

# Beyond Trust: How Usefulness and Immersiveness Drive Space Tourism Intentions in High-Risk Contexts

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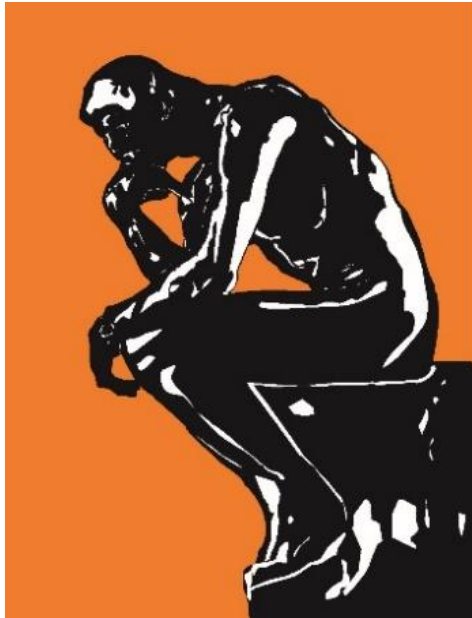
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“Upon conducting field research, which includes climbing onto the robots to check, we reach the following conclusion:

1. The robots have state-of-the-art technology capable of chasing birds away.
2. All of the information you seek verification is wrong. Your scouts are likely too scared to come closer and, thus, make poor speculations from their 200-meter distance on what the robots can do.”

—In “Bogeyman”; *Wild Wise Weird* (2024)

## **Abstract.**

The rapidly evolving space tourism industry faces significant challenges in building consumer trust and balancing emotional appeal with factual accuracy—both essential for reducing uncertainty and fostering long-term public engagement in this high-risk sector. This study examines the key factors shaping individuals' intentions to participate in space tourism, with a focus on their perceived trustworthiness, usefulness, and immersiveness of information on social media. Applying Mindsponge Theory, we explore the interplay between trust evaluation and subjective cost-benefit judgement of individuals in high-risk tourism context. The findings reveal that while trustworthiness positively influences participation intention, its role diminishes when usefulness and immersiveness are particularly strong. This suggests that space tourists, who are naturally inclined toward risk-taking, prioritize experiential rewards—such as novelty, prestige, and emotional engagement—over concerns about information reliability. These insights offer practical implications for marketing in high-risk industries, highlighting the importance of immersive storytelling, exclusivity, and transformative experiences over conventional trust-building measures. Future research should investigate how personal risk tolerance, prior experience, and cognitive biases shape thought processes, decision-making, and behaviors in extreme tourism contexts.

**Keywords:** space tourism, trustworthiness, usefulness, immersiveness, Mindsponge Theory, decision-making, high-risk industries

## **1. Introduction**

The growth of commercial space tourism represents a new chapter in human exploration, with private companies like SpaceX, Blue Origin, and Virgin Galactic playing an important role (Vecchi and Brennan, 2015). These companies are contributing to a shift from a government-led space industry to one where private businesses are increasingly involved. Over the past decade, advancements in technology have made space travel more achievable for individuals with significant financial resources, turning an ambitious dream into a possibility (Laing and Frost, 2019; Mehran et al., 2023). The market for space tourism is expected to expand, with projections suggesting the industry could be worth \$217 billion by 2030 and potentially grow to \$2.7 trillion by 2040 (Mehran et al., 2023). In 2022, the global space economy saw investments totaling \$384 billion across sectors, including space tourism (Bryce et al., 2016). Innovations such as reusable rockets, improved spacecraft designs, and sustainable propulsion systems are helping reduce costs and make space travel more accessible. These advancements also support progress in related industries, including telecommunications, transportation, renewable energy, and materials science. Space tourism presents both an economic opportunity and a cultural development. Private companies are investing heavily, with the industry's annual revenue forecasted to reach \$1.1 billion by 2032 (Musselman et al., 2024).

Unlike traditional forms of travel, space tourism involves financial, physical, and psychological risks, requiring careful communication to build trust and address uncertainties (Bensoussan, 2010). Physically, space tourists face extreme conditions, such as high G-forces during launch, microgravity, and radiation exposure, which can lead to muscle atrophy, bone density loss, and long-term health risks (Baran et al., 2022). The effects of prolonged exposure to microgravity and radiation remain poorly understood, adding to the risks. Psychologically, isolation, confinement, and the unfamiliar environment of space can cause stress and anxiety, with uncertain long-term mental health impacts (Arone et al., 2021). Financially, the high costs of space tourism - ranging from hundreds of thousands to millions of dollars - place a significant burden on participants.

Although technological advancements have mitigated some risks, they remain significant obstacles to attracting customers. In addition, most information currently available to potential space tourists comes from media sources such as news reports, documentaries, films, and publications by space agencies. While these sources ignite public interest, they often provide incomplete insights into the full spectrum of risks and rewards associated with space tourism (Tasci et al., 2021). This lack of comprehensive and reliable information complicates decision-making, highlighting the need for clear and transparent communication by the industry (Spector, 2020). Additionally, social media platforms have become an increasingly important source of information, providing real-time updates and a space for enthusiasts to engage with one another (Appel et al., 2020). However, the quality of social media content—its authenticity, relevance, and engagement—varies significantly, which can influence how people assess the risks and rewards of space tourism (Keelson et al., 2024).

China and Macau are positioning themselves as key players in the global space economy. China's substantial investments in space exploration, including satellite technology, lunar missions, and space station development, underscore its ambition to lead in the space sector. With a growing middle and upper class, China represents a promising market for luxury experiences like space tourism. Projections indicate that by 2027, 65% of luxury goods consumers will emerge from the middle class, signaling significant purchasing power shifts (Chernov and Gura, 2024). The China National Space Administration (CNSA) is central to this progress, driving policies that enhance both national security and commercial opportunities (Han et al., 2023). In parallel, Macau's tourism and economic environment, bolstered by the "one country, two systems" framework, makes it a strategic entry point for businesses targeting the Chinese market (Zhang and Wang, 2024).

