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Marketing analysis of diversification of the factors determining the market conditions of the space tourism market

Abstract. The study is dedicated to the marketing analysis of the diversification of the factors affecting the formation and development of the market conditions of the space tourism market. The article summarizes scientific approaches to the definition of space tourism, systematizes the features of the formation and development of the global space tourism market, and analyses the indicators of the development of the space tourism market in the leading spacefaring countries of the world. The actual determinants of the development of the world market of space tourism have been identified, as well as main motivational factors of space tourists. The main endogenous and exogenous factors for the development of the space tourism market were investigated. Attention was focused on the fact that the modern economic mechanism for the development of the space tourism market is based on the concept of marketing with its main elements adapted. Marketing directions for the popularization of tourist space flights were researched. It is concluded that the space tourism market has a huge potential. Space travel has become a reality, and in the foreseeable future space tourism will become massive, while the industry of space experiences will develop at an accelerated pace, stimulating the emergence of other lucrative sub-markets.

Key words: tourism, outer space, space tourism, extreme tourism, marketing factors, market conditions

Introduction

The global tourism industry is constantly evolving, offering new types of services available to tourists. Modern tourists are not limited to traditional types of tourism, a significant part of them do not strive for a comfortable, calm, relaxing holiday, but, on the contrary, look for active, unique, extreme types of travel. Space exploration has long been one of the goals of mankind, striving to discover new planets and worlds. Once upon a time, people discovered new continents on Earth, and now it is time to do the same in outer space since the thirst for making discoveries is inherent in human nature.

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At the same time, commercial interest arises, which manifests itself, in particular, in the space tourism market.

In the 20th century, mankind has achieved tremendous success in space exploration: the first artificial satellite was launched, the first manned flight into space was completed, astronauts landed on the moon, and the International Space Station (ISS) was constructed. Space tourism has become a new paradigm for space exploration. Space tourism is the most spectacular, amazing, and expensive type of extreme recreation. The childhood dream of becoming an astronaut and looking at the globe from orbit or flying to the moon now has its price, which is the price of a tourist trip into outer space. Space tourism makes it possible to fly into space for both specialists and the civilian population. The development of astronautics has taken a big step farther and forward resulting in the fact that nowadays space tourism is open and popular among especially wealthy tourists. Precisely in 2022, the transportation of space tourists is not carried out; however, booking tickets for space travel started at the beginning of the 21st century, and the number of people wishing to fly into space already exceeds 700 persons.

Because space tourism emerged only in the 21st century, all its subspecies are in the process of development and use different marketing tools in different ways. Private space companies, unlike government missions, strive to create maximum comfort for their space tourists. This significantly increases the requirements for the equipment of spacecraft. In addition to a comfortable stay on a spaceship, the duration of the flight is very important for tourists. Many would-be tourists readily understand that a one-way trip to the moon will take three and a half days, but it is much more difficult to communicate to tourists that they will pay millions of dollars for a 180-day trip to Mars. Despite the complexity of implementation and the high cost of flights to the ISS, seven space tourists have already visited it; one of them visited the station twice. The experience of organizing these flights turned out to be extremely important because it proved that non-professional astronauts can fly into space and live in zero gravity for a long time.

The relevance of the study is due to the rise in interest in the emerging space tourism market from large private space companies that successfully apply high space technologies and modern marketing tools. Private space companies, as powerful entities in the space tourism market, direct their marketing efforts to reduce the cost of space services, as well as to ensure maximum customer safety. Owing to the already considerable number and diversity of private space companies, space tourism has become much more diverse. Nowadays it is not only visiting museums of space, observatories, spaceports, and other places related to space activities or space history, but also suborbital flights, flights to the ISS, and to other space stations that will be built in the future, as well as to other planets.

