Awareness and Action: An Exploration Between Public Perception and Space Industry Priorities Regarding Sustainability

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Abstract

As issues regarding sustainability continue to grow more urgent and prevalent to everyday life, it is important to recognize whether society fully understands what is occurring. The low earth orbit is at threat of overcongestion, and the environment is experiencing higher rates of pollution due to rocket launches, calling for the need for the government and public to engage in this issue. Additionally, the efficiency of current frameworks can be analyzed through the results from this research. In order to identify existing gaps, a mixed methods approach was used, with a survey provided to the general public and interviews conducted with space industry professionals. The findings from this study revealed that a communication gap does indeed exist, with information platforms and delivery of issues showing strong correlation. This carves a path for policymakers to bridge the gap by addressing current frameworks and suggesting new ones that are more efficient. This can help preserve both the terrestrial and orbital environment, ensuring safety for future generations and long-term missions.

Keywords: sustainability, conservation, space industry, framework, environment, communication

Introduction

Miscommunication between everyday members of society and experts has become increasingly more common throughout the United States. Beginning in 1985, Heise and his colleagues at Florida International University began to explore the loss of American trust placed towards the United States government. Heise (1985) discovered stark contrasts that existed between the opinions of different people, concluding that "the communication gap between citizens and government is narrowed if citizens feel better informed either through personal experience or through information provided by the media." This study set the foundation for in-depth insights into the issue of communication gaps, most notably in the scientific and space industry. Specifically, Kennedy and Tyson in 2023, surveyed Americans to analyze their views of space company and exploration priorities. This similarly reflected the earlier studies done, bringing to attention that people who were more familiar with NASA had different opinions than those who were not, primarily emphasizing "monitoring the Earth's climate system" to be at the "top of the list" (Kennedy & Tyson, 2023). This further catalyzes the importance of both large and private companies in communicating effectively in today's society, specifically regarding the sustainable initiatives that people anticipate.

Therefore, many organizations and businesses are becoming more expected to prioritize practices that fall into the concepts of sustainable development (SD) and corporate social responsibility (CSR). However, these practices were found to vary greatly amongst different companies, with most implementing more CSR than SD, which brings to attention the lack of environmental focus. Specifically, Malys (2020) surveyed 500 companies in order to determine their level of involvement, and found that more do not incorporate either compared to those incorporating both. With this lack of practices, it is important to note that small and medium sized businesses (SMEs) specifically experience more struggles to enforce these, especially considering their rapid growth in the industry (Burch, 2018). To further analyze the extent to which companies need to incorporate sustainability into their practices, Rathnasabapathy and his colleagues found that increased risks due to human-made space objects calls for the alignment and evaluation of practices using the Space Sustainability Rating, SSR (2025). This system

provides feedback that encourages more voluntary efforts to stay within the framework of international guidelines and enhance mission sustainability.

Moreover, in recent years, the private sector in various fields has become increasingly influential in the space industry. Burch (2018) explored that the smaller organizations in the private sector can provide solutions to increase the likelihood of meeting environmental goals, as they tend to be more connected to communities. However, common approaches such as CSR and life-cycle assessments are insufficient, thus more transformative responses are necessary for real change to be seen. This increase in private companies simultaneously causes an increased reliance on them by the larger space industry and companies, specifically for their valuable and productive technologies. For example, with the ongoing Artemis program, NASA has been incorporating over hundreds of private organizations, including Axiom Space and Boeing (NASA, 2024). While this does draw in more investments for such partnerships in hopes of enhanced sustainability efforts, it ultimately brings about new threats and concerns regarding the environmental efficiency of these advanced technologies (Chaben, 2020).

Thus, the growing presence of the space industry further prompts the question of how society views such changes. Choi and Ng (2011) investigated that "consumers respond more negatively to poor company sustainability than to high company sustainability," and also that "consumers evaluate a company more favorably if the company shares the consumers' social causes." This makes prominent that intentional marketing systems are necessary to promote the sustainability and social strategies that consumers seem to respond so favorably to. Significantly, misinformation and surface level opinions appear to be created by society when communication gaps exist between the public and organizations. Pisani-Ferry (2024) explains that people regard "experts as isolated from and indifferent to the concerns of ordinary people," which leads to the rejection of many ideas in the scientific community. To delve further into why these feelings exist, Mazzoni (2024) explains how when "companies choose not to communicate, consumers will make their own assumptions." Therefore, it is crucial for organizations/experts to capture interests and provide the public with accurate information.

