Past, present and futures of cruise ship concept design. The perspective of Finnish cruise ship industry

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Costa Smeralda. Image: Meyer Turku/ Lavea Media.

Introduction

The concept design process and designers' vision are two of the most important factors that have contributed to the evolution of cruise ship builds, but only a relatively limited amount of research has been done in this area. The importance of documenting the early planning phase of this process has been examined in an early study on the subject,[1] but Finnish shipyards' role in cruise ship construction remains underrepresented in the literature. This study endeavours to remedy this shortcoming by contributing a discussion on collaboration's role in concept development, as well as central actors' forward-looking visions, with a view toward identifying and analysing how collaboration has been constructed at the social network level. This article focuses specifically on the historical development of the concept design process, ideation's role and the networks of designers, architects and other experts involved in these processes. This discussion aims to provide an overview of influential ships, planning process innovations and actors who have contributed to Finnish-built ships' reputations as modern and innovative products. This study examines cruise ships built in Finland from the 1960s to the present.

The primary motivation to carry out this research has been the lack of comprehensive historical studies into the evolution of Finnish cruise ship design. Thus, in the interviews that our team conducted, one of the key aims has been to examine the history of the concept design for cruise ships by documenting

and collecting interviewees' memories of and perspectives on developments in ship concepts and design processes since the 1960s.

The shipbuilding industry is networked and project-based, with networks evolving from project to project. A ship is sold to a customer as an outline and draft, and the detailed design is collaborative and ongoing until the construction process. Cruise ships' conceptual designs are products of a demanding process involving large networks of designers, naval architects, engineers and other experts seamlessly working together towards the best concepts. Within the maritime industry, innovation and research have focussed more on technical and process innovations or relatively large regional networks, rather than networks and collaborations between people and firms. However, in a recent study within the marine transport sector, open innovation and value co-creation networks have been viewed as social capital for a joint development.[2] We discuss collaborative social networks and their actors as resources for the shipbuilding industry, particularly in the Finnish maritime sector.

This article is structured as follows: First, we provide a historical overview of the development of cruise ships through expert interviews with key actors in their fields and personal networks. Collaborations between firms and individuals, as well as forward-looking practices, will be analysed on the basis of empirical evidence. We hope to provide new insights on the evolution of the concept design process and how visionary innovations have emerged over time.

A historical overview of the development of the cruise industry

The nature of passenger ship traffic changed fundamentally in the 1960s. This era was characterised by increasing passenger volume, breakthroughs in ferry operations and, due to expanding airline services, a decline in traditional transoceanic ship travel, during which the era of 'classic' ocean liners ended. One of the most far-reaching changes was the beginning of considerable growth in the international cruise industry's significance. Gradually, cruise products became a leisure activity available to the wider public, becoming a significant part of the maritime industry.

The roots of cruise-type travel can be traced back to the mid-19th century, when British and German steamship operators, among others, started to arrange regular excursion voyages, which subsequently evolved into longer leisure cruises. Ship owners typically used the same vessels for liner operations. Initially, this mode of travel was viewed mainly as a complement to route traffic, primarily as a luxury that only very few wealthy people could afford.

From the 1960s onwards, vacation cruises, particularly in the Caribbean and the Mediterranean, increased significantly. Furthermore, new and old companies focussed solely on cruise activities and holiday travel, while eliminating route transportation from their operations. The advent of modern cruising coincides with the decline of ocean liners and conventional passenger ships, many of which were used for cruise traffic.[3] The industry evolved from being a niche passenger shipping operation into a discrete and complex vacation business that has expanded in recent decades.[4]

Since the 1960s, the cruise industry worldwide has evolved from a rather insignificant sector to one that serves around 30 million passengers per year. The cruise concept varies depending on the context. On a fundamental level, a *cruise* can be defined as 'a trip by sea in a passenger ship for pleasure, usually calling at a number of ports'.[5] From another perspective, a cruise normally should last at least two or three days (on a ship that does

not carry any commercial freight) and have several different ports of call.[6]

However, the typical concept of short and inexpensive ferry cruises (i.e., mini-cruises) in the northern Baltic Sea area, usually lasting less than 48 hours, may differ significantly from the previously described definition, but it is not a completely unique phenomenon. For example, short cruises on ferries have been popular in some areas outside the Baltic Sea as well, even in the US. According to Bruce Peter, the design of short-sea passenger ships and ferries, which also are used for cruising, has influenced the development of modern mass-market cruise ships remarkably. The design of ferries and cross-fertilisation between the two ship types also can be viewed as important factors in enabling Finnish shipyards to gain leading expertise in building cruise vessels.[7]

The breakthrough in cruising led to the introduction of a new ship type, built and designed specifically for mass-market cruise activities. The first purpose-built modern cruise vessels were constructed in the 1960s, even though the earliest ships built solely for cruise operations already had emerged before World War II. As a result of the changes in concept design, a passenger ship was no longer viewed as merely a means of transport. Modern cruise ships have been characterised as floating hotels, or more recently, floating resorts that imitate their land-based counterparts, with amenities that include restaurants, bars, sports facilities, shopping centres and entertainment venues.8 This kind of development has come to be reflected in the idea of 'ship as a destination', which is described later in this article.

The growing cruise sector profoundly impacted the shipbuilding industry in Finland from the late 1960s onwards. Finnish shipyards were among the first to build modern passenger ships designed exclusively for cruise purposes and soon gained an international reputation as premier cruise ships builders. The breakthrough in cruising into the mass market enabled the Finnish shipbuilding industry to develop a new area of specialisation, as the company Wärtsilä became a world-leading producer of cruise ships as early as the late 1960s.

The shipping company Royal Caribbean Cruises ordered the first generation of cruise ships, which Wärtsilä built at its Helsinki shipyards. The first in a series of three vessels was the *Song of Norway*, which was ordered in the mid-1960s and delivered in the autumn of 1970. Sister ships *Nordic Prince* and *Sun Viking* were completed over the next two years. These vessels, designed in collaboration with the Danish Knud E. Hansen company, were around 170 metres long, weighed more than 18,000 gross tons and had berths for approximately 700-900 passengers. This series of three fully developed cruise ships was preceded by two smaller ships, which could be described as 'half-cruise ships': the *Bohème,* based on a car ferry and built in Turku in 1968, and the expeditionary passenger vessel *Lindblad Explorer*, delivered from Uusikaupunki in 1969.

The 1970s brought further cruise ship orders to the Finnish shipyards. Another significant order comprised a series of three large cruise vessels (*Royal Viking Star, Royal Viking Sky* and *Royal Viking Sea*), each with a length of almost 180 metres, built in Helsinki for the Royal Viking Line's worldwide operations. Other major clients later included Royal Caribbean Cruises Ltd. and Carnival Corp. and its various brands, and more recently, Germany's TUI Cruises company. Bridging the 1980s and 1990s, another important order was the Fantasy-class series (260 metres, approximately 70,000 gross tons and 2,600 passengers), comprising eight ships that the Helsinki shipyards delivered to Carnival Cruise Line by 1998.

