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Author(s): Jokinen, Leena; Mäkelä, Marileena; Heikkilä, Katariina; Apostol, Oana; Kalliomäki, Helka; Saarni, Jouni

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Creating futures images for sustainable cruise ships: Insights on collaborative foresight for sustainability enhancement

Leena Jokinen^{a,*}, Marileena Mäkelä^b, Katariina Heikkilä^c, Oana Apostol^d,
Helka Kalliomäki^e, Jouni Saarni^f

^a Finland Futures Research Centre, University of Turku, Finland

^b Jyväskylä University School of Business and Economics & School of Resource Wisdom, University of Jyväskylä, Finland

^c University of Turku, Finland Futures Research Centre, Finland

^d Faculty of Management and Business, University of Tampere, Finland

^e School of Management, University of Vaasa, Finland

^f Centre for Collaborative Research, University of Turku, Finland

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ABSTRACT

The aim of the study was to explore futures images of collaborative sustainability enhancement within a cruise ship building network. Addressing collaborative sustainability at the organizational level rather than at the macro (regional or planetary) level, the paper explores socially constructed and shared futures images, which are less widely studied than individual-level images of the future. We advance an analytical model for constructing and evaluating collectively held futures images based on the structure and content of those images. From our data, we identified four futures images: *Money rules*; *The customer is always right*; *Local economy focus*; and *The most sustainable ships in the world*. From the perspective of collaborative sustainability enhancement, we contend that futures images can provide a basis for target-setting and a frame for sustainability enhancement actions.

1. Introduction

This study explores futures images in the cruise ship building industry from the perspective of sustainability enhancement, including normative and strategic agendas for desirable and possible futures. In-depth analyses of the various definitions of sustainability (e.g., Dahlsrud, 2008; Sarkar & Searcy, 2016) have identified multiple dimensions that include economic, environmental, social, stakeholders, and voluntariness. Economic sustainability relates to the classical expectation that business organizations should be economically profitable, adopting a long-term perspective in their strategic planning. Environmental sustainability refers to efforts to minimize negative impacts on the natural environment resulting from the organization's activities. This entails various environmental management practices such as waste management and eco-efficiency. Social sustainability refers to the organization's effects on employees and local communities, as well as relationships with various stakeholders (see Global Reporting Initiative, 2017 <https://www.globalreporting.org/>). The significance of stakeholder relationships for sustainable organizations is also widely acknowledged, as again highlighted by Dahlsrud (2008) and Sarkar and Searcy (2016). No organization that claims to be sustainable can ignore its stakeholders but must instead cultivate honest and long-term relationships with them. Finally, many scholars have pointed out that

* Corresponding author.

E-mail address: leena.jokinen@utu.fi (L. Jokinen).

sustainability actions should be voluntary rather than an outcome of regulatory or other pressures. For instance, [Dahlsrud \(2008\)](#) and [Sarkar and Searcy \(2016\)](#) identified voluntariness as a key factor, where organizations willingly exceed regulatory requirements.

The present study links the concepts of futures images and sustainability to describe a range of futures—including some that are less sustainable—and to inform sustainability efforts within the cruise ship building industry. The construction of futures images in inter-organizational networks is understood as part of the process of collaborative corporate foresight, based on the core notion that actors produce futures knowledge ([Rossel, 2012](#)). Inter-organizational collaboration refers to e.g. strategic alliances, supply chain collaboration, and innovation networks ([Shi, Lin, Chen, & Su, 2019](#)). In the context of corporate foresight, interaction and social relations are emphasized as a focal part of collaboration (e.g. [Daheim & Uerz, 2008](#)). Collaborative foresight is based on corporate foresight, which develops knowledge about alternative futures and courses of action to support organizational decision-making ([Mastio & Dovey, 2021](#); [Tuomi, 2019](#)). The paper highlights the role of critical analysis and transparency in collaborative insight generation and flow.

Processes of collaboratively constructing futures images are seen here as a useful point of entry for exploring how different ideas and viewpoints on sustainability enhancement develop towards shared understanding or the identification of relevant development needs. The concept of futures image is less used in scholarly literature than e.g. scenarios ([Minkkinen, 2020](#)). For that reason, in the paper we discuss, whether such construction processes are an important component of collaborative foresight that build on interaction and dialog between partners. Linking together the notions of futures images and collaborative foresight, highlights the nature of futures images construction as an open-ended process, which generates diverse representations of possible futures.

This study focuses on micro-level collaboration among organizations or individuals involved in a specific ship building process. In focusing on actions, opportunities, and the sharing of futures ideas, our approach is linked to the “practice turn” in corporate foresight, which emphasizes enactment and the methods used to evaluate, examine, and explore those practices ([Rowland & Spaniol, 2020](#); [Tapinos & Pypier, 2018](#); [Weber, Sailer, & Katzy, 2015](#)). We chose to explore futures images that are collaboratively constructed and shared because these are less widely studied than individuals’ images of the future. In so doing, we address the need for theoretical development of the concept of *futures image/image of the future* as noted by [Minkkinen \(2020\)](#), p. 18). Minkkinen remarks that the theoretical underpinnings of futures images are relatively weakly developed to shed light on system or network level, which we here address.

To explore the dominant beliefs and assumptions that inform sustainability enhancement actions in the shipbuilding industry, we adopted a critical-transformative perspective (for an account of Futures Studies (FS) paradigms, see [Minkkinen, 2020](#)). This approach is grounded in critical social theory, which emphasizes the role of multidisciplinary inputs in advancing the emancipatory function of knowledge ([Ahlqvist & Uotila, 2020](#); [Habermas & Fultner, 2001](#)). Following [Mannerman \(1991\)](#), we assume the centrality of emancipatory knowledge in FS, where the aim is to explore and create new ideas for possible futures. Viewing sustainability enhancement as a set of value-driven and normative goals, the critical-transformative perspective adopted here seeks to influence and redirect existing ways of imagining the future.

Focusing on sustainability enhancement as the content of futures images, our collaborative approach to corporate foresight emphasizes context, positionality, and actor relations, exploring knowledge frames in their real-world context ([Ahlqvist & Uotila, 2020](#); [Mische, 2014](#)). The relational theory of futures knowledge provides a socio-theoretical basis for futures studies and links to critical social theory by showing how future projections develop through communication and interaction in group, organizational, and institutional settings.

The network of cruise ship builders we are studying, is a highly interesting one as it is at the same time highly interconnected both on personal and on company-level, and it is centralized around the lead partner ([Jokinen, Palonen, Kalliomäki, Apostol, & Heikkilä, 2020](#)). The company partners within the supply chain network seemed to have only few means to respond collaboratively to systemic sustainability challenges. In our previous study ([Apostol et al., 2021](#)), we discovered, that the employees of the lead company have a strategic goal to enhance sustainability and the employees express high sense of pride regarding the quality of their work. There was a clearly identified motivation and need to develop stakeholder interaction for sustainability enhancement, but not agreed processes to address these issues ([Saarni et al., 2019](#)). This study explores how collaborative construction of futures images might be a fruitful method to offer one possible way for collaborative sustainability enhancement.

To illuminate collaborative sustainability enhancement in a cruise shipbuilding network, we elaborated an analytical model for identifying and evaluating the structure and content of collectively held futures images, which vary in terms of their focus, timeframe, sociality, and resonance. To capture new elements of these images, we analyzed their structure in a workshop setting. The model promotes critical analysis and transparency as key elements in such collaborative discussions of futures images.

The rest of the paper is structured as follows. Section 2 describes a theoretical framework for understanding futures images and corporate foresight, and section 3 describes the study materials and methods, including data, analysis, and the case study approach. Section 4 details the four observed futures images. The paper ends with a discussion and conclusions regarding the concept and practical use of futures images in the context of corporate foresight. Details of our research data are included in the Appendix.

2. Theoretical background and context

2.1. Futures images

As used here, the term *futures images* refers to “snapshots” of possible futures (see for example [Gordillo Kontio & Tapio, 2017](#)) rather than to scenarios that also include pathways from the present. In general, these images represent probable, possible, or preferable futures ([Amara, 1981](#)) based on individual beliefs, expectations, opinions, values, hopes, and fears ([Rubin, 2013](#)) and taking account of development and change. While such images are often assumed to be private or personal ([Rubin & Linturi, 2001](#)), they can be regarded

as public when shared by a group (Polak, 1973; see also Rubin, 2013; Rubin & Linturi, 2001).

According to Kuhmonen (2017), futures images work well as broad representations of alternative futures that are distant from the present and evoke the “pull of the future” (p. 217). As futures images contain more intuitive and creative elements than scenario-based approaches (see for example De Smedt, Borch, & Fuller, 2013), they are sufficiently simple to communicate sustainability issues and proposed actions and are useful for shaping long-term strategy. Kuhmonen (2017) proposed that futures images can be used to envision, structure, crystallize, and compare different possible futures, and according to Rubin (2013), such images can help to make futures more predictable and transparent for decision makers. According to Slaughter (1991), futures images “present us with options and possibilities from which we can select and choose or with which we may argue and debate” (p. 499). Similarly, Vinnari and Tapio (2009) reasoned that futures images and associated factors can be used to realize a desired future state.

Given the need to engage with multiple possible futures and radical uncertainty, imagination and reasoning of a less formal kind play a significant role in developing sustainability practices. Understanding futures images as collectively held assumptions involving non-linear causality highlights the role of agency and the need for critical-transformative studies (Jasanoff & Kim, 2015; Mische, 2009) that analyze and reflect on collectively constructed projections of possible futures. Articulating and communicating futures images as an object of research facilitates collaborative dialog in approaching the uncertain and imperfectly knowable. Rather than merely selecting from a set of predefined alternatives, futures images (and the related concept of *future imaginaries*) involve a creative and active process of envisaging possible and projected futures (Minkkinen, 2019). For that reason, collective spaces for constructing these images and imaginaries simultaneously enable and restrict the scope for individual and collective action. Social interaction broadens the scope of discussion when participants share viewpoints and experiences; conversely, predetermined features (e.g., set discussion topics and/or workshop arrangements, timeframes, participant grouping) may have a restricting effect (see for example Hoolohan & Browne, 2020; Karhunmaa, 2019). In the present context, our data regarding the sustainability of the cruise ship building industry reflect the opinions, beliefs, hopes, and fears of interviewees and workshop participants as a basis for shared futures images of the industry (see section 3).

2.2. Corporate foresight

In general, corporate foresight (CF) refers to how organizations anticipate the future. As a subset of futures research, the multiple definitions of CF in the existing literature broadly reflect two distinct approaches, emphasizing either the organization’s ability to anticipate future changes (e.g., Ahuja, Russell, & Lee, 2005; Tsoukas & Shepherd, 2004) or the actions that companies take to prepare for the future (Heger & Boman, 2015; Rasmussen, Andersen, & Borch, 2010; Rohrbeck & Kum, 2018). These definitions also differ in their conceptions of alternative futures; while Becker (2003) and others prioritize visions of a *preferred* future, others including Darkow (2015) and Paliokaitė and Pačėsa (2015) emphasize *multiple* alternative futures.