It is clear that there is an emerging problem present in the United States, where space exploration and research are rapidly growing, raising speculations and concerns on the extent to which environmental sustainability remains a priority. This includes key issues, including information gaps between expectations versus real actions, and a lack of in-depth attention being given to environmental impacts, despite it being a threat.

Literature Review

The modern space industry experiences challenges in balancing sustainability efforts, while also simultaneously working towards rapidly advancing space technology and missions. With this growth, the method in which sustainable practices are incorporated becomes a primary topic of conversation amongst the public. The following literature review aims to establish a clear and in-depth understanding of the association between public perception of sustainability priorities, and the actual initiatives that are being implemented by space companies. By identifying a common trend amongst the public's knowledge and opinions, the study further intends to provide alternatives that can promote more awareness communicated by such companies and experts to the general public.

Existing Attention Towards Sustainability Efforts

Since sustainability in the science field, particularly regarding practices, materials, and overall environmental impacts in space, is a very significant advancement, there are existing attempts to demonstrate such efforts. For instance, previous research by Hansson (2021) has explored that "contemporary museums are demonstrating an increased interest in exhibiting and discussing complex sustainability issues." In conversation, he also provides that how the information is presented is crucial for guests to "grapple with the complexities, uncertainties, and possible solutions," underlining how information gaps can exist despite efforts (Hansson, 2021). Furthermore, in the early 2000s, the Special Issue, derived from the conclusions of the 2nd International Conference on Sustainability Science, aimed to be mindful of the "link between science and society in sustainability efforts and [indicate] some accomplishments," but primarily suggested that "current sustainability science efforts… fail in contributing significantly" (Wiek et al., 2012). This brings attention to the struggles sustainability scientists face when classifying their environmental efforts, and further connects this idea to the public, whose attention is often focused solely on surface level media and rarely into the real root causes (Wiek et al., 2012). Additionally,

ongoing and more prevalent advocacy has continued to gather support for additional objectives regarding outer space to be included in the United Nation's Sustainable Development Goals, or SDGs. Losche and his colleagues have recently dug into how "increasing activities related to space tourism… space mining... and the launch of mega-constellations" only have so long before "larger problems appear" (2025). This aligns with the recognition to add elements of outer space sustainability to the UN's SDGs. Likewise, it facilitates increased acknowledgement of risks towards both the environment and space needed to be made known to the public.

Unexplored Area Between Society and Experts

The above studies indicate the research completed regarding communication gaps that exist in the marketing field between businesses and feedback from their buyers and consumers, along with space sustainable measures being implemented in general. However, little to no research has been done establishing the relationship between sustainable measures in space companies with the general public. How companies market their products, or showcase the extent to which their processes are sustainable plays a profound role in buyer decisions, indicating the significance of efficient communication. Furthermore, the issues pertaining to sustainable materials, satellite launches, detachment of rocket bodies, and rocket launching have caught the attention of many. The correlation between public knowledge and environmental actions is important to forming accurate perceptions, especially as companies strive toward both informing and including the public in their sustainability decisions and organizational initiatives.

In response to this unexplored area necessary for further study, this study proposes that a majority of people would be less aware of the sustainability initiatives that are being taken by space companies compared to those who are fully knowledgeable and accurate. Though a small portion of the general population may have more information, it will further highlight what disparities exist, and bring forth the types of methods that bring across information most effectively. Thus, this gap guides the focus of the study's examination of how space exploration companies prioritize sustainability compared to public knowledge and expectations, and what strategies best promote more awareness on sustainable practices.

Methods

Design

This research identified how existing expectations and knowledge held by the general public regarding sustainable practices compared to the actual measures being taken by companies within the space industry. A survey research design was used to gather data from a sample of individuals in order to obtain insight into their perspectives of sustainability that can then be applied to a larger population. Responses were placed on a statistical scale to develop a more structured dataset, in a manner similar to how Joo and Kim (2023) measured community qualities and education attainment in their study. Additionally, a phenomenological study research design allowed for people's perceptions and social realities to be examined.

Incorporating a survey research design contributed to measuring the public's knowledge and thoughts on space companies, and gained insight into general understandings regarding sustainability. Similarly, interviews with industry professionals provided insight into the sustainability practices being used and the reasoning behind why such practices are currently being implemented either by their organization or throughout the greater space industry. By identifying the extent to how effective general communication is between space companies and the public, an overarching theme was found reflecting common societal views, similar to how Chen and Bokock (2024) performed their study on parenting and mental health. This design particularly fits because exploring how industry initiatives differ or coincide with public expectations requires insight from personal experiences. This revealed commonalities that exist across a broader population, where individuals have varying degrees of experience and knowledge.