Affluent, adventure-seeking demographics in Asia, particularly early adopters of luxury and high-tech experiences, represent a critical customer segment (Zhang et al., 2023). These individuals are drawn to the exclusivity and prestige of space tourism, provided they receive credible and compelling information. By engaging this demographic effectively, the space tourism industry can unlock new revenue streams, foster customer loyalty, and establish itself as a transformative force in global tourism, driving both regional and international growth.

To succeed in emerging markets, space tourism companies need to understand how consumers evaluate the idea of space travel. Key considerations include safety, cultural relevance, and the prestige associated with participating in advanced technological experiences (Laing and Frost, 2019; Wang et al., 2024). Adapting strategies to align with these preferences - such as building trust through endorsements from local influencers, highlighting the unique aspects of the experience, and considering culturally specific concerns—may help enhance consumer appeal.

A crucial component of this strategy is bridging informational gaps. Clear and transparent communication about the risks, rewards, and logistics of space travel fosters consumer confidence, particularly in markets where the concept of commercial space tourism is still developing. By emphasizing perceived trustworthiness, usefulness, and immersiveness, companies can reduce uncertainties that might otherwise deter potential customers. This approach is particularly relevant in rapidly expanding markets such as China, where familiarity with space tourism remains limited. If successful, such strategies could offer insights into how space tourism can be introduced in other regions in a way that aligns with local expectations and interests.

Research has explored factors shaping consumer attitudes toward space tourism, including psychological, financial, and safety risks, as well as motivations such as adventure, personal fulfillment, and social status (Chang, 2017; Olya and Han, 2023; Slaney et al., 2024). However, less attention has been paid to how prospective tourists evaluate the trustworthiness, usefulness, and immersiveness of the information they encounter - factors that play a crucial role in consumer decision-making.

This study addresses this gap by examining how these information characteristics influence consumers' intention to try space tourism. Trustworthiness determines whether company claims are perceived as credible and reliable, shaping perceptions of safety and viability. Usefulness reflects how well the information addresses concerns such as costs and risks while aligning with individual motivations. Immersiveness fosters emotional connections, making the experience more tangible and engaging.

To examine these connections, the present study adopts the Bayesian Mindsponge Framework (BMF), a decision-making model that incorporates both emotional and rational factors in the process of evaluation (Nguyen et al., 2022b; Vuong et al., 2022). The current study is conducted to examine the following research questions:

- How are information trustworthiness, usefulness, and immersiveness associated with the general intention to try space tourism?
- Does the uncertainty of information (proxied by information trustworthiness) moderate the associations between information usefulness, immersiveness, and the general intention to try space tourism?

This study aims to contribute to the literature by exploring how different aspects of information influence consumer behavior in the context of space tourism. By examining these

relationships, we seek to provide space tourism companies with insights to refine their communication strategies, fostering customer trust and encouraging broader participation. Understanding the factors that shape consumer decision-making is important not only for companies aiming to grow their market presence but also for helping the public make more informed choices about space tourism. The findings of this study are expected to offer practical guidance for enhancing information dissemination, supporting the industry in building consumer confidence, addressing perceived risks, and promoting growth in this emerging field.

## **2. Methodology**

### **2.1 Theoretical foundation**

This study employs the Bayesian Mindsponge Framework (BMF), which integrates the Mindsponge Theory with Bayesian analysis to examine how individuals process, absorb, and act on information across various contexts. The Mindsponge Theory provides a structured approach to understanding how different “minds” (systems) within the biosphere interact with their “environments” (external systems) (Vuong, 2023). The term “mindsponge” is a metaphor likening the mind to a sponge, absorbing new values that align with existing beliefs while filtering out incongruent ones (Vuong and Napier, 2015). The theory has been applied across multiple fields, including environmental psychology, consumer behavior, and technology adoption, offering insights into how cognitive, emotional, and social factors shape human thought and action (Alzahrani et al., 2023; Huang et al., 2023; Nguyen and Jones, 2022; Nguyen et al., 2022a).

As an information-processing system, the human mind continuously absorbs and filters environmental inputs through mechanisms ranging from simple cognitive evaluations to complex neuroplasticity, identity shifts, and extreme ideation (Vuong et al., 2021). This process is governed by cost-benefit judgments, where subjectivity and objectivity depend on the observer’s perspective and contextual factors (Lahav and Neemeh, 2022; Nguyen et al., 2023). Accepted values then serve as inputs for future cognitive processes, allowing the system to adapt and evolve in response to changing environments. Recently, insights from quantum mechanics and information theory—such as granular worldviews and entropy (Hertog, 2023; Rovelli, 2018; Shannon, 1948)—have been incorporated into the theory, providing a deeper understanding of how individuals evaluate information within the “infosphere,” the dynamic landscape shaped by media and interpersonal exchanges (Vuong and Nguyen, 2024a, b).

Social media plays a key role in spreading information, particularly in the context of emerging technologies like space tourism. Platforms such as Twitter, Instagram, TikTok, and YouTube allow companies to engage directly with potential consumers and provide real-time updates, while also enabling individuals to share experiences and opinions (Jeswani, 2023). This exchange of information influences how consumers form opinions, assess trustworthiness,

and establish emotional connections with space tourism. Due to its broad reach and interactive nature, social media has become a significant tool in shaping public perceptions and, to some extent, influencing attitudes toward space tourism (Ausat, 2023).

Central to the Mindsponge Theory is the formation and reinforcement of mental models (Tanemura et al., 2022). Individuals absorb relevant and trustworthy information to shape their beliefs and guide decisions while filtering out conflicting or irrelevant ones. In the context of this study, the Mindsponge Theory explains how individuals' exposure to social media influences their interest in emerging space tourism. The theory highlights key factors—trustworthiness, usefulness, and immersiveness—that shape information processing, decision-making, and subsequent behavioral shifts.