Materials and methods

The idea of space tourism was first reflected in the works of Barron Hilton and Eric Kraft published in 1967. The authors were the first to try to promote the idea of commercialization of space, but this idea did not succeed. Space tourism began to be actively discussed at the end of the 20th century when in 1986 the report *Possible Eco-*

nomic Consequences of the Development of Space Tourism was presented at the International Congress of Astronauts, which turned the level of discussion from scientific to business circles. After its presentation, for the first time, active discussions about the initiation and development of space tourism began. In 1984, the first series of publications by David Ashford on the topic *Creating an Aircraft for Tourist Flights into Space* was published in Great Britain.

Many scientific publications are devoted to the problems of space tourism, and most of them focus on the prospects of the development of this type of tourism. This approach, in particular, is implemented in the works by Michel Van Pelt (2005), John Spencer, Steve Kortenkamp, and Kenny Kemp (Kemp, 2010), which consider technological possibilities for space tourism development. Despite a large number of studies in this field, the issues of systematization of features and factors of the formation and development of the space tourism market remain unexplained.

Modern integration processes in the world economy create such conditions for the functioning of the space tourism market, when its economic growth depends on the ability to effectively respond to endogenous and exogenous factors of the marketing environment. The global space tourism market, on the one hand, contributes to the social development of society and acts as a catalyst for structural transformations in the economy, and on the other hand, it accelerates the processes of formation, exchange, and use of human capital, information, and technologies in the global space. The change in the principles, mechanisms, and conditions for the functioning of the global space tourism market is due to the diversification of factors influencing its development.

The purpose of the article is a recognition of the diversification of factors influencing the formation and development of the market conditions of the space tourism market.

In the process of preparing the article, both general scientific and special research methods were applied: comparative analysis was used to identify the features of the space tourism market in the system of the world market for goods and services; a systematic approach was used to systematize the theoretical aspects and marketing determinants of the development of the global space tourism market; comparative and historical analysis were applied to assess the development of the space tourism market and its main segments; statistical, comparative economic, factorial and structural methods were used to identify the structure and main trends of the global space tourism market as well as to assess its dynamics.

The information basis of the study was as follows: data from statistical and analytical reporting by NASA, European Space Policy Institute (ESPI), and Euroconsult; materials of domestic and foreign publications in the field of space tourism, and Internet information resources.

Research results

In recent decades, one of the most popular discussions has been about space as a new tourist environment for people living on Earth. An analysis of marketing sources of information proves that this issue is far from being new. Since the mid-1960s, the term “space tourism” has been used in discussions about the future of military and

civilian space technology. Today, the almost sixty-year-old dream of people has come true, primarily thanks to private space companies that do business in the field of space tourism. The largest private companies in the space tourism market are American "Space Adventures", "Armadillo Aerospace", "Blue Origin", "Space X", "XCOR Aerospace", British "Virgin Galactic", European "EADS Astrium", "Copenhagen Suborbitals" (Sweden), "Project Enterprise" (Germany), Japanese "Kawasaki". These companies are constantly investing huge amounts of money in the development of suborbital and orbital space flight projects, as well as offering potential tourists to book spaceship seats directly or through affiliated travel agencies. One can book a flight ticket through accredited space agencies around the world.

The European Space Agency provides the following definition of space tourism: "space tourism is the performance of a sub-orbital flight funded by the private sector and/or carried out in a private mode using vehicles and technology development based on the space tourism market. Space tourism can be considered one of the branches of the tourism industry, which is mainly based on technological development, progress, and activities related to satellite orbital flights" (Space tourism, 2008). According to the Cambridge Dictionary, space tourism is travelling into space for pleasure rather than work (*Space tourism*, 1995).

In 1998, the National Aeronautics and Space Administration (NASA) report *General public Space Travel and Tourism* endorsed the idea of space tourism and stated that it was planned to launch suborbital flights, thanks to which the space tourism market will be much broader than just launching rocket vehicles into space (*General Public Space Travel…*, 1998).