Method

To perform this study, information was collected through a mixed-methods approach. Randomly selected participants completed surveys, and space company professionals were purposefully interviewed to gain insight. Doing so allowed for a comprehensive understanding of sustainability in both public perception and the realities of space companies. For this research, the dependent variable was how public knowledge and expectations align

with actual sustainability prioritization in the industry. The independent variables included the extent of communication by space industries, prior knowledge, demographic background, and existing public awareness.

The mixed methods approach resolved the question proposed by this study and also enabled a thorough analysis of both sides of the existing research gap. Contrary to the common idea that space companies maintain full communication and transparency with the public, this method further provided insight into the existing, or lack thereof, communication strategies that influence public expectations and knowledge of sustainability practices.

Subjects of Study

To further understand the gap, the subjects of this study included the general public, specifically those visiting the Space Center, and professionals from various space companies, both private and public, to examine the industry more thoroughly. Some areas of this study were at risk of possible ethical implications, including the breach of participant information and lack of confidentiality with the surveys and interviews. However, to prevent and mitigate these risks, participant responses remained anonymous and interviewees had the option on whether or not to be cited and quoted in this study. Additionally, all participation remained voluntary with clear intentions for the survey and overall research.

Such subjects are aligned with the research question because they allow for insight from both sides of interest, the general public and space companies, to be understood. Specifically, they demonstrated how sustainability is most commonly understood, and how it is often prioritized from an inside perspective within the industry. This allowed for a clear comparison between perspective and prioritization.

Instruments

Moreover, to perform this research, a digital self-administered multiple-choice survey was conducted to analyze the general public views, measuring the extent of knowledge and expectations. An interview was also given to space company professionals to recognize actual sustainability and communication strategies being implemented and prioritized. To ensure consistency, the interviews were structured with a set and purposeful list of questions.

Surveys showed to be efficient for distributing, time, and costs as they are conducted digitally with set questions. Since interviewees were also interviewed through digital platforms, effective communication and transcriptions of interviews were made available, allowing for clear analysis. These allowed for thorough insight into both sides of the research gap, further answering the research question. Furthermore, the survey and interviews provided the necessary information of public knowledge and expectations, along with consistent findings from interviewees to ensure comparisons were able to be made. To illustrate these results, a data table expressing percentages of answers from the survey, and a qualitative representation of responses from interviews is included in the appendix.

Procedure

To perform this method, the steps taken consisted of multiple from both the survey and interview. The survey was finalized with multiple choice questions that prevent potential bias or unclearness, and was distributed through random selection to 60 museum visitors over a week through a provided evaluations iPad. The data from this survey was analyzed thoroughly by placing it in a data table and identifying commonality with percentages. Additionally, space companies were reached out for an interview, and were conducted through digital platforms, such as Zoom, to ensure efficiency and transcriptions. The interview had a structured list of questions to ask to allow nonconfounding thematic connections to be made. In Smith and Roysircar (2010), they similarly identified overarching themes to obtain a clear conclusion on leadership. Together, with the data from the survey and interviews combined, encompassing connections were made. To select the sample to participate in the survey, random sampling was used, to ensure every individual had an equal chance to be selected to ensure representation. Additionally, statistical comparisons were used, meaning two sets of data were evaluated to observe and analyze potential differences. Lastly, thematic connections were made across interview and survey responses to bring forth commonalities that demonstrate the most prominent issues and understandings.

The method process took a longer amount of time due to two separate data that needed to be collected, from both the survey and the interview. However, this allowed for clear qualitative and quantitative data to be collected, bringing forth in-depth thematic connections and most significant understandings and practices. These steps helped answer my research question as it allowed for in depth and thorough analysis into both the sample from

the public and interviewees responses. Ultimately, clear connections and a comparative analysis were able to be made between both the public and space industry.

Results

Regarding the data collected, the survey consisted of 60 valid survey responses from randomly selected individuals considered to be the general public (Appendix A), and 5 interviews with space industry professionals with a set list of questions (Appendix B). The demographic distribution from the final public cohort was multimodal, with the greatest level of participation coming from the 35-44 (28.3%) and 18-24 (25%) age ranges. A qualitative baseline for the definition of space sustainability was established by the industry experts.

Through quantitative analysis from the survey (Appendix D), an inverse relationship was demonstrated between the public's perception of the importance of space sustainability and their measured level of being informed. As shown in Table 1, a significant majority of respondents (73.3%) placed space sustainability in the category of "Very Important" or "Extremely Important," but these numbers did not reflect a statistically significant high level of knowledge. Going further, when participants were asked to evaluate their informedness on current industry practices, the data indicated a skew toward the lower end, with 68.3% of the sample selecting "Not informed" or "Slightly informed." A chi-square test was conducted to analyze the relationship between familiarity and perceived importance, but there was no significant relationship found ($p>0.5$).

Table 1: *Comparison between Public Importance and Informedness*

Variable Measured	High Rating (%)	Low/Moderate Rating (%)
Perceived Importance (Very/Extremely)	73.3%	26.7%
Level of Informedness (Very Informed)	1.7%	98.3%

Furthermore, a fundamental, yet notable difference in the terminology used by the public was revealed. Table 2 shows the topics individuals related to "space sustainability," with the most common association being "Rocket Emissions" (33.3%), which was followed closely by "None of the above/Not sure" (21.7%). It also shows a conducted cross tabulation, which compares the frequencies of the categorical variables of association category and familiarity, to explore if one's extent of knowledge impacted the associations mentioned previously. The participants who responded with "Not familiar" or "Slightly familiar" with the space industry comprised 85% of the total "Rocket Emissions" answers. In contrast, those identifying as "Moderately" or "Very familiar" were the only group to reliably choose "Space Debris" (18.3%) or "Satellite Overpopulation" (16.7%). Therefore, this presents that association with space sustainability shifts from terrestrial to orbital challenges as familiarity with the industry increases.

Table 2: *Cross Tabulation of Industry Familiarity and Sustainability Association*

Familiarity Level	Sustainability Association Category				
	Rocket Emissions	Space Debris	Satellite Overpop.	Other/Not Sure	Row Total
Low Familiarity	17 (53.1%)	2 (6.3%)	2 (6.3%)	11 (34.3%)	32
Moderate Familiarity	3 (20.0%)	5 (33.3%)	5 (33.3%)	2 (13.4%)	15
High Familiarity	0 (0.0%)	4 (30.8%)	3 (23.1%)	6 (46.1%)	13
Column Total	20	11	10	19	60

The data showed that the main source of information an individual uses is significant in influencing their confidence and accuracy. The largest proportion of respondents stated using “Social Media" or “News websites and TV” (59%), and less than 10% relied on direct industry sources like company reports. Table 3 showcases the significant variance in confidence levels depending on their information source. A lower confidence interval was found with the cohort that selected “Social Media,” with 77.8% being low confidence. However, those resorting to “Company Websites” had the highest mean confidence level of 83.3%. When comparing the participant’s self-reported extent of informedness and confidence levels, a positive correlation (r=0.64) was found. In other words, those informed by direct industry sources expressed higher trust in the accuracy of the information received.

Table 3: *Bivariate Analysis of Influence of Information Source on Respondent Confidence*

Primary Information Source	Sample Size (n)	Low Confidence (%)	High Confidence (%)
Company Websites	6	16.7%	83.3%
Friends/Family	6	33.3%	66.7%
News Websites/TV	17	52.9%	47.1%
Social Media	18	77.8%	22.2%
Does not follow topic	13	100.0%	0.0%

Moreover, qualitative data from interviews with 5 space industry professionals set a technical baseline (Appendix C). All 5 professionals (100%) defined the concept of space sustainability from the perspective of orbital movements and space debris, which differs from the general public’s common emphasis on rocket emissions. The first professional stated that the key goal was “ensuring current missions don’t limit future missions,” while the third professional focused on "preserving orbital environments.” Each of the professionals (100%) agreed that there is an existing communication gap, and attributed the "technical complexity” of discussions to be the primary factor. Additionally, the fourth professional indicated that although in-depth, transparent reports are demonstrated, the extent of technical information makes it difficult for the average individual to access. This further aligns with the survey results, where less than 10% resort to such direct sources of information.

From these results, quantitative and qualitative data was triangulated for a systematic misalignment to be seen. In Table 4, a gap in the definition of space sustainability is shown as the majority of the general public associates it with “Rocket Emissions,” while industry professionals’ definitions are based on safety in orbit. The misalignment in channels also verifies the extent of low confidence reported in the survey results, with the industry using technical briefings, but the public using social media, where accuracy rates are statistically lower.