Usefulness determines whether information supports practical decision-making. Details about cost, safety, and physical requirements increase the likelihood of acceptance as individuals incorporate actionable insights into their mental models (Buckley, 2023; Vuong and Nguyen, 2024a). Thus, when consumers receive relevant, practical details about space travel, their perceptions gradually shift by absorbing and accepting more relevant information to enter the mindset, increasing their willingness to consider participation. Meanwhile, immersiveness influences information processing by evoking emotional and sensory engagement (Krishna, 2012). According to the Mindsponge Theory, emotionally resonant information is more likely to be absorbed, particularly when it aligns with core values such as curiosity, excitement, or adventure (Cheng et al., 2023; Escandon-Barbosa et al., 2024). For instance, a virtual reality simulation of space travel can evoke awe, strengthening interest in space tourism. If the experience aligns with personal values, the mind integrates this information, reinforcing a perception of space travel as desirable and feasible. Conversely, if the experience induces discomfort or presents unrealistic expectations, the perceived costs may outweigh the benefits, leading to rejection of the information and, subsequently, lower willingness to participate.

Trust evaluation plays a crucial role in filtering information of the mind, which helps to reduce the uncertainty of the information absorbed. As indicated by Shannon (1948)'s formula, a greater amount of information within the mind leads to higher informational entropy, i.e., uncertainty and unpredictability:

$$H(X) = - \sum_{i=1}^n P(x_i) \log_2 P(x_i)$$

$H(X)$  is the informational entropy of a random variable  $X$  with possible outcomes  $\{x_1, x_2, \dots, x_n\}$  and corresponding probabilities  $\{P(x_1), P(x_2), \dots, P(x_n)\}$ .  $P(x_i)$  is the probability of the outcome  $x_i$ . Each probability  $P(x_i)$  represents how likely each outcome  $x_i$  is to occur. In this context, the variable  $X$  represents an individual's mind in its current state, containing  $i$  units of information. Higher entropy increases the cognitive energy required to store and process information (Vuong and Nguyen, 2024b). Consequently, trust evaluation

serves as an energy-saving mechanism for the human mind. This mechanism operates alongside subjective cost-benefit judgments, either amplifying or mitigating their influence on thoughts and behaviors (Vuong, 2023).

For example, people are more likely to accept information from credible sources while rejecting misleading or unreliable content, even if such content suggests potential benefits. In the case of space tourism, false advertising or reports of accidents can undermine consumer trust, fostering skepticism and reducing interest. Therefore, we hypothesize that, beyond its direct association with participation intentions, trustworthiness also moderates the effects of usefulness and immersiveness on individuals' willingness to engage in space tourism.

## 2.2. Selected variables for the study

This study utilized data from a survey conducted in Macau SAR, which aimed at investigating the perceptions, attitudes, and intentions of individuals interested in space tourism (Peng et al., 2023). The survey, which was carried out in May 2021, involved 361 respondents who were recruited through snowball and convenience sampling. After data validation, including screening for missing responses and biases, 339 valid responses were retained for analysis. The dataset is available in the Mendeley Data repository under the DOI: 10.17632/92bdw68ctw.4.

The data collection for this study focused on individuals interested in space tourism and was conducted through an online questionnaire distributed via Wenjuanxing, a platform similar to Amazon Mechanical Turk. The questionnaire was designed to assess key factors influencing the intention to engage in space tourism, specifically exploring perceptions of trustworthiness, usefulness, and immersiveness. To ensure clarity, reliability, and relevance, the questionnaire was pre-tested with a subset of respondents.

For this study, several key variables were selected to analyze the relationship between social media engagement, emotional responses, and individual intentions toward space tourism. The primary outcome variable, *SpaceTourismIntention*, represents individuals' willingness to consider space tourism as a potential recreational activity. The predictor variables are:

- *Trustworthiness*: Measures the reliability and credibility of information encountered on social media.
- *Usefulness*: Evaluates the practical value of the information in decision-making processes.
- *Immersiveness*: Assesses the ability of the information to create engaging and impactful experiences.

These variables reflect important elements of cognitive and emotional engagement that may influence individuals' intentions toward space tourism. For instance, *Immersiveness* highlights how engaging and experiential content could potentially generate interest and curiosity about space tourism. Meanwhile, *Trustworthiness* plays a role in moderating the



effects of the other predictors by establishing credibility. When information is viewed as trustworthy, it may enhance the impact of both useful and immersive content, making individuals more likely to consider space tourism as a possibility.

**Table 1: Variable Description**

Variable Name	Description	Data Type	Measurement
<i>SpaceTourismIntention</i>	Consumers' intention to participate in space tourism	Numerical	1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree
<i>Trustworthiness</i>	The credibility and accuracy of space tourism content on social media.	Numerical	1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree
<i>Usefulness</i>	The practical value of space tourism content for decision-making.	Numerical	1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree
<i>Immersiveness</i>	The extent to which space tourism content creates an engaging and impactful experience.	Numerical	1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

### 2.3. Statistical model

The following model was developed to examine the direct associations of *Trustworthiness*, *Usefulness*, and *Immersiveness* with *SpaceTourismIntention*, as well as the moderating role of *Trustworthiness* on the relationships between *Usefulness*, *Immersiveness*, and *SpaceTourismIntention*.

$$SpaceTourismIntention \sim normal(\mu, \sigma) \quad (1.1)$$

$$\mu_i = \beta_0 + \beta_1 * Trustworthiness_i + \beta_2 * Usefulness_i + \beta_3 * Immersiveness_i + \beta_4 * Trustworthiness_i * Usefulness_i + \beta_5 * Trustworthiness_i * Immersiveness_i \quad (1.2)$$

$$\beta \sim normal(M, S) \quad (1.3)$$

In this model,  $\mu_i$  represents the expected *SpaceTourismIntention* for individual  $i$ , with each  $\beta$  coefficient quantifying the effect magnitude of the respective predictor on *SpaceTourismIntention*. The  $\beta$  coefficients include  $\beta_0$  as the intercept term,  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  representing the main effects of *Trustworthiness*, *Usefulness*, and *Immersiveness*, respectively, while  $\beta_4$  and  $\beta_5$  capture the interaction effects, exploring the moderating role of *Trustworthiness* in its relationship with *Usefulness* and *Immersiveness*. The logical network of Model 1 is shown in Figure 1 below.

