

Cruise market investigation and price optimization: what do consumers want?

Cruise market investigation and pricing

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Abstract

Purpose – This study aims to examine consumer perception during COVID-19 and identifies cruise industry marketing strategies to fill a gap in crisis management and product pricing literature.

Design/methodology/approach – This study developed and validated two-factor measurement scales (vaccine perception and protective behavior), which predicted cruise intents well. This study revealed how geo-regional factors affect consumer psychology through spatial analysis.

Findings – This study recommended pricing 7-day cruises at \$1,464 (the most preferred length). The results also showed that future price hikes would not affect demand and that coastal marketing would help retain customers.

Originality/value – This study contributed to the business, hospitality and tourism literature by identifying two new and unique factors (vaccine perception and protective behaviors), which were found to affect consumers' intention to travel by cruise significantly. The result provided a better understanding of cruise tourists' pricing preferences and the methods utilized could easily be applied to other cruise markets or tourism entities.

Keywords Cruise, Price sensitivity meter, Pricing, Crisis management, Market recovery

Paper type Research paper

1. Introduction

Prior to COVID-19, cruise travel had become increasingly popular over the past two decades (Pan, Shu, Kitterlin-Lynch, & Beckman, 2021; Espinet-Rius, 2018). Unfortunately, COVID-19 shut down the cruise industry, with the vast majority of cruise lines discontinuing sailing by March 2020 (Clarke, 2020). Due to the nature of cruise tourism (e.g. confined cabins and conditions of ventilation) health concerns related to passengers and crew members have been an important recent topic in the cruise travel literature (Quintal, Sung, & Lee, 2022). According to Northstar (2022), while travel restrictions and advisory warnings were removed, the Centers for Disease Control and Prevention (CDC) still recommends that individuals be vaccinated and tested prior to departure. These changes have helped the cruise industry start to rebound, but the long-term effects are unknown. Table 1 shows a list of current news from the major cruise lines (updated until January 2024).

Beyond ramifications related to the pandemic, the cruise industry faces many other challenges related to consolidating revenues, maximizing profits and retaining consumers

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Cruise line	News
Carnival cruise line	The Carnival Liberty, Sunshine, Paradise, Ecstasy and Sensation delayed their sailing schedule. Since March 1, 2022, Carnival no longer requires face masks on board. On most ships, Carnival permits unvaccinated passengers to self-test for COVID-19 beginning September 6, 2022. Vaccines and testing are not required for most U.S. and European departures in 2024
Celebrity cruises	The Celebrity Eclipse was postponed sailing at the end of April. The company also cancels four sailings between late March and mid-April. The cruise line resumed some sailing in the United States on June 26 2021. On August 8, 2022, Celebrity Cruises eliminated its testing requirement for vaccinated customers on cruises of five days or less
Disney cruise line	Disney Cruise Line resumed service on August 9, 2021, with the Disney Dream sailing from Port Canaveral. Since March 11, 2022, masks have been optional for most indoor spaces, but passengers over the age of 2 must still wear a face covering in the Walt Disney Theater. As of November 14, 2022, passengers on all U.S. cruises will no longer be required to submit a COVID-19 screening, regardless of vaccination status
Norwegian cruise line	Norwegian Cruise Line resumed sailing in 2021. Passengers do not have to wear masks, but for crew members, it is still a must. Then, the cruise lines no longer required passengers to take a COVID-19 test at the pier prior to sailing, but they must provide a negative rapid or Polymerase Chain Reaction (PCR) test within two days of boarding. The cruise line now allows unvaccinated children ages 4 and under on the ships. On October 4, 2022, Norwegian Cruise Line ended all Covid-19 requirements. Passengers are no longer required to provide a negative test result, vaccination documentation or to wear masks onboard. Nonetheless, they are subject to local travel restrictions imposed by each nation on the route. Norwegian was the first major cruise operator to eliminate testing requirements for customers who were unvaccinated
Royal Caribbean international	Royal Caribbean no longer requires fully vaccinated passengers to wear face masks on board since February 25, 2022. Cruises belonging to Royal Caribbean International resumed sailing in 2021. Effective November 2, 2022, Royal Caribbean has removed pre-cruise examination and vaccination requirements for the majority of U.S. and European trips. However, they recommend guests be fully vaccinated against COVID-19
Princess cruises	Princess Cruises resumed Alaska sailings, and the Grand Princess, Majestic Princess and Caribbean Princess were resumed in 2021. The staffing shortage problem occurred in Princess Cruises, and they have canceled 11 sailings on the Diamond Princess in 2022. The cruise lines removed precruise testing for vaccinated passengers on the majority of itineraries, with the exception of cruises to Canada, Bermuda, Greece and Australia, per local regulations, and voyages of 16 nights or more
Virgin voyages	Virgin Voyages cruises resumed sailing in 2021. The Scarlet Lady, which is a new cruise line of the Virgin Voyages, carried 2,700 passengers and departed from Miami on October 6, 2021. Virgin Voyages has removed all vaccine and testing requirements beginning October 30, 2022, on Valiant Lady and October 28, 2022, on Scarlet Lady. All Sailors no longer require COVID-19 testing prior to their embarkation date

Table 1.
Current news from the major cruise lines (2024)

Note(s): The information is sourced from [Northstar \(2022\)](#) and health protocols from each cruise line
Source(s): Table by authors

([Papathanassis, 2017](#)). In particular, it can be argued that the cruise industry's pricing tactics and revenue management strategies are more complex than other tourism segments (e.g. airlines and hotels) as they have to deal with multiple capacity constraints, onboard spending and seasonality ([Maddah, Moussawi-Haidar, El-Taha, & Rida, 2010](#)). Yet, there has been limited research on pricing and revenue management in the cruise context ([Sun, Xu, &](#)

[Kwortnik, 2021](#)). A primary reason for this research scarcity is the difficulty of obtaining reliable data, including private data from companies, applicable databases and survey data. Current research related to pricing and revenue management is also needed, as consumers' perceptions and behaviors have changed due to the pandemic and recent recession ([Pan et al., 2021](#)). This paper aims to fill this potentially important void in the literature by capturing consumers' perception changes from 2021 to 2022 and identify pricing and marketing strategies for the cruise industry by employing price sensitivity measurement (PSM) and multiple linear regression (MLR) approaches. This study analyzes the data from 2021 to 2022 and provides insightful results from different angles, including cruise experience (nonexperience vs with-experience) and census regions. Furthermore, the results of non-experience and with-experience consumers are compared.

2. Literature review

2.1 Pricing in the cruise industry

Price has been documented as one of the main determinants of cruise consumer acquisition and retention ([Petrick, 2005](#)). According to [Sun, Jiao, and Tian \(2011\)](#), cruise companies and online travel agencies (OTAs) have successfully attracted more price-sensitive consumers by using discounts and lower prices. However, pricing is still considered both a challenge and an opportunity in cruise operations and marketing ([Sun et al., 2021](#)).

Pricing for the industry is complex as the final price of a cruise includes boarding fees and tips since cruise companies often charge these automatically ([Espinete-Rius, Fluvià-Font, Rigall-Torrent, & Oliveras-Corominas, 2018](#)). [Espinete-Rius et al. \(2018\)](#) identified features and characteristics that impact cruise prices by adopting a hedonic pricing methodology. They found that the number of nights of the itinerary, the departure date, the number of days before the booking is made, accommodation type and some entertainment facilities were primary attributes affecting cruise price.

Advancing this area of inquiry, [Namin, Gauri, and Kwortnik \(2020\)](#) revealed segments of travelers based on individual attributes using third-degree price discrimination methodology. They adopted a finite mixed modeling approach to develop, validate and compare pricing models. Their results indicated that the third-degree discrimination method's segment analysis could increase revenue by 4%. They also found that accurately identifying and targeting individual customers who, based on their specific attributes, are more inclined to pay a premium price at a particular time – referred to as “the right person at the right time” – could significantly enhance incremental profits ([Namin et al., 2020](#)).

However, past research has suggested that discounted cruises may be degrading the industry's standards and been potentially harmful to revenue management ([Petrick, 2005](#); [Sun et al., 2011, 2016](#); [Sun & Ni, 2018](#)). [Petrick \(2005\)](#) had conflicting results in finding that more price-sensitive passengers evaluated their experiences more positively, yet less price-sensitive travelers spent more on their cruise travels.

[Espinete-Rius \(2018\)](#) also analyzed the role price plays in the cruise industry. He examined cruise websites, created an extensive database and built a hedonic model to identify the cruise industry's pricing strategies at global and local levels. Results revealed that cruise prices were usually based on the type of cabin, the date of departure and the length of time between booking and departure. He also found that cruise prices vary depending on the cabin's location, occupancy rate, discounts and loyalty program. [Espinete-Rius \(2018\)](#) further suggested that advanced technologies such as artificial intelligence, big data analytic tools and specialized software development play an essential role in increasing revenue and profits.

Not surprisingly, while the cruise industry is still in recovery, cruise companies and relevant organizations are paying close attention to consumer behavioral changes and marketing strategies ([Pan et al., 2021](#)). Due to the importance of understanding the effect these

changes are having on cruise decisions related to price, this paper focuses on pricing strategies that could be applied in the industry.

2.2 Price sensitivity measurement (PSM)

Van Westendorp (1976) developed the PSM model as a continuance of past research related to pricing (Gabor & Granger, 1966; McConnell, 1968; Monroe, 1971, 1973, 1976). The literature has consistently shown that the PSM model can be beneficial for managers to establish pricing strategies to understand consumers' price perceptions (Kupiec & Revell, 2001; Chhabra, 2015; Zhang, Sanchez, & Fitter, 2022). Hence, this model has been successfully applied to many fields of pricing research, such as software engineering processes (Harmon, Raffo, & Faulk, 2003) and restaurants (Raab, Mayer, Kim, & Shoemaker, 2009).

A primary benefit of employing the PSM model is that it has been suggested to be easily adopted and requires minimum advanced skills in academia and/or industry (Lewis & Shoemaker, 1997). Historically, researchers and marketers have employed the PSM model by designing a survey based on the price sensitivity meter, with the utilization of the following four questions (Van Westendorp, 1976; Ceylana, Koseb, & Aydin, 2014):

- (1) At what price on the scale do you consider the product or service to be cheap?
- (2) At what price on the scale do you consider the product or service to be expensive?
- (3) at what price on the scale do you consider the product or service to be too expensive, so expensive that you would not consider buying it?
- (4) At what price on the scale do you consider the product or service too cheap, so cheap that you would question the quality?

Analysis of these four questions results in four price points (indifference price (IDP), optimal price point (OPP), optimal trial price (OTP) and optimal revenue price (ORP)) and information related to acceptable price ranges. IDP is the intersection between the cheap and expensive curves, revealing two equal proportion groups of respondents who disagree on this price (Harmon, Unni, & Anderson, 2007). According to Van Westendorp (1976), this price shows the reality of the market and can be interpreted as the median market price for this type of product.

The OPP is where the too-cheap question's cumulative distribution line intersects with the too-expensive question (Harmon *et al.*, 2007). This price has been argued to be an equal trade-off in extreme sensitivities to price at both ends of the price spectrum (Chatterjee, Singh, Goyal, & Gupta, 2014). The acceptable price range identifies the product's lower (marginal cheapness) and upper pricing bounds (marginal expensiveness). Marginal cheapness is the intersection of too-cheap and not-cheap curves, and marginal expensiveness is the intersection of the too-expensive and not-cheap curves.

Newton, Miller, and Smith (1993) integrated consumers' purchase intentions within the PSM model by asking respondents about their purchase intention score for cheap and expensive prices. These purchase intention scores can be transformed into probabilities using an intention scale ranging from 1 to 5 to 0/0.1/0.3/0.5/0.7, respectively. Once the probabilities are available, the OTP and ORP can be identified. OTP is the price at which companies can generate a maximum volume of sales, and the ORP is the price at which companies are likely to receive maximum revenue.

It is believed that the PSM model has great practical utility as service organizations continually strive to increase their prices while maintaining consumers' willingness to purchase (Lewis & Shoemaker, 1997). Nevertheless, many service organizations are still adopting unsophisticated approaches to pricing products without considering shifts in demand, the rate that supply can be expanded, price-volume relationships and consumers'

behaviors and perceptions (Lewis & Shoemaker, 1997; Monroe & Bitta, 1978). Zeithaml, Bitner, and Dremler (1996) mentioned that the service industry commonly faces three complicating factors in pricing: (1) inaccurate or limited reference prices; (2) prices heavily associated with product quality and (3) monetary prices not considered as the only relevant cost while consuming a service product.

The PSM model has been suggested to be an excellent technique for evaluating consumers' willingness to pay and pricing a product because it incorporates psychometrics with statistical modeling and does not require presenting different detailed characteristics of a product (e.g. size, color, etc.) (Stobierski, 2020; Sadwick, 2020). This method has further been argued to be particularly beneficial in three situations: (1) pricing new products, (2) pricing products with massive markets, and (3) obtaining consumers' perceptions of pricing after an event (positive/negative).

Recent research has utilized the PSM model with cluster analysis, offering pricing strategies at the market segment level. These studies include an investigation of bundling strategies on three- and five-star hotel consumers' price sensitivity (Dominique-Ferreira & Antunes, 2019), segmentation based on travel motivations to show differences in terms of perceived fair prices (Stangl, Prayag, & Polster, 2020), and exploration of the price sensitivity of OTA consumer segments and compared OPPs across the segments regarding monetary values (Chung, Chung, & Kim, 2022). According to the aforementioned studies, the PSM model can be utilized to gauge consumers' willingness to pay and offer significant pricing strategies for a product.

Consumers' psychological perceptions also play an important role in pricing decisions (Zou & Petrick, 2021), and the COVID-19 pandemic has been found to change cruise tourists' perceptions (Harmon *et al.*, 2007; Pan *et al.*, 2021). Hence, it is believed that adopting the PSM model would help cruise companies establish prices based on consumers' perceptions and maximize revenue. Therefore, the current study will employ the PSM model, incorporating questions to identify the IDP, the OPP, the OTP, the ORP and the acceptable price range for mainstream cruise ships.

2.3 Economics and consumer psychology

It has been found that household expenditures and a company's performance are significantly impacted by economic conditions, including micro and macro conditions (Scholdra, Wichmann, Eisenbeiss, & Reinartz, 2021). Microeconomics studies related to individuals' decision-making and firms' allocation of their resources for instance, how households' personal income impacts their purchasing intention and behaviors. Macroeconomics research has traditionally examined the influences of long-term economic growth and shorter-term business cycles.

Furthermore, economic inequality can shape consumers' perceptions, expectations, needs, desires and attributions (Goya-Tocchetto & Payne, 2022). Individuals have usually been found to have lower levels of happiness when inequality is high, even when variables of individual income, personal characteristics, year, and country are controlled (Alesina, Di Tella, & MacCulloch, 2004). They found that people who have a higher income in the United States were more concerned about inequality because of higher mobility in US society, suggesting that individual effort can influence household income.

Moreover, Papatheodorou and Pappas (2017) examined the complex relationships between economic recession, disposable income, job vulnerability and tourists' decision-making. They found that job vulnerability caused by economic recession, disposable income for tourism, quality issues with the absence of marketing activities and price issues stimulated tourism decisions. Hence, suggesting that when an individual has difficulty keeping their jobs during times of economic recession, they had less disposable income for tourism and their intentions to take a cruise were negatively influenced.

The entire COVID-19 pandemic and individual events such as the infection of 712 passengers on board the Diamond Princess docked at Yokohama in Japan in 2020 have had large negative effects on perceptions of the industry (Syam, Gohari, Levitt, DeJesus, & MacKillop, 2021; Chen, Zhang, & Wang, 2022). These conditions, combined with the inherent global recession have made it more important for cruise lines to develop sound marketing and pricing strategies based on consumer perceptions. Further, the identification of changes in these perceptions during the pandemic are also believed to be of importance to the industry. Hence, this study is designed to track perception variances during the pandemic to assist in developing optimal pricing strategies for the cruise industry.