One of the decisive turning points was the ships that the Turku shipyards built for Royal

Caribbean Cruises in the late 1990s and early 2000s, starting with the five 310-metre-long Voyager-class vessels. The escalating dimensions of this class clearly indicate the trend toward increasingly larger-capacity cruise ships. *The Oasis of the Seas* and the *Allure of the Seas*, built in 2009-2010, at the time were not only revolutionary, but also the world's largest passenger ships, with each ship measuring over 360 metres long, weighing around 225,000 gross tons and able to accommodate about 5,500 passengers. They remain the largest cruise vessels ever built in Finland.

Typically, cruise ships have been built in series of several vessels, with succeeding generations becoming both larger and more advanced in terms of design. However, several one-off cruise vessels also have been constructed in Finland that do not represent any series or particular generation. Some of these also have contained important new and innovative design features, such as the *Royal Princess* (1984), described later in this article.

The process of designing a ship

During the concept design phase, the main features of a ship's architectural and technical design are defined and developed. The whole design phase can last for many years, and the ship's life cycle is expected to span several decades. Thus, futures thinking is paramount in the development of new ship concepts. The concept design phase's goal is to develop the concept in more detail after 'dreaming', with design documentation prepared for the design phases that follow. The size and overall arrangement of the vessel are specified, the main components are defined and project risks are assessed carefully, along with cost estimates. Ship concept design is an iterative process and a significant first step in ship design; it is the stage during which design issues regarding the ship's main dimensions, as well as its technical and architectural solutions and their integration, are worked out interactively to produce the best possible ship concept. Large-scale conceptualisation projects require a knowledgeable network comprising a variety of actors, including naval architects and engineers, technical design and architectural design experts, owners' representatives, classification societies and various other specialists.

A classical approach to communicating a ship's concept design is illustrated in Evans'[9] design spiral, in which design issues are evaluated and elaborated sequentially and iteratively. This method's harmonious and balanced end result may require several design rounds.

The concept design phase is the most innovative stage of a ship's design process and always requires input from an experienced ship designer.[10] With advances in information technology, more reliable alternative technical and architectural designs have become available on short notice. Through new modelling technology, expected outcomes, the ship design's quality, and even its cost can be better monitored during the design process, as a large part of a ship's cost is determined during the concept phase.

During the early design phase, it is recommended that several conceptual options be generated, the best of which will be selected for further development. According to Andrews (2011), these alternative plans typically comprise a final ship concept that commits the parties to the design and construction phases.

Concept Design Phase

The concept phase is intensive and creative, during which the new ship's principal parameters are defined, as well as, more detailed technical specifications and general arrangement, including technical areas, staterooms and public spaces for passengers and crew. During this stage, structural design, model tests and various other analyses ranging from wind tests

Rendering Aqua Theatre *Oasis of the Seas.* Image: Royal Caribbean Cruises Ltd.

to people- and goods-flow modelling, among many others, are conducted intensively. Particular attention is paid to the synchronisation of architectural solutions and technology, energy consumption and emissions from the ship, as well as long-term usability and maintenance, from an environmental and sustainable development perspective.

It should be noted that in addition to ship specifications, the general arrangement is the most important document in ship design, as it binds all ship design and features together. The general arrangement determines the ship's principal dimensions, including length and width; cabin sizes; and the number of passengers that can be accommodated. The document contains all ship facilities and logistics, people and material flow, and related design solutions as a whole. Other architectural and technical documentation support everything defined in the general arrangement.

Development of the Classical Design Approach

Increasingly, innovation is viewed as being applicable to the development of new service offerings, business models, pricing plans and routes to market, as well as new management practices. Companies increasingly are rethinking the fundamental ways in which they generate ideas and bring them to market, harnessing external ideas while leveraging their in-house R&D capabilities on projects outside their current operations.[11] Many ship owners and shipyards, together with their partner networks, collectively are developing more efficient ways to collaborate throughout the initial design phase. This approach requires trust, commitment, perseverance, resources concerning product and process innovation capabilities, and absorptive capacity while mapping out needs, ideas and future trends in new ship concept development.

The concurrent design approach, in contrast to the sequential process of traditional shipbuilding, is designed to ensure that guests on the ship will benefit from the latest innovations and technologies, not just those from the previous decade. Group members enter each project acknowledging that the industry is dynamic and that the industry tends to change based on the competition, economic environment and customer value trends.

Over the past five decades, complex expectations for ships' passenger services have increased significantly. The design and building time for these increasingly grand cruise ships ranges from three to seven years, with construction typically beginning when a ship's basic design is still progressing. Constant pressure exists to progress from design to revenue-generating vessel in ever shorter timeframes, but cutting back on the time allotted for work to be carried out requires significant improvements in process efficiency and leadership quality. Collaborative practices and group dynamics among partners participating in project work must be preserved to maintain productive relationships and expertise. Greater design maturity and quality, as well as a deeper understanding of costs, also would be needed during the project's early stages.

Furthermore, the dialogue level required during the conceptual stage increases exponentially with the rising multiplicity of partners having sustained involvement in the project. All areas of expertise, especially with a cruise ship, must fit together and be independent, shaped and refined collectively to achieve cutting-edge design and innovations. The concept design process descriptions also must be developed and formulated further in the continuously changing context and environment. This dynamic process increases workload and requires dialogue between partners. Maintaining competitiveness would require a focus on the development of new operating models and processes, as well as enhancement of capabilities related to the adoption of creative design processes and collaboration models. According to Baldwin,[12] collaborative open innovation systems seem to be a commonly shared way of conducting innovation strategies.

Forward-looking practices in concept design

The approach used in this study was practical and views futures thinking and acting as development and applications, rather than foresight epistemology or process.[13] This study was future-focussed and concentrated on activities in the concept design processes. A ship's concept design can be viewed as a structured process, but we argue that forward-looking actions within concept design happen in wider contexts that cannot be structured unambiguously. Forward-looking actions need not be part of a structured foresight process. Instead, forward-looking actions are creative, indeterminate perceptions of multiple futures possibilities.

Forward-looking concept design within shipbuilding is defined here as a multitude of future-focused actions and thinking that take place in the open-ended domain of concept creation. We understand forward-looking concept design as actions on the periphery of practical visions, inspiration, open innovation and reworking beyond earlier concepts' limitations. The time perspective in forward-looking action is flexible, varying from short- to long-term futures. It can be anything from one year to decades, and we think in the short and long terms simultaneously. However, the long-term perspective is more relevant when analysing sources or repositories in concept creation. Even though forward-looking design is a fuzzy concept, it describes the dynamic and open system of creating ideas for new ships. Forward-looking concept design in-

volves action-based projections on the future in a social context.