Beyond these differences of emphasis, there is broad agreement about the nature of CF in several respects. In general, scholars accept that CF is a useful tool for strategic management and decision-making (Ahuja et al., 2005; Becker, 2003; Darkow, 2015) in pursuit of competitive advantage (Ahuja et al., 2005; Hamel & Prahalad, 1994; Paliokaitė & Pačėsa, 2015; Rasmussen et al., 2010; Rohrbeck & Kum, 2018; Rohrbeck, Battistella, & Huizingh, 2015). That competitive advantage is assumed to depend on active preparation for the future (Paliokaitė & Pačėsa, 2015; Rohrbeck, 2011; Tsoukas & Shepherd, 2004) or self-determination of that future (Becker, 2003; Hamel & Prahalad, 1994; Heger & Boman, 2015; Rasmussen et al., 2010; Rohrbeck et al., 2015).

A collaborative and practical perspective on CF acknowledges that imagining the future is embedded in operational actions and in workers’ daily lives, especially when setting objectives or solving problems. This approach highlights relations between actors, objects, and contexts in constructing knowledge and envisioning futures. The collaborative perspective commonly focuses on collaborative/constructive foresight, foresight actions, and anticipation communities (Kurki, 2020; Mastio & Dovey, 2021; Tuomi, 2019). As a participatory process, collaborative foresight is characterized by diversity and inclusivity in constructing futures images, including ideas for sustainability enhancement. These collaborative actions facilitate dialog and highlight dialectic tensions among multiple coexisting imaginaries, and this saturation of futures-related information, beliefs, and ideas can produce diverse responses to perceived drivers of possible futures (Dufva & Ahlqvist, 2015). In the present case, we investigated collaborative foresight as a means of sharing ideas for long-term sustainability development by encouraging discussion of what interviewees and workshop participants perceived as possible, probable, preferable, and impossible.

Collaborative foresight emerges from communicative and constructive interactions in a group or organizational setting rather than from individual thoughts and actions (Gattringer et al., 2017; Gattringer & Wiener, 2020; Mische, 2014; Weigand, Flanagan, Dye, & Jones, 2014). This pragmatic approach focuses on imagining and/or projecting futures at operational level by planning for anticipated situations or looking for novel solutions. The emphasis on collaboration and discourse serves to explicate *latent futures* as ongoing processes of “future in-the-making,” “living futures,” and “using the future” that underpin visible and formal foresight activities (see for example Adam & Groves, 2007; Poli, 2017), emphasizing the role of present actions in the implicit but active construction of the future. In light of the potency of latent futures to shape emergent organizational realities, our aim was to develop an analytical approach to elicit futures images produced in and for the present.

3. Materials and methods

3.1. Case study

The research context was a shipbuilding network located in Europe. The lead firm produces luxury cruise ships and retains about

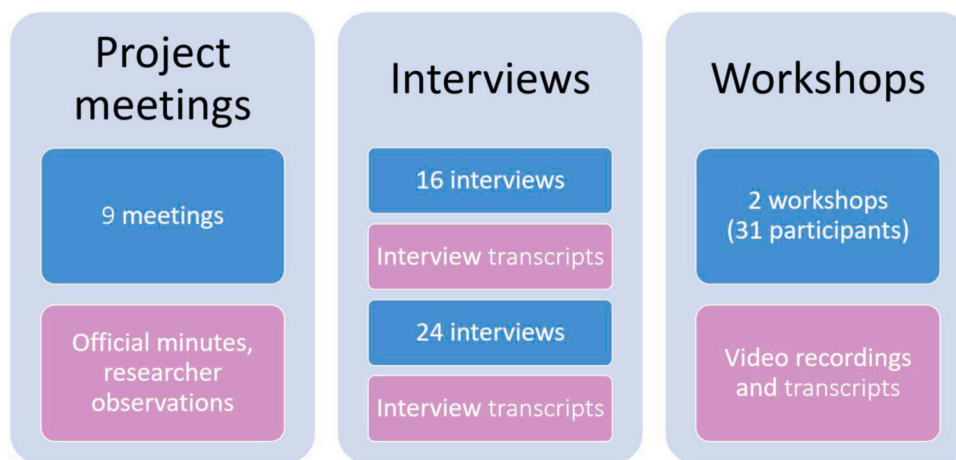


Fig. 1. Research data constellation.

1500 employees. The complex nature of the end product necessitates the involvement of an extensive network of suppliers. As well as requiring intensive physical work, building a cruise ship involves the use of a wide range of cutting-edge technologies and machines. While the lead firm has addressed various aspects of sustainability to varying degrees throughout its history, the issue has not been comprehensively mapped. The firm has only recently begun to adopt a more systematic approach to sustainability, focusing mainly on occupational health and safety, environmental issues, and social responsibility.

In any shipbuilding network, the most important stakeholders are the ship owners, NGOs (typically environmental), relevant authorities, and communities in the vicinity of the shipyard. The end users include passengers and the ship's operational personnel (so called operators). As any forward-looking perspective on shipbuilding requires the early involvement of all partners and stakeholders to incorporate ideas about sustainability in the construction process, the study engaged with all of these actors. Commencing in early 2016, the case study ran to the end of 2019. The four research stages were: Research data collection; Data analysis; Construction of futures images; Analysis of the futures images, and the four stages are described in detail below.

3.2. Research data

The first stage of the research process employed a number of data gathering methods, including interviews, workshops, and field observations. Fig. 1 shows the three types of research data, which are explained in detail below.

The *interviews* were conducted in two phases. In stage 1 (March–September 2016), we interviewed shipyard personnel, suppliers, and ship owners. In stage 2 (November 2017–August 2018), we broadened the perspective by interviewing representatives of service providers and an industry association, as well as representatives of the shipyard's suppliers and other maritime companies and suppliers. Shipyard interviewees were drawn from the company's main departments, including procurement, sales and design, human resources, environmental management, administration, HSE (health, safety and environment) and risk management, investments, and ICT, as well as top management. Maritime company interviewees included department directors, project managers, and blue-collar employees. In total, we conducted 40 interviews with 62 individuals, who included both women and men.

The aim of the interviews was to capture individual understandings of sustainability. To facilitate open discussion, the interviews were semi-structured, beginning in each instance by exploring the interviewee's interpretation of sustainability and its relevance to their own work. There followed a loosely structured discussion around social, environmental, and economic factors as the major pillars of sustainability and how understandings of sustainability might have changed over the company's history. If the interviewee indicated that sustainability was irrelevant or only marginally relevant to them, follow-up questions sought to clarify the detail of what had already been said rather than suggesting additional interpretations.

The *workshops* served the dual purposes of gathering further data and promoting open collaboration among members of the project consortium. The two workshops were attended by 31 participants in total, including representatives of the participating organizations (ranging from senior vice president to project engineer, plus one person from an NGO) and academics interested in the maritime industry (including senior sustainability and communication experts). The first workshop (in March 2018) addressed the results of the interviews and explored existing supports for collaborative sustainability development in the network. The discussion covered the following themes: standards, indicators, and reporting; social sustainability and the workforce; external sustainability requirements and expectations; project and time management; ways of collaborating; and environmental aspects of sustainability. The second workshop (October 2018) focused on futures and sought to develop futures images for sustainable collaboration in the cruise ship building industry, including associated development needs. The themes addressed in the second workshop included communication, social sustainability, innovations, sustainability of processes, strategic thinking futures, network futures, regulation futures, and knowledge futures.

The workshops were designed as an inter-organizational opportunity space for the development of sustainability practice and

Table 1
Dimensions of futures images captured by the analytical frame.

Sustainability	Timescale	Sociality	Resonance
Range of alternatives	Short: 1–2 yrs Medium: 3–5 yrs Long: 6–10 yrs Distant future: 10+ yrs	Actors Relations Interactions	Reformulated opportunities and actions

innovation and provided an appropriate communicative setting for gathering data on the collaborative construction of futures images. In thematic discussions conducted in groups of 3–4 persons, a facilitator took notes on a flipchart that was visible to the group. Across the two workshops, there were 12 such discussions, each lasting for 60 min. As “sites of hyperprojectivity” (Mische, 2014), the purpose of the workshops was to explicate assumptions and to develop ideas about sustainability practices in the cruise ship building industry. Based on issues raised during the interviews, participants were encouraged to envisage futures images and changes, and to reflect on the consequences of sustainability enhancement. This workshop method accommodates both narrative and interactionist approaches to the construction of futures images. To ensure that communication and interaction among workshop participants was not disturbed, we used small video cameras (about the size of a voice recorder). While the cameras were of sufficient quality to facilitate general observation, they could not capture the nuances of facial expressions, but they did provide information about interactions within the group.

Field observations from the regular *project meetings*, including research seminars and steering group meetings, were analyzed to gain background knowledge and an understanding of the context for subsequent data interpretation. At the research meetings, researchers and corporate participants discussed the research findings and issues arising; questions related to project management were discussed at the steering group meetings. In total, there were nine project meetings; the data these generated included official minutes and research notes prepared by the academic partners.

3.3. Data analysis

The data were analyzed in two phases. The first phase focused on individual and group discussions of sustainability, and the second phase addressed the collaborative construction of imagined futures. To begin, the interview and workshop audio and video recordings were transcribed *verbatim*, and the transcripts were analyzed thematically. One author performed the initial coding, which was subsequently modified following discussion with the others. Using ATLAS.ti software, the coding phase sought to identify futures images based on multiple rounds of reading and interpretation of the transcripts. We first coded those parts of the transcripts referring to aspects of sustainability, either within the participant’s own organization or across the network. In the second round of coding, we focused in greater detail on each sustainability issue in terms of the economic, environmental, social, voluntariness, and ethical dimensions identified in the literature (Dahlsrud, 2008; Sarkar & Searcy, 2016), along with cultural aspects.

Combining interactionist and textual approaches, we traced reformulations of ideas of the future using video-based content analysis and the interview and workshop transcripts, based on relevant methodological precedents from the literature (Gibson, 2005, Huber, 2020). To augment the validity of our interpretations, we supplemented the workshop transcripts and observation notes with 360-degree video recordings. Specifically, we observed interactions in the video footage (see for example Price, 2020; Tavory, 2018) and analyzed speech content and iterative reprocessing, reformulation, and reorientation of imagined futures from the workshops.