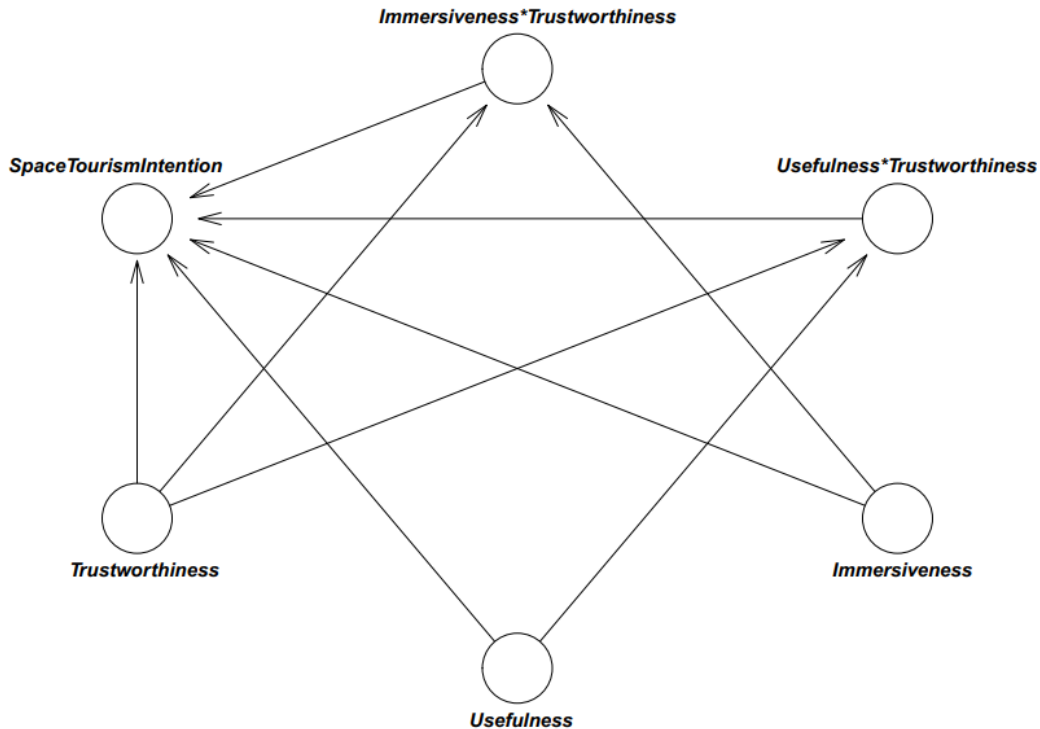


Figure 1. Model 1's logical network

#### 2.4. Data analysis and validation

This study employed Bayesian Mindsponge Framework (BMF) analytics to examine the factors influencing individuals' intention to participate in space tourism. The BMF method integrates the logical reasoning of Mindsponge Theory with the probabilistic strengths of Bayesian inference, providing a comprehensive analytical framework. This approach is particularly well-suited for the study, as it combines the Mindsponge Theory's ability to explain social behavior with Bayesian inference's flexibility and predictive capabilities (Nguyen et al., 2022b). Specifically, BMF facilitates a probabilistic understanding of how individuals process, absorb, and act on information in complex and dynamic environments (Vuong, 2023). The integration of probabilistic reasoning within BMF allows for the modeling of decision-making processes under conditions of uncertainty and change.

Bayesian inference evaluates all parameters probabilistically, enhancing predictive reliability even in complex models (Csilléry et al., 2010; Gill, 2014). By employing Markov Chain Monte Carlo (MCMC) techniques, Bayesian analysis effectively handles intricate models, such as the multilevel structures used in this study (Dunson, 2001). A key advantage of Bayesian inference is its reliance on credible intervals rather than  $p$ -values, enabling more nuanced and informative decision-making (Halsey et al., 2015; Wagenmakers et al., 2018).

Selecting appropriate priors is a critical aspect of Bayesian analysis. For this exploratory study, uninformative or flat priors were chosen to reduce prior influence on the results. The model's fit was assessed using Pareto-smoothed importance sampling leave-one-out (PSIS-LOO) diagnostics (Vehtari and Gabry, 2019; Vehtari et al., 2017). The LOO statistic was calculated to evaluate how well the model fit individual data points, while  $k$ -Pareto values identified any influential or problematic observations. Values below 0.5 were considered indicative of a good model fit.

$$LOO = -2LPPD_{loo} = -2 \sum_{i=1}^n \log \int p(y_i|\theta)p_{post(-i)}(\theta)d\theta$$