The need to analyse forward-looking and foresight practices on individual and operational levels recently has been discussed in future-focussed research literature.[14] Forward-looking practices seem to rest on utilitarian use of futures visions and experimental learning-by-doing approaches, rather than concentrating on foresight systems or formal futures studies methods. Attila Havas and Matthias Weber (2017) use the term *forward-looking analysis* (FLA) to analyse technology development from a futures perspective. They highlight the complex nature of forward-looking analysis and highlight several theories that underpin forward-looking practices. Among theoretical approaches are, e.g., evolutionary innovation, actor-network theories, cooperation and participation, as well as future-focused methods and techniques.[15]

The concept of forward-looking practices has not yet attained clear meaning in academic discourses and is used to refer to various operations, thinking and acting, which are significant from a futures perspective. The futures can be understood from short-, medium- or long-term perspectives using methodologies that can be based on future-focussed studies or other disciplines. To understand forward-looking practices within a ship concept design, particularly operational-level practices to grasp the futures, we need to analyse and describe operations linked to the concept design process and futures thinking and acting.

Our aim is to frame operational-level areas in the concept design, in which the futures perspective has gained substantial meaning. As discussed above, orientation toward the futures is an inherent characteristic of concept design because a shipbuilding process itself takes several years, and ships are designed to be used for decades. The cruise ship is an individually designed product with high process flexibility and the integration of different systems and actors. We argue that the concept design phase in particular combines innovativeness relatable to forward-looking practices. Here, we make a basic assumption that concept creation is innovative and involves long-term futures thinking and perceptions of the futures. This assumption will be tested and validated through inductive analysis of the data gathered from the interviews.

While we analyse new idea generation and turning points in concept design, we also need to examine the dynamics of concept design processes and mechanisms to show how diffusion and integration of technologies and practices, as well as broader ideas – e.g., from hospitality services – have emerged in ideation. Using open innovation discourse, relevant variables such as performance, personal relationships, skills, collaborations and organisational forms can be used to create an overall picture of forward-looking concept design practices.[16]

The contemporary principle of the concept design process, i.e., the double-design spiral (see Figure 3), seamlessly connects the initial vision with the actual concept design phase. At the beginning of the vision phase, various long-term futures analyses are processed and ideas are gathered and generated using, e.g., the open innovation method.[17] Work teams can comprise both internal and external members, and the more diverse their background, the more versatile the ideas that are generated. The ideas then will be introduced to larger groups for further evaluation before being summarised and submitted for development during the concept design phase. During this phase, the selection of ideas will be studied, developed and evaluated further based on different ship design aspects before the final reconciliation of the ideas and innovations that form the principal conceptual idea of the ship.

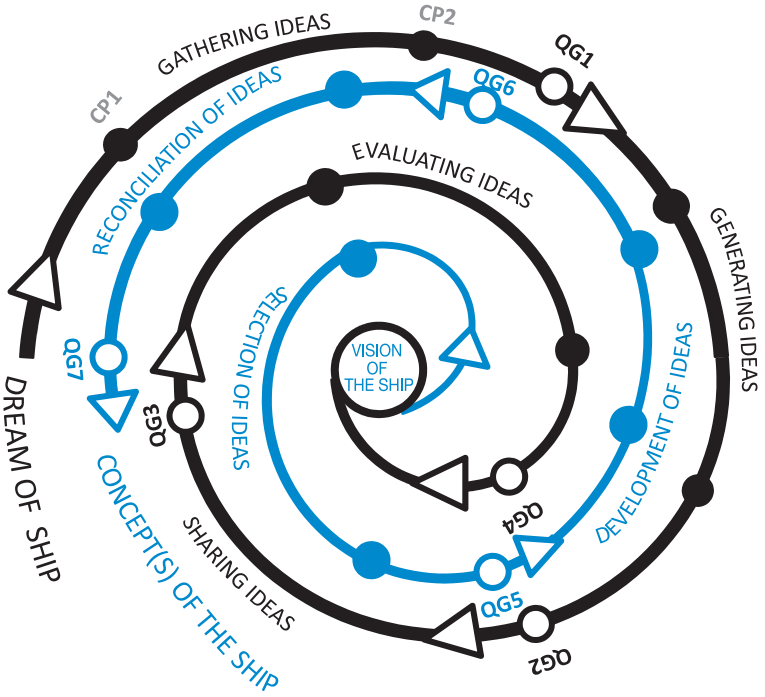

Figure 1. The double-design spiral principle is a contemporary design approach that guides the integrative path from a vision to a concept.[18]

The new state-of-the-art model brings required transparency for the whole design development of new concepts. For each area, regular checkpoints are programmed with key performance indicators defined on top of the higher-quality gate reviews. If issues are pending in joint reviews, necessary actions must be taken and issues resolved before moving on in the process. The more structured way to work from the very beginning would secure a more solid and timely approach during the project's later stages.

We focus on actions that shape the futures and are connected to specific concept creation functions. New ideas and innovation generation typically are analysed in a framework of innovation systems, but we argue that forward-looking activities occur in other business functions as well. We recognise innovation's systemic nature and its links to other business systems, but in our case, we do not try to analyse research and development and innovation systems. Rather, we concentrate on product and service ideation, which involves strategies and interpretations of futures expectations and possibilities, as well as key players in concept design. Like innovation systems, forward-looking actions and their impacts are complex in nature, the analyses are context-specific and very diverse methods can be applied to describe the processes in question.[19] In our case, we examined business functions, which are significant for concept design, to get an overall picture of how concept design has emerged over the decades since the 1960s. We analysed key players' orientation toward the futures and their relationships with concept design. We described

strategic issues, as well as innovative turning points, in ship concepts. At this stage, the study is descriptive and does not aim to construct a new theory or build a theoretical framework of a historical cruise ship concept design. However, several possible paths can be taken to enter a theoretical frame concept design phase, e.g., prerequisites for collaborative working procedures.

Materials and methods

The views presented here are based on semi-structured interviews conducted in 2018-2019 by the researchers from Forum Marinum, the University of Turku, Finland Futures Research Centre and through a doctoral dissertation project at Aalto University. The participants chosen for the study comprise individuals from Finland and other countries. The views presented in this article are based on these individuals' personal thoughts and memories, and the results are descriptions of concept design that these particular individuals have experienced.

Retrospective semi-structured face-to-face interviews and tools developed through social network analysis were integrated to understand the role of personal characteristics and variables regarding social context in the development of expertise in the concept design domain. Retrospective analyses help trace long-term development, which distinguishes the most forward-looking steps in the concept design process to see how the experts were coupled with each other. The most important actors in the field were traced, i.e., the most prominent and influential players regarding cruise ship concept design in Finland. The name-generator technique was employed, and social network analysis (SNA) was conducted to map the network's actors. Furthermore, the methodology links community-level actions to the individual agency.