3.4. Construction of futures images

Textual analysis of the interview and workshop discussions were used to construct the main features of the futures images that emerged from the coding process described above. The accompanying narratives were based on categorization supported by quotes; for further reflection, these were then compared with the field notes.

On the basis that the formation of futures images is central to understanding collaborative construction and the production of relevant inputs, and that this process occurs in dialogic settings and is elaborated through interaction and talk, we sought empirical support for a collaborative account of futures image construction as one component of collaborative foresight actions (see also Kuhmonen, 2017; Mische, 2014; Morgan, 2002).

3.5. Analyzing futures images

The analysis of collaboratively constructed futures images is methodologically challenging because the framing of future-focused talk and interaction depends on the dimensions identified (see for example Mische, 2014). We developed an analytical frame based on alternative images, timescale, sociality, and resonance as descriptive dimensions that provide a rich and meaningful account of the content of futures images (see Table 1). First, images were elaborated by capturing the range of relevant alternative futures on sustainability enhancement and including some that are less sustainable. Second, it was important to set a time horizon determining the reach and variation of futures images. Third, the study’s collaborative perspective required us to specify the relevant social actors and their relationships and interactions. To that end, following Mische (2014), we use the term *sociality* to locate actor categories as grammatical subjects linked to action verbs and nouns with a deliberate focus on futures and on relations and interactions. Finally, to

Table 2
Analysis of futures image “Money rules”.

Economic sustainability	Timescale	Sociality	Resonance
Barter economy	Distant future	Providers and producers as key actors; Self-directed relations for sustainability interactions	Changing monetary systems; Indicators other than money; Preventing tax avoidance
Cost efficiency	Short	Ship owners; Executives; Win-win relationships with producers and ship owners	Sustainability innovations for economic benefits; Business value takes priority over saving the world; Coordinated sustainability at supply chain level
Platform economy	Long	Collaborative working culture; Sub-contractor relationships also a risk	Information as product; Process innovations; Local stakeholders must have a shared understanding of sustainability enhancement

reflect how sustainability issues raised in the interviews were further developed in the workshops, we use the term *resonance* (see Gibson, 2011; Mische, 2014) to describe emerging ideas about practices and courses of action for reorienting sustainability.

Using the proposed analytical frame, we examined the video footage from the workshops to explore the futures images in greater depth beyond the content descriptions. Drawing on the transcripts and facilitators’ notes, the analysis illuminated the process of collaborative construction; the video footage helped to identify resonant topics and issues that developed during the interaction. This combination of video footage, transcripts, and notes helped to make sense of the interactions and to identify the most resonant topics or issues, so deepening our understanding of how inputs were received and addressed during the dialogs. This process confirmed that our analytical frame supports more profound analysis of the collaborative construction of futures images beyond content descriptions or lists of issues by capturing ideas presented and analyzing how they are remodeled to new meaningful and shared information from dynamic workshop discussions.

To capture the range of alternative futures images, we explicated and compared their content. Time horizons were classified as short (1–2 years), medium (3–5 years), long (6–10 years), or distant future (more than 10 years). Social context was specified in terms of actors, relationships, and interactions. Finally, resonance was analyzed in terms of reformulations or reorientations related to technology, product, process, service, strategy, or policy issues that emerged during workshop discussions. By illuminating these dimensions, our analytical frame explicated the structure of futures images and captured the significance of collaborative talk and interactions in the workshops.

After preparing for the observations by reading through the interview transcripts and thematic codes, we identified four major sustainability-related themes: *economic sustainability and market competition*; *customer demands and industry growth*; *employees and the local economy*; and *clean-tech knowhow and sustainability demands*. The workshop observations included several rounds of watching the video footage and following the transcripts. The observations were coded and quotes were assembled in line with the analytical frame; in this way, we were able to elaborate versions of the four futures images as alternative narratives (see Tables 2–5). This iterative analytical process served to enhance the quality and credibility of these futures images and participation to the workshops provided a shared learning opportunity for workshop participants.

4. Results: four futures images

This section describes the sustainability content of each of the identified futures images, followed by an analysis informed by the frame in Table 1.

4.1. “Money rules”

The key content of this first futures image is that every action necessarily centers on money—in other words, every decision must make economic sense. Strong competition in the market means that day-to-day operations are a struggle, especially because Asian companies can compete on price. From a network perspective, this means that each operator is focused on their own profit rather than on the survival and future of the network. The following interview excerpts highlight the central role of money.

Money is the thing that matters. (H40)

... money-based competition ... is no longer healthy [because] the lowest bid always wins, and you get cheap workers from Greece ... For us, there is no point in ... Finnish workers going there because they are too expensive ... And what do these [foreign] workers know about the work? Not necessarily enough... (H34)

As a result, any sustainability improvements are largely mandatory, with little scope for voluntary improvement. While companies must take account of the regulatory requirements, other stakeholders’ needs receive less attention, promoting a general view that sustainability is unimportant for the industry. In addition, some regard cruising as an unnecessary luxury.

Interviewee 1: Yes, but overall, cruising tourism is not at all ecological.

Interviewee 2: I didn’t want to say it aloud, but it is not [ecological]. (H13)

Table 3
Analysis of futures image “The customer is always right”.