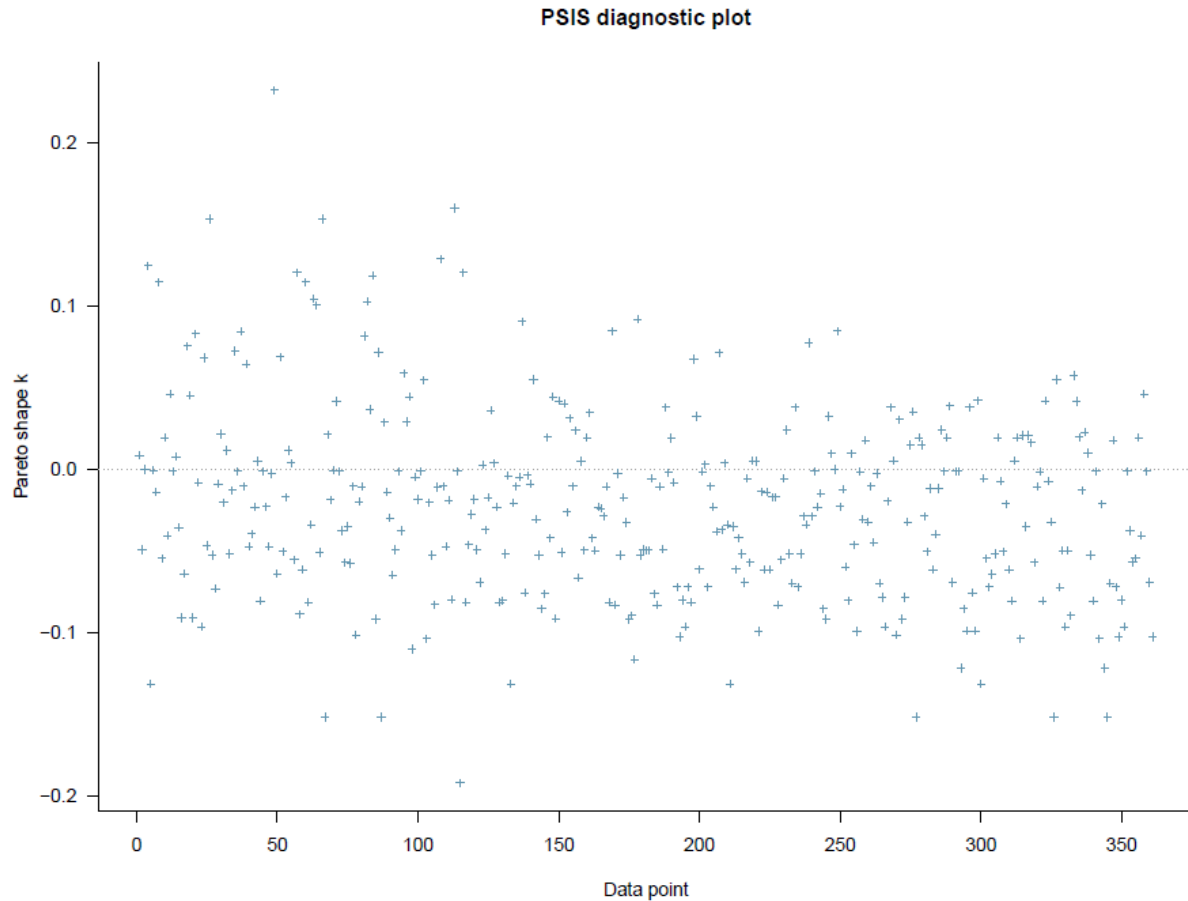
The posterior distribution  $p_{post(-i)}(\theta)$  is calculated based on the data excluding data point  $i$ . In the PSIS method,  $k$ -Pareto values are used to compute leave-one-out cross-validation, which helps identify observations with a high degree of influence on the PSIS estimate. Observations with  $k$ -Pareto values greater than 0.7 are often considered influential and may pose problems for accurately estimating leave-one-out cross-validation. Generally, a model is considered well-fitted when the  $k$  values are below 0.5.

If the model fit was deemed satisfactory, convergence diagnostics were performed using both statistical and visual methods. Key metrics for evaluating convergence included the effective sample size ( $n_{eff}$ ) and the Gelman-Rubin shrink factor ( $Rhat$ ). A  $n_{eff}$  greater than 1,000 indicates adequate sampling, while  $Rhat$  values close to 1.0 suggest convergence (Brooks and Gelman, 1998). Trace plots are also used to visually assess the convergence of the Markov chains.

The Bayesian analysis was performed in R using the `bayesvl` package, which provides robust visualization tools (La and Vuong, 2019). To ensure transparency and reproducibility (Vuong, 2018, 2020), the dataset and code snippets used in the analysis have been made publicly available on Zenodo: <https://zenodo.org/records/13859282>.

### 3. Results

Before interpreting the results of BMF analytics, it is necessary to evaluate how well Model 1 fits the data. As can be seen in Figure 2, we found no value exceeding the 0.3 threshold; the recommended value is below the 0.7 threshold. This indicates a good fit signal between the model and the data.



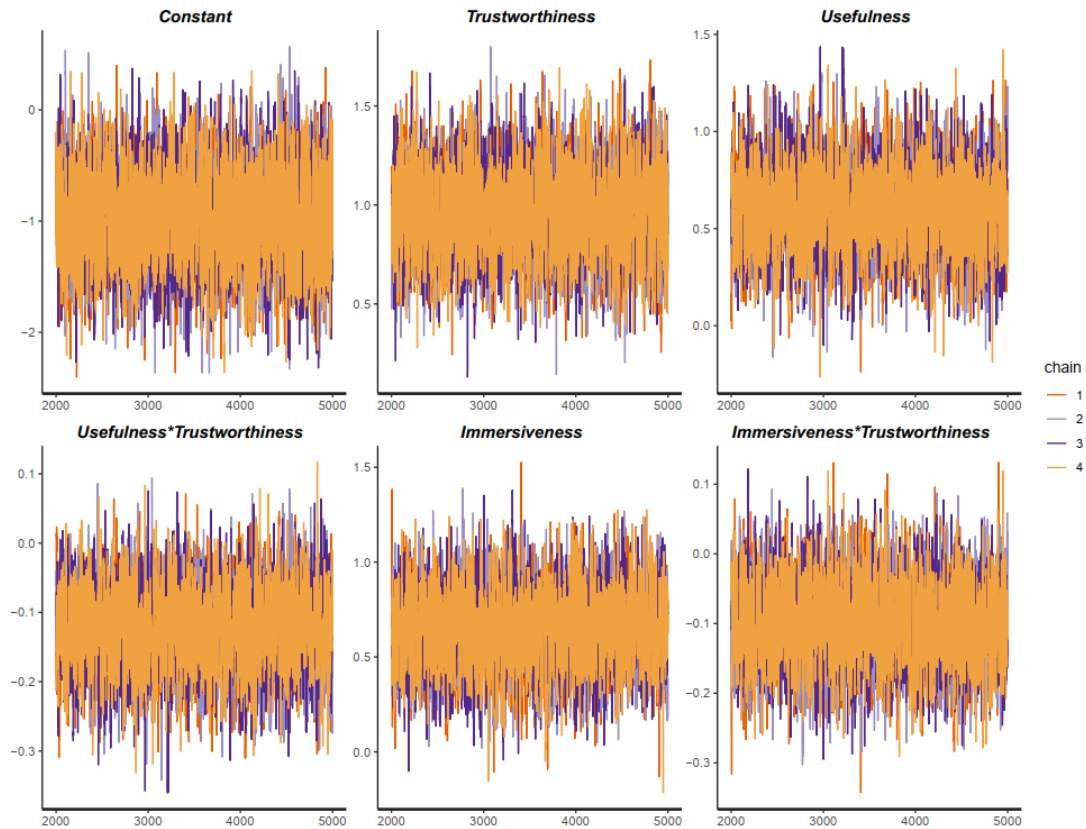
**Figure 2.** Model 1’s PSIS-LOO diagnosis

The posterior distribution statistics of Model 1 are shown in Table 2. All  $n_{eff}$  values are greater than 1000, and  $Rhat$  values are equal to 1, so it is plausible that Model 1’s Markov chains are well-convergent. The convergence of Markov chains is also evident in the trace plots shown in Figure 3. Notably, after the 2,000<sup>th</sup> iteration, all chains stabilize and fluctuate around a central equilibrium, indicating successful convergence.

**Table 2.** Estimated results of Model 1

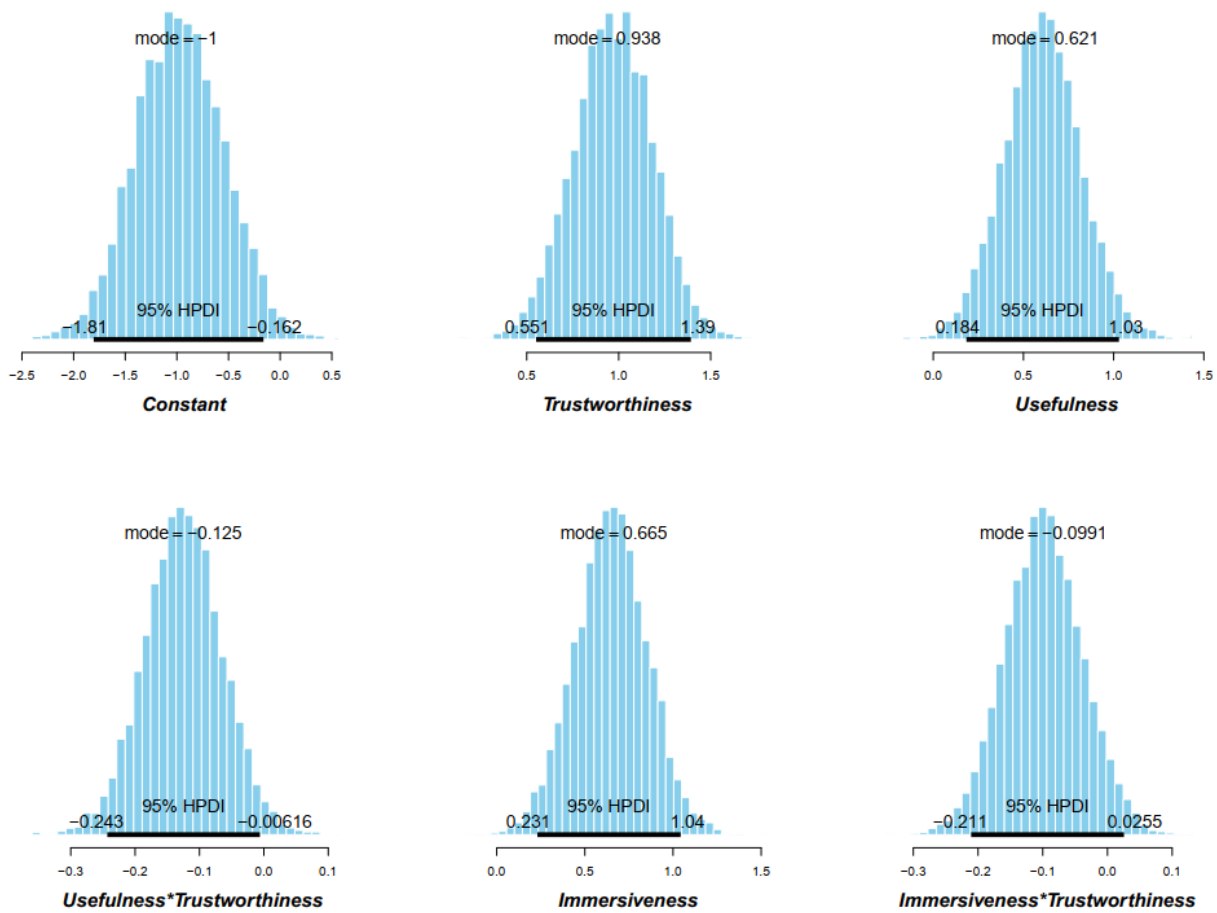
Parameters	Mean	SD	$n_{eff}$	$Rhat$
<i>Constant</i>	-0.96	0.42	4131	1
<i>Trustworthiness</i>	0.96	0.21	4162	1
<i>Usefulness</i>	0.61	0.22	3774	1
<i>Usefulness*Trustworthiness</i>	-0.13	0.06	3756	1

<i>Immersiveness</i>	0.64	0.21	3754	1
<i>Immersiveness*Trustworthiness</i>	-0.10	0.06	3696	1



**Figure 3.** Model 1's trace plots

Since all diagnostics confirm the convergence of Markov chains, the simulated results are deemed reliable for interpretation. Figure 4 presents the distributions of estimated outcomes with Highest Posterior Density Intervals (HPDIs) at 95%, illustrated by black lines in the middle. All the HPDIs of *Trustworthiness*, *Usefulness*, *Immersiveness*, and *Usefulness\*Trustworthiness* are located entirely on either the positive or negative side of the axis, suggesting that their associations with *SpaceTourismIntention* are highly reliable. Although a proportion of 95% HPDI of *Immersiveness\*Trustworthiness* is still located on the positive side of the axis, that proportion is negligible. Thus, the negative association between *Immersiveness\*Trustworthiness* and *SpaceTourismIntention* can still be deemed highly reliable.



**Figure 4.** Distributions of posterior coefficients with HPDI at 95%

To aid the interpretation of the interaction effects in Model 1, we added the coefficients' mean values, which represent the value that has the highest probability to occur, to Equation 1.2 to calculate the relative level of *SpaceTourismIntention* in accordance with different levels of *Trustworthiness*, *Usefulness*, and *Immersiveness*. Specifically, Figure 5 illustrates *SpaceTourismIntention*'s level according to *Trustworthiness* and *Usefulness*, while *Immersiveness* is constantly chosen as 'Neutral.' Meanwhile, Figure 6 illustrates *SpaceTourismIntention*'s level according to *Trustworthiness* and *Immersiveness*, while *Usefulness* is constantly chosen as 'Neutral.'