Altogether, 16 people representing contemporary actors in the field of concept design have been interviewed. The interviewees have been selected using the so-called snowball method, in which key people are asked to identify other people who worked with a concept design. The data gathering began by selecting four pioneers in the field, and then the researchers selected eight persons who are working currently in the field, in addition to four people who were representatives of sub-contractors to cover full scope more completely, making a total of 16 interviewees. Finally, all the names cited during the interviews were listed. Altogether, 79 people were nominated as pivotal actors in the concept design. Among the interviewees, five were retirees, and 11 were employed. Only two of the respondents were females. To protect participants' anonymity, some of the information gathered from the participants has been left out.

The interviews focussed on the term *concept design* and its background, the development of concept design processes, significant turning points in cruise ship concept design, recognising the most influential planners in the field and visions of the concept design futures. The researchers used pre-interviews, which made it possible to modify and refine interview topics and questions. Altogether, the interviews aimed to describe the development of the accumulation of knowledge and expertise in the field of modern cruise ship building design in Finland. The interviews lasted from 41 to 139 minutes each, depending on the relevance of the particular interviewee's career and his or her articulateness level. The interviews were transcribed and analysed qualitatively using NVivo12 software, which helps organise transcripts into categories.

The content analysis was done inductively, based on the data. First, relatively broad coding keywords were used by defining the codes for the aspects relevant to concept design processes and key actors involved in

them. The data were analysed several times to identify important notions and to organise these according to the order of how the questions were asked during the interviews. Next, the findings were reorganised based on selected keywords. The most relevant and commonly mentioned thematic categories formed the basis of the keywords, which were: 1) concept design definitions; 2) key actors and stakeholder groups; 3) development and turning points in concepts; 4) forward-looking actions; 5) collaboration descriptions; and 6) named vessels. Researchers worked independently during the first phase, but the results were discussed jointly later. Quotations were selected during researchers' meetings to describe the findings using the respondents' own words.

The most commonly used social network data-gathering technique, i.e., the name generator, was used to list important people from the past. This method comprised free recall questions to help interviewees remember as many names as possible. According to Marsden,[20] name-generating questions elicit only a fraction of respondents' social contacts. However, this approach's advantages include identification of specific content areas and the mapping of the context, locations and characteristics, including social resources, embedded in the actor network. The disadvantages include a bias towards inclusion of the most prominent names in the community, i.e., stronger ties.[21]

The interview topics were: 1) Ask interviewees how they would define *concept design*; 2) ask interviewees to describe the concept design process and its development, as well as a process for producing novel ideas; 3) ask interviewees to identify which innovations or changes they view as turning points in concept design; 4) ask interviewees to nominate prominent individuals in ship-planning processes; and 5) ask interviewees to highlight the notions that are relevant to the future development of concept design, as well as the domain as a whole.

Results

Major turning points in the development of cruise ship concepts

Regarding the history-based questions, the aim was to nominate the most remarkable cruise vessels delivered from Finnish yards and the development of the concept design methods among these. The focus was particularly on the main turning points in the development of cruise ship concepts and design innovations. The interviewees include key actors with an exceptionally long career in the industry, including representative designers from the generations involved with the earliest cruise vessels built in Finland.

Based on the analysis of the interview materials gathered, it was possible to determine six significant turning points suggestive of major breakthroughs:

1. The first deliveries of purpose-built cruise ships from the Wärtsilä Helsinki shipyards in the early 1970s. This initial phase was characterised by collaboration with foreign design companies and is viewed as the starting point in the development of Finnish cruise ship concept design. Some interviewees described these first steps taken in constructing cruise vessels as a learning process.
2. The all-outside-cabin concept, first launched with the single cruise ship *Royal Princess*, delivered from Helsinki to the British company Princess Cruises in 1984. This new and innovative design model enabled a layout arrangement in which all passenger cabins had windows or a balcony. Subsequently, designers have aimed to maximise the number of outside cabins on cruise vessels.

Oasis Class, *Symphony of the Seas* inside balconies and abyss.
Image: Marjo Keiramo.

3. Since the 1970s, there has been significant development in the tools used for design, with a gradual transition from manual methods towards computer-based modelling, which has enabled the design of new kinds of solutions, such as the use of 3D technologies. Several interviewees described this as a radical change and believed that these new, better tools for analysing and simulating concepts have raised the industry to a new level.
4. The open-plan promenade running through the interior of the ship was a revolutionary interior layout and a dramatic change compared with previous designs. This type of construction was first launched with the passenger car ferries *Silja Symphony* and *Silja Serenade* in the early 1990s and proved to be an important Finnish shipbuilding innovation. Starting at the end of the 1990s, the layout arrangement with a promenade has been adopted on many cruise ships. These Silja Line ferries are also a significant example of how ferry construction has influenced cruise ship design, as exemplified in Bruce Peter's research.[22] Apart from these ships, the interviewees did not emphasise ferry designs' role in general clearly.
5. During the past two decades, cruise ships' size and complexity have increased significantly. The interviewees specifically mentioned the *Voyager, Freedom* and *Oasis* class series built by the Turku shipyards in

1999–2010 as being groundbreaking vessels in terms of size and complexity, posing new challenges for ship designers.
6. The aforementioned three series of cruise ships also were viewed as contributing to the development of the 'ship as a destination' concept. In the 2000s, concept designers increasingly paid attention to passengers' expectations and perceptions. The ship itself had to be sufficiently attractive to be a principal reason for taking a cruise.

Some interviewees who represented older designer generations had been involved in a few or even several of the projects that they viewed as important breakthroughs, but their younger colleagues also often identified the same ship designs and evolutions as remarkable developmental turning points. The experienced designers and architects' perceptions of the field's history, apparently partly influenced by schooling and accumulated expertise, show that the described stages commonly are viewed as crucial changes that still define the cruise ship concept design today.

With the last of the identified turning points, the cruise ship itself came to be viewed as the focal point of the entire cruise and travel experience for many passengers, becoming a kind of floating leisure centre, and the experiences and entertainment that it offered could be viewed as more important than the actual destinations.[23] This extract neatly emphasises this key turning point in the history of cruise ship design:

Interviewee 4: So, when you are pondering over this development of [cruise ship] concepts, the biggest change really took place when we, in a way, stopped thinking like shipbuilders. Instead, we started to think about what being a passenger actually means.

