use of recourses into such an investigation of the offshore work domain is rare, and would probably not been approved if the project was commercial and not a research project. When that is said, the award winning results of the overall project, might suggest that perhaps companies should invest a lot more resources into such work. Limitations are though obvious while these vessels are often hard to reach, doing operations all over the world, and also require an ability to accommodate visitors. Some vessels even do their crew-changes by helicopter, making it mandatory for design researchers to acquire necessary security courses. In the light of this, it is tempting to suggest closer collaboration between several companies that can chare this precious knowledge. But that was not the scope of the UBC project, and is passed on to future studies.

4.3. Interpretation and Translation

While acquiring a thorough user and domain insight, including an investigation of possible promising technologies is believed to be vital, there is still no guarantee that new ideas will pop up just like that. In the nature of design thinking, this is when designers facilitate a continuous process of conceptual design exploration, collaboration and critique, interpreting the acquired insight, and turn that insight into externalisations of possible solutions - an activity I here describe as translation.

Such conceptual design exploration is, as mentioned earlier, the kind of work designers have special skills and tools to conduct and facilitate. The designers in the UBC project used an iterative approach where many activities took place in order to inform and inspire discussions and critique around open-ended questions and suggestions. These important, informal discussions served the ambiguous and chaotic nature of the ill-structured and complex design problems.

Communication through design representations (as boundary objects) was vital in this design exploration and discussion. Within the design team of the UBC project, there was a continuous dialogue where the members exchanged insight, interpretations, and proposals. In this collaborative work they could critique and test the robustness of their assumptions, and share their ideas and visions. They could explore new possibilities, experimenting, and even recombining other's findings. When sharing and exploiting, they could get instant feedback and identify promising results, and they could get inspiration to

Figure 3: The UBC design lab for collaboration

Source: UBC

their own work based on what the other team members where doing. The representations, or mediating design artefacts, were here objects that represented a shared understanding of an individual's interpretation and proposals. In the UBC project this representation was done on several levels; sketches of early design ideas, physical prototypes made up of cardboard, plastic, wood, or other available useful materials, interactive electronics made of the open-source platform Arduino, and high quality images of screen layouts.

In order to fully utilise this collaborative design exploration, the project used a dedicated design lab where all the design artefacts could be placed in conjunction (figure 3). This made it possible to see how the different parts of the bridge design would affect each other, or work together, thus strengthen the holistic approach.

n the UBC project, several new interpretations have been made, one of them a holistic view of the offshore ship bridge, taking on an approach that this is a work environment that needs to be designed in conjunction, as a whole, in order to fully support the mariners operational work tasks. Foster new interpretations means being able to envision a new understanding of how future users could give meaning to how they perceive and experience a new system or service. This interpretation can be done by anyone taking part in a project's work, and their background is not necessarily limited to design, although the project has shown that designers often do this envisioning easier as this is part of their professional training. In the UBC project, people with a diverse set of competencies have taken part in this process. There have been design competencies as in industrial design, interaction design, furniture design, sound and acoustics, and architecture; combined with the competencies of users, engineers, managers and marketers.

Another new interpretation in the UBC project is a changed approach from designing products or equipment to rather designing user experiences. In this design approach, the designers envision a future system interaction that is based on a need to present system information when and where the user needs it, and provide an ability to interact with the various bridge systems accordingly. This is an extension, and in my believe, a complete new understanding on how to utilise the idea of integrated bridge design that allows different sensors and functions to be displayed according to the task. It is a challenging approach, meaning the interaction design of the complete offshore ship bridge needs to be taken up on a higher level, giving the user control over the various ship bridge systems in one integrated manner. This new approach became fundamental to the overall design project, and was presented as a conceptual design vision for the future.

While doing the fore mentioned interpretation of acquired insight, it needs to be translated and externalised further into conceptual design solutions through the use of design representation as sketches, mock-ups, and prototypes. In this translation process possible solutions for both the macro and micro level have been investigated and explored among the design team, and discussed with the other stakeholders in the project, using the fore mentioned design lab. This is a way of building to learn. Ideas and thoughts are externalized in order to be able to reflect upon them, critique, and develop them further. Tools like sketches or rough prototypes inherit a property of being cheap, easy and fast to make. In the translation process, design solutions could then be created easily and plentiful, and be collaboratively evaluated and reflected upon. Through this work, the designers in the design team reflected and learned continually more and more about the offshore ship bridge design problem. And as our project design manager puts it; "I want to see suggestions for a design solution fast. Not after a month, but rather a week or even a few days. It is when you produce something into the world that your thoughts and ideas can be critiqued, both by yourself and by others".

4.4. Presentation - Communicating the Design Vision

The UBC project has made presentations of design visions on several layers, and used a diverse set of means according to what effect was intended. Three of these presentations are briefly mentioned and discussed upon here. More information about objectives, target groups, strategy, and means of the presentations can be found in a working paper by Lurås and Nordby (2013).

The first presentation was internal, and used high quality 3D animated renderings to show a holistic design vision of an offshore ship bridge of tomorrow, inspired by how the car industry make prototypes of their futuristic cars shown on exhibitions. One important objective of this presentation was to gain enthusiasm and support for further research. This pre-work of the UBC project started as a small-scale design pilot, but ended up as a multi-million-research project due to the seductive power of these conceptual design presentations.

The second major presentation was the launch of an animated film at ONS, a biennial oil and gas industry exhibition and conference in Stavanger, Norway. A screenshot of this film is shown in figure 4. This short film caused quite a stir, and represented also an incredible means for communicating Ulstein as an innovative company. This was a bold decision of the top managers and owners of Ulstein, showing a design vision of a possible future that was by no means a product ready for launch. But as a response, the company got enormous attention, and has even received numerous inquiries by sub-suppliers for future collaboration. The commercial value of this presentation

Figure 4: Screenshot from an animated film presented at ONS in Stavanger,Norway.

Source: UBC

is hard to estimate, but gives an indication of a considerable increase in brand value. Though it is hard to conclude whether such presentations should be made public.

A third presentation was a working demonstrator at the trade fair NorShipping in Oslo, Norway. The purpose of this presentation was to illustrate further the projects vision of a possibly offshore ship bridge for a more near by future. Again Ulstein got a lot of attention by the maritime industry, and the demonstrator was even visited by the Crown Prince of Norway, attracting additional attention to the UBC project.

These presentations of design concepts represented three targeted strategic means of communicating the project's design visions either internal to the Ulstein group, or external to the maritime community. They all inherited a necessary richness that made it possible to make an envisioning of the future perceivable and comprehensible. As one of the managers in Ulstein said it: "you could write page up and page down, and still not explain these visionary solutions in an understandable way". The presentations showed also to be seductive to their audience, showing a window into the future of how a maritime work environment could be, making everyone dream and believe in it. They were experienced to be vital in order to the make the top managers and owners of Ulstein be enthusiastic and supportive of the project, and by this, engage both the company and the maritime community.

The property of the conceptual design presentations as communicative are also their strength while different actors in the company needed to evaluate the presented visions' possibilities and strengths in order to make the important decisions of which to take further, and how. These decisions need the input from a broad range of competencies in order to fully understand every aspects of a complete innovation process ultimately leading to commercialisation. This part of the innovation process has not been the scope of this paper.

5. Concluding Remarks

The UBC project has provided a strong indication that design competency may provide a valuable means of increased innovation in the maritime industry. The project has worked in a conceptual design process constituting four main activities; insight, interpretation, translation, and presentation; where the focus has been on generating design visions of a possible future. The presented conceptual design visions have initiated several patents, generated ideas for further product development now ready for launch, and fostered a complete new understanding of how to design for the mariners work environment on an offshore ship bridge. The project imply that a continuous process of generating new design visions for future user experiences in the maritime work domain may improve a company's innovation strategy, and hereby foster the development of new products or services. Although the research findings is based on one case study only, and can not be taken as evidence, the award winning results of the overall project, and the reasoning of this paper, suggest that companies in the maritime industry should invest a lot more resources into a process of creating visions through conceptual design.

There are though several issues not touched upon in this research paper. Perhaps the most prominent one is the role of Ulstein in the UBC project. The use of designers in a conceptual design process do not necessarily guaranty a successful outcome in it self. There has been a close relation between the design team at The Oslo School of Architecture and Design and the project management of Ulstein. The important role of design management, and the impact of Ulstein having long traditions as an innovative company, has not been investigated in this paper. Further research, including contributions from other research disciplines, could be beneficial in this respect.

The term design thinking has in recent years become more and more ubiquitous, when being adopted into a broad range of businesses and research fields (Kimbell, 2011). I will not go into this debate here, rather suggest that design thinking originated from the mind-set of designers, and therefore should be understood this way. Though the UBC project was a design-driven innovation project, not a designer-driven innovation project. I believe hiring a bunch of designers does not guaranty anything. Design thinking, or design-driven innovation, is a special approach where the competency of designers is allowed to be a driving force in the ubiquitous search for a possible new future design vision for e.g. an offshore ship bridge. It inherits a highly unstructured process that is probably impossible to codify into some quick workshops, or a step by step recipe to successful innovation. Designers have their own training and practice, like managers and engineers have theirs. As an engineer and design researcher, I suggest these competencies are allowed to flourish together with the aid of design techniques and tools that really mediate such collaboration.

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