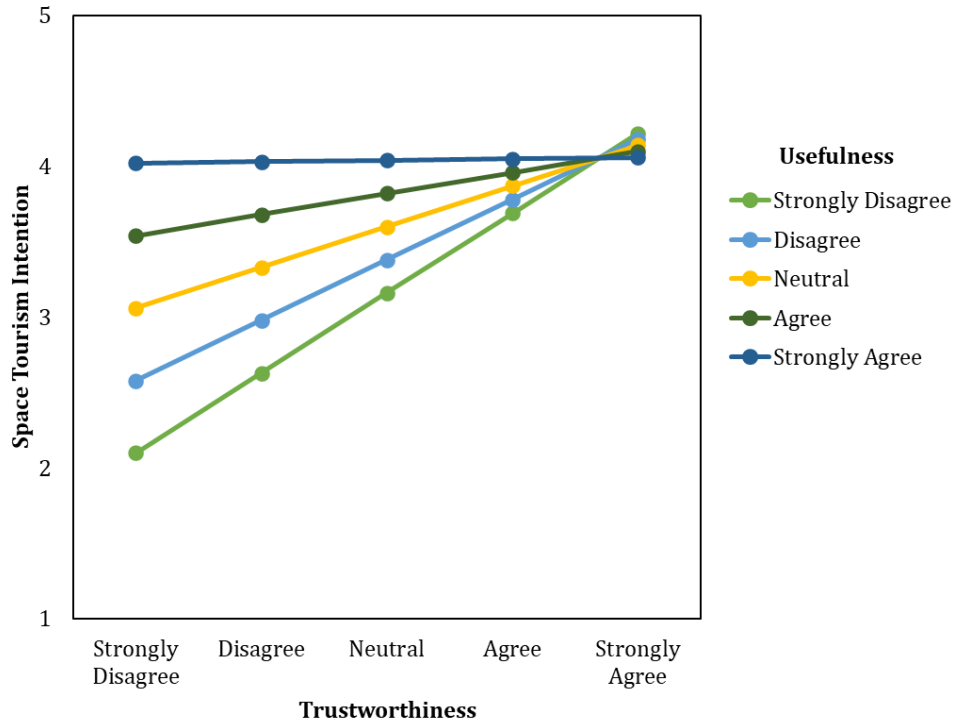
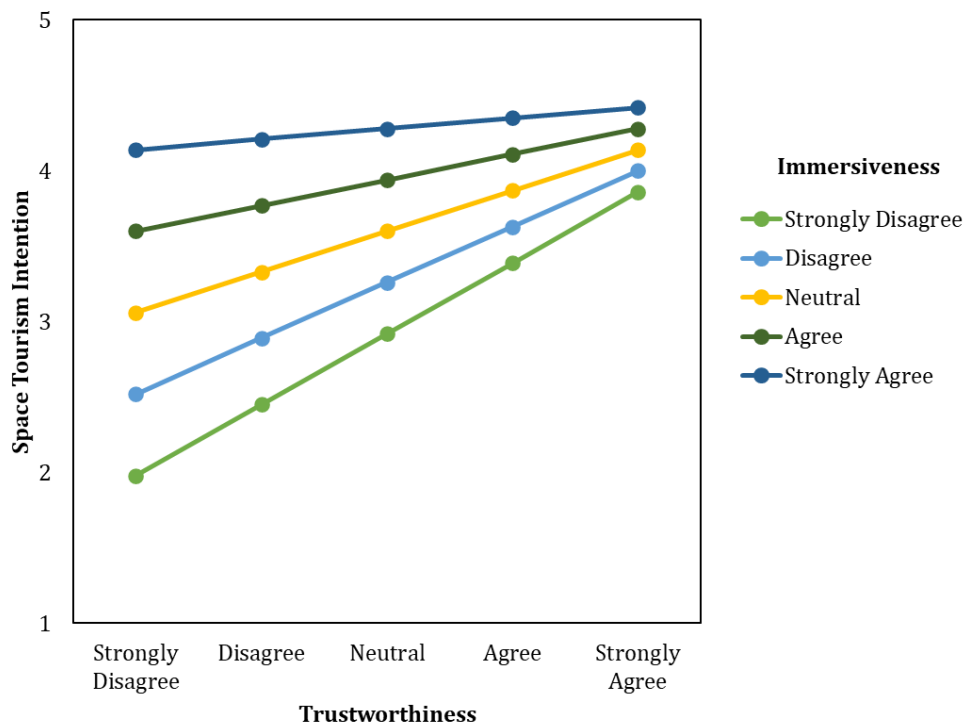


Figure 5. The respondents' intention level to participate in space tourism, predicted by the level of usefulness and trustworthiness of information on social media



**Figure 6.** The respondents' intention level to participate in space tourism, predicted by the level of immersiveness and trustworthiness of information on social media

As illustrated in Figures 5 and 6, respondents' perceived usefulness, immersiveness, and trustworthiness of space tourism information on social media are positively associated with their intention to participate in space tourism. However, the influence of information trustworthiness on participation intention is more pronounced among individuals with low perceived usefulness and immersiveness than among those with high levels of these perceptions. In other words, among people with high levels of perceived information usefulness and immersiveness, their space tourism intention is high regardless of the perceived information trustworthiness.

#### **4. Discussion**

This study applies Mindsponge Theory, an information-processing theory of the mind that simultaneously emphasizes trust evaluation—reducing uncertainty by assessing information reliability—and subjective cost-benefit evaluation—weighing perceived rewards against potential costs and risks—to explore how *Trustworthiness*, *Usefulness*, and *Immersiveness* influence individuals' intentions to participate in space tourism. The findings suggest that all three factors positively impact participation intention.

Trustworthiness has long been a critical factor in consumer's thought processes and decision-making, particularly in industries like hospitality, where it reduces uncertainty and provides a sense of security (Fisher et al., 2018; Kulnadee and Pankham, 2024). Consistent with this, our findings reveal a positive relationship between trustworthiness and the intention to engage in space tourism. In the context of space tourism, a company perceived as trustworthy—coupled with immersive and engaging experiences, such as virtual space travel—can significantly increase the likelihood of participation. This aligns with prior research emphasizing the importance of credibility in emerging industries, where consumers often rely on reputable sources—such as travel agencies, online reviews, and peer recommendations—to navigate uncertainty and make informed decisions (Su et al., 2022).