According to a recent economic report from the United Nations, US economic growth in 2021 was the strongest since 1984 (5.7%), but the economy declined in the first quarter of 2022 by 1.5% (ECLAC, 2022). This is a significant turnaround from the 6.9% annual growth rate in the fourth quarter of 2021. Additionally, in 2021, a total of 6.7 million new employees were produced, with an additional 2.4 million between January and May 2022. Yet, the economy was 0.8 million jobs below its prepandemic level as of May 2022 (ECLAC, 2022). Moreover, the slowdown in consumer spending was detected in the first quarter of 2022, suggesting that consumption and the economy will have less momentum heading into the second half of the year (Pickert, 2022).

Based on the above, the following hypotheses are proposed:

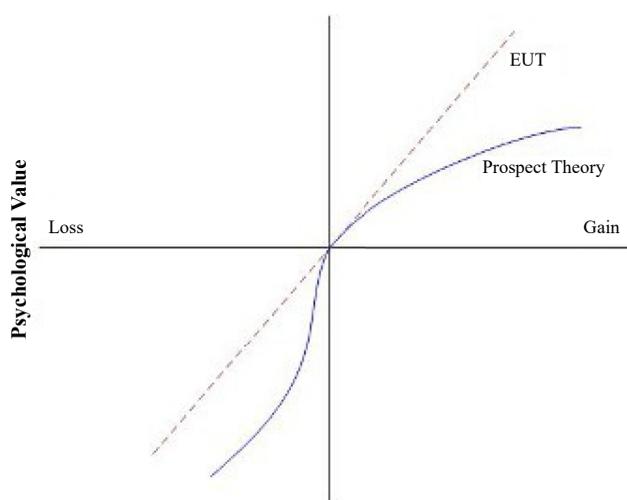
- H1. Consumers' willingness to pay for traveling by cruise in 2021 was higher than in 2022 during the economic recovery.
- H2. Consumers' intention to travel by cruise in 2021 was higher than in 2022.

2.4 Expected utility theory (EUT) and prospect theory

Expected utility theory (EUT) was formulated by Bernoulli (1738), axiomatized by Morgenstern and Von Neumann (1953) and further developed by Savage (1972). EUT is considered a deterministic theory, meaning that individuals tend to make the same decision in identical situations (Blavatsky, 2007). However, many scholars have found that EUT cannot sufficiently explain an individual's irrational behaviors or decisions when facing risky situations including the findings related to the Allais paradox (Allais, 1953) and intransitivity of preferences (Tversky, 1969). Thus, Kahneman and Tversky (1979) proposed prospect theory to aid in understanding these discrepancies. They suggested that prospect theory should be employed for "simple prospects with monetary outcomes and stated probabilities, but which can be extended to more involved choices" (Kahneman & Tversky, 1979, p. 274).

The value function of this theory is normally concave for gains and convex for losses (Figure 1). People whose choices result in more gains than losses are considered risk-averse personalities, and people who have converse decisions are considered risk-seeking. In the cognitive psychology literature, prospect theory has been used to explain people's decisions that typically contain many heuristics and biases, which could result in people treating gains and losses unequally (Barberis, 2013). In general, findings from this literature reveal that losses are perceived to be more important than gains (Edwards, 1996). This theory has often been used to explain consumers' choices and irrational decisions under uncertain conditions (e.g. risks) (McBride & Cutting, 2017).

Taking a cruise usually involves many risks, especially during a pandemic (Liu-Lastres, Schroeder, & Pennington-Gray, 2019). According to Sönmez and Graefe (1998), there is a two-stage process before tourists make decisions. The first stage is narrowing their prospects down to several alternatives, and the second is evaluating each alternative and choosing the best one.



Source(s): Figure by authors

Figure 1.
EUT and prospect
theory

Cruise tourists' prospects include the various cruises and vacations they are choosing between. When making these decisions, they likely evaluate the cruise lines' prices based on several risk factors including health, time, financial, disaster/crisis and political. One would expect that risk-averse tourists would be more likely to choose safer cruise experiences and more well-known brands to avoid the negative impacts of COVID-19. Conversely, risk-seekers might not evaluate the trip as heavily based on safety factors. In this study, consumers will be divided into two groups: non-experienced (never cruise before) and experienced (have cruised).

Asgari and Levy (2009) discussed prospect theory's certainty effect and framing effect. They suggested that certainty effect is a phenomenon whereby individuals weigh possible outcomes compared to certain outcomes, and that risk-averse consumers prefer choices with certain gains that are different than risk-seeking customers. Prospect theory further proposes that framing effect is a common feature whereby "individuals facing a choice among different prospects disregard components that are common to all prospects under consideration" (Asgari & Levy, 2009, p. 382). Additionally, one's reference point related to price often divides consumers' decision-making space into regions of gains and losses, and many sources can impact the reference point of a consumer (Asgari & Levy, 2009). For example, online reviews and branding of a cruise line could be the source of nonexperienced consumers' reference points, while for experienced consumers, past travel experiences could be the source of their reference points. Therefore, this study is guided by prospect theory to help explain different travelers' willingness to pay and postulates:

- H3. Nonexperienced consumers perceive a lower price than experienced consumers for travel experiences.
- H4. Nonexperienced consumers have lower intentions to travel by cruise during the COVID-19 pandemic than experienced consumers.

2.5 Regional impacts on cruise travel behaviors

Dwyer and Forsyth (1998) noted that cruise businesses were not only beneficial to national economies but can also impact regional economies. They developed a framework for

assessing the economic impacts of cruise tourism on a nation and its subregions, as well as exploring how this framework could be applied to relevant benefits and cost estimation. Their findings indicated that cruise businesses significantly impacted port cities' development (taxation) and residents' expenditures.

Similarly, [Artal-Tur, Navarro-Azorín, and Ramos-Parreño \(2019\)](#) estimated the economic impact of cruise tourism in the Port of Cartagena, Spain, by using a regional input-output (IO) framework. Their findings revealed that cruise tourism significantly impacted regional employment, wages, gross operating surplus, consumers' perception and expenditures. These results provided important policy recommendations to the public and private stakeholders to manage impacts.

Although prior studies have offered some insights on regional impacts of cruise tourism on communities, the influences between a regions and consumers' perceptions to travel by cruise remain unclear. The definition of a coastal county from the US Census Bureau is that "a county has to be adjacent to water classified as either coastal water or territorial sea" ([Census Bureau U.S., 2021a](#)). Intuitively, cruise ports are in coastal cities and [Figure 2](#) shows the map of US cruise ports in 2022. According to cruise tourism's impacts on regional economies, the following hypotheses aim to fill in the literature gap with respect to consumers' perception variances between coastal and inland cities:

- H5.* Consumers who live in coastal cities have a higher intention to travel by cruise.
- H6.* Consumers who have previously traveled a cruise(s) is more likely to be residents of coastal cities than those who have not previously cruised.

3. Research design and methodology

This study followed a mixed-method research design in order to confirm the data and results' representative, reliability and validity ([Hair, Money, Samouel, & Page, 2007](#)). A quantitative survey was first created by reviewing copious literature. The purpose of the quantitative



Figure 2.
US cruise ship ports
in 2022

Source(s): Figure by Camosse (2022)

survey is to identify consumers pricing and travel perceptions. Then, a qualitative group with industry experts was formed in order to review this quantitative survey. The researchers collected comments from this qualitative group and finalized the survey based on these comments, for instance, the price range of a 7-day trip balcony room on a mainstream cruise ship was based on the comments from this industry expert group.