Processes and mechanisms in concept design

Key questions in concept design are related to idea description, customer identification, visualisation of the idea and service design of the end product. While conceptual design is essential for highlighting an idea's potential, it is equally important to evaluate the risks associated with competition, as well as the feasibility of the concept analysed, considering both short- and long-term business opportunities. The conceptual design phase's importance is undisputed from a strategic perspective and viewed as an essential element in the process of designing a new ship. The following quotes collected from expert interviews emphasise this view and highlight the importance of seamless collaboration between multiple parties in large networks:

Interviewee 1: Concept development is very responsible work that involves a lot of risk management from different aspects. Developing a top-level concept requires people who are in control of the ship's three-dimensional world and operational know-how, i.e., how the ship is operated. Then, of course, an important part is architecture, world-class designers and architects, which are an essential part of creating the concept.

Interviewee 2: Together with a customer, it is attempted to map customer needs and size of a ship, amount of passengers, customer segment and operating area the ship would be suitable for.

Interviewee 6: Many things have been solved happily because even after the controversy, there is a feeling of togetherness, and often after agreement with subcontractors, we have jointly succeeded, even though the shipyards trying to push back. Then these subcontractors have offered solutions. It shows that the message was understood,

however, that at the end it is ultimately about the common interests.

Strategic thinking and interpretations of future development

Foresight activities are viewed as embedded in individual-level prospective ponderings and sense making, as well as multi-lateral conversations within teams and groups about futures possibilities, along with application of future-focussed techniques and methodologies. These practices are intertwined and interconnected in complex relationships.[24] Most corporate foresight research tends to focus on controlling uncertainty and managerial decision-making. Instead, this study has focused on identifying both forward-looking practices on an informal and unstructured level of managerial strategic interpretations of changes and futures possibilities, as well as creative thinking.

For a business to be successful, continuous renewal of its product portfolio is a requirement, one that every forward-looking company must embrace. For companies in the cruise industry, new product and service innovations are keys to success in a rapidly evolving world. Customer expectations, especially among well-travelled and mature groups, also pressure companies further to respond to increasingly rising demands. A corporate strategy to invest in conceptual designs of new products and services often improves business opportunities, especially during a period of business growth. Conceptualising a new ship is a major strategic decision for a shipping company in terms of investment and resource allocation:

Interviewee 7: In the mid-1980s, shipyards still had a lot of general understanding of cruise operations, which was often better than shipping companies themselves had. But then, the development of the industry was so dynamic and so strong that the shipyards lagged behind…. Now it has come to the point where that kind of innovation and product development, and partly concept design, has passed on to ship owners.

The initiative for launching a conceptual design can be the need to fill a hole in the product portfolio identified during a strategic review, create a new solution made possible by technical progress or fulfil identified user needs. The design of emerging concepts, including research and prototyping activities, is often a long-term process in which projects can last months or even years. While emerging concepts are based on very realistic assumptions about the future development of markets and technology, other concepts go one stage further and include factors that may not be impossible, but have not been proven to be feasible yet. These concepts are sometimes developed to support the company's strategic decision-making by outlining the futures beyond the range of product development and research activities.[25]

Earlier in this article, concept creation was introduced as an innovative process that involves long-term future-focussed thinking and perceptions (see Section 4.2). Our data imply that forward-looking actions are embedded in the concept design process, although futures perspectives are not exposed explicitly. Novel ideas are sought from fairs and expert magazines, and from visiting hot spots in the hospitality and entertainment industry. Innovation strategies seem to follow evolutionary principles, rather than radical innovations:

Interviewee 2: It could be a result of a longer-term development process, in that there has not been a sudden flashing lightbulb, like, ' Oh boys, now we are doing it like this', but those also occur ... those sudden flashing lightbulbs do not occur so often, so they are more like results of incremental development.

Actors and actions in concept design

The foundations in collaborative networks are based on an authentic co-creation of value and long-term knowledge transfer between partners.[26] Collaborative interaction comprises knowledge flow, interpersonal trust building and cooperative tasks such as communicating across organisational and disciplinary boundaries.[27] In the context of forward-looking practices, key actions are ideation of novel solutions, establishment of social relations and trust building between collaborators. Connections and interdependence among actors are the focus of this study to see how forward-looking ideas are transmitted and how significant trajectories are described in practice. Thus, connections between significant initiators and idea transmitters are viewed as central factors in the development of forward-looking actions in the shipbuilder network.

A personal network approach using Social Network Analysis (SNA) was selected to identify central actors, such as managers and directors, as well as project leaders and designers in the concept design process. Our analysis determines which individuals or organisations are located at the core of the processes and occupy recognised positions. Furthermore, we aim to understand what kinds of personal features are appreciated by colleagues and collaborators in the context of concept creation. It is expected that personal inter-organisational connections between key players are significant elements in becoming a recognised expert in the field of concept design.

In organisational literature, networks have been viewed as a third organisational form between markets and hierarchies. Inter-organisational collaboration, in the form of horizontal networks, plays a pivotal role in knowledge exchange, process optimisation and new product and service development. One of the principal characteristics of networks is the coexistence of different kinds of relationships, both personal and professional, among others. The role that personal relationships play in networks has been indicated in various contexts.[28]

Coexistence of personal and professional relationships shapes a context that alters the usual dynamics of knowledge exchange. Strategic and innovative activities often take place in different networks: The *locus* of innovation is not the *locus* of strategy. Innovative activities are distributed widely within networks involving multiple network dimensions.[29] The transmission of knowledge and novel ideas is connected to organisational or technological brokering, which facilitates innovative and novel perspectives. In practice, these types of actions involve deliberate networking and the formation of personal ties that extend beyond organisations or units' borders, as well as the ability to interact across disciplines.[30]

Central organisations and individuals in the concept design process

Almost all the interviewees emphasised collaboration's impact between two central individuals representing a shipyards and a shipping company, namely naval architect Kai Levander and maritime design executive Harri Kulovaara, both of Finnish origin. Levander in particular was viewed as having a uniquely varied perspective as a naval architect in designing ships because he brought both the owner and end-user perspectives to the concept design process. Levander was described as a person who understood both the economics of a cruise company, as well as a cruise guest's experience during a trip. The concept design network in Finnish cruise shipbuilding seems to revolve around the aforementioned two key actors.

In addition, many of the interviewees represent experienced experts who have been in-

Kai Levander. Image: Jouni Saaristo.

Harri Kulovaara. Image: Jouni Saaristo.

volved in concept design since the mid-1990s. Figure 7 depicts the nominations of interviewed persons (black ovals) and actors whom they have nominated (white ovals). Lines between ovals include both incoming (received) and outgoing (given) nominations. The central people – i.e., those with the highest number (four or more) of incoming nominations – are marked by grey highlighted ovals, and the two most central people (more than seven incoming nominations) are marked with highlighted octagons.