Table 4: *Thematic Analysis of Industry Professional Interviews vs. Public Perceptions*

Identified Theme	Industry Consensus (n=5)	Primary Industry Definition	Comparison with Public Perception	Statistical Discrepancy (Δ)
Sustainability Definition	100.0%	Orbital Mechanics	33.3% associate with Rocket Emissions	66.7% Alignment Gap
Primary Safety Concern	100.0%	Debris Mitigation	18.3% identifies with Debris	81.7% Knowledge Gap
Communication Barriers	100.0%	Technical Complexity	Majority use Social Media	High Variance

To clarify, the table above demonstrates a disparity between 100% industry expert consensus and lower general public awareness and knowledge throughout identified themes. High Variance indicates a qualitative difference

between the data types, which does not allow for subtraction of percentages, further emphasizing the communication gap.

Discussion

After examining the results from both the survey for the general public and interviews conducted with professionals in the space industry, valuable insights regarding the extent of alignment between both perspectives were revealed. This can be seen beginning in the survey results, where a majority of participants (73.3%) responded to space sustainability as being "Very Important" or "Extremely Important," showing that people tended to value sustainability despite being less knowledgeable. A very little number of respondents (1.7%) considered themselves to be "Very Informed" on the space industry and 68.3% being "Not Informed" or "Slightly Informed." This brings forth that an inverse relationship exists between perceived importance and the extent of being informed, suggesting that the public still prioritizes sustainability without specific expertise. This aligns with Choi and Ng's observations (2011) where consumers were found to respond more positively if a company shares social causes, regardless of whether technical information was seen. Furthermore, a chi-square test of independence demonstrated that there was no statistically significant difference between perceived importance and knowledge ($p>0.5$). This suggests that valuing space sustainability may be attributed to widespread environmental issues and social concepts.

Moreover, terminology typically associated with space sustainability by the public tended to be more related to terrestrial issues, specifically rocket emissions. This trend was commonly seen amongst people who had low familiarity and knowledge with the space industry, as 85% of "Rocket Emissions" responses came from those also responding as "Not Familiar" or "Slightly Familiar." However, those reporting to have higher extents of familiarity typically associated this term with more orbital issues. This pattern highlights that knowledge and technical familiarity plays a role in individuals' perceptions of space topics. The shift from terrestrial to orbital concerns emphasizes that an education gap exists as the public is more focused on visible challenges, the industry, including five of five industry professionals, focuses on preserving orbital space to ensure missions can continue long-term.

Furthermore, where information is obtained from by the general public is shown to correlate with the extent of familiarity and perspective of space sustainability. Most of the participants responded to using social media or new websites and television as their main source of information. On the other hand, less than 10% of respondents reported resorting to direct media sources, such as company websites and reports. The choice of information source impacts how confident individuals feel in the information they receive. With 77.8% of social media users responding with low confidence, and 83.3% of respondents using company sources reporting high confidence, a positive correlation is seen between confidence and level of being informed. This further suggests that resorting to more primary and direct sources can bridge the confidence gap that Heise (1985) identified, where the divide between government experts and the public is brought closer through more efficient communication.

From the interviews conducted with five industry professionals, a conceptual misalignment was seen. Five of five experts defined sustainability as being related to orbital safety, mitigating debris, and ability to perform long-term missions. However, the public was shown to focus on terrestrial issues, such as rocket emissions. Regarding this, professionals attributed this misalignment due to the technical complexity of this information, bringing forth Wiek and his colleagues (2012) findings that sustainability science can often lack in translating technical terms to be understood by society. This barrier is often made worse as many communication sources, such as the commonly used social media, simplifies technical information, leading to a thematic gap where a majority of the public value sustainability, but little understand how it works in the context of space and orbital concerns. Pisani-Ferry (2024) brings forth that when experts appear indifferent to public concerns, scientific ideas can often be rejected. In response to this, companies need to use Sustainability Development frameworks to prioritize environmental transparency rather than only incorporating Corporate Social Responsibility (Malys, 2020).