3.1 Sample and data collection

The sample contained United States residents who had any travel experience in their lifetime. Two-staged data collection and quota sampling was employed. In the first stage, a survey was launched on Qualtrics in April 2021 and respondents were offered \$4.5 on average as compensation per participant. A total of 1,540 valid surveys were collected with a response rate of 91%. The survey was slightly modified for the second stage by adding factor-protective behaviors. The second-round survey was published in April 2022 by using Qualtrics (with \$4.5 per participant compensation). A total of 1,641 valid surveys were collected with a 97% response rate. All data was collected anonymously, and an Institutional Review Board (IRB) approved this research's survey distribution, data collection and analytic methods.

3.2 Measurement

The PSM questions were adapted to represent a cruise context (price options ranged from \$800 to \$3000). Each perception variable was placed on five-point Likert-type scales anchored by 1, *Strongly Disagree* and 5, *Strongly Agree*. Intention was adopted from [Fan and Hsu \(2014\)](#), and examples include: "Given the chance, I would take a cruise frequently in the future;" and "I intend to take a cruise in the next 12 months." Similar to [Choi, Law, and Heo \(2016\)](#), attitude to travel by cruise was measured by four items: "Taking a cruise would be pleasurable;" "I would enjoy into cruise travel;" "Cruise travel would be satisfying;" and "Cruise travel would be fun." Perceived crisis management capability was consisted of four factors: command and information, providing assurance, coordination and integration, and management and learning. The measurement scale for these four factors were inspired by [Kao, Wang, and Farquhar \(2020\)](#), and examples include: "There're clear lines of authority and sufficient authorization from top management in cruise companies;" "Cruise crew members provide qualified onboard service politely;" "The internal coordination of cruise companies for emergency management;" and "Keep complete crisis management related for further implications." According to [Reisinger and Mavondo \(2006\)](#), thirteen distinct forms of risk are typically perceived in the tourism industry. [Pan et al. \(2021\)](#) identified consumer perceptions of the cruise industry during COVID-19; hence, five risks (financial, time, politics, health and cultural) were chosen to reflect cruisers' perceptions of risk. Example questions include: "Cruise travel is too expensive" (financial risk); "Cruise travel is a waste of time" (time risk); "Political tension between my country and my preferred cruise destination makes me feel uncomfortable to take a cruise" (politics risk); "Taking a cruise is putting my health at risk" (health risk); "The language barrier is a problem with cruise travel" (cultural risk) ([Reisinger & Mavondo, 2006](#)). Two new variables (vaccine perceptions and protective behaviors) were developed based on health education research ([Syan et al., 2021](#); [Resnicow et al., 2021](#); [Ajana, Engstler, Ismail, & Kousta, 2022](#)). Example questions include "When the COVID-19 vaccine is ready, I would like to take the vaccine;" "Taking the COVID-19 vaccine before cruise travel is necessary for me" (vaccine perceptions) and "Using hand sanitizer that contains at least 75% alcohol;" "Social distancing, keeping about 6 feet between yourself and other people" (protective behaviors). Ten demographic questions were placed at the end, including cruise experience, preferred destinations, region, gender, age and annual income.

3.3 Methodologies

3.3.1 PSM. After data collection, both datasets were cleaned and all variables were labeled, including too cheap, cheap, expensive, too expensive, intentC and intentE for the PSM model. Next, data normality, linearity and outliers were examined. The results suggested that the data were normally distributed, and variables were linearly correlated. Three outliers were identified in each dataset with cook distances lower than 1.0 and were subsequently removed. R package {pricesensitivitymeter} was used to analyze the data, and the Newton Miller Smith extension was applied to corroborate the intention variables and obtain OTP and ORP points (Newton *et al.*, 1993). These methods were used to explore consumers' willingness to pay trends from 2021 to 2022 and the variances between consumers who had cruise travel experiences and those who had not.

3.3.2 MLR. Multiple regression analysis has been suggested to be robust because it allows scholars to explicitly control many other factors that simultaneously affect the dependent variable (Wooldridge, 2015). It has been suggested that to develop a stepwise MLR, the technique's assumptions need to be checked, and that some treatments may be performed on the dataset based on the assumptions check (Abdulredha *et al.*, 2018). The current study's e MLR was adopted to explore and explain the decision-making process variances between 2021 and 2022. The models shared one unique factor in 2021 and 2022 due to the emphasis on vaccine completion in 2021 and protective behavior promotion in 2022. Factor means were used, and equations (1) and (2) presented the models. The reliability and validity of these two unique factors were confirmed prior to regression analyses (Cronbach's $\alpha_{vac} = 0.92$, 95% confidence interval in [0.91,0.93]; Cronbach's $\alpha_{pb} = 0.91$, 95% confidence interval in [0.90,0.91]).

$$INT_{2021} = f(vac, att, pcmc, rp, experience), \forall vac, att, pcmc, rp, experience \in \{n_{2021}\} \quad (1)$$

$$INT_{2022} = g(pb, att, pcmc, rp, experience), \forall pb, att, pcmc, rp, experience \in \{n_{2022}\} \quad (2)$$

Note: INT = intention; vac = vaccine perception; att = attitudes; pcmc = perceived crisis management capability; rp = risk perception; pb = protective behaviors; experience = previous cruise travel experience.

3.3.3 GeoSpatial analysis. Once the variances in consumers' perceptions were reviewed based on the PSM and MLR, classical geographic spatial analysis was adopted to explore consumers' cruise travel intention variances by region. Respondents' longitude and latitude data were used to plot them on a map, and intentions was added as a layer. R package {mapview} was used to visualize the results.

4. Results

4.1 Descriptive analysis

Of the 1,540 respondents in 2021, 56.1% had no cruise travel experience, and 43.9% had traveled on a cruise at least once. Of the 1,641 respondents in 2022, 60% were without cruise travel experience and 40% had at least one cruise travel experience. The majority of respondents from 2021 (77.1%) and 2022 (76.5%) both years were Caucasians, which aligns with the Census Bureau U.S. (2021b) results ($PC_{Caucasians} = 75.8\%$) which helps suggest the data's representativeness (Census Bureau U.S., 2021b). Respondents were found to prefer to travel by cruise in the summer, and the most preferred cruise travel durations were 4–7 days ($PC_{21} = 69.5\%$; $PC_{22} = 68.1\%$), as well as eight days and above ($PC_{21} = 18.6\%$; $PC_{22} = 18.1\%$). This result aligns with reports from the Cruise Lines International Association (CLIA): 74% of passengers preferred 4–7 days and 18% of passengers preferred 8 days plus (CLIA, 2021).

Moreover, the top five cruise lines preferred by consumers were Royal Caribbean International, Carnival Cruise Line, Norwegian Cruise Line, Disney Cruise Line and Holland American Line. To help ensure that the data represented the United States market, the population percentage in each region followed the code and data in the Census Bureau (*Northwest: 17.1%; Midwest: 20.6%; South: 38.6%; West: 23.6%*) (Census Bureau U.S., 2022). The percentage of each region in this study is 18% (Northeast), 20.5% (Midwest), 38.2% (South) and 23.1% (West). The results of descriptive analyses are shown in Table 2.

4.2 PSM

4.2.1 General models. This analysis was started by first plotting the four pricing variables on a graph. The vertical axis comprised the cumulative percentage of respondents, and the horizontal axis the price points. Figures 3–8 present the results of the PSM analysis, including the OPP, IDP and the range of acceptable prices for both years. Figure 3 reveals that the OPP was \$1,464, meaning an equal number of respondents described this price as exceeding either their upper or lower limits. The IDP was \$1,497, indicating that this is the median market price for a cruise. As mentioned earlier, the lower bound of the acceptable price range is the intersection of the lines “Expensive” and “Too Cheap,” and the upper bound of this range is the intersection of the lines “Cheap” and “Too Expensive.” The range of acceptable prices for the mainstream cruise ship was [\$1,183, \$1,900]. Table 3 presents the results for both years.

Next, consumers’ purchase intentions were considered in the analyses. The OTPs and ORPs are shown in Table 3. The OTP for 2021 was \$1,399, meaning that consumers’ price adoption for a mainstream cruise is maximized at that price point. Furthermore, the ORP for 2021 was \$1,816, indicating that revenue would be maximized at this price point. In 2022, the OTP was \$1,525, while the ORP was \$1,986. In general, consumers’ willingness to pay increased in 2022, which means they accepted a higher price range and were more willing to travel by cruise. These results do not support H1.

4.2.2 Group models. Based on the assumptions, participants were divided into two groups: nonexperienced ($N_{2021} = 864$; $N_{2022} = 994$) and experienced ($N_{2021} = 676$; $N_{2022} = 647$). The data for both groups, over the two years were analyzed, and the results were compared. For the nonexperienced group, the willingness to pay increased from 2021, and the OTP was 14% higher in 2022, indicating that cruise companies could maximize their product adoption at a higher price point and obtain more revenue in 2022. For the experienced group, the perception slightly decreased from 2021; however, OTP and ORP increased. Potential reasons behind this phenomenon are explained in the following section. Tables 4 and 5 present the comparison of the nonexperienced group and experienced group for both years, respectively. These results partially support H3 because the willingness to pay for the non-experienced group was lower than the experienced group in 2021 but was the opposite in 2022.

4.3 MLR

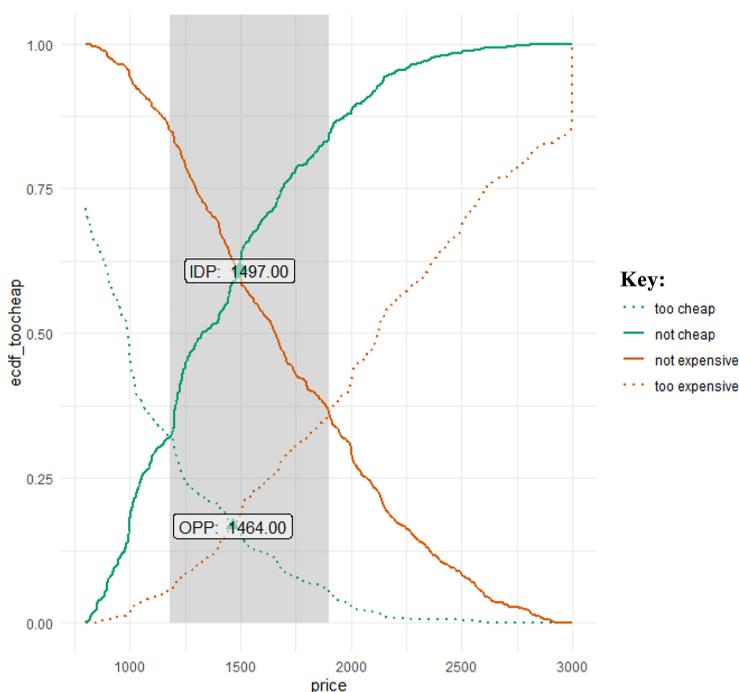
Table 6 presents a summary of the regression analyses for the above-mentioned variables predicting different consumers’ intention to travel by cruise for both 2021 and 2022, including intercepts, coefficient estimates, t-value and significance level. In 2021, the results showed that vaccine perception, attitude toward cruising, perceived crisis management capability and cruise experience significantly affected consumers’ travel intentions; however, risk perception did not affect their intention to travel by cruise at this time.

It was found that consumers who were more willing to take COVID-19 vaccines and had positive attitudes were more likely to travel by cruise if they perceived better crisis management capability from companies. Furthermore, experienced consumers were found to have a higher intention to travel by cruise in 2021. The R^2 of the 2021 model was 0.558,

Characteristics	Categories	2021 (N = 1540)		2022 (N = 1641)	
		Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
1. Have you ever taken a cruise before? If yes, how many times in the past five years?	None	864	56.1	994	60.6
	1 time	290	18.8	295	18.0
	2 times	141	9.2	158	83.0
	3 times	101	6.6	83	5.1
	4 times and above	144	9.4	111	6.8
2. Are you willing to take the COVID-19 vaccine?	Yes	1238	80.4	1284	78.2
	No	302	19.6	357	21.8
3. What is your most preferred cruise travel season?	Spring	400	26.0	609	37.1
	Summer	666	43.2	584	35.6
	Fall	298	19.4	263	16.0
	Winter	176	11.4	185	11.3
4. What is your most preferred cruise duration?	2	102	6.6	139	8.5
	3	81	5.3	87	5.3
	4	93	6.0	105	6.4
	5	251	16.3	253	15.4
	6	57	3.7	57	3.5
	7	670	43.5	703	42.8
	8	43	2.8	51	3.1
	9	17	1.1	16	1.0
	10 days and above	226	14.7	230	14.0
	5. Gender	Male	745	48.4	809
Female		795	51.6	832	50.7
6. Races	White	1187	77.1	1255	76.5
	Black or African American	152	9.9	143	8.7
	American Indian or Alaska Native	77	5.0	95	5.8
	Asian	85	5.5	110	6.7
	Native Hawaiian or Pacific Islander	2	0.1	2	0.1
	Other	37	2.4	36	2.2
	US 49,999 or less	590	38.3	757	46.1
	US 50,000–79,999	419	27.2	412	25.1
US 80,000–109,999	203	13.2	197	12.0	
US 110,000–139,999	132	8.6	105	6.4	
US 140,000–169,999	96	6.2	70	4.3	
US 170,000–199,999	45	2.9	53	3.2	
US 200,000 or above	55	3.6	47	2.9	

Table 2.
Results of descriptive statistics

Source(s): Table by authors



Source(s): Figure by authors

Figure 3.
PSM general
model 2021

suggesting that the level of predictiveness in this model is acceptable (Henseler, Ringle, & Sinkovics, 2009).

For 2022, all variables were found to have significant impacts on cruise travel intention, and variable risk perceptions ($Coefficient_{rp} = -0.32$) was found to highly negatively influence their intention to travel by cruise compared to other variables ($R^2 = 0.569$). For both years, the top three impacting factors were found to be the attitude toward cruising ($Coefficient_{21} = 0.41$; $Coefficient_{22} = 0.42$), perceived crisis management capability ($Coefficient_{21} = 0.44$; $Coefficient_{22} = 0.36$) and cruise experience ($Coefficient_{21} = 0.24$; $Coefficient_{22} = 0.16$). Compared to 2021, consumers' positive attitudes were found to play a more important role in intentions, while perceived crisis management capability becomes less important. Consumers' intention to travel on cruises was further found to be relatively low for both years but to be higher in 2022 ($Mean_{2021} = 2.72$, $Mean_{2022} = 2.86$). These results support H4 but not H2.

4.4 GeoSpatial analysis

Via geospatial analysis, it was found that residents in the coastal cities had a higher intention to travel by cruise, which was found to not change over time. Figures 9 and 10 display respondents' intention maps and the intention color ranges from purple to yellow (purple indicates lower intention). These results support H5. Furthermore, Figures 11 and 12 reveal that consumers with cruise travel experience(s) were mainly residents of coastal cities or near those cities, which was found to not change over time. Their cruise experience(s) color ranged from purple to yellow and the color purple (score = 1) indicates the respondent does not have any cruise travel experience. This result supports H6.

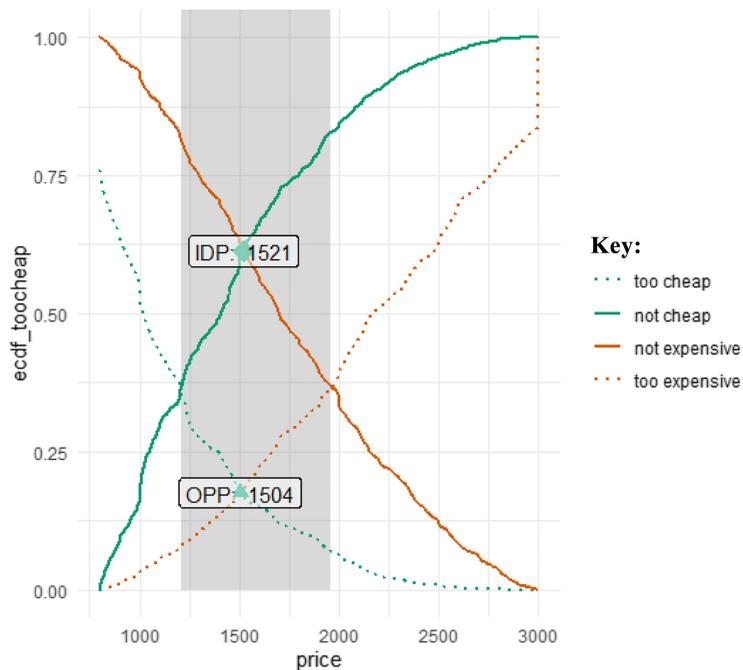


Figure 4.
PSM general
model 2022

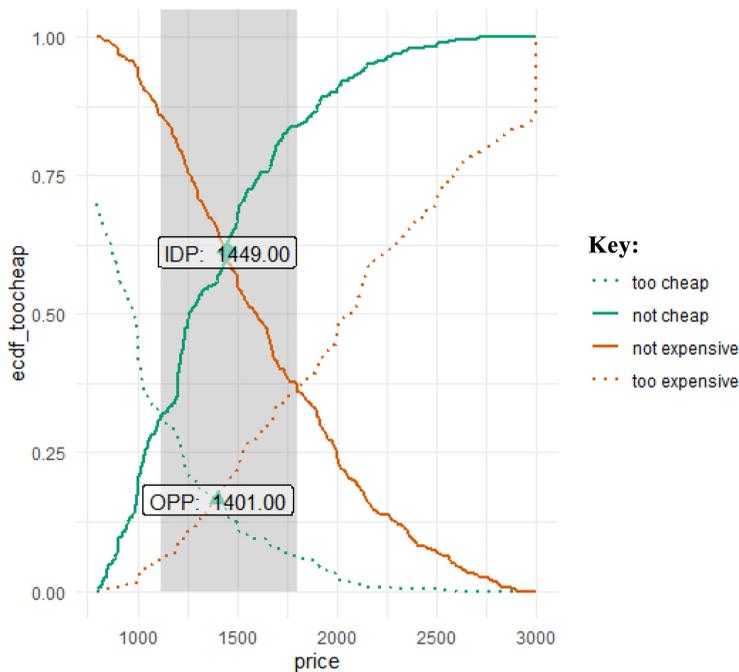
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5. Discussion and implications

Results of the PSM analyses revealed that consumers' willingness to pay for cruise tourism increased in 2022, which could be explained in two ways. First, many cruise lines resumed operations in late 2021, which increased the media exposure of cruise tourism. This increase in media exposure, likely increased potential cruise travelers' desires to cruise again. The OTP obtained from the study was \$1,399, which suggests the preferred price that should be set by cruise management.

A notable distinction emerged in the willingness to pay between nonexperienced and experienced cruiser groups. For non-experienced cruisers, there was an increase in willingness to pay from year 1 to 2, potentially attributable to their reliance on broader environmental and economic cues. This observation aligns with Kahneman and Tversky's prospect theory, which posits that individuals perceive higher risks in unfamiliar situations. For nonexperienced cruisers, lacking prior personal experience with cruise travel, their perceptions and willingness to pay might be more influenced by their confidence in the broader environmental and economic conditions, as they evaluate the unknown risks of cruise travel.

In contrast, the willingness to pay among experienced cruisers did not show a similar increase. This group's perceptions and decisions are likely more deeply anchored in their past experiences with cruise travel. Historically, cruise prices were higher prior to the pandemic (Espinete-Rius & Gassiot-Melian, 2022), and experienced cruisers' expectations of price levels might still be influenced by these past experiences. Although prices were adjusted and more discounts offered post-resumption in 2021, this group's willingness to pay in 2022 was likely tempered by these adjusted price perceptions.



Source(s): Figure by authors

Figure 5. PSM consumers with no cruise travel experience 2021

Interestingly, despite a general lowering of accepted price ranges compared to 2021, the OTP was still \$10 higher in 2022. Additionally, the willingness to pay for non-experienced cruisers was slightly higher than that of the experienced group in 2022, suggesting that non-experienced cruisers are currently less sensitive to price changes compared to the previous year.

Finally, the regression analyses revealed that perceived crisis management capability plays an important role in the intention to travel by cruise, indicating that companies should include information about developed crisis management plans to potentially stimulate sales. It is likely that risk perceptions did not significantly impact travel intentions in 2021 because cruise traveling was not an available option during that time.

5.1 Theoretical implications

This research mainly offers three theoretical implications regarding product pricing, consumer psychology and disaster and crisis management and recovery. First, this study contributes to business, hospitality and tourism literature by introducing “vaccine perception” and “protective behaviors” as influential determinants in cruise travel intentions. This novel integration offers a significant advancement in understanding consumer behavior in the context of health crises. The inclusion of these factors reflects a shift in consumer priorities amidst global health concerns, such as the COVID-19 pandemic, providing a critical lens through which to examine future consumer behavior models. The empirical validation of these variables not only underscores their relevance in the current context but also signals their potential applicability across different sectors facing similar health-related challenges. This study, therefore, extends the theoretical boundaries of

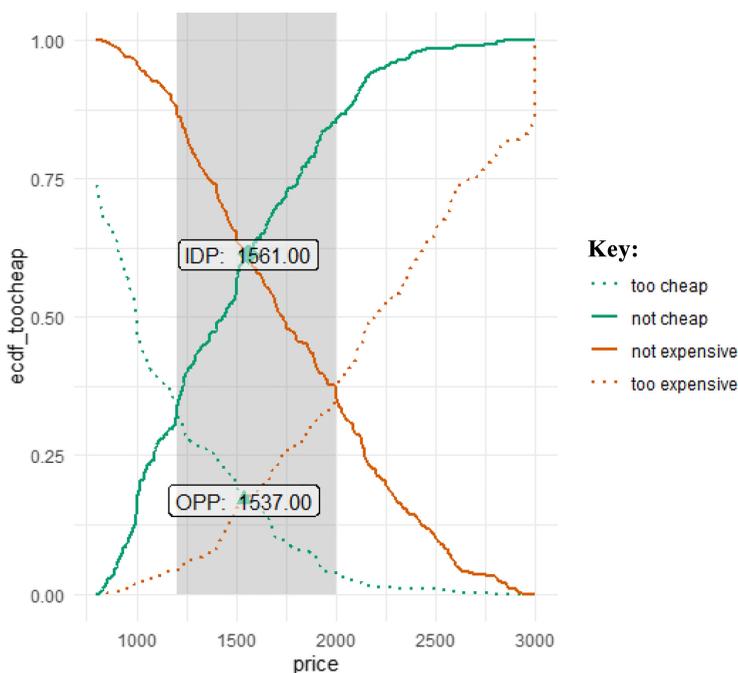


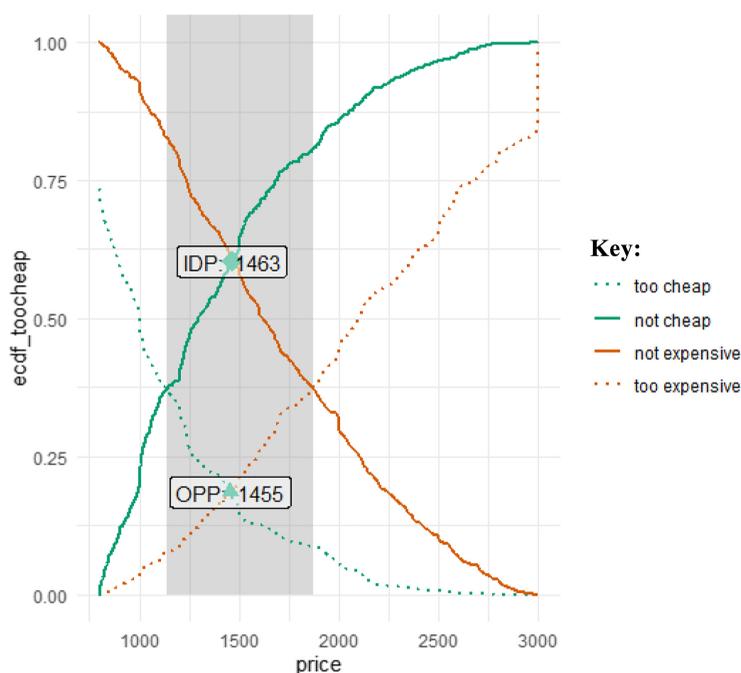
Figure 6.
PSM consumers with
cruise travel
experience 2021

Source(s): Figure by authors

consumer psychology, incorporating a health-conscious perspective that is increasingly pertinent in modern society.

Second, the spatial analysis conducted in this study offers groundbreaking insights into the relationship between consumer behavior and geographical location in the context of cruise tourism. Our findings reveal a heightened travel intention among residents of coastal cities, suggesting a geographic component to consumer preferences in cruise tourism. This aspect has been underexplored in previous research, which primarily focused on the economic benefits of cruise tourism, such as job creation and tax revenue generation in coastal areas. By highlighting the significance of consumer origin in understanding travel intentions, this study prompts a reevaluation of marketing strategies in the cruise industry. It also opens avenues for future research to explore the broader socioeconomic and environmental impacts of cruise tourism on coastal cities, thus contributing to a more comprehensive understanding of the sector's role in regional economies.

A third contribution is to the existing hospitality pricing literature, particularly in the context of cruising. By demonstrating the pricing preferences of cruise tourists, this study offers valuable insights into effective pricing strategies in the wake of the pandemic. The nuanced understanding of pricing dynamics gained from this research provides a framework for the development of pricing models that balance profitability with customer attraction in a market still recovering from the pandemic's impact. This study further extends the application of prospect theory by demonstrating how it can be applied to understand the differential pricing sensitivity and decision-making processes between experienced and nonexperienced cruisers. Specifically, nonexperienced cruisers, facing the uncertainty of a novel travel experience, tend to evaluate potential losses and gains differently compared to



Source(s): Figure by authors

Figure 7.
PSM consumers with
no cruise travel
experience 2022

their experienced counterparts. This aligns with the theory’s assertion that individuals value gains and losses differently, placing more weight on potential losses. Moreover, our findings contribute to the discourse on EUT, which posits that individuals make decisions based on the expected outcomes of their choices, maximizing utility in the process. This study highlights how experienced cruisers, with their past experiences serving as a reference point, assess the utility of cruise travel in the post-pandemic context. Their willingness to pay does not increase proportionally to the non-experienced group, suggesting that their utility calculation incorporates a broader range of factors, including past price points, perceived value and changes in service quality or safety measures.

5.2 Practical implications

Results of the current study also offer practical implications to cruise management. Based on the descriptive results, the most preferred cruise length is 4–7 days, which is in line with industry averages and suggests cruise management should offer a majority of 7-day cruises, while also offering some 3-to-4-day cruises.

Results of the PSM general model revealed that the OPP was \$1,464, which is where the “too cheap” questions distribution intersects the “too expensive” results (Harmon *et al.*, 2007). Hence, cruise management should utilize this as an average starting point when pricing 7-day cruises. Cabins and experiences cruise lines provide that are above average should be priced higher, and vice-versa. Since the range of acceptable prices was between \$1,183 and \$1,900, these could be used as guides for the upper and lower limits of what should be charged.

Further, the OTP increased from \$1,399 in 2021 to \$1,525 in 2022 and the ORP respectively increased from \$1,816 to \$1,986 in 2022. These reflect an increase of 9.0% for OTP and 9.4%

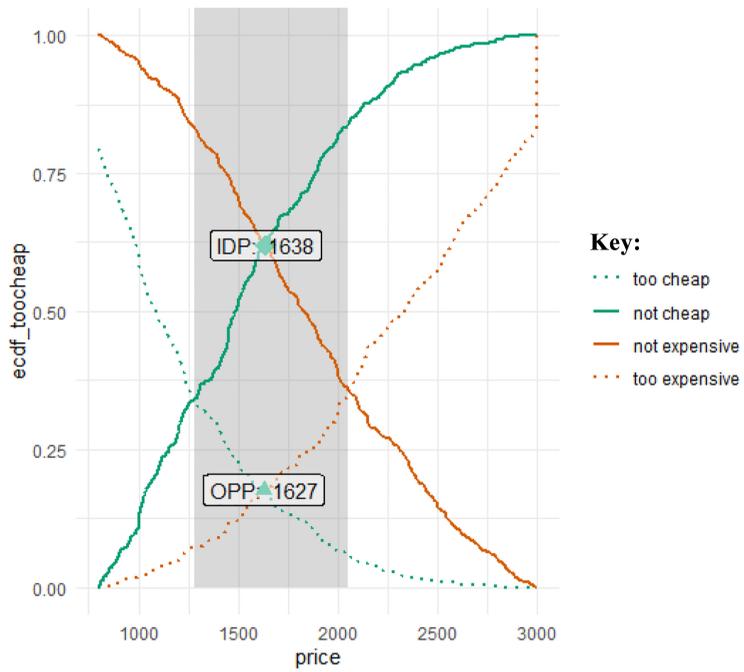


Figure 8.
PSM consumers with
cruise travel
experience 2022

Source(s): Figure by authors

Table 3.
The results of PSM
general

Price points	2021	2022
Accepted price range	\$1,183 – \$1,900	\$1,209 – \$1,982
Indifference price point	\$1,497	\$1,530
Optimal price point	\$1,464	\$1,511
Price with optimal trial rate	\$1,399	\$1,525
Price with optimal revenue	\$1,816	\$1,986

Source(s): Table by authors

Table 4.
The results of PSM
group – none-
experience

Price points	2021	2022
Accepted price range	\$1,119 – \$1,803	\$1,159 – \$1,891
Indifference price point	\$1,449	\$1,487
Optimal price point	\$1,401	\$1,464
Price with optimal trial rate	\$1,399	\$1,588
Price with optimal revenue	\$1,596	\$1,846

Source(s): Table by authors

for ORP in just one year and suggest that demand and willingness to pay are increasing. Hence, future pricing can likely be increased without having too much of a negative effect on demand.

Results of the PSM group model showed that non-experienced cruisers had a 14% increase in their OTP from 2021 to 2022, while experienced cruisers had a slight decrease. Yet, the nonexperienced group still had a lower overall willingness to pay than the experienced cruisers. Since first time cruisers have been found to spend more than experienced/loyal cruisers (Petrick, 2004), this increase in nonexperienced cruisers' OTP suggests the first-time cruise market is likely worth going after.

The MLR analysis revealed that risk perceptions became a more important from 2021–2022 and that protective behaviors were important in 2022. Hence, cruise management should likely include information related to the things they are doing to reduce at sea risks and find ways to minimize these risks. Future research should determine specifically what risks are most important to cruisers and specific measures that should be taken to reduce these risks.

Not surprisingly, the MLR also revealed that attitude toward cruising was the best indicator of cruise intentions for both 2021 and 2022. This is consistent with multiple travel related results from studies grounded in the theory of planned behavior and accentuates the importance of having marketing communication that aids in developing positive attitudes toward cruising. Since cruising has been found to have potential psychological and physiological benefits to cruisers (Petrick, Markert, & Sasangohar, 2022), it is suggested that cruise messages include reference to these benefits to aid in increasing potential cruisers' attitudes toward cruising. Further, since Jordan, Bynum Boley, Knollenberg, and Kline (2018) suggested the importance of measuring both positive and negative attitudes; future research

Price points	2021	2022
Accepted price range	\$1,201 – \$2,000	\$1,140 – \$1,870
Indifference price point	\$1,561	\$1,463
Optimal price point	\$1,537	\$1,455
Price with optimal trial rate	\$1,506	\$1,516
Price with optimal revenue	\$1,965	\$1,986

Source(s): Table by authors

Table 5.
The results of PSM group – with-experience

	Estimate	Std. error	t-value
<i>2021</i>			
(Intercept)	-1.11	0.18	-6.17***
Vaccine perception	0.07	0.02	3.13**
Attitudes	0.41	0.02	18.07***
Perceived crisis management capability	0.44	0.03	13.47***
Risk perceptions	-0.03	0.03	-1.03
Cruise experience	0.24	0.02	13.42***
<i>2022</i>			
(Intercept)	-0.28	0.19	-1.43
Protective behaviors	0.24	0.02	11.54***
Attitudes	0.42	0.02	20.71***
Perceived crisis management capability	0.36	0.04	9.70***
Risk perceptions	-0.29	0.04	-7.86***
Cruise experience	0.16	0.02	9.01***

Note(s): Significance codes: <0.001***, <0.01**, <0.05*, >0.05 (no star)

Source(s): Table by authors

Table 6.
The coefficients of MLR for 2021 and 2022

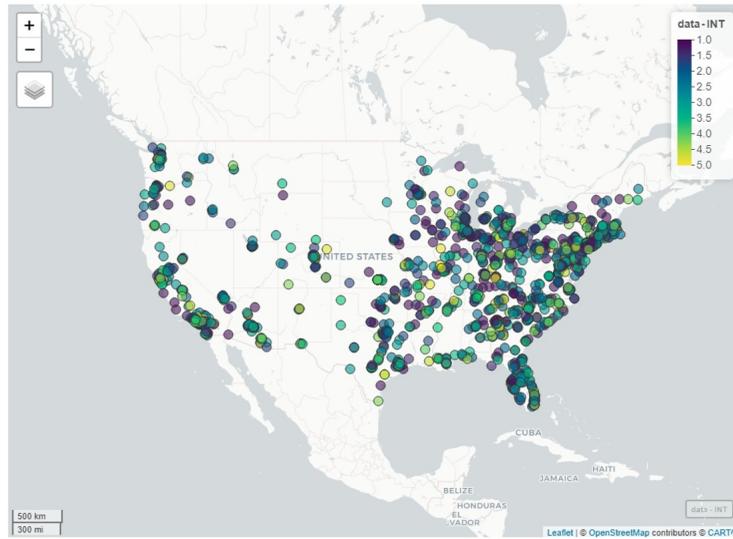


Figure 9.
GeoSpatial analysis –
intention 2021

Source(s): Figure by authors

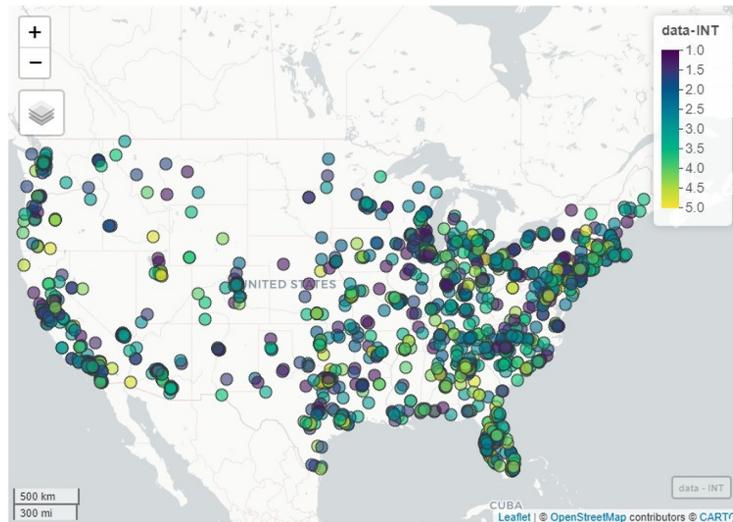


Figure 10.
GeoSpatial analysis –
intention 2022

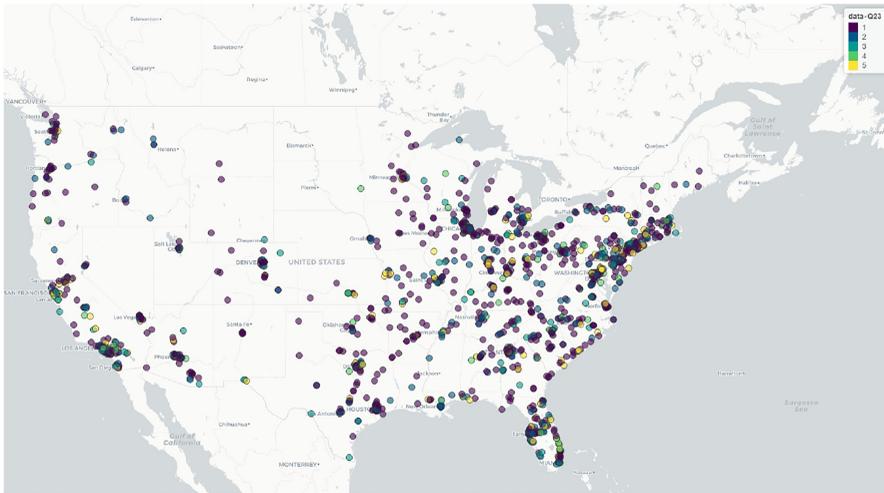
Source(s): Figure by authors

should also incorporate inclusion of negative attitudes in similar studies. Finally, the geospatial analysis revealed that residents from coastal cities were significantly more likely to cruise. This suggests that geographical marketing to coastal regions would be effective.

6. Limitations and future directions

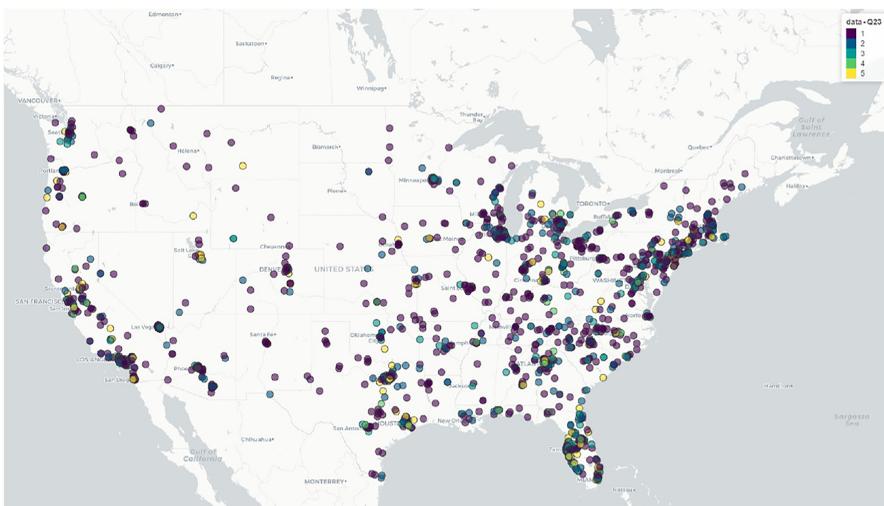
This study explored regional impacts on cruise tourism by using a one-layer geographic spatial analysis. It is likely that annual household income is relevant to understanding the

Cruise market investigation and pricing



Source(s): Figure by authors

Figure 11.
GeoSpatial analysis –
cruise experience 2021



Source(s): Figure by authors

Figure 12.
GeoSpatial analysis –
cruise experience 2022

role of price in decision-making. Hence, it is recommended that future studies include household income. Further, the current study only examined consumers' willingness to pay for mainstream cruise experiences. Even though this type of cruise line represents the majority of the cruising market (CLIA, 2022), it could also be beneficial to examine pricing preferences for other types of cruising. Hence, a comparison of mid-scale, upper-scale and luxury experiences is suggested for future research. Finally, the current study only tracked two years of perception variances, both of which were highly affected by the COVID-19 pandemic. It would likely be fruitful to continue survey data collection and build a comprehensive panel database in the future. Future studies could hence observe longitudinal perception changes integrated with various intervention events across the globe.

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