Social sustainability	Timescale	Sociality	Resonance
Ship specifications	Short	Shipowners and supply chain leaders rule	Visualization of shared processes across the supply chain; Interfaces aligned
Supply chain relations	Short/medium	Guiding and teaching sub-contractors/suppliers; Follow-ups among partners working on the same area	Selling and buying ship life cycle
Regulations	Short/long	Formal certification; Sustainability experts; Alignment of global and regional/local regulation	Established knowledge sources for regulation changes
Customer values	Long/distant future	Individual passengers; Operators; Customer research; Civic organizations	Reacting proactively to end customer demands

Our analysis of the collaborative construction of this futures images is summarized in Table 2. Along with cost efficiency, the *Money rules* image incorporates substantial ideas about a barter economy and concerns about economic profitability as obstacles to sustainability enhancement. Understandably, sustainability experts articulated far-reaching possibilities beyond the current business environment, including innovative monetary systems that would add value to natural resources, and the workshop discussions resonated with and reformulated the coordination of sustainability systems.

4.2. “The customer is always right”

The key aspects of this image are strong customer demands (both from the point of view of passengers and ship owners) and how each network member strives to meet those requirements. As incomes increase in many countries, especially in Asia, the cruise industry has a large and thriving passenger base. Ship owners are interested in sustainability and are (to some extent) willing to pay for it, especially in the case of sustainability improvements related to ship operations, such as water and energy efficiency.

It could be this ‘eco cabin’ concept ... some passengers may be interested in this kind of cabin and would be willing to pay more. Given this possibility, we have thought about materials, energy, and water solutions, for example, as concrete things we could do. (H12)

One important factor is the passengers ... Increasing environmental awareness and willingness to promote environmental friendliness ... will affect cruise ship building. This is a significant issue for us [the shipyard] too, and this is often forgotten. I think designing more energy-efficient ships is probably the most important way of promoting cruising as environmentally friendly—in other words, the less energy consumed, the lower the emissions produced. (H9)

The customer perspective encompassed multiple levels, ranging from global regulation to the individual values of passenger (see Table 3). Timescales were mainly short, other than in the case of individual value change, which was naturally framed as long-term or distant future. The role of industry leaders and ship owners was emphasized, both in terms of defining sustainability and guiding subcontractors and suppliers. The main reformulation related to ship life cycles and recycling.

4.3. “Local economy focus”

This image refers to the industry’s impact on the local economy, and in particular on its own employees. Society values the shipbuilding industry wherever it operates because it brings employment to the region. Employees are the key stakeholders, and as the following excerpts illustrate, their safety and well-being is a top priority for the industry.

We have worked for a long time with occupational health and safety (OHS) ... this is a core issue for us—to make sure that our employees get home safe and sound ... For example, we have a lot of OHS data, and [there are] a lot of indications that we have done well. (H1)

We monitor the health of our employees and take the best care of them. In other words, occupational health care is one of the areas of sustainability in which we invest a lot of effort. We have an exceptional solution here, with our own occupational health care. We employ the doctors; we employ the nurses; we haven’t outsourced this. The benefit is that the occupational health care personnel know our business—they know what we do here ... This has helped [occupational health care personnel] to maintain our employees’ ability to work and to keep them healthy... (H7)

To ensure the business continuity of the network as a whole, local knowledge of shipbuilding is valued as highly as economic sustainability. From a cultural sustainability perspective, Finnish cruise shipbuilding knowledge and tradition are especially valued.

The fact is that the Finns—a population of five million—account for a third of all big ship refits globally. In a way, this is because, as you mentioned, the Finns generally do things wisely, handle people relatively well, and above all, deliver more or less what they promise. So, we ... are not trying to bullshit anybody, ship owners or suppliers. (H39)

The employee perspective on sustainability development addressed both individual consciousness building and collaborative

Table 4
Analysis of futures image “Local economy focus”.

Social sustainability	Timescale	Sociality	Resonance
Sustainability education	Short	Companies focus as much on social sustainability as on environmental dimensions; The industry promotes branch modernity; Teachers at all levels provide sustainability education; Sustainability knowledge is built at the personal level	Baltic Sea Education Centre for Sustainability Transdisciplinary education programs with industry partners
Influencing individual attitudes	Short	Sustainability experts contribute to market sustainability; Reaching those who know less about sustainability; Catastrophes change attitudes	Gamification
Collaboration	Short	Personal interactions; National-level inter-organizational networks; Sharing information and ideas	Unofficial social support networks; Risk is built into relationships

Table 5
Analysis of futures image “The most sustainable ships in the world”.

Environmental sustainability	Timescale	Sociality	Resonance
Life cycle	Long/distant	Entire chain committed to ship’s circular economy	Ships should be assigned a deposit price; Sustainability tax
Collaboration at operational level	Short to distant	Actors “jointly welded” at operational level; Build a culture of trust in the supply chain	Channel for radical ideas and problem solving; Strategic partnerships; Coordination of inter-organizational collaboration; Collaboration on issues that are problematic for everyone
Eco-efficiency	Short to distant future	Industrial companies develop joint solutions with universities; Companies set high-level objectives	Construction robots; System for anticipating near-future changes
Virtual ships and cruises	Far future	Artificial intelligence; Private individuals decide they prefer virtual experiences	Virtual reality takes over

network efforts (see Table 4). The actions discussed were mainly those that could be performed continuously. The main actors and drivers of change were identified as individuals (e.g., teachers), company strategies, and catastrophes (which enforce attitude change at every level). Reformulated ideas included high-level joint education centers, gamification for sustainability measurement, and recognition of the risks associated with partnerships and collaborative actions.