However, our findings also indicate a notable insight into thought processes and decision-making dynamics within space tourism. While trustworthiness remains relevant, it becomes less significant when the experience is perceived as particularly useful and immersive. This shift might be largely driven by the high-risk nature of space tourism, where participants—naturally more inclined to take risks—prioritize experiential rewards (novelty, prestige, and excitement) over the reliability of the information they receive (Spector, 2020). Unlike normal consumers, space tourists are primarily motivated by the allure of a once-in-a-lifetime adventure, focusing on the prestige and exclusivity of being among the first to experience space tourism (Gatti et al., 2023). They view space travel as not just about the destination but about the transformative experience itself, perceiving it as unique, life-changing, and a personal achievement.



As a result, the perceived benefits—the thrill of space travel, personal accomplishment, and the exclusivity of the experience—often outweigh concerns about trustworthiness, making decision-making more reward-driven than credibility-dependent (Nasution et al., 2023). This highlights a significant difference with the thought process in normal contexts, as it highlights that in extreme tourism contexts like space travel, the promise of an extraordinary experience takes precedence over conventional pivotal factors such as risk assessment and trust evaluation. In this setting, the potential for novelty and excitement becomes the dominant force shaping participation decisions, reshaping how we understand decision-making in high-risk, high-reward industries.

The decision-making patterns observed in space tourism are not unique to this field but are evident in other high-risk, high-reward activities, such as cryptocurrency investments and extreme sports. These activities share key characteristics with space tourism, particularly a willingness to accept risks in exchange for meaningful experiences or rewards. For instance, extreme sports like deep-sea exploration, skydiving, and base jumping involve inherent dangers such as injury or death (Hornby et al., 2024). However, the appeal of excitement, personal achievement, and exclusivity often outweighs these concerns for participants. Similar to space tourists, extreme sports enthusiasts tend to have a higher risk tolerance, prioritizing emotional fulfillment, prestige, and the uniqueness of the activity over trust or safety considerations (Allman et al., 2009). This comparison further underscores that in high-risk environments, the desire for extraordinary experiences often overrides other pivotal considerations in the thought process, like trust and safety.

## **5. Practical implications**

### **5.1. Implications for space tourism marketing**

To effectively promote space tourism, marketers should focus on highlighting the perceived usefulness and immersive qualities of the experience rather than relying solely on traditional trust-building methods (Kieanwatana and Vongvit, 2024). By emphasizing the unique and transformative aspects of space travel—such as its prestige and exclusivity—marketers can create a stronger appeal than simply reassuring potential customers about safety. Immersive storytelling techniques, including virtual reality simulations and astronaut testimonials, can help potential customers clearly imagine the experience, making it more engaging and tangible (Papadopoulou et al., 2024).

In addition to traditional marketing methods, social media plays an important role in enhancing the perceived usefulness and immersiveness of space tourism. Platforms such as Instagram, Twitter, and YouTube provide spaces where immersive content, such as live streams, virtual reality experiences, and personal testimonials, can capture the interest of potential customers (Jeswani, 2023; Liu et al., 2022). Social media also facilitates the sharing of user-generated content, which helps build trust and credibility through peer recommendations and personal stories (Turcotte et al., 2015). This type of interactive and

immediate engagement can make the experience feel more relatable and accessible, further influencing potential customers' perceptions.

To effectively promote space tourism, marketers should focus on highlighting the perceived usefulness and immersive qualities of the experience rather than relying solely on traditional trust-building methods (Kieanwatana & Vongvit, 2024). By emphasizing the unique and transformative aspects of space travel—such as its prestige and exclusivity—marketers can create a stronger appeal than simply reassuring potential customers about safety. Immersive storytelling techniques, including virtual reality simulations and astronaut testimonials, can help potential customers clearly imagine the experience, making it more engaging and tangible (Papadopoulou et al., 2024).

Moreover, marketing efforts should strategically target individuals with a higher tolerance for risk—those naturally drawn to adventure, novelty, and exclusivity (Mehran et al., 2023). For this audience, space tourism can be positioned as a pioneering, elite opportunity that offers an extraordinary, once-in-a-lifetime experience. Marketers should emphasize the groundbreaking nature of space travel, its role in advancing human exploration, and the immense personal achievement it represents. This messaging will resonate with thrill-seekers and innovators, making space tourism an aspirational pursuit.

## **5.2. Implications for other high-risk industries**

The insights from space tourism decision-making could provide useful guidance for marketing in other high-risk industries. In extreme tourism activities like skydiving, deep-sea exploration, and extreme sports, participants often value the excitement and uniqueness of the experience more than the trust in safety measures (Brymer, 2010; Buckley, 2012). Companies in these sectors may find it beneficial to focus on highlighting the exceptional, transformative, and thrilling aspects of their offerings rather than placing too much emphasis on building trust. The appeal often lies in the adventure and prestige itself, with customers typically drawn to the experience rather than safety assurances.

Similarly, luxury and high-tech innovation industries may experience a similar decision-making process. Early adopters of new technologies, such as private space flights or advanced electric vehicles, are often motivated by the novelty, status, and potential rewards of pioneering new experiences. Marketing strategies aimed at these consumers should emphasize the groundbreaking nature of the product, its appeal in terms of status, and the transformative experience it offers. By focusing on these aspects, companies can highlight the attractiveness of their offerings, even with the inherent risks, appealing to those who prioritize innovation and exclusivity over the potential dangers (Palmié et al., 2024; Ponte et al., 2021; Slaney et al., 2024).

## **6. Limitations and future research directions**

This study provides helpful insights into decision-making in space tourism, but there are a few limitations to consider. First, the sample used may not fully represent the typical space tourist,

who is often an ultra-wealthy individual. As such, the findings might not be fully applicable to this specific demographic. Future research could aim for a more representative sample to enhance the relevance of the findings for this group. Moreover, personal factors such as risk tolerance, prior experience, and knowledge of space travel may influence respondents' thought processes. Future research could investigate how these factors, along with cognitive biases like optimism and overconfidence, affect individuals' willingness to participate in space tourism despite the inherent risks and uncertainties.

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