

Space Tourism Market Analysis. Current Situation and Future Trends

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Nowadays, tourists benefit from a substantial variety of destinations to choose from. In the near future, with the development of new technologies, tourism activities could exceed the boundaries of our atmosphere. Access to space to the common person could become a reality very shortly. The objectives of this study are to analyze the current situation of space tourism and determine the potential of this activity, both economically and socially. Space tourism is currently accessible only to the very rich. The most promising segment in opening space tourism to the masses is represented by the suborbital flights, segment dominated by the company named Virgin Galactic. According to the research presented in this study, it is observed that there is a significant public demand for this kind of activity. With the entry of more operators of such services and with the increase of the consumer flow, prices will decrease and the space tourism sector will become one of the main tourist activities to generate profit.

Given the uniqueness of the product offered, the space tourism industry will not compete with other tourism sectors, bringing economic benefits untapped to date. We can compare the beginnings of space tourism with those of aviation. Nobody would have imagined 100 years ago that, one day, millions of people will be traveling immense distances by air in a very short time, safely and comfortably. Drawing a parallel, we can speculate, without risk, that public access to outer space will lead to the development of new industries and technologies, bringing huge benefits to our society and transforming it in a way that is unimaginable today.

Key words: space tourism, market potential, suborbital flights, consumer behavior

JEL classification: M31, L83.

1. Introduction

Tourism is a very important activity for people. We provide a wide range of tourism products. As technology allows us, we can access increasingly exotic and interesting places reaching the desired destinations in no time. As a result of the technology boom of the twentieth century, the number of potential attractions has grown exponentially, with far fewer places on Earth to which we do not have access yet. However, the ultimate destination to which many of us dream is not on Earth, but at least 100 km above us, a line considered the conventional border of crossing into space.

People with vision in space tourism are creating the next generation of holidays, working on projects related to entering a new era of tourism. In the very near future, each of us will be able to enjoy a great panoramic image of the Earth from orbit. It might mean for us the journey of our lives.

The space frontier will give us an unforgettable adventure. Think of how it would be to be able to check in at a “billion stars” luxury hotel, somewhere on the Earth orbit or, going further, how it would be to schedule your vacation at one of our luxury resorts on the Moon or Mars. These images seem drawn from science fiction movies, but one should not forget that 100 years ago, the Wright brothers, aviation pioneers, inventors and builders of the first airplane, would not have imagined how, every day, hundreds of people will dine aboard a modern and safe aircraft flying great distances, such as from New York to London.

Considering the huge revenues associated with tourism, public space travel is a market with huge potential. These space travels are divided into two distinct services: orbital flights (travels across the Earth orbit) and suborbital flights (travels beyond the Earth's atmosphere and back). Each of these markets is in different stages of development.

2. Space private access: a luxury that few can afford under current conditions

We can consider space tourism being somewhere in its inception, as aviation was 100 years ago: an extravagant and experimental field. We can see it by observing the similarities of the users of the two types of products. 100 years ago, very few people had access to air travel, as it was a new, very expensive experience and had a high risk factor because the aviation industry was in its early stages of development.

We notice the similarities with the current aerospace industry. The number of people who have flown into space so far is somewhere around 550. In relation to the global population, this number is extremely small. The number of tourists who have travelled to space is much smaller (seven people). This is because, currently, the only organizations that can send people into orbit are the state agencies of the main economic world powers.

Those who can afford an adventure of about 2 weeks aboard the International Space Station are, therefore, only very rich people who are willing to pay from 20 to 40 million dollars. There are several reasons why the price is so high. One of them would be that the technology needed for one to reach orbit is much higher than that of an aircraft used in commercial aviation or any other mode of transportation of passengers. For example, the Russian Soyuz TMA-7 capsule used for orbital flight was propelled into space by rocket engines totaling 20 million horsepower.

Although we can consider the 7 people who paid to spend a little time on board of the International Space Station, where normally only scientists and astronauts who work for state space agencies have access, as tourists, their activities during the journey are more like those of an astronaut than those of a tourist. These people are passionate and interested in the activities that take place aboard the station and participate with professionals in scientific experiments undertaken on board. Because of this, the term most commonly used to catalog public space flights aboard the International Space Station is “space mission”.