4.4. “The most sustainable ships in the world”

In this final futures image, the central issue is the continuous development of all aspects of sustainability. The industry’s economic sustainability is strong because it meets the requirements of various stakeholders, and especially of environmental NGOs. The environmental impacts of shipping operations are minimized by high-quality clean-tech systems for water and wastewater management and energy efficiency, and environmental sustainability improvements encompass the entire life-cycle, including end-of-life issues.

... the recycling—the old word was ‘scrapping’—of a ship... should relate to a life cycle, where we agree how long it will last ... and then we need to know where the ship will be decommissioned. Where will we recycle the ship? It needs to be done at a certified shipyard, where we know exactly what happens to it. This is equally important.

(Workshop 1)

We are building cruise ships; so, if we agree that the whole circular economy should be covered, there is a devastating hole in the decommissioning phase because it is done in largely ‘shady’ circumstances. I don’t know how many are decommissioned each day, and here in Europe, we just shrug and say ‘It does not concern us, it’s their problem.’

(Workshop 2)

Building the world’s most sustainable cruise ships was also a key discussion topic during meetings toward the end of the project. From a network perspective, the implication is that each member must innovate to develop the sustainability of their own production process and of the end product. The role of culture in promoting sustainable cruise ship building was also emphasized.

How can we develop an operating culture that cannot be copied? In a way, if digitalization means that all information is freely available, and that you can in theory cooperate with anybody, the point of the local network is the culture of working together, which indeed cannot be copied. (Workshop 2)

This futures image of *The most sustainable ships in the world* emerged as the preferred and perhaps most viable futures image of a sustainable future for shipbuilding. The range of issues addressed included life cycle thinking, collaboration, economic realities, and radical innovations (see Table 5). Notably, the timescale ranged from short to distant future, depending on the lead company’s

Table A1
Project meetings.

Date	Type
Stage 1	
20.6.2016	Research seminar & steering group meeting
5.10.2016	Research seminar & steering group meeting
15.2.2016	Research seminar & steering group meeting
Stage 2	
29.5.2017	Research seminar & steering group meeting
26.9.2017	Research seminar & steering group meeting
30.1. 2018	Research seminar & steering group meeting
19.4.2018	Research seminar & steering group meeting
18.9.2018	Research seminar & steering group meeting
28.11.2018	Steering group meeting
29.1. 2019	Steering group meeting

Table A2
Interviews and interviewees: Stage 1.

Code	Department	Date	Duration
H1	Shipyard (1 person)	02.03.2016	85 min
H2	Shipyard (1 person)	10.03.2016	59 min
H3	Shipyard (3 persons)	10.03.2016	54 min
H4	Shipyard (2 persons)	13.05.2016	49 min
H5	Shipyard (1 person)	26.05.2016	31 min
H6	Shipyard (1 person)	03.06.2016	44 min
H7	Shipyard (2 persons)	09.06.2016	56 min
H8	Shipyard (2 persons)	27.05.2016	73 min
H9	Shipyard (4 persons)	08.06.2016	42 min
H10	Shipyard (2 persons)	09.06.2016	85 min
H11	Shipyard (2 persons)	15.06.2016	65 min
H12	Supplier 1 (3 persons)	17.05.2016	64 min
H13	Supplier 2 (3 persons)	02.05.2016	64 min
H14	Supplier 3 (1 person)	24.05.2016	42 min
H15	Ship owner 1 (3 persons)	27.05.2016	70 min
H16	Ship owner 2 (1 person)	01.09.2016	59 min

Table A3
Interviews and interviewees: Stage 2.

Code	Company	Date	Duration
H17	Service provider (3 persons)	10.01.2018	64 min
H18	Supplier 4 (3 persons)	25.01.2018	76 min
H19	Supplier 5 (1 person)	10.11.2017	74 min
H20	Supplier 5 (1 person)	10.11.2017	54 min
H21	Supplier 5 (1 person)	28.11.2017	48 min
H22	Industry association (1 person)	01.03.2018	27 min
H23	Supplier 2 (1 person)	23.11.2017	64 min
H24	Supplier 2 (1 person)	18.01.2018	88 min
H25	Supplier 2 (1 person)	15.02.2018	39 min
H26	Supplier 2 (1 person)	15.02.2018	55 min
H27	Supplier 6 (1 person)	17.01.2018	32 min
H28	Supplier 6 (1 person)	17.01.2018	40 min
H29	Supplier 1 (1 person)	18.12.2017	47 min
H30	Supplier 1 (1 person)	18.12.2017	58 min
H31	Supplier 1 (1 person)	18.12.2017	36 min
H32	Supplier 1 (1 person)	18.12.2017	21 min
H33	Supplier 7 (1) (2 persons)	24.5.2018	77 min
H34	Supplier 8 ¹ (1 person)	6.6.2018	64 min
H35	Maritime company 1 ² (1 person)	7.6.2018	65 min
H36	Company 3 (also supplies maritime industry) (1 person)	8.6.2018	94 min
H37	Supplier 9 (2 persons)	15.6.2018	73 min
H38	Supplier 10 (1 person)	19.6.2018	58 min
H39	Maritime company 2 ² (1 person)	16.8.2018	61 min
H40	Maritime company 3 ² (1 person)	17.8.2018	79 min

¹ Supplier 7 and Supplier 8 also supply other industries.² Maritime companies 1, 2 and 3 are not currently supplying the case network.

strategy. Issues of agency were also wide-ranging and highlighted commitment at both inter-organizational and individual levels of the network. Reformulations touched on issues of global taxation policy, strategic partnerships, coordination of radical innovation spaces, and digital solutions such as virtual cruise ships.

To conclude our findings on whether the collaborative construction of futures images is a relevant part of collaborative foresight and fruitful method for addressing collaborative sustainability enhancement, we state it to be a useful tool in exploring and gathering ideas from different actors to more or less coherent conceptions. Our analysis showed how ideas brought forth in the interviews were enriched in the workshops, and subsequently evolved into futures images through analysis. The process reveals how the partners' different ideas and viewpoints of the partners were built upon, and how new, even somewhat radical, ideas emerged through interaction during the workshop. This can be considered as a valuable contribution to the collaborative foresight process. Furthermore, the construction of futures images was found to be a well-functioning tool that produces shared representations of possible futures. From a theoretical perspective, our analysis showed, that futures images benefit from some type of structure as is the case with scenarios. However, we see futures images as story-like, open-ended conceptions compared to more rigid scenarios.

Collaborative construction futures images represent critical-transformative paradigm of Futures Studies (Minkinen, 2020) as they explicitly try to influence and change the future in some value-driven direction such as towards certain sustainability framework. Critical approach here refers to increasing the space for seeing new opportunities and pathways for action. The transformative element is linked to the focus in this research, which is on the dynamics of futures images evolution and aim is at generating novel insights for futures without explicitly representing them in full.

5. Discussion and conclusions

In this study, we identified four images of alternative futures for cruise ship building networks from a sustainability perspective and explored how ship builders, ship owners, and other stakeholders can use collaboratively constructed futures images to facilitate sustainability development. The content of these images varied along four dimensions; *Money rules* prioritizes economic sustainability; *The customer is always right* emphasizes environmental sustainability at operational level; *Local economy focus* highlights social sustainability and the industry's positive regional impact; and *The most sustainable ships in the world* acknowledges the multiple dimensions of sustainability.

The account was enriched by analyzing the four images in terms of their variation, reach, sociality, and resonance. The images' content varied across these dimensions, most notably in relation to sociality, as the data highlighted the key role of the network—in other words, no single actor can resolve all of the identified sustainability issues. The data also confirmed the vital role of society as a whole; for example, participants referred to the need for general education and attitude change in relation to sustainability, as some of the key actors are outside the ship building network.

This research also contributes to existing knowledge by linking sustainability and futures images. While companies commonly manage sustainability by referring to performance data—for example, by setting targets on the basis of what was achieved during the previous year—our approach shows how futures images can be used to define targets and the actions required to achieve them. In addition, the paper highlights the value of collaboratively constructing futures images as a component of collaborative foresight. Futures images as a theoretical concept will need further elaboration in the context of collaborative foresight. Possible avenues for further research can include e.g. discussing variables or structures of futures images, which would serve best in target setting and making action plans, while simultaneously preserving the open-ended and diverse nature of futures images.

Methodologically, the study shows how data from workshop discussions can be systematically analyzed to elaborate the content of futures images. This structured analysis provides a multi-dimensional and more fine-grained understanding of how discussion flows across alternatives, timescales, social contexts, and ideas for innovation and change. While it was challenging to access comprehensive information about each variable from the different discussions, our analytical frame proved useful in developing a multi-faceted i.e. more elaborated understanding of the dynamics of collaborative construction of futures images. In highlighting the varied content of each image, the framework seems promising as a tool for guiding discussion and decision making. The analysis of workshop discussions depends in part on the quality of transcription, and other methods of documentation (such as video recording) are likely to augment the validity of interpretations. In particular, the 360-degree video recordings contributed to the analysis of resonances and reformulations of futures images.

It is also important to acknowledge the limitations of the study design. In particular, the workshops were limited as spaces for interaction and for creating futures insights. As the workshop participants were sustainability experts, their eagerness to promote new pathways may not be representative of others in their organizations, and radical futures thinking and co-creation would probably benefit from the involvement of a more diverse range of actors, with more resources for reflexive discussion. The scope of the interviews and workshops was also limited by the research topics and project context. Finally, the video footage was of insufficient quality to capture the finer nuances of participants' interactions.

Despite these limitations, the study findings resonate with a relational-realist approach to generating futures insights, drawing on a plurality of ideas and engagement at practice level to explore alternative proposals. While reformulations of ideas for sustainability enhancement did emerge under workshop conditions, no conclusions can be drawn about companies' actual decision making processes, which were beyond the scope of this study. Nevertheless, this form of participatory deliberation promises to widen and strengthen ownership of sustainability enhancement in networked inter-organizational foresight processes. In the present case, adopting a collaborative approach in an appropriate communicative setting facilitated multi-dimensional analysis of how communities construct such insights and futures images (Garduño García & Gaziulusoy, 2021). This kind of collaborative project setting, where the actors invest resources to interaction with specific partners relatively long time, creates a space to analyze, how early fuzzy ideas or

opinions are shared and reformulated. Existing theoretical studies also highlight the multiple roles of foresight and confirm that the natural role of the inter-organizational community is to generate ideas for further development (Gattringer & Wiener, 2020; van der Duin, Heger, & Schlesinger, 2014).

The study takeaways can be summarized as follows.

- Collaborative foresight for sustainability enhancement supports a broad futures-focused perspective in setting far-reaching goals.
- A critical-transformative approach to collaborative foresight enables practitioners to reflect on the assumptions underlying the construction of futures images.
- For futures-focused data collection, the workshop method is enhanced by combining video footage with observations, notes, and transcripts.

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Appendix A. Study data

Tables A1–A3

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