Certain central actors' roles – managerial leaders, interior designers and naval architects – in concept creation unquestionably have been prominent in the Finnish cruise ship industry. The central people and major design firms have been of Nordic origin. Focal firms, particularly the Danish design firm led by Knud E. Hansen and the Swedish design firm led by Robert Tillberg, have played a prominent role in the Finnish cruise ship industry. The interviewees recognised Knud E. Hansen as a leading naval architect worldwide. On the other hand, designer Joseph Farcus was viewed as one of the most prominent designers, especially for Carnival Cruise Line ships, together with Maurizio Cergol. Other pivotal interior designers mentioned were Njål Eide, Scott Butler, Scott Wilson and Tom Wright, who were important collaborators for Royal Caribbean Cruises. Nominated leaders in management and directors at design firms who have impacted concept design in the form of leading innovation include Ted Arison of Carnival Cruise Line and Olav Nils Sunde of Colour Line in Norway.

Interviewee 2: Really, if we think about Song of Norway [1970], for example, it [the concept idea] did not start from the shipyards, but it included the involvement of Knud E. Hansen. I would say the '70s in full, and long into the '80s, Knud E. Hansen was the clear

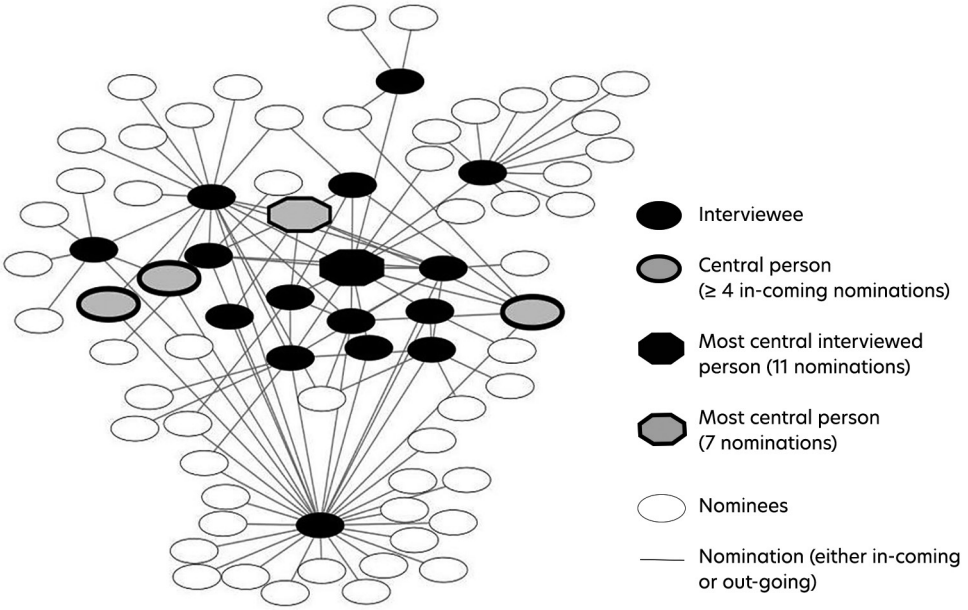

Figure 2. The community of most central actors based on interviews and nominations.

number one choice. All shipyards would use him, and from there, this concept design came to shipyards, and the shipyards would just start taking that onwards, so that they could realise that ship.

Interviewee 10: Carnival's Joe Farcus, he has really created the whole Carnival, the architecture. An amazing guy. […], draws in free hand these unfathomably fine, an unbelievable guy.

Collaboration

Inter-organisational collaboration is organised around the shared goal of fulfilling the shipowner and end customers' expectations. Collaboration between different groups has not been problem-free or consistently harmonious. Many of the interviewed experts particularly noted the difficulty of coordinating architects' visions with the technical planning of the ship. Concerns were raised over architects and builders' divergent views, particularly technical designers' attitudes towards architects' understanding of ship performance and requirements, as well as economic performance. However, the long-term experience of cooperation has increased understanding on both sides. Contemporary views on operating practices also emphasise the importance of flexible collaboration in building a successful end product. A cruise ship's initial planning phase involves large inter-organisational networks of designers, naval architects, engineers and other experts who work together towards an overall goal. Strong collaborative ties have been based on personal-level trust and, at least partially, on previous cooperation. The dense group of central actors with strong collaborative ties across the firms were found in the data (see Figure 7). These collaborative ties are based partly on long-term professional relationships and interpersonal connections. We argue that collaboration between stakeholders

Example of an individual designer's style (Joseph Farcus; Big Blue "C" rendering). Image: Joseph Farcus

has been a transversal tradition and a specific characteristic of the shipbuilding industry.[31]

Some of the actors changed employers at different times, or they might have worked both in the yard and at a shipping or supplier company. Of course, this engenders a profound understanding of how the ship initially is designed and what aspects need to be considered. In addition to mutual trust between individuals, the ability to see things from another professional's perspective is the basis for smooth collaboration and interaction. Knowledge intermediaries and interpreters' roles in networks are important, especially when developing new solutions and innovations.

The principal motivation for collaboration between partners has been willingness to pursue shared goals and engage in dynamic progression towards moving targets to produce high-quality work. Such willingness, equal relationships and collaborative abilities form the most significant basis for collaboration:

Interviewee 2: [construction process] Kinda forces in a way to that seamless cooperation and better processes, and faster.… Shipyards have, of course, accepted that, so they do not even try to rule the roost in every subject.

Interviewee 3: A prerequisite for the success of that collaboration has been on both sides that people have wanted to do good work, and many matters have been solved happily because despite arguing, there has still been this feeling of collaborating together.

It is difficult to assess the nature of cooperation accurately because personal thoughts and experiences influence it strongly. Collaboration also varies depending on different ship projects. Only a few excerpts from key experts' perspectives have been presented here. It is evident that the role of collaboration has been a significant part of concept design, and its role seems to be strengthening in the futures. The core finding on the collaborative mode of working is the notion that all ship designers and builders are highly motivated to cooperate, at least in principle and in the way they talk to the general public.

Communication, interaction and trust between partners

Collaborative ties between experts from different organisations and bodies of expertise also are viewed as a key aspect of communication among central people within a network.[32] Communication during the concept design phase might require fewer collective actions and coordinated joint activities than the construction phase. Still, the creation of new designs requires communication and interaction between designers and technical project leaders. Ship concept development is a joint process at the operational level, in which an authentic co-creation between partners plays a crucial role.[33] The ability to communicate with people from different organisations and fields of expertise is highlighted in the data. Trust between partners and inter-organisational communication are intricately linked together. Appreciation of a concept designer's work is based on the designer's professional knowledge and broad understanding of the ship's operation and usage. Acting as a member of a group and mediating between different groups of international players are core competencies within the profession.

Essentially, interaction between partners was based on long-term relationships between firms and individuals. Inter-organisational collaboration in forward-looking development and concept creation is, more or less, a collaborative process. Initial concept creation may start from discussions in a small group, then later in a larger group, as experts are brought into the process. The ability to communicate new concept ideas in a multi-vocational community was viewed as a key competency for concept designers:

Interviewee 4: The majority of the ship concepts … they are supposedly collaboration projects. There is, of course, this creation of trust, and through that, improvement of communication.

Interviewee 8: It could be that one of the guys, or three or four guys, can create the concept very easily … And once we start to have that concept ready, so that we can proceed to discuss it in more detail, then more people may come from there to think about how to refine that concept.

Interviewee 14: So that the [concept designer] is able to bring those ideas to the forefront … but that she/he can present those thoughts to the customer, and can then, through discussions with the customer, integrate the wishes of the customer into the product.

Interviewee 11: A customer's wishes [should be] read and kept in mind without putting down either of the parties. But you have to be able to, in a way, anticipate that, like what things the customer is interested in.

Trustworthiness is a critical mechanism underlying the exchange of knowledge. Trust

correlates with effective knowledge transfer. While benevolence-based trust improves the usefulness of both tacit and explicit knowledge exchange, competence-based trust is especially important for tacit knowledge exchange.[34] Personal relationships can build trust, reduce relational stress and increase innovation-related activities' intensity. A crucial distinction exists between formal organisational structures and complex informal social networks through which knowledge flows in practice. Rather than being designed or imposed in a top-down manner, these structures have developed organically over time. As informal networks extend across organisational boundaries, they include working relationships, collaborations and exchanges of knowledge between individuals, which are the result of employees' personal initiatives.[35]

Trust between partners builds through long-term close ties that develop among individuals, including personal-level trust and relationships that are created among key players in Finnish cruise ship design:

Interviewee 5: I suppose there is, in all its simplicity, this thing that both parties think passionately about their work. Then through that, both have had a level of professional competency made of iron, and a mutual respect, so then it will carry itself from that point onward.

Interviewee 5: But of course, if you know each other over the years, you know what the other is offering and what do they want. So then it is much easier to discuss and trust. So it does have a real impact, that personal relationship.

Forward-looking actions in concept design

Collaboration between actors and organisations is a prominent characteristic of forward-looking actions in the context of concept design, as described in Chapter 3. At the group and network level, forward-looking actions are based on the notion that futures thinking is 'the fundamental human activity of looking into the futures, which becomes a social activity when the future is shared among different members of an organisation'.[36] Furthermore, the social aspect of futures thinking has been emphasised more recently[37] by those who consider foresight to be a participatory process among members of one or more organisations. Communicative and collaborative sense-making, as a key part of being oriented towards the futures, has been highlighted.[38]

Contemporary forward-looking actions in concept design seem to be collaborative. The ideation of novel concept designs occurs at the intersection of communities of actors operating in inter-organisational settings. In our case, the yard and shipping companies are operating at the leading edge of collaborative practice, developing radical innovations and incrementally developed solutions through new ways of working. The starting point for envisioning a new concept commonly begins with interactions involving the ship owner's basic specifications and external inspirational sources' basic specifications, often found in the entertainment and hospitality industries. The interviewees stressed that boldness is necessary to create something entirely new and to elevate ideas from initial conception to concrete solutions. A ship's concept design phase is a particularly open energising and idea-generating activity stage to which all actors can contribute:

Interviewee 5: [novel ideation] So, we actually tried to do thing that they [the ship owner] were not as familiar with. And then we, of course, needed support from them for that, as if it would be possible to do this kind of a ship.

Interviewee 8: Many things were entirely remade, like things that have never existed in the world before.

Interviewee 4: Not many can do that, so it has really been an exceptional trick also, really took an unprecedented degree of freedom there. Really fine concept ships came from there.

Interviewee 2: Yes, this is in that sense very rewarding work, that it is easy to get people excited about it, and everyone puts their best effort in it, so I would say that it is what really builds a team. That feeling of succeeding together and noticing that, oh, this turned out pretty good.

Our data do not allow for deep analysis of futures images of concept design, but we can highlight collaborations and personal relationships' importance in forward-looking actions.

Conclusions and further research

Our aim has been to describe concept design development in cruise ships built in Finland. We focussed on Finnish-built ships and ship series from the late 1960s to the present day, the concept design process and collaborations between key players in the field. In addition, we examined the orientation toward the futures and forward-looking actions within the concept creation process. This article's general purpose has been to document and analyse memories of collaborations in creating novel ship concepts among people who played pivotal roles in these ships' concept design. We warmly thank all the interviewees for their cooperation. Concept design has not been studied very closely in Finland, and research on forward-looking actions in particular has been relatively infrequent in futures studies literature.

One of this article's motivations has been a desire to understand the evolution of the cruise ship concept design process during the past 50 years. We strived to increase understanding of the drivers for development and principal turning points in cruise ship concepts. We analysed interviewees' memories, how they reflected on interactions between different partners and how past lessons introduce possible new forms of collaboration in the futures. Also, the analytical framework was studied, allowing us to further develop the conceptual design process that reflects today's needs in a more collaborative environment. Another important research topic would be to understand how the concept creation process has developed and impacted other design parts, how information coordination is managed and how partnerships are developed, as well as their impact on further development of collaborations, especially during the concept design phase.

This research approach is part of the long-term development and evolution of the conceptual design of cruise ships as a natural creative process. This article aimed to present observations based on expert interviews that epitomise the features and importance of collaborative and integrative design models that contribute to the entire process of designing and building cruise ships.

According to our research, a few focal visionary and respected individuals and their teams or collaborators have played an active and forward-looking role in concept development. Likewise, international design agencies have played a significant role in the development of ship concepts, and international architects and design agencies appear to have remained key creators of concept design with a similar futures focus. Notably, the Finnish players operating on the periphery of design, planning and construction have had the motivation and abilities to seek understanding of the cruise business as a whole, and not just from the perspective of the ship construction process. This might not be a unique Finnish feature in the field of cruise shipbuilding, but it appears to be a meaningful part of the col-

laboration between the ship owner, design company and individuals. One possible background variable for Finnish cruise shipbuilding success could be employment continuity, i.e., retention of stable design teams, thereby preserving necessary knowledge capital and establishing relationships among collaborators. Our results validate, at least partially, the assumption that concept creation is innovative and involves long-term futures thinking and perceptions of the futures. Forward-looking actions are embedded in operational-level practices and collaboration practices.

This study is a work in progress, and we aim to continue gathering data to cover the topic more comprehensively. The concept design process remains a relatively under-researched area, and we also aim to analyse any new data that we collect in more detail.

The international network of actors within the field is relatively small and dense, with those of Finnish descent comprising a large chunk of the industry. For example, we suggest that further research be conducted on the topic to examine Finnish experts' role and professional development in the global shipbuilding network.

ENDNOTES

1 Peter & Id 2017, 5.
2 Rupo et al. 2018, 729.
3 Mc A. Baker 2016, 144.
4 Brida & Aguirre 2009, 206.
5 Dowling 2006, 3.
6 Research Centre for Coastal Tourism 2012, 3–4.
7 Peter 2020, 84.
8 Dowling 2006, 3 and passim.
9 Evans 1959, 672.
10 Andrews & Pawling 2008.
11 Broberg et al. 2011, 464.
12 Baldwin & Hippel 2011, 1399.
13 Piirainen & Gonzales 2015, 191.
14 Tapinos & Pyper 2018, 292–293.
15 Havas & Weber 2017, 327.
16 Homburg 2015, 47.
17 Chesbrough 2006, 34-35.
18 Keiramo et al. 2018, 193.
19 Havas & Weber 2017, 327.
20 Marsden 2002, 408.
21 Lin 1999, 467.
22 Peter 2020, 84.
23 Dowling 2006, 3.
24 Iden, Methlie et al. 2017, 89.
25 Homburg 2015, 47.
26 Rupo et al. 2018, 729.
27 Hytönen 2016, 12.
28 Ceci & Iubatti 2012, 566; Rupo et al. 2018, 729.
29 Ceci & Iubatti 2012 566; Rizova 2006, 49.
30 Sverrisson 2001, 313.
31 Teräs 2017, 193–194.
32 Hytönen 2016, 15.
33 Rupo et al. 2018, 729.
34 Levin & Cross 2004, 1477.
35 Allen, James & Gamlen 2007; Cross & Parker 2004, 178.
36 Slaughter 1990, 801.
37 Miles et al. 2008, 7.
38 Könnölä et al. 2012, 223.

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Tiivistelmä

Risteilylaivojen konseptisuunnittelun menneisyys, nykyisyys ja tulevaisuus

Tässä artikkelissa keskitytään Suomessa rakennettujen risteilylaivojen konseptisuunnitteluun ja sen kehitykseen. Aikaisemmat konseptien kehittämiseen liittyvät tutkimukset ovat koskeneet suunnittelun teknistä kehitystä. Konseptisuunnittelua, siihen liittyvää innovointia ja tulevaisuusajattelua on tutkittu suhteellisen vähän inhimillisen toiminnan näkökulmasta, vaikka konseptisuunnittelun resurssit nojaavat pääosin inhimilliseen osaamiseen ja kykyyn luoda uutta. Tutkimuksemme koostuu 16 henkilön puolistrukturoidusta haastattelusta ja niiden analysoinnista. Keskitymme kuvaamaan konseptisuunnittelua erityisesti tulevaisuuteen suuntautuvana toimintana. Kuvaamme konseptisuunnittelun prosessia ja sen kehitystä 1960-luvulta lähtien päätyen nykyiseen toimintatapaan. Pyrimme myös löytämään keskeisiä käännekohtia sekä teknisissä toteutuksissa että suunnitteluprosesseissa. Tavoitteena on kartoittaa merkittäviä toimijoita sekä heidän ajatuksiaan ja muistojaan konseptisuunnittelusta. Tutkimme toimijoiden välisiä yhteistyösuhteita ja löysimme keskeisiä henkilöitä, joilla on ollut ratkaiseva merkitys uusien laivakonseptien suunnittelussa.

Laivan määrittely risteilijäksi on monitahoinen kysymys, eikä risteilylaivan erottaminen autolautasta tai linjalaivasta ole yksinkertaista. Kuvaamme konseptisuunnittelua osana alusten rakentamisprosessia tavalla, joka mielestämme tuo esiin risteilylaivan erityispiirteitä ja tarjoaa hyvän pohjan tarkastella konseptisuunnittelun keskeisiä osa-alueita. Keskeinen havaintomme on, että konseptisuunnittelu on ytimeltään yhteistyötä eri organisaatioiden ja yksilöiden välillä. Haastateltavien mielestä konseptikehityksen käännekohtia ja merkittäviä innovaatioita ovat olleet erityisesti ulkohyttien määrän lisääminen ja jaettu kansirakennus. Lisäksi haastateltavat korostavat ”ship as a destination” -ajattelun tärkeyttä muutoksena suunnittelun lähtökohtana. Tulevaisuuden ennakointi on ollut osa konseptisuunnittelua, mutta se on ilmeisesti ollut uusien ajatusten ja inspiraation etsintää enemmän kuin systemaattista ennakointityötä.

Sammandrag

Konceptplanering av kryssningsfartyg i går, i dag och i framtiden

I den här artikeln ligger fokus på konceptplanering av finskbyggda kryssningsfartyg och utvecklingen inom detta område. Tidigare forskning om konceptutveckling har gällt planeringens tekniska utveckling. Konceptplaneringen, den därmed förknippade innovativa verksamheten och framtidstänkandet har i relativt liten grad studerats med mänskliga insatser i blickfånget, trots att konceptplaneringens resurser i huvudsak bygger på mänskligt kunnande och förmåga till nyskapande. Vår undersökning består av halvstrukturerade intervjuer med 16 personer och en analys av dessa. Vi koncentrerar oss på att beskriva konceptplanering som en verksamhet speciellt inriktad på framtiden. Vi beskriver konceptplaneringens process och dess utveckling från 1960-talet till i dag. Vi försöker också hitta viktiga vändpunkter i fråga om såväl tekniskt genomförande som planeringsprocesser. Avsikten är att kartlägga betydande aktörer, deras idéer och hågkomster om konceptplanering.Vi undersöker samarbetsrelationer mellan aktörer och har hittat viktiga personer som spelat avgörande roller i planeringen av nya fartygskoncept.

Vad som definierar ett fartyg som ett kryssningsfartyg är en komplex fråga, och det är heller inte enkelt att skilja mellan kryssningsfartyg och bilfärjor eller linjefartyg. Vi beskriver konceptplanering som en del av processen att bygga ett fartyg, på ett sätt som enligt vår mening visar vad som är utmärkande för ett kryssningsfartyg och ger en god grund för att studera de centrala delområdena i konceptplanering. Vår viktigaste insikt är att kärnan i konceptplanering är samarbetet mellan olika organisationer och individer. De intervjuade personerna ansåg att vändpunkterna och de betydande innovationerna i konceptutvecklingen skedde i samband med att antalet ytterhytter utökades och överbyggnaden delades in. Dessutom betonar de intervjuade personerna ”ship as a destination”-tänkandets betydelse som förändrare av planeringens utgångspunkt. I konceptplanering har ingått att göra framtidsprognoser, men av allt att döma snarare i form av letande efter nya idéer och inspiration än som systematiskt prognosarbete.