Although an adventure of this kind is spectacular, most people will not be able to afford it in the near future and, although orbital space tourism will continue, it is unlikely to grow much in this format. (Crouch, et al., 2008)

We can see how, at this incipient stage, space tourism is very difficult to compare with other forms of niche tourism, as a spaceflight is very different from any other possible vacation experience on Earth. Therefore, for the current form of public access to space (those who can afford to pay exorbitant amounts to reach the International Space Station) the proposed term was “public space travel”. (Foust, 2004)

Another reason for which the term “tourism” is yet inadequate is the scale of exclusivity and uniqueness of a space adventure. A space adventure is, objectively, the most expensive holiday in the world.

Tourism is traditionally defined as either visitor activities or commercial activities related to both the demand of tourists / visitors and the offer presented to them. At the WTO Conference on Travel & Tourism Statistics in Ottawa, “tourism” was defined as representing “the activities of people traveling to and living in different environments than usually frequented for a period not exceeding one year, for leisure, business and for other purposes.” (WTO, 1995) According to these definitions, we can include the public space tourism activities in the “tourism” category. However, the dimensions of recreation and comfort do not occupy such an important role in the current form of space tourism. The purpose for which such a trip is desired is another, because of current technological limitations. We can assume that in the future, as the supply will become more diversified and prices for access to space will decrease substantially, the recreation and comfort concepts will be present. Just like in the beginnings of the airline industry comfort was not a primary element and came gradually, with the development of the industry itself, so in the future, space tourism will include, if possible, the comfort factor that will be found in both the supply and the demand.

3. Opening outer space to the public: commercial suborbital flights

As a result of increased public interest in space travel, several companies dealing with related activities have appeared. They offer services such as immersive computer simulations, training programs similar to those of the astronauts using original means and equipment, parabolic flights of certain models of aircraft that simulate the feeling of weightlessness (such as Ilyushin 76 MDK), or flying at high altitude with jet aircraft type MiG-31. Nevertheless, we live in a society based on and driven by experiences, in which people constantly want new adventures. Therefore, there is a growing demand for new experiences regarding the space-related sphere of activities. Consequently, this request has determined an increase in the number of companies that currently develop technology platforms that can provide services to the market segment targeted for business purposes.

As mentioned above, the challenges to send people into Earth orbit go far beyond other tourism activities carried on Earth and therefore the testing of technologies and their subsequent implementation is quite slow, as the hazards in case of failure can lead to the bankruptcy of companies that offer this type of

service.

Since the 80s, many organizations have made many requests to initiate space tourism. Although there was a great interest in this futuristic form of travel, the huge costs necessary for the development of space tourism could not provide a crucial element in the work of any private company, namely, to generate profit. There was no viable financial solution in using space as a tourist area. Even so, a number of important progresses in this area in recent years has brought hope and has created expectations. (Billings, 2006)

An important step in the development of space tourism was made on the 4th of October, 2004, when the Ansari X PRIZE competition awarded a 10 million dollar prize for the first non-governmental organization that managed to launch a reusable spacecraft at an altitude of 100 km.

The winning project, SpaceShipOne, is capable of carrying three people to 100 km above the Earth's surface, twice within two weeks. (AnsariXPrize, 2009) Following this success, the project was taken under the wing of Virgin Galactic.

Virgin Galactic is a British commercial space company whose aim is to develop the technology necessary to offer travel services in the form of suborbital flights. The company is made up of hundreds of dedicated and passionate professionals. The staff includes scientists, engineers and designers united in their vision to create something new and resilient that stands the test of time: the first commercial space tourism network. So far, 550 people have traveled to space. Virgin Galactic will open this border for the rest of us.

The partnership between Scaled Composites and Virgin Galactic led to the development of an improved prototype. The current improved model, SpaceShipTwo, can carry six tourists along with the two pilots. The prototype has been tested several times, but progress was slowed down by an accident that occurred in October 2014 when the ship crashed into the desert after a technical failure. One of the crewmembers died. Even so, after this incident, continuous efforts have been made, since a new vessel is under construction and it will be completed during 2015.