Themes from this study conducted have implications for this research. Familiarity with the industry and technical understanding are strongly correlated to the understanding of orbital issues. The source of information also impacts the accuracy of the information received and the confidence in it. This suggests that efforts should focus

on making industry communication more accessible while preserving the technical concepts. Furthermore, the public is shown to prioritize sustainability despite having lower levels of informedness, indicating that if understandable resources are brought forth, they would actively engage. The influence of the private sector also grows in regards to this, with companies having newfound responsibilities to fill the information gap to prevent any misinformation (Chaben, 2020). Building on this, targeted communication methods can help bridge this gap. Space companies can simplify complex information through visual and digital formats on platforms the public already uses. Making first-hand information more accessible maintains accuracy and can improve understanding to promote awareness.

Some limitations exist to this study as a somewhat small sample size was used, being n=60 for the survey and n=5 for the interviews. Additionally, surveys relied on self-reported data, meaning that the participants could choose their responses based on personal opinion. Despite these constraints, it allows for an in-depth look at people's perspectives about the space industry. They provide guidance for enhancing communication strategies and public engagement. In the future, research should be conducted with larger sample sizes to explore the impact of specific sustainability awareness methods, such as the Space Sustainability Rating for trust amongst the public and accountability by companies (Rathnasabapthy et al., 2025).

Conclusions and Future Directions

The findings from the research brings forth that there is an existing communication gap between the general public and industry regarding space sustainability. A correlation between confidence and highest association with sustainability issues was shown, along with the type of data platform individuals obtain their information from. This was shown to impact confidence and accuracy according to definitions set as a guideline by the industry professionals that were interviewed. Specifically, when participants reported obtaining space related information from direct media rather than secondary sources such as social media, they associated sustainability issues with those beyond just those on earth and terrestrial. Between the identified themes of the definition of sustainability, primary safety concern, and communication barriers that space industry professionals identified, a statistical discrepancy greater than 50% for each was seen. This brings forth that a communication gap does indeed exist between the industry and general public surveyed.

However, these conclusions hold some limitations that could make it difficult to generalize to the wider population that should be acknowledged. For example, a sample size of 60 general public individuals and 5 industry professionals participated, however this study could benefit from a larger sample size to obtain a more reliable baseline and gain more data points. Additionally, self-reported data may cause response or information bias. This could slightly alter the accuracy of representing the general public. Since this survey was conducted in one location, in Houston, Texas the geographic scope and diversity captured could have been a limiting factor. Future research should address these issues, incorporating a larger and more diverse sample. It could also use a different method to analyze the general public, such as a test, rather than a survey to avoid any sources of bias.

To build upon the findings of this research, researchers could test different strategies to improve communication and public awareness. Using the results regarding participant's main information sources, industry companies can be drawn to utilize such platforms to maximize communication efficiency and effectiveness. Additionally, policymakers can evaluate the impact of current sustainability frameworks according to the topics the public most associates with the industry and greatest concerns that they see. Identifying where specific frameworks like the Space Sustainability Rating lack or are sufficient can help enhance specific areas of existing policy that need to be changed to bridge the gap.

This research identified that a communication gap persists between the general public and space industry professionals. This inefficiency was most attributed to difficulties in technical understandings and where information was being attained from. In order to bridge this, policymakers and future researchers can look into policies currently in place to improve upon areas in need of attention.

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Appendix

Appendix A: *Google Form Survey Questions for General Public*

1. What is your age range?
    a. 18-24
    b. 25-34
    c. 35-44
    d. 45-54
2. How familiar are you with the space industry?
    a. Not familiar
    b. Slightly familiar
    c. Moderately familiar
    d. Very familiar
    e. Extremely familiar
3. How often do you engage with news or media about space exploration?
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Very often
4. Have you heard the term "space sustainability" before this survey?
    a. Yes
    b. No
    c. Unsure
5. How informed do you feel about what space companies are doing to promote environmental sustainability?
    a. Not informed
    b. Slightly informed
    c. Moderately informed
    d. Very informed
    e. Extremely informed
6. Which of the following sustainability topics do you associate most with the space industry?
    a. Space debris
    b. Rocket emissions
    c. Resource extraction
    d. Satellite crowding
    e. None of the above/not sure
7. How important do you think it is for space companies to prioritize sustainability?
    a. Not important
    b. Slightly important
    c. Moderately important
    d. Very important
    e. Extremely important
8. How accurate do you think your understanding is of the sustainability initiatives that space companies are currently implementing?
    a. Not accurate
    b. Slightly accurate
    c. Moderately accurate
    d. Very accurate
    e. Extremely accurate
9. Where do you usually get information about space companies' sustainability efforts?
    a. New websites or TV
    b. Social media
    c. Company websites/press release
    d. Educational programs
    e. Friends/family
    f. I do not actively follow information on this topic
10. How confident are you that the information you get about space sustainability is accurate?
    a. Not confident
    b. Slightly confident
    c. Moderately confident
    d. Very confident
    e. Extremely confident

Appendix B: *Questionnaire Sent to Participating Industry Professionals*

1. How does your organization define space sustainability?
2. What sustainability guidelines or frameworks guide your current practices?
3. What biggest challenges does your organization face regarding sustainability?
4. How do you communicate effectively with the public?
5. Do you believe there is an existing communication gap between the space industry and the general public? Why or why not?
6. How does public perception and media influence your approaches to sustainable practices?

Appendix C: *Raw Notes from Interviews with Space Industry Professionals*

	Questions					
Expert	Q1	Q2	Q3	Q4	Q5	Q6
1	responsibility so current missions don't limit future missions	widely accepted debris mitigation standards and practices that guarantee safety and functionality	keeping up with increases in space exploration; increase in satellites results in more congestion, making planning complex	focused on transparency through reports and educational outreach	yes, space activity commonly seen as fascinating yet distant, but technical terms are harder to understand	encourages to prioritize sustainability to maintain trust
2	designing systems to minimize negative environmental impacts from launch to orbit	engineering standards for debris minimization, collision prevention, and other protocols beyond regulations	tracking existing debris is difficult, especially as the traffic increases quickly	visual data, simulations, and more simplified explanations work with communicators to make technical concepts easier	yes, many don't realize how crowded orbit is, and how it affects everyday services	reinforces accountability and encourages designing space systems
3	preserving orbital environments so space stays safe and usable	international guidelines and coordinate with other teams to ensure missions are environmentally responsible	different groups have different priorities, so aligning is difficult	public outreach, reports, and talks that explain policy and technical info	yes, discussions can be technical, so people don't approach them	public perception shapes which efforts are highlighted /messaged
4	ensuring that space access doesn't sacrifice long-term safety • keeping sustainability in mind with every launch	follow industry standards and internal guidelines for safe mission planning	fast pace of launches puts pressure to move quickly, but every mission should include responsibility	clear messaging, media briefings, and educational content to explain importance of launches for future	yes, people know about launches but rarely know what happens to satellites after missions	expectations shape decisions, reinforcing sustainability as a key part of planning
5	long term management of orbital environments to ensure science and exploration don't jeopardize future	international practices and collaborate with other teams to ensure responsibility	predicting long term effects of missions because what is done now impacts future generations	public talks and simple briefings that show consequences of poor debris management	yes, people get excited about exploration, but don't consider or understand the sustainability aspect	media focus affects how and which sustainability goals are presented

Appendix D: *Raw Data from Survey Responses to General Public*

Survey Question	Response Options	Frequency (n)	Percentage (%)
What is your age range?	18–24	12	20.3%
	25–34	16	27.1%
	35–44	18	30.5%
	45–54	8	13.6%
	55+	5	8.5%
How familiar are you with the space industry?	Not/Slightly Familiar	41	69.5%
	Moderately/Very Familiar	18	30.5%
How often do you engage with space news?	Never/Rarely	32	54.2%
	Sometimes/Often	27	45.8%
Heard "Space Sustainability" before?	Yes	29	49.2%
	No/Unsure	30	50.8%
How informed do you feel about initiatives?	Not Informed	28	47.5%
	Slightly/Moderately Informed	30	50.8%
	Very Informed	1	1.7%
Topic most associated with the industry?	Rocket Emissions	20	33.9%
	Satellite Overpopulation	12	20.3%
	Space Debris	11	18.6%
	Resource Extraction	6	10.2%
	None/Not Sure	10	17.0%
Importance of prioritizing sustainability?	Very/Extremely Important	49	83.1%
	Moderately/Slightly/Not	10	16.9%
How accurate is your understanding?	Not Accurate	22	37.3%
	Slightly Accurate	18	30.5%
	Moderately/Very Accurate	19	32.2%
Where do you get your information?	Social Media	21	35.6%
	News Websites or TV	21	35.6%
	Do Not Actively Follow	12	20.3%
	Friends/Family/Other	5	8.5%
Confidence that information is accurate?	Not/Slightly Confident	38	64.4%
	Moderately/Very Confident	21	35.6%