Summarizing the theoretical approaches to the definition of space tourism, we can conclude that they have one common element, which is that space tourism is purely commercial space travel for scientific research or non-military activities. In other words, it is customary to call space tourism or suborbital flights for recreational or scientific research purposes, provided that this takes place at private expense. Marketing studies have shown that the space tourism market is characterized by a number of features. Firstly, the elitism of the first and subsequent tourists; secondly, the high cost of a "civilian" seat in the space crew; thirdly, strict criteria for the selection of space tourists; fourthly, the duration of pre-space training.

Space exploration has influenced the formation of a new paradigm in the tourism market, especially in the segment of extreme tourism. Space tourism is totally unusual; it allows a tourist or a group of tourists to get into earth orbit and into space. The development of modern space tourism makes it possible to make a flight or a series of flights of one or more people into space to an altitude of 100 km above sea level, the so-called Kármán line, the conditional upper limit of the Earth's atmosphere or the near-Earth orbit. In 2004, the United States, for the first time in the world legislative practice, began to single out a new category of people carrying out space flights on a commercial basis – space tourists. In other words, people who go into space at their own expense have become known as space tourists. In orbit, they become participants in scientific experiments, learn what the risk of space flight is and perform work on a par with the crew.

Therefore, space tourism is often called an expedition, a visit, since the preparation for the flight of tourists and the crew is the same. Such travellers receive a huge image effect, consisting of pride in discovering space personally. Marketing research shows that the main motivating factors for space tourists are: the opportunity to contemplate the view of the Earth from space; overload; acceleration during take-off; a unique travel experience; exclusive sensations and impressions; zero gravity.

In recent decades, outer space has been developed at a gigantic pace, and space tourism also continues to gain momentum. Private space companies play an increasingly important role in this. They engage in the organization of extra-terrestrial tourist trips and are created by the famous entrepreneurs, such as Jeff Bezos (Amazon), Richard Branson (Virgin Group), and Elon Musk (Tesla). The first two companies offer 15-minute suborbital flights directly above the Earth, Elon Musk's SpaceX is the only one that offers the opportunity to spend several days in space. Tickets cost from $250,000 to several million dollars.

A Virgin Galactic flight can be booked in 33 countries around the world. The price offer of $250,000 provides two and a half hours of flight, of which several minutes are in space (that is, at an altitude of more than 100 km above sea level). The company reports that there are only a few tickets left at this price, and the price will only increase in the future. At the same time, Virgin Galactic does not set clear deadlines, because it considers the safety of future passengers to be its main priority. The company emphasizes that space travel is a complex process, and potential tourists have the option of abandoning these trips at any stage due to various risks and costs. Despite the seemingly high demand, customers wait years for the development, flight testing, and reliability of the launchers. The rather vague prospects of the flight did not prevent several hundred people from buying tickets, including famous actors, journalists, businessmen, politicians, etc.

Companies providing space tourism services set themselves to the task of creating an environment that evokes a completely new level of emotional states in a person. With this in mind, companies are physiologically and psychologically preparing space tourists to behave and respond appropriately in the space environment. Space travel involves a complex set of protocols: tourists must be in good physical condition, meet medical screening criteria, learn and follow safety protocols that include mandatory quarantine, and gain prior experience in dealing with zero gravity and high speeds.

Considerable foreseeable risks and high financial costs are the main factors forming the market conditions and constraining the development of the space tourism market at the current stage. The price of a ticket to space is high, starting at $250,000 for a suborbital flight on Virgin Galactic and up to more than $50 million for an orbital flight on SpaceX. But space tourism is a type of extreme tourism to which the adherents have a strong interest in fulfilling their life ambitions despite the dangers and financial risks involved. To develop the space tourism market and ensure the sustainability of the space company's business model, it is primarily necessary to stimulate demand and minimize the risks and costs of space travel. Among the stimulating factors of the attractiveness of space tourism are the search for diversity, human self-esteem, the possibility of research, and space experience.

Since a huge amount of investment goes into the production of launch vehicles, when all these rockets are completed, the volume of deliveries to the orbit of space tourists will increