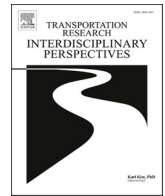


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# Transportation Research Interdisciplinary Perspectives

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## Customer perceptions of COVID-19 countermeasures on passenger ships during the pandemic

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### ABSTRACT

The COVID-19 pandemic devastated substantial portions of the tourism industry; the cruise industry particularly suffered from negative publicity as the virus spread rapidly on cruise ships. The pandemic is a disaster that the industry has been forced to adapt to. This study illustrates, through a mixed-methods research design, what factors cruise ferry operators considered in their responses to the pandemic, whether the implemented countermeasures increased their customers' sense of security, and what countermeasures customers would agree to follow before boarding a ship. The study thereby provides insights into which countermeasures are likely to decrease customers' perceived health risks and which they are ready to accept or not on cruises during pandemics.

### Introduction

Mobility has a vital role in the welfare of society: Food and medical availability, industries, and individuals suffer from mobility restrictions. In the future, the world is likely to be hit by several severe epidemics and pandemics that cause significant negative socioeconomical impacts like the current COVID-19 pandemic. During the ongoing COVID-19 pandemic crisis, cities, societies, and infrastructures are suffering from tangible agony over the restricted mobility at all levels, personally, professionally, locally, regionally, nationally, and transnationally. Travel, tourism, and mobility are among the sectors that have suffered the most from the current pandemic. The situation reflects the acute and serious need to find solutions to enable continued mobility even during lockdown situations and when mobility imposes a risk for human health in terms of transmittable diseases.

Based on the experiences from the current COVID-19 pandemic, it is now obvious that restricting transnational, national, and local mobility has a highly detrimental impact on involved societies and their economy. Hence, there is an acute need to develop both strategic and operational solutions for industries, and consequently societies, to function

in these restricted situations. The COVID-19 pandemic differs from previous disasters as it is widespread and, more crucially, it has involved a government-led regulation of mobility. Thus, it has widely affected the travel and the cruise industries. However, as researchers have noted (e.g. [Holland, 2020](#); [Radic et al., 2020](#)), disasters and crises are not new to tourism. Particularly in the cruise industry, pathogens and human error have led to various kinds of disasters and crises, such as grounding, collisions, floundering and fires ([Holland, 2020](#)), as well as outbreaks of norovirus ([Bert et al., 2014](#)) and Legionnaires' ([Kura et al., 2006](#)). Therefore, there is much to gain from previous frameworks for crisis or disaster management, such as the work of [Faulkner \(2001\)](#) and reviews such as [Wut et al. \(2021\)](#). A pandemic does not necessarily require researchers to invent the wheel again, but to apply some new grease to its old bearings ([Zenker and Kock, 2020](#)).

It has been acknowledged that the emergency mechanisms of epidemic prevention need to be improved to resume safe cruise operations ([Xu et al., 2020](#)). Moreover, to recover from the pandemic crisis, cruise companies would need to understand cruise passengers' consumption behaviours which have been affected by the pandemic and rebuild the trust in cruise shipping ([Pan et al., 2021](#)). Central to the choice

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of countermeasures on cruises are their feasibility in terms of how effective they are and how much their implementation costs (Niemelä et al., 2021). However, it is as important to consider how effective passengers perceive them to be (i.e. to what extent they reduce the perception of risk and increase a subjective sense of safety) and how willing passengers are to accept them. From a business perspective, it is crucial to ensure that the countermeasures (or the lack of them) do not alter the cruise experience and hence, reduce customers' willingness to travel. Thus, the following research question is posed: *Which COVID-19 countermeasures are deemed acceptable by cruise passengers and increases their subjective sense of safety?*

This study was undertaken in two phases. First, our interdisciplinary research team attended and led meetings and workshops in which two cruise ferry companies together with the research team developed contingency plans for responding to the pandemic. Knowledge of what countermeasures were *currently*<sup>1</sup> implemented and which countermeasures could be *realistically* implemented in the future was reached based on the workshops and seminars with health experts, cruise ferry operator representatives, a port representative, and a consulting company. In the second phase, these insights were operationalised into a survey that was sent to a participating cruise ferry operator's loyalty club members. As such, the study takes an established mixed-methods approach where a qualitative approach (interviews and workshops) is used as the basis for designing a quantitative study (survey) (Creswell, 2015). Therefore, the developed survey is firmly grounded in the empirical reality of cruise ferry operators. This is a particularly relevant approach in the current context, as the pandemic is a novel situation.

The remainder of the article is organised as follows: First, we review the literature on disaster management in general, what kinds of countermeasures the cruise industry has been adopting, and how their effects are moderated by passengers' perceptions of safety and their acceptance of them. We then present our mixed-methods research design detailing both the qualitative and the quantitative parts of the study. In Section 4, we first present the findings from the qualitative part of the study by introducing a model considering safety perception in relation to countermeasures, followed by a presentation of the quantitative results. Next, we discuss the findings in the light of extant literature on disaster management in the cruise industry. We conclude by outlining the contribution, the implications, and the limitations of our study with further research avenues.

## Literature review

### Disaster management

There are several different frameworks that describe the distinct phases of disaster management in different contexts (Pennington-Gray, 2018). For example, the seminal work of Faulkner (2001) provides six distinct phases of disasters, whereas Hystad and Keller (2008) present a four-phase framework. Furthermore, the disaster management frameworks are often modified to represent the phases of specific disasters (Ritchie and Jiang, 2019). Common to these frameworks is that they divide a disaster or crisis into pre-disaster, mid-disaster, and post-disaster phases.

COVID-19 poses a multitude of challenges to the cruise industry, and many aspects of tourism disaster management are relevant for tourism businesses during the pandemic. The damage to the cruise industry's image caused by the media coverage of several cruise ship outbreaks and the consecutive actions of different national authorities makes communication strategies an important aspect of disaster management. Furthermore, the development of emergency procedures is obviously relevant to avoid situations where, for example, staff are confined to the ship indefinitely. From a theoretical perspective, the pandemic provides

a unique opportunity to observe and understand what Faulkner (2001) refers to as the *intermediate* phase of a disaster, that is, how tourist businesses modify their processes to continue providing services *during* disasters – something that has received less attention (Ritchie and Jiang, 2019).

Research that investigates the attempt of tourist businesses to prevent or resolve damages caused by disasters that are out of their control is scarce (Ritchie and Jiang, 2019). The crisis or disaster management studies have mainly described how distinct locations manage natural disasters or human-made catastrophes, such as floods (Faulkner, 2001) or terrorist attacks (Berbekova et al., 2021), respectively. The difference between crises and disasters are meticulously described by other researchers (e.g. Faulkner, 2001; Wut et al., 2021). For this paper, we settle on Faulkner's (2001) definition of crises as negative events that originate from something more or less human-made (e.g. errors or terrorism) and disasters as deriving from natural occurrences that cannot be controlled by humans (e.g. floods or earthquakes). The COVID-19 pandemic, as far as the current consensus about its origin, belongs to the latter category.

### Cruising during pandemics and proposed countermeasures

The cruise industry was one of the fastest-growing segments in the tourism sector up to the year 2019 (Papathanassis, 2019), with an estimated annual value of more than \$150 billion USD in 2019 (Cruise Lines International Association, 2019), was devastated by the COVID-19 pandemic. At the beginning of 2020, passengers started cancelling their cruise bookings out of fear of exposure to COVID-19 and to follow governmental recommendations to avoid travelling, such as those issued by the Centers for Disease Control and Prevention (CDC<sup>2</sup>) in the US. The image of 'ships as infectious petri-dishes' (Awoniyi, 2020) was facilitated by the situation that unfolded, for example, on Diamond Princess, where 700 people were infected and several died<sup>3</sup>. Further, regulatory limitations were imposed on cruising and port entry for cruise ships, which ceased all cruise shipping in spring 2020. These limitations included, for example, a No Sail Order for American ports issued by the CDC, bans on cruise ship arrivals in the US, Canada and Australia, and the closure of borders and ports by national governments globally (Holland et al., 2021). The lack of sailing meant significant losses for cruise companies and the whole supply chain for cruise business (Radic et al., 2020). The stock prices of the big cruise liners dropped more than 80% when the pandemic hit and have not recovered to pre-crises levels, even though the rest of the market is at an all-time high. In June 2021, the stock prices of Royal Caribbean Cruise Lines and Carnival Corporation were 35–45% below their pre-crisis levels from 2019<sup>4</sup>.

### Industry response

In an attempt to resume cruising in a safe manner, cruise lines have established new safety rules for cruising during the pandemic. For example, the classification society American Bureau of Shipping (ABS) released guidance notes on response measures to COVID-19 for the marine and offshore industries in October 2020<sup>5</sup>, and the CDC issued a Framework for Conditional Sailing Order at the same time<sup>6</sup>. The cruise industry reacted by adjusting their safety protocols on vessels and

<sup>2</sup> <https://wwwnc.cdc.gov/travel/notices/covid-4/coronavirus-cruise-ship>

<sup>3</sup> [https://www.mhlw.go.jp/stf/newpage\\_10870.html](https://www.mhlw.go.jp/stf/newpage_10870.html)<https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e3.htm>

<sup>4</sup> In November 2021, when this paper was revised, the stock prizes had increased since June but were still below 50% of the pre-crises levels.

<sup>5</sup> [https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/other/314\\_gnonresponsemeasurescovid19formarineoffshore/covid-19-oct20.pdf](https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/other/314_gnonresponsemeasurescovid19formarineoffshore/covid-19-oct20.pdf)

<sup>6</sup> <https://www.cdc.gov/quarantine/cruise/covid19-cruiseships.html>

<sup>1</sup> September 2020–March 2021

organizing ‘cruises to nowhere’, that is, with no stops at ports (da Silva, 2021). Several articles on measures that can be adopted to guarantee safe travel on cruise ships and ferries during pandemics have been published (e.g. Niemelä et al., 2021; Pradhan et al., 2020; Sun and Zhai, 2020). The studies range from what role the cruise ships have had in spreading COVID-19 internationally (Ito et al., 2020), what safety measures would prevent and contain outbreaks on ships (Codreanu et al., 2021), and governance measures to manage pandemic-related emergencies and prevent the disease spread in the long term (Liu and Chang, 2020). These articles point out the importance of social distancing and the use of face masks and disinfectants as effective methods for preventing the virus from spreading.<sup>7</sup>

Niemelä et al. (2021) present a near-zero risk model for seaborne travel during a pandemic that constitutes a series of layered procedures. These include a negative PCR test, vaccination passport, self-diagnosis (questionnaire), temperature check, rapid test (antigen), staged boarding, and reduced vessel capacity to focus on identifying possible infected passengers during boarding of the vessel. The study shows a reduction in the chance of one infected person boarding using efficiency numbers of the countermeasures from previous studies (Niemelä et al., 2021). Based on the three main ways of spreading of the SARS-CoV-2 virus (airborne through, droplets and aerosols, indirect contact, and direct physical contact), Niemelä et al. (2021) also present a model for decreasing the reproductive number (R0) onboard cruise vessels and ferries. Depending on the pandemic situation (e.g. percentages of infected population), a series of countermeasures are applied, such as decreasing the number of passengers or their mobility, face masks, hand washing, additional disinfection, and quarantine.

#### *Safety perception and countermeasure acceptance*

The subjective experience of the passengers in relation to different countermeasures is extremely important. A recent article by Villacé-Molinero et al. (2021) highlights the importance of reducing the tourists’ perceived risk to cruise during the COVID-19 pandemic. Safety measures can, however, radically alter the cruise experience and eventually impact the intention to cruise (Holland et al., 2021). Consider the dining experience on cruise ships: It is one of the core elements of cruising, and it can be assumed that COVID-19 has affected this experience negatively (Radic et al., 2020). Following this, recent research looks past COVID-19 and asks how the pandemic may have affected the cruise travelers’ attitudes (Pan et al., 2021). Pan et al. (2021) and Wut et al. (2021) identify safety as one of tourists’ most important considerations when making their decision to travel. Hence, there is a need to investigate how disaster contingency plans are regarded by customers and how cruise companies adapt to the current pandemic so that they are better prepared for future similar crises.

The introduction of different countermeasures against COVID-19 can increase the perception of safety on cruises. In turn, the lack of a sense of safety can reduce the positive experience of a cruise. Previous studies on the perception of risks and safety in tourism have demonstrated that safety perceptions affect tourist decision-making in terms of the choice of travel destinations (Floyd and Pennington-Gray, 2004; Sönmez and Graefe, 1998) and the choice of whether to go on a cruise (Holland, 2020). In the cruise shipping context, health concerns have been found to be among the most significant issues regarding cruise travel even before the onset of COVID-19 (Tarlow, 2017). Zou and Petrick (2017)

also found that health-related perceived risk was one of the underlying factors against taking a cruise. In general, travelling by sea has been associated with many health risks and uncertainties (Liu et al., 2016).

It has been widely acknowledged that for the revival of the cruise industry, it is crucial to understand how travellers’ attitudes towards cruising have changed due to the pandemic (Pan et al., 2021) and to study the impact of perceived risk on the choice to go on a cruise despite the ongoing threat (Holland, 2020; Holland et al., 2021). Recent studies have paid attention to the impact of tourists’ risk perception in relation to the pandemic on their decision-making. Radic et al. (2020) studied the role of health-related perceived risks on the nature and impact of the COVID-19 cruise tourism crisis and highlighted the emotional nature of tourism consumption, which makes people cautious in their decision-making when feeling unsafe.

While previous studies draw attention to the impact of perceived health-related risks on decision-making in terms of going or not going on a cruise (Radic et al., 2020; Holland et al., 2021; Pan et al., 2021), it is still unclear how health-related risks and safety are experienced by tourists when already on a journey, and how they affect the travellers’ cruise experience. The connection between the acceptance of different safety measures implemented on cruise ships, the perceived safety during a cruise and the overall cruise experience are not evident and require further investigation. The cruise experience has been described as a multisensory experience (Radic, 2019). Therefore, the introduction of too many safety measures can limit the experience of a cruise in terms of its central elements such as entertainment and socialising. For the cruise industry to handle the crises caused by the current and potential future pandemics, it is crucial to understand the way passengers perceive safety in terms of their health and how it affects their cruise experience.

To summarise, for continuing their services, the cruise industry and the cruise ferry operators studied here need to understand which protocols (i.e. countermeasures) are effective and realistic (i.e. considering expenses in relation to protection). Furthermore, it is important to understand which countermeasures increase their customers’ feelings of safety. They also need to understand what countermeasures are deemed acceptable by their customers to maintain the attractiveness of their services.

## **Methodology**

### *Research context*

Cruiseferries are ships that combine the features of a cruise ship and RoPax vessels. The cruise ferry operators studied in this paper operate 22 cruiseferries in the Baltic Sea Area. The most important routes for these operators are between Helsinki and Tallinn, Helsinki and Stockholm, and Turku and Stockholm. Most of the ships are about 200 m or more in length and, thus, are comparable in size to the ships run by the big cruise liners Royal Caribbean and Carnival. A sizeable (but undisclosed) part of the ferry operators’ sales comes from customers spending one or two nights on the ships enjoying the food, bars, spa, tax-free shopping, and other leisure activities.

The operation of cruiseferries poses an extreme challenge to disaster management during disease outbreaks as there is a daily mix of new and old passengers. The cruises can be booked close to departure, making business operations less predictable, whereas longer cruises on vessels dedicated to that single purpose are typically booked long in advance. Moreover, the cruiseferries also carry cargo (trucks and trailers) and serve an important function in the trade flows between countries. Hence, their continuous operation has a crucial societal role during the pandemic.

### *Research design*

The study uses a mixed-methods design based on performing

<sup>7</sup> Revision update: In November 2021 the same recommendations of social distancing and wearing face masks are at place on the cruise ferries. The situation compared to early 2021, when the data was collected, has mainly changed in terms of higher rates of vaccination, the increased use of (voluntary) rapid corona tests at the terminal(s), the introduction of a national corona tracing mobile app, and the separation of domestic cruise passengers and foreign travellers by the border control.

qualitative inquiries to design and implement a questionnaire. This type of approach is widely used in designing measures and instruments (Creswell, 2015). Especially as the COVID-19 pandemic is a new situation for the cruise industry, it warrants an approach grounded in empirical observations, which ensures that the items in the questionnaire are *relevant* in the studied context. Furthermore, the development and sampling approach guaranteed that the developed measure coincided with the countermeasures that were used in, or were potential for, the context that the respondents had cruised.

*Qualitative data collection*

To gather evidence of important challenges that the cruise industry faces during the COVID-19 pandemic, we arranged one-on-one interviews with two cruise ferry operators. Following the interviews, we arranged two seminars with the ferry operators and several stakeholders of the cruise business as well as diagnostics and healthcare professionals. The first seminar was held on November 2, 2020, and the second on January 18, 2021. The participants in these seminars were representatives from a major shipyard and its supplier, diagnostics companies, a port operator, a university hospital, two cruise ferry companies, and an international cruise liner. Both seminars lasted slightly longer than 1.5 h, and both had the same number of participants (10 practitioners and 6 members of the research team). The presentations and discussions during the seminars focused on finding solutions for what can be done by the industry to increase the safety of the passengers on ships and how to convince the customers to take cruises again.

The main purpose of the interviews and seminars was to collect information about the measures the cruise liners have taken and should take to prevent COVID-19 and other similar future viruses from spreading on cruises. Overall, it became clear that the ship operators had undertaken a wide range of measures to keep their passengers safe during the pandemic. This knowledge of the companies' actions was then used to develop the questionnaire together with one of the ferry operators.

*Quantitative measures and data collection*

The workshops' and the research team's previous work acted as the basis for the development of our quantitative measures. The quantitative measures were developed based on what the cruise ferry operators had implemented during the pandemic. The quantitative phase of the study aimed to identify which countermeasures received the most support by the passengers. The items in the questionnaire are displayed in Table 1.

**Table 1**  
Countermeasure and Acceptance items.

Sense of safety	Acceptance
The following countermeasures increased my sense of safety	Before I board a ship, I would accept the following safety measures
Clear social distancing rules	Respond to a health questionnaire
Use of face masks	Provide written assurance of not having symptoms before boarding a ship
Availability of hand sanitizer	Take temperature
Availability of handwashing stations	Mandatory wearing of face masks
General cleanliness of the ship	Increase social distancing in the terminal
Information and signposts onboard and in the terminal	Boarding the ship in small groups to avoid passenger jams in the corridors
Protective sheets in customer service points (e.g. at the information desk and at the cashiers)	Follow personnel instructions
Use of disposable gloves in the buffet restaurant	Be tested for corona
Friendly personnel	Show a corona passport
	Wear a bracelet that registers my contacts during the cruise to prevent infections
Scale	1 completely disagree, 2 disagree, 3 neither disagree nor agree, 4 agree, 5 completely agree

Cleanliness of the ship is an operationalisation of the increased cleaning that the ferry company had initiated in the wake of the pandemic. The survey was sent to one of the participating cruise ferry operator's loyalty club members in March 2021.

To ensure the relevance of the questions, a representative of the operator that had participated in the workshops provided feedback on the questionnaire. The survey included questions about how safe the respondent felt during the journey, how much they enjoyed the cruise compared to before the pandemic, and how worried they were about contracting COVID-19 during the cruise. Furthermore, the respondents were asked what other things they have done during the pandemic to provide a comparison between cruising and other behaviours that involve large gatherings in a space.

The survey was distributed via a cruise operator's Finnish online newsletter for customers registered in its loyalty club, which has 2.7 million members in total. These members receive discounts and exclusive offers, but none of these were tied to answering the questionnaire. This data collection source ensured that the questionnaire would reach the passengers that are interested in cruising and are thus relevant respondents for the study as it excludes those that are not particularly interested in cruising in general. The data were collected during the first weeks of March 2021. Furthermore, sampling the passengers of one company ensured the research team's awareness of the countermeasures used on the ships. A random sampling method that comprises several ferry companies does not provide such in-depth understanding of the respondents' context. Considering the possibility that cruise companies have implemented different measures during the pandemic, collecting data from one cruise company ensured that the items in the survey were relevant for their passengers. The results of the survey were presented to representatives of the cruise ferry operator in an online meeting for validation and further insight.

**Findings**

*Considerations of cruise ferry operators regarding contingency planning*

In the one-on-one meetings with the cruise ferry operators that took place in autumn 2020, it became clear that they had taken several countermeasures to secure safe travelling on their ships. Most of these measures included adjusted procedures and instructions to passengers, such as social distancing at boarding and on the ships, new enhanced cleaning procedures and new routines in the restaurants, especially in the buffet. These countermeasures were accompanied by signs about COVID-19 safety onboard and wide availability of hand sanitizer and even installation of new and separate hand washing stations in the public spaces. In the meetings, it became clear that both cruise ferry operators had been offered a range of countermeasures such as new ventilation systems and infrared lights which could reduce virus transmission on the ships. Generally, the cruise ferry operators had not invested in these solutions because their effectiveness was uncertain, and their budgets were constrained due to crisis caused by the pandemic.

Both operators thought that their ships were very safe since the countermeasures were in place but admitted that their low capacity, which was as low as 20% of the normal level, contributed to the safety of their vessels. It is still uncertain how well the implemented countermeasures would work in an environment with higher passenger figures, which the cruise ferry operators also pointed out. However, their biggest concerns regarding the countermeasures were how well the passengers would follow the new procedures and how much these countermeasures would affect the travel experience.

*Balancing business and safety*

The workshops provided three main findings regarding the implementation of countermeasures on the passenger vessels. They concerned

the challenge of testing passengers during boarding, the impossibility to completely rule out the risk of virus transmission among passengers and crew, and the likelihood that the current pandemic will not have a major effect on how cruise ships are designed and built. The cruise ferry operators were interested in having the possibility to test passengers for COVID-19 during boarding. A central issue for them, however, was that the extremely limited boarding time due to the required fast turnaround (usually less than 1 h) and the costs of testing made its implementation challenging and expensive in practice. Even if all passengers could be tested (or at least the passengers with higher-than-normal body temperature and other symptoms), other problems, such as the problem of false positives and false negatives, would persist. Testing would further create new challenges. For example, how would they cope with others from a travel party if one tested positive, and how would the testing be experienced by the paying customers? The consensus of the workshop participants was that the goal should not be to make the cruise ships 100% safe but to increase level of safety. The marginal cost to make the ship 100% safe is too high regarding both the monetary cost and the toll on the passenger experience. The common belief of all participants at that moment was that the current pandemic will be over relatively soon, and therefore, it will not affect the ships currently being built. That is, new ships would not have features that are adapted to the pandemic context.

Based on the discussions during the workshops, the central aspects that the cruise ferry operators were considering in their contingency plans were derived and are illustrated as a model in Fig. 1. First, the relevant and effective countermeasures need to be identified. The uncertainty of various countermeasures' effectiveness inhibited the investment in countermeasures in the dire economic situation. Thus, identifying effective countermeasures is the first element in our model. Another concern that the workshops and meetings raised was to what extent passengers would be prepared to adhere to the countermeasures and whether the countermeasures would repel potential customers. Thus, the *acceptance* of the countermeasures affects whether implemented countermeasures increase the actual protection against contagion (in contrast to the perception of safety). The perception of safety and the enjoyment of the cruise then mediates the relationship between the actual protection against the spread of COVID-19 (safety) and the cruise experience. From a business perspective, how safe passengers *feel* or how safe they *perceive* cruising to be is essential for attracting new customers as safety is a crucial factor in deciding to travel (Radic, 2020).

Fig. 2.

*Findings from the quantitative study: Impact of countermeasures on safety perception and acceptability of countermeasures*

Of the total number of respondents (N = 1151), roughly 61% reported that they had travelled by ship during the pandemic. Thus, the questionnaire provides relevant responses regarding what increases passengers' experiences of safety on the ferries. Of the respondents, 58% (N = 657) had travelled with the case cruise ferry operator during the pandemic. This analysis is limited to those respondents that have travelled during the pandemic with this particular cruise ferry operator. Of the respondents that had travelled, the majority were female (67,3%) and between the ages 36 and 63 (64,7%). Most respondents had completed high school or a bachelor's degree (45,3% and 28,8%, respectively), while 11,5% had completed elementary school and 14,4% a master's degree. The majority of the respondents reported living in Finland (89,7%). The sample thus permeates several social strata and is not limited to the most affluent share of the population.

To understand how frequent cruise ferry travel is compared to other social activities, the respondents were asked to rate how often they have engaged in other social activities that the local government has recommended avoiding. Note that many of these activities are also available on the ships, including cinema and dining, spas, nightclubs, and pubs, and are central aspects of the services that the cruise ferry operators provide. The ships in question are also, for example, used by sports teams to travel to tournaments in countries with a shoreline to the Baltic Sea. Table 2 indicates that the majority of those who have travelled during the pandemic by ship have done so less than once per month. In general, most respondents have avoided situations that involve groups of people gathering in an area.

The respondents were asked how worried e of being infected with corona they were during their cruise (1 = not at all worried, 100 = very worried; M = 40, std. dev. 33, N = 581), how safe they felt the cruise was (1 = not at all safe, 100 = completely safe; M = 83.6 std. dev. 17, N = 581), how successful the trip was compared to their travels before the pandemic (1 = not at all successful, 50 = as successful, 100 = more successful; M = 67 std. dev. 22, N = 569), and how well the level of hygiene met the respondent's expectations (1 = not at all, 100 = completely; M = 86, std. dev. 14, N = 581). In general, these results suggest that respondents are quite content with the safety and hygiene aspects of their cruises and not that worried about infections onboard.

The fundamental question is whether the possibility of contracting COVID-19 is perceived as a health threat for passengers that have travelled during the pandemic. For a basic understanding of this, the correlation was calculated between the question of how safe one felt

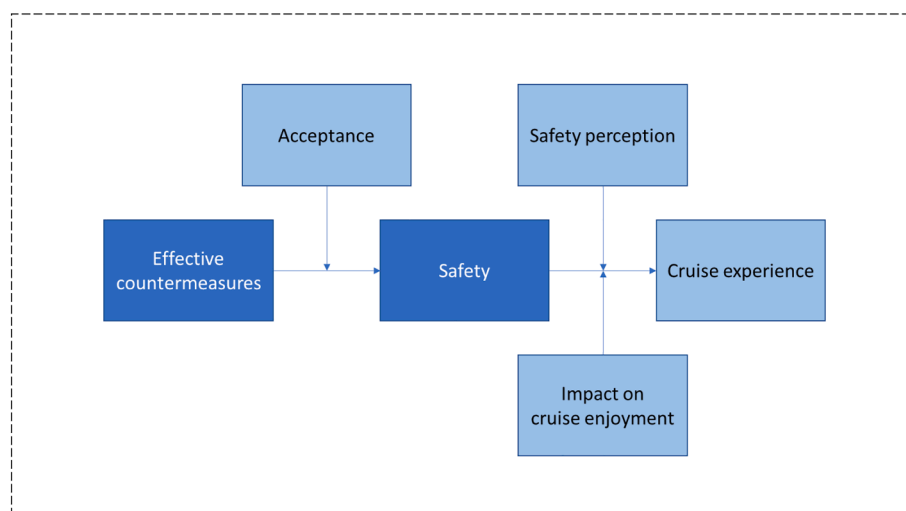


Fig. 1. A conceptual model for considering safety perception in relation to countermeasures against the spread of COVID-19 on cruiseferries.

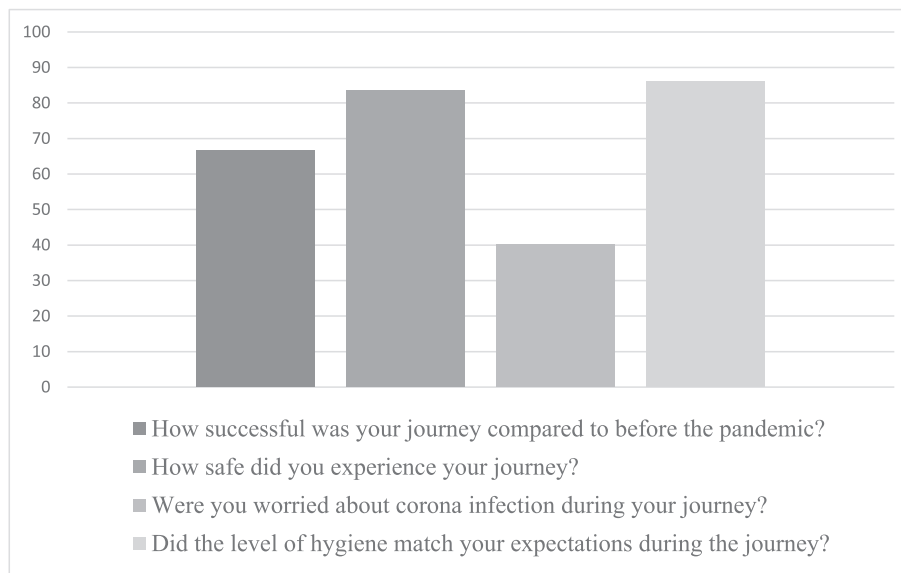


Fig. 2. Means of items related to worry about corona, subjective safety, cruise success, hygiene levels.

**Table 2**  
Other social behaviours that travellers have participated in during the pandemic (% of valid responses N = 585).

	Not once	Less than once/month	Monthly	Weekly	Daily
Used mass transportation	32,5	29,1	15,4	13,2	9,9
Travelled by ship	0,0	86,2	12,3	0,9	0,7
Dined in a restaurant	16,6	46	25,1	10,6	1,7
Participated in hobbies	55,0	20	8	13,5	3,4
Visited theatres or cinemas	68,4	28	2,1	0,5	1,0
Visited nightclubs or pubs	68,9	22,4	3,8	4,1	0,9

during the trip and the question of how worried they were about being infected by corona during their cruise (scales: 1 = not at all safe, 100 = very safe; 1 = not at all worried, 100 = very worried). The correlations indicate that the two factors are negatively correlated ( $r = -.362p < .001$  N = 581). Thus, fear of being infected by COVID-19 is a relevant safety concern for the respondents as they cruise.

For the overall cruise experience, safety is a key factor. The sense of security onboard the ship is related to the success of the cruise compared to cruises before the pandemic ( $r = .240p < .001$ , N = 569). When controlling the correlation with how well the level of hygiene onboard the ship fulfilled the respondents' expectations, hygiene clearly mediates most of the relationship between safety and the success of the trip ( $r = .09p = .03$  N = 566). The level of hygiene, then, is central for the respondents' cruise experience both in terms of safety perception and cruise success.

Most of the countermeasures were reported as increasing the sense of security for the passengers. As shown in Table 3, the most important factor was the availability of hand sanitizer and cleanliness of the ship. It is noteworthy that the use of face masks has a relatively low position in increasing the sense of security, which may relate to the communication by the Finnish government about the non-proven efficacy of face masks during the initial stages of the pandemic (YLE, 2020). This may have affected the perception of face masks as a source of security in a negative way. The results indicate that most of the countermeasures in current use increase the feeling of safety among respondents.

Surprisingly, the friendliness of the personnel was in the top 3 items

**Table 3**  
What countermeasures made passengers feel safe on the cruise (% of valid responses N = 569).

	Totally disagree	Disagree	Neither disagree or agree	Agree	Completely agree
The availability of hand sanitizer	2,3	2,8	6,7	34,4	53,8
The general cleanliness of the ship	1,4	2,1	9,5	48,2	38,8
The friendly personnel	1,8	2,5	12,3	38,7	44,8
The availability of hand washing opportunities	1,9	3,5	13,4	40,9	40,2
Clear instructions of social distancing	4,2	7,0	13,5	43,8	31,5
The instructions to passengers on the ship and in the terminal	2,6	5,4	18,5	47,6	25,8
The use of face masks	7,9	10,7	17,8	34,1	29,5
Protective screens at the customer service points [cashiers and information desk]	4,9	7,7	26,9	37,8	22,7
The use of disposable gloves in the buffet restaurant	5,8	7,7	31,8	30,9	23,7

that increase a sense of security among the respondents. Although technically not a countermeasure, kind service may provide comfort in uncertain or unfamiliar situations. The results confirm that most countermeasures discussed in the public increase the passengers' sense of safety – many of which relate to hygienic factors – when implemented in cruise ships.

Table 4 summarises how acceptable the respondents reported that the different proposed countermeasures are. The table shows that the majority of the countermeasures are accepted by the passengers. The most accepted terms are quite general and require little effort. In

**Table 4**  
What countermeasures passengers would be prepared to accept before boarding a ship (% of valid responses N = 559).

	Totally disagree	Disagree	Neither disagree or agree	Agree	Completely agree
Follow personnel's instructions	1,3	0,5	3,9	26,5	67,8
Organise boarding in small groups to avoid crowding in corridors	1,8	2,0	8,4	34	53,8
Increased distances between people in the terminal	1,1	1,4	10,4	30,2	56,9
Mandatory wearing of face masks	5,5	5,9	10,4	30,2	56,9
Reply to a health questionnaire	5,4	4,1	13,2	33,3	44,0
Give my written assurance that I have no symptoms	4,1	5,5	15,7	30,9	43,6
Take your temperature	3,8	7	17,4	29	42,9
Show a corona passport	9,5	5,9	21,6	25,2	37,7
Be tested for corona	8,2	9,3	22,5	27,2	32,7
Wear a bracelet that tracks my contacts during the voyage	10,2	12	21,6	27,7	28,4

contrast, the least supported terms are closely related to the privacy of the individual. Tracking someone's contacts can be viewed as a considerable infringement on privacy, and corona tests, corona passports and fever measurement are intimately related to information about the individual. Thus, the results indicate that passengers are more accepting towards terms that do not relate to their individual person,

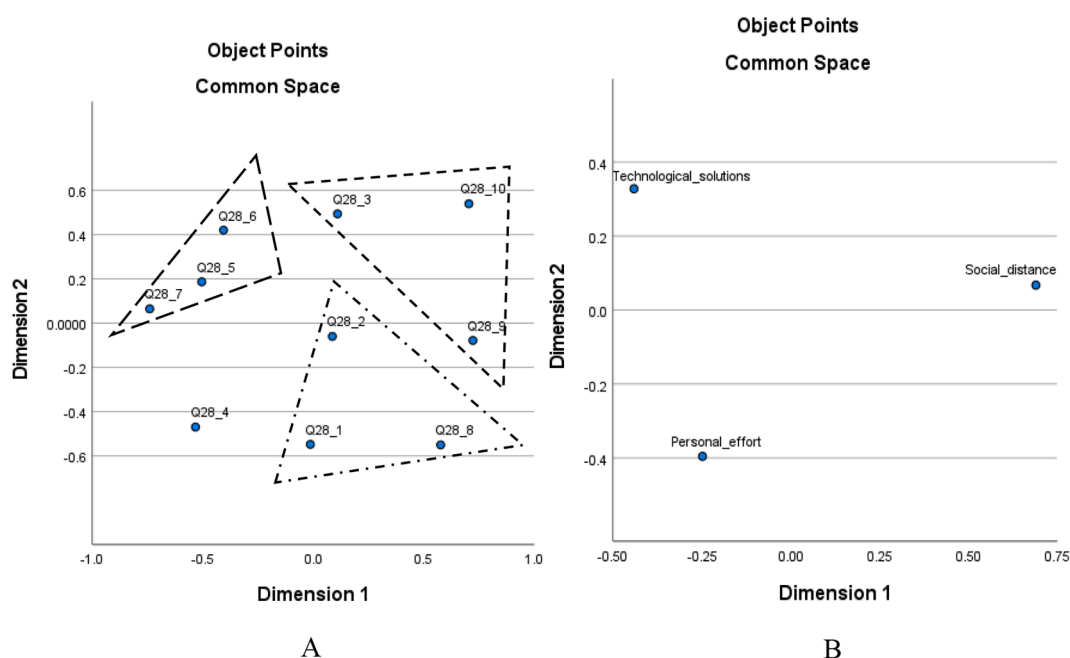
while rather generic countermeasures such as social distancing and following instructions are accepted to a higher degree.

To further shed light on the relationship between the measured variables their associations were measured and visualized by multidimensional scaling. The procedure has been recommended by previous researchers as a promising analytical strategy in tourism for identifying types of tourists and destinations (Fenton and Pearce, 1988). The strength of the procedure is its ability to visualize underlying structures in the data (Marcussen, 2017). The PROXSCAL function in SPSS (Euclidean distances, distances derived from data) was used to analyze the data set. Fig. 3 illustrates the associations between the acceptance of different measures. From the analysis three different regions could be derived: *social distance*, *personal effort*, *technological solutions*. Table 5 illustrates which items are included in the constructs and the reliabilities of the constructs, which each are above the common 0.7 threshold for internal consistency. Quite interestingly the analysis indicates that "Mandatory wearing of face masks" is least associated with the item 'Reply to a health questionnaire' and be 'Tested for corona'.

The same analysis was performed based on the questions regarding increased feeling of safety (Table 6). Two conceptually relevant constructs emerged from the analysis: *safety in protection* and *safety in hygiene*. Both constructs were made relevant in the public discussion of how to decrease the spread of the COVID-19 virus. Four items were excluded from the constructs as their associations make conceptually little sense. Quite surprisingly, protective screens at the cashiers are distinct from other protective measures such as social distancing, use of face masks, and using disposable gloves in the buffet restaurant.

The regions of items identified in the MDS tests (see Figs. 3 and 4) were correlated with *how safe did you feel during your cruise* and *were you worried about corona during the cruise*. The acceptance regions indicate weak correlations with feeling safe during the cruise (social distance  $r = -.10p = .016$  N = 559, personal effort  $r = -.07p = .11$  N = 559, technological solutions  $r = -.12p = .004$  N = 559). There is also a weak positive correlation between all the acceptance regions and level of worry of corona during the cruise (social distance  $r = .17p < .001$  N = 559, personal effort  $r = .15p < .001$  N = 559, technological solutions  $r = .16p < .001$  N = 559).

The regions identified from the questions related to increasing a sense of safety are *Safety in Protection* and *Safety in Hygiene*. The regions



**Fig. 3.** PROXSCAL common space of countermeasure acceptance. A: Identified constructs are illustrated with lines. B: Illustrates the association of the constructs.

**Table 5**  
Items, reliabilities, means, standard deviations, and respondents of acceptance constructs identified in the PROXSCAL analysis.

constructs	Items	Cronbach's alpha	Mean	Std. Dev.	N
Social distance	Q28_5 'Increased social distancing in the the terminal' Q28_6 'Boarding the ship in small groups to avoid passenger jams in the corridors' Q28_7 'Follow personnel instructions'	0.85	4.5	0.70	559
Personal effort	Q28_1 'Respond to a health questionnaire' Q28_2 'Provide written assurance that I have no symptoms' Q28_8 'Be tested for corona'	0.79	3.9	1.0	559
Technological solutions	Q28_3 'Take my temperature' Q28_9 'Show a corona passport' Q28_10 'Wear a bracelet that tracks my contacts during the cruise to prevent infections'	0.79	3.8	1.0	559

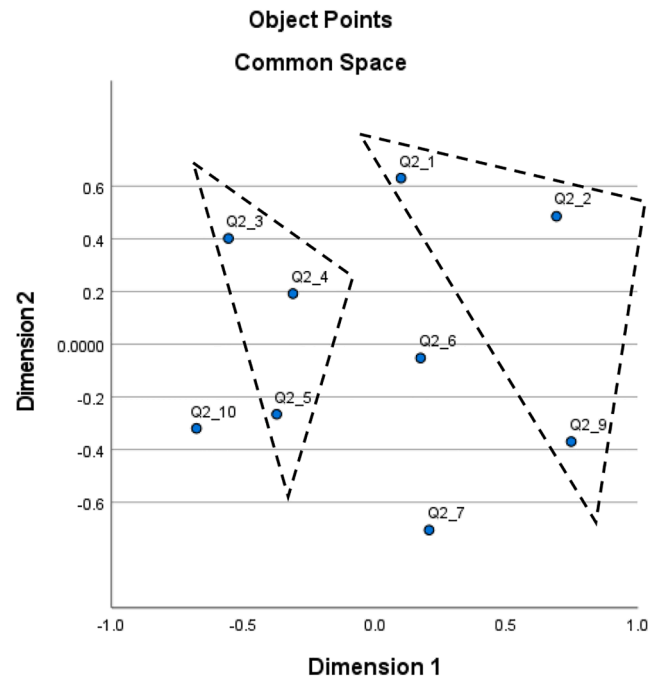
**Excluded:**  
Q28\_4 'Mandatory wearing of face masks'

**Table 6**  
Items, reliabilities, means, standard deviations, and respondents of safety constructs identified in the PROXSCAL analysis.

Region	Items	Cronbach's alpha	Mean	Std. Dev.	N
Safety in Protection	Q2_1 'Clear social distancing rules' Q2_2 'Use of face masks' Q2_9 'The use of disposable gloves in the buffet restaurant'	0.72	3.7	0.90	569
Safety in Hygiene	Q2_3 'The availability of hand sanitizer' Q2_4 'The availability of hand washing stations' Q2_5 'General cleanliness of the ship'	0.81	4.2	0.74	569

**Excluded items**  
Q2\_6 'Information and signposts onboard and in the terminal'  
Q2\_7 'Protective sheets in customer service points [e.g. at the information desk and at the cashiers]'  
Q2\_10 'Friendly personnel'

were correlated with the questions *how safe did you feel during your cruise and were you worried about corona during the cruise*. Feeling safe on the cruise was correlated positively with both *safety in protection* ( $r = .26p < .001$  N = 569) and *safety in hygiene* ( $r = .26p < .001$  N = 569). Worry about corona during the cruise is also linked to whether the countermeasures that the cruise ferry line had implemented made respondent's feel safe. Worry about corona during the cruise had significant negative correlations with both *safety in protection* ( $r = -.14p = .001$  N = 569) and *safety in hygiene* ( $r = -.10p = .016$  N = 569).



**Fig. 4.** PROXSCAL common space of the items related to countermeasures increasing subjective safety. Identified constructs are illustrated with lines.

**Discussion**

The COVID-19 pandemic has created a prolonged disaster that has forced the cruise industry to consider their practices and safety protocols in a new light. This study had two aims. First, to shed light on the countermeasures that are implemented by cruise ferry operators and what countermeasures they are considering for their future operations. Second, to explore how cruise passengers accept and perceive different countermeasures that are already implemented or are under consideration for implementation. The study accomplished this with a mixed-methods approach, combining information from workshops and meetings with a survey of passengers that have cruised during the pandemic. The workshops illuminated what countermeasures the cruise ferry operators had implemented during the pandemic: social distancing, recommendations for the use of face masks, increased informing inside and outside the terminal and onboard the ships, increased cleaning and disinfection of surfaces, and restrictions of some services onboard the ships. The survey shed light on how passengers experienced the countermeasures and how they relate to subjective safety and worry about corona infection.

The context of cruise ferries has rarely been studied and to the best of our knowledge this is the first study to investigate travel experiences on cruise ferries during pandemics. The study takes consciously a practical perspective on pandemic travel. In terms of life in the 'new normal', the findings point to which countermeasures relate more strongly to creating a safe cruise experience for passengers. The countermeasures as such are not novel and have been presented in previous research both in terms of efficacy and cost (e.g. Pradhan et al., 2020; Niemelä et al., 2021). What the study adds is an understanding of how these countermeasures relate to the passenger's sense of safety and their willingness to accept them. Both are critical aspects of disaster management (Faulkner, 2001). Furthermore, the paper illustrates how a concern for contracting the corona virus seems to increase the acceptability of different countermeasures. Thus, the results suggest that crisis communication, and a sense of urgency are, indeed, essential to increasing the acceptability of new countermeasures during both global pandemics and local outbreaks.



## Industry response

The industry has taken many adaptive actions to ensure the safety of their passengers and to continue their operations. The Finnish Government rapidly restricted the mobility of the population when the pandemic hit. On March 16, 2021 the Finnish authorities closed the country's borders and restricted passenger traffic. Consequently, the passenger traffic on the cruiseferries dropped to "marginal" levels. Following the rapidly increased economic losses, the cruise ferry operators cut costs significantly and securing financing. Already in these early stages of the pandemic measures were undertaken: improved cleaning procedures, new buffet arrangements, securing availability of hand disinfectant and reminding passengers of social distancing. At start the operators had difficulties to decide which measures to implement because contradictory information about countermeasure effectiveness and reliability circulated.

Later, in the Summer and Autumn of 2021 when the knowledge improved and better procedures were established, the cruise ferry operators expressed confidence that their ships were safe. At this point they had implemented extensive written guidelines for procedures for their terminals and ships to keep both passengers and crew safe. They had used external expertise to develop and prevent the virus spread on ships and terminals. One of the cruise ferry operators formalized their procedures to the extent that they were able to certify them with the classification agency DNV GL.

## Passenger safety perception

Previous research on risk perceptions has identified that safety perceptions are a key factor in making decisions to travel (Floyd and Pennington-Gray, 2004; Sönmez and Graefe, 1998; Wut et al., 2021). Furthermore, risk perception has a fundamental impact on whether to take a cruise (Holland, 2020). Our findings show that even among those that have travelled during the pandemic, a concern for contracting COVID-19 is related to the overall safety perception of the cruise. Therefore, even when the decision to travel has been made, the pandemic is an important concern that needs to be considered by cruise operators. The cleanliness of the ships is extremely important in this context because the relationship between safety and cruise success was mediated by the perceived level of hygiene. Poor hygiene increases worry about contracting the disease, even if the transmission routes of the virus are still debated and emerging variants pose a new level of uncertainty. Therefore, it is crucial that cruise operators maintain and communicate high hygiene standards on their ships not only to mitigate the actual spread of the virus, but also to create a sense of safety among the passengers.

In line with previous research on safety and risk perceptions in travel (e.g. Villacé-Moliner et al., 2021), the cruise ferry operators were concerned about how customers would perceive the countermeasures. Important questions were whether countermeasures would repel potential customers and which countermeasures increased their customers' sense of security. These are important questions to consider as health risks are central to making decisions about travel (Radic et al. 2020). Indeed, the case cruise ferry operators were concerned about how countermeasures would affect the cruise experience. The model developed based on the meetings and workshops with cruise ferry operators and other key experts (Fig. 1) illustrates what factors cruise ferry operators considered when they adapted to the disaster.

The countermeasures that most respondents felt provided a sense of safety are related to hygiene. Interestingly, although not a countermeasure as such, the friendliness of the personnel was reported as a source of security by more than 80% of the respondents. This can be explained by Holland's (2020) observations: Cruise passengers place significant trust in cruise companies and officers to ensure their safety in uncertain situations. Interestingly, this is still applicable in the current pandemic, as little research exists on the nature of the virus and its

spreading mechanisms. Therefore, the role of the cruise staff and company image should not be understated in the recovery process during and following the pandemic.

The analysis of associations between the safety items rendered two meaningful constructs: *safety in protection* and *safety in hygiene*. The items that they comprise relate to the use of protective gear or behaviour, or to maintaining an elevated level of hygiene. Both safety constructs have a negative relationship to worrying about corona and a positive relationship to making the passengers feel safe. This suggests that countermeasures do not only provide physical protection, but also relate to the subjective feelings of safety, which in turn can translate into passengers preferring marine transportation and increase passenger volumes.

The importance of communication and marketing after a disaster has been emphasised in several disaster management models (e.g. Faulkner, 2001; Hystad and Keller, 2008). Therefore, the passenger perceptions of the countermeasures are extremely important. They provide guidance as to which countermeasures could, for example, be emphasised in marketing and which could be less suitable from this perspective but still need to be implemented to achieve the factual safety on-board. For a prolonged disaster such as the COVID-19 pandemic, understanding which countermeasures increase customers' sense of security is extremely important from a business perspective. By understanding from which countermeasures passengers derive a sense of safety and which countermeasures passengers deemed most acceptable, cruise lines can target their marketing and communication efforts. These aspects are critical for the cruise industry's recovery as it rebuilds consumer trust and recover its image (Pan et al., 2021).

## Travel behaviour and customer acceptance

A key element of disaster management plans during pandemics is establishing a set of epidemiologically efficient countermeasures. A number of such studies have been published during the ongoing COVID-19 pandemic (e.g. Niemelä et al., 2021). However, the effectiveness of such countermeasures is significantly altered by passengers' ability and acceptance of them. Moreover, part of such disaster management plans must also inevitably consider what impact various countermeasures may have on passengers' willingness and intentions to cruise (Holland et al. 2021). Hence, from a business perspective a good countermeasure shall have a minimum effect on customer retention or even improve the customer experience of a cruise, as illustrated in Fig. 1, to become part of a disaster management plan in the cruise industry.

That customers accepted and agreed to countermeasures was emphasized by the industry partners concern over customer experience during the interviews and workshops. The importance of understanding what countermeasures customers would agree to before boarding was further highlighted. The survey findings indicate that passengers would agree to most of the proposed countermeasures. The majority of passengers accept the commonly used and recommended countermeasures. However, the support for a countermeasure decreased as it became more related to the individual. The survey results suggest that widely advocated and debated countermeasures such as personal tracking (e.g. a bracelet or GPS-based technology) and health-related documents (e.g. a corona passport) may impact the customer experience and thus the willingness to travel. They may reduce willingness to travel because passengers indicate least favourable attitudes to them. As part of a disaster management plan for cruise operators then, they may decrease willingness to travel and thereby create loss of revenue in an already diminished industry.

Three distinct types of countermeasures could be discerned from the acceptance questions. First, *individual effort* which requires the passenger to make an effort by responding to health questionnaires or take a corona test before boarding the ship. Second, *social distance*, which comprises diverse ways to keep a distance from other people (instructions from personnel tends to relate to keeping a distance). Third, *technological solutions* that do not require an effort from the individual

and enables cruising as before, however, it requires an acceptance of being closely monitored by the service provider. The correlations between the acceptance of the measures and safety or worry about corona infection suggest that the safer the respondent felt during the cruise, the less acceptable additional countermeasures are. Similarly, the more worried a passenger is about corona, the more acceptable additional countermeasures are. Therefore, we can conclude that the more worried passengers are of a situation, the more willing they are to consider future actions. Based on the results, a communication strategy that undermines, rather than enhances, the threat of a disease outbreak can impact passenger's willingness to act according to protocols negatively. Cruise lines are thus required to perform a fragile balancing act to attract customers and simultaneously increase their willingness to conform to safety protocols by making them aware of risks.

It is clear, that the pandemic has had a prolonged effect on the cruise industry as it has received a considerable blow to its reputation, but it has also been strongly affected by travel bans and no-sail orders administered by governments and government agencies (Holland et al., 2021). From a disaster management perspective, the pandemic has provided an opportunity to study the recovery strategies of cruise industries. The research conducted for this paper clearly shows that the cruise industry has, indeed, implemented many safety measures concerning the spread of the disease and that these measures increase their passengers' sense of security. Therefore, our study confirms that the countermeasures are likely to decrease the risks perceived by passengers.

## Conclusions

### *Theoretical contribution*

This study reports the findings of the workshops where contingency plans for operating cruiseferries during the pandemic were developed and discussed. The study contributes to transportation research by illustrating what factors impact the effectiveness of various countermeasures on cruiseferries during pandemics. Specifically, the study extends the current literature on disaster management by showing what factors cruise ferry operators consider as they adapt to a disaster during the disaster – what Faulkner (2001) refers to as the *intermediate* phase of a disaster. In addition to considering how the cruises could be made safer, establishing a sense of safety on board the ships through the countermeasures as well as the acceptability of the countermeasures are crucial factors for adapting to the disaster. This is related to their presumed impact on the travel experience. By surveying people who travelled on ships during the pandemic, it was revealed that hygiene is intricately linked to worry about COVID-19 contagion and perceived safety. In addition, the study illustrates which countermeasures increase passengers' sense of security and which countermeasures they would agree to before boarding a ship. The countermeasures that increased the sense of safety for most people were related to hygiene and social distancing, the exception being the friendliness of the personnel, which was deemed to be a significant source of safety for many passengers. Most of the respondents would willingly agree to all countermeasures proposed by cruise ferry operators; however, the more personal the countermeasures became, the less acceptable they were found to be. Therefore, in disaster management, it is essential to consider passengers' willingness to follow each specific countermeasure and how they impact the risk and safety perceptions among passengers as part of a contingency plan. Focusing only on the most theoretically effective solutions might give false pretences in real-life situations.

### *Managerial implications*

This study has direct managerial implication for cruise operators and related authorities. Our findings support directing investments in countermeasures that are most effective both in combatting the

pandemic and in attracting passengers back on board. The passenger responses suggest that the most important safety inducing countermeasures relate to hygiene and that the most acceptable countermeasures are those of non-invasive character. Furthermore, the results suggest that the crew on ships can take a more proactive mode in instructing passengers about countermeasures without decreasing customer experience. It follows that investment in cleanliness is central for marketing and operations during pandemics. In addition, from a policy perspective, the findings show the importance of reliable information about the efficacy of countermeasures for businesses' investment decisions. This was a key factor in the cruise ferry operators' decisions about which countermeasures to implement. False information or careless communication by governments or authorities can therefore slow the recovery of tourism businesses and can be detrimental to the adaptation of operations.

### *Limitations and future directions*

The paper provides a perspective on potential countermeasures and how cruise customers relate to them in terms of perceived safety and acceptability. In a future study, some important insights could be gained by comparing those that have travelled during the pandemic with those that have not. A crucial factor is why potential customers have not travelled. Is it because they have feared for their health or is it due to recommendations from authorities? Such knowledge is valuable for the cruise industry in terms of communication strategies and for understanding how much influence their contingency plans and countermeasures against the spread of COVID-19 on the ships have on the passengers' decision to travel. Furthermore, it would be important to understand whether certain countermeasures can deter people from cruising during pandemics. This study focused on passengers that have travelled on a cruise ferry during the pandemic, but those that have not travelled at all might perceive countermeasures differently. Furthermore, a comparison between these groups would provide insight into the different risk-taking profiles (Pizam et al., 2004) and their impact on the cruise industry's recovery from the pandemic.

### *Impact statement*

The COVID-19 pandemic has required cruise ferry operators to change their safety protocols and processes on the ships. This paper examines the protocol development by these companies and whether their passengers felt that the implemented countermeasures provided a sense of security. Furthermore, the paper provides insight into the terms and procedures that customers are willing to comply with to take a cruise. This provides essential information for cruise ferry lines as they strive to resume their operations during the disaster that has devastated the industry.

### **CRedit authorship contribution statement**

**Johnny Långstedt:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Visualization, Investigation. **Jonas Spohr:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition, Project administration. **Magnus Hellström:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition. **Anastasia Tsvetkova:** Conceptualization, Writing – original draft, Writing – review & editing. **Erik Niemelä:** Conceptualization, Writing – review & editing. **Joakim Sjöblom:** Conceptualization, Methodology, Investigation. **John E. Eriksson:** Supervision, Funding acquisition. **Kim Wikström:** Supervision, Funding acquisition.

### **Declaration of Competing Interest**

The authors declare the following financial interests/personal

relationships which may be considered as potential competing interests: Johnny Langstedt reports financial support was provided by Business Finland. Erik Niemela reports financial support was provided by Business Finland. Joakim Sjöblom reports financial support was provided by Business Finland.

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