The flight will start early in the morning and will be conducted in two phases. At launch, the spacecraft will be attached to a carrier aircraft that will take it to an altitude of 15 km. Then, the shuttle will come off the plane and will start the rocket engine that will propel it to an altitude of 110 km. There, the passengers will experience a feeling of weightlessness for about 5 minutes and will enjoy a panorama of about 1600 km in all directions. Thereafter, the vessel will enter Earth's atmosphere where it will be slowed down until it reaches an altitude of about 18 km. From here, it will land at the company's spaceport. The whole trip will last for about two and a half hours, but the actual flight time is much shorter. On board of the shuttle there will be two pilots and six tourists. Each tourist will be assigned a seat next to a window to be able to enjoy the view and have enough space to experience the five minutes of weightlessness. (Papathanassis, 2011, p. 99) The SpaceShipTwo cabin was designed to offer tourists a maximum of safety and comfort, being the only spacecraft ever created to optimize the passenger experience. There is a total of 12 windows on the side and above the tourists, this giving everyone a better view of the Earth and the cosmic space.

Before the actual flight, the tourists will be staying for 3 days at a location near the space terminal, where they will go through a series of short training procedures that include training in an acceleration simulator, several presentations related to safety and a basic medical examination.

The cost of these services was expected to be somewhere around \$ 200,000 per person and the price was going to decrease, as more such operations would have been made, but also due to the expansion of providers of such services on the market. There were more than 65 thousand applications for the first travel of 100 tickets. In December 2007, Virgin Galactic recorded 200 customers who had paid in advance and 95% of them successfully passed the physical tests. By 2011, the number of paying customers had reached 400 and by early 2013, 575. In April 2013, Virgin Galactic increased the suborbital trip price to \$ 250,000, the motivation being one related to inflation. (Papathanassis, 2011, p. 98) The estimated total cost of the SpaceShipTwo project in 2011 was somewhere around the amount of 400 million dollars.

Except for the rocket engine that has to be replenished with fuel and oxidant after each flight, SpaceShipTwo is a fully reusable spacecraft.

4. Space tourism market. Analysis and future trends

Research shows that people generally have the curiosity to travel to space. Nevertheless, this desire is expressed without knowing the costs and risks that one takes as a space tourist. It is clear that enough

people show interest and have the financial possibilities to fulfill this dream. However, because of the high prices, very few people have so far afforded to go on flights in space.

Marketing research is essential in commercial space tourism, in the idea that these trips are designed by understanding the consumer's behavior regarding such services. In this context, we are dealing with a new industry and we are unable to rely too much on history or a past consumer behavior to be able to consider it as basis for future research.

Since space tourism is technologically feasible, there are many variables to be analyzed from the point of view of entrepreneurs as well as that of potential consumers. For example, the relationship between customer demand and pricing and what would be considered as the most important set of characteristics of a space tourism experience that would determine the client to pay that amount.

Clearly, people turn their attention to the price of the travel, but also to the security aspect of that kind of an experience. Flying in space is still dangerous and all tourists must accept that they are subject to relatively high risks in terms of health. The stress placed on the body during takeoff, landing, the effects of exposure to the feeling of weightlessness and the fact that the whole journey is performed in a relatively small space are characteristics that can influence the health of even the most enduring people. It is obvious that in the case of orbital flights, the physical and mental stress tests are more detailed. Conversely, suborbital journeys will not need more than a set of basic examinations.

Space tourism industry has made amazing progress lately, developing technological options to reduce costs for space exploration. The entire SpaceShipOne project, including both construction and shuttle flight tests, cost about 25 million dollars, an amount that is less than what NASA spends in a day of space exploration. (Collins, 2002) If these cheap technological methods will eventually allow space travel for much smaller amounts of money, starting with the amount of \$ 200,000 that Virgin Galactic assigned in the beginning, space travel will become more accessible to a greater number of people, especially in relation to the results of a market analysis, which has found that potential consumers are very price sensitive. (Goehlich, 2005) A study shows that at least 10 million people from around the world would be willing to spend a year's salary for space travel. (Smith, 2001)

In order to understand and deepen the needs and preferences of the target market, researchers and governmental and commercial organizations surveyed the market in the US, Canada, UK and Japan. However, research results are difficult to assess in terms of potential variations caused by price factors, travel safety and product design offer.

After analyzing and interpreting the results of these studies, researchers have come to several conclusions. The first is that most respondents said they would be willing to pay the equivalent of one month to three months' salary for a trip to space. Between 10-20% of those surveyed said they would sacrifice even one year's salary for such a journey. The level of interest varies with sex. Female respondents generally expressed an interest of 5-10% lower than male respondents. The survey also included questions related to the requirements and expectations of future space tourists. When they were asked about the amount of time they would like to spend in space, 37% of the respondents indicated a period of 2-3 days. On questions regarding personal needs, respondents mainly indicated the need for privacy and hygiene in space. Space tourism will mainly target middle class people. (Crouch, et al., 2008)

Space tourism will be a lot like tourism on the Earth's surface. A small component will comprise of a niche segment that will target very rich people, but most of the offer will target middle-class customers. Space tourism industry will have difficulty in finding the most profitable economic strategy for the carried out operations. It is therefore very difficult to predict how this market segment will evolve in the future. The fact is that it will take several years until the quite high initial prices will stabilize at a level acceptable to the vast majority of the middle class.

To make profit, one should use the skimming pricing strategy. (Goehlich, 2005) This represents a marketing strategy that at first introduces high prices for a new product in order to get the most profit. Thus, initially, the tickets for these trips will be bought by very rich people. The strategy in terms of price will be one where ticket cost will decrease over time, in sequences, targeting a market segment growing bigger with each sequential drop in price. This approach will make every client pay the maximum amount they would be willing to pay.

It is expected that the number of space travelers will grow somewhere to a million per year when the price of a ticket will be under \$ 10,000. According to researches, people around the world are already

prepared for an adventure in space, despite its high price and physical risk. It is recommended for space tourism industry to aim, at first, for rich and adventurous young people. They seem to form the most suitable target market due to their care-free rebellious component and the low level comfort that they will accept in return of the fact that they would be among the first passengers in space. (Crouch, et al., 2008)

Following another research conducted in 2002, 450 people in the US were interviewed by telephone in order to find out their opinion of space travel. Each discussion lasted about 30 minutes. Those surveyed had an annual income / family between 250,000 and 1 million dollars. The average age of the respondents was of 57 years old, only 18% of them being between 30 and 49 years of age. In terms of percentage, 70% of the respondents were male. After they were informed about what a suborbital flight actually implied, 28% of the respondents expressed interest in such an experience. In contrast, over 40% of them said they would not like to experience it. When they were told about how one should follow a week training in advance, things changed. Only 19% were still excited to travel to space, while the percentage of uninterested people increased to 57%. By comparing the answers to the two questions, we understand that a real presentation of space travel can greatly influence the demand. The most important aspect of such a trip, as expressed by 60% of the respondents, was that they would have to be able to see the Earth from space. The rest of the people mentioned, in order, the following points of interest: the experimentation of space shuttle launch, weightlessness and, finally, the interaction with things to which only astronauts and cosmonauts have access to. There is a huge pleasure to see how different continents pass before your eyes, with no visible border between countries. Regarding the cost of such travel, only 16% of the respondents were willing to pay the maximum amount established by the researchers, that of \$ 250,000. The main reason respondents would not participate in space travel is the extremely high price. (Futron, 2002)

This study was conducted only to find out what is the current demand for space travel, but also to establish strategies and chart future trends regarding the demand for space tourism for the next 20 years.

A segment of 10% of the respondents was very interested in space travel and would be willing to pay the maximum price. The Futron Corporation study concluded that in 2021, the market for suborbital flights could reach 15,000 passengers per year, bringing revenues of 700 million dollars. (Futron, 2002)

Most times, when the market must adopt completely new technology services, it generally follows a model called the “S” curve. According to this model, there is an initial slow customer absorption until the market becomes familiar with the product, followed by a period of rapid adoption when the market fully engages in the purchase of the product, culminating in a slowdown, when the market reaches saturation.

Another study was conducted in 2006 on 783 Australian respondents with high incomes. Of these, 54% were male. The average age was 41 years old, with 29% of the respondents between 26 and 35 years of age. This study showed that potential consumers are price sensitive. At a price of \$ 50,000, about 20% of those surveyed were interested in a suborbital flight. When the price climbed to over \$ 200,000, the percentage halved. Potential customers preferred American or Australian operators to the detriment of Japanese, German, English or Russian ones. They also expressed increased interest regarding safety rules implemented by operators when organizing space tourism experiences. The preferred launching mode was indicated as being that of a rocket, vertically. Those who showed the most interest to travel into space were mostly thrill seeking young men. (Devinney, et al., 2006)

The economic potential of space tourism development is extraordinary. The expansion of this type of tourism will bring significant benefits, both economically and socially, as such that we could predict a huge surge in this kind of activity in the future that may overcome aviation at the Earth's surface. So far, the activities undertaken in space only received funding from state agencies and organizations. Therefore, it was not necessary to generate profit directly in a financial form. Benefits were scientific, because all progress and all the innovations resulting from that particular area led to the development of technologies that have helped us in our daily lives, even if we do not clearly realize this. In this category, we can mention communication satellites, GPS satellites and technology miniaturization.

There are some opinions stating that tourism development in terms of access to space would be a financial loss or that it would not have an economic value. This is because, as mentioned above, so far, the funding has been received only from the state and, as such, it has not been aimed at covering initial expenses and generating profit.

The reason why the direct economic contribution of space agencies is very low, despite the massive funding they receive, is that they do not strive to develop services that the public would purchase or would

like to purchase. Another reason is that in government-financed organizations bureaucratic behavior determines that the recovery of public investment is not necessarily a priority for employees.

The development of the space tourism sector would generate, in addition to indirect scientific and technological advances, a direct important economic component. This will lead on to an exponential growth of this sector. Because space tourism has the potential to become a new important branch of the tourist industry using advanced aerospace technology, the economic effects of this development will be significant for both these industries involved, as well as for the global economic progress and development of society as a whole. In this type of organization, the investor aims mainly at the return on investment and profit and, consequently, it will want to maximize the efficiency of all processes in order to minimize the investment.

There needs to be a better strategy of informing the public and media regarding global economic benefits that would result from the development of commercial space travel. Space activities would become a massive economic generator and launch costs will decrease dramatically in the future, leading to an acceleration of the development of this industry.

Space tourism will become an activity that will include a very large number of people (both operators and beneficiaries) and will generate significant trading profits in the decades to come. It is important to recognize this and to realize that, in a very short amount of time, space tourism could become as common as other forms of tourism, and, because of the sensational experiences that it will offer to the consumer, it will become a significant segment of the entire tourist sector.

5. Conclusions

The increase of what we call the “Space Tourism Movement” will have a significant cultural impact and will broaden the horizons of people in a characteristic manner of the XXIst century. Under this influence, spatial development will gain an economic dimension and will signify the true beginning of the “space age”, in which people will reach this border as passengers, customers, employees, operators and managers, not just as government employees. Therefore, the roles will reverse and the private space services consumers and providers will become a majority. (Collins, 2004)

The beginning of tourist suborbital flights will open the way for a revolution in how we view and manage society. It is hard to imagine the direction in which this first step will take us. Just as 100 years ago, the emergence of the car radically transformed the world and generated unexpected industries, we can predict a similar transformation in terms of human activities in space. Fully understanding that these innovations will transform our society, inspired by previous examples, the potential investors in this sector will generate a huge profit in the long run, even if the initial costs of entering into this race do not seem to be justified. The studies presented reveal that potential customers show both the demand for space travel and the financial availability for this activity. These results are encouraging for investors in space tourism as prices are still quite high and the requirements for conducting this kind of business are not yet fully in place. The market will grow exponentially as the prices will decrease and vice versa.

The flow of innovation and optimism generated from this type of activity will influence our society in many other ways. The impact generated by the possibility of private access to space will develop a multitude of related activities needed to support this new industry.

This is the first time in history that space exploration is financed by private investors, an important aspect in establishing a space tourism industry.

Space is not important only for the future of transportation, commerce or science. Overcoming the space border represents the future in our imagination. What is clear is that the ability to overcome this border is one of the drivers of human development.

So far, very few people have had the opportunity to orbit the Earth. From here, they have experienced the so-called panoramic effect, looking at our planet as a whole, from afar. Looking at Earth from space, they saw and understood that most borders for which we fight are imaginary lines and that the atmosphere seems a very thin, fragile protective layer to support life, as we know it. This experience is a fundamental personal one, but its magnitude cannot be doubted or denied. It is possible that following the rise in accessibility to space travel, this experience will lead to a better understanding of the unity of humankind and our relationship with the planet. This could lead to a radical transformation of our society, to the degree of magnitude that exceeds the current boundaries of our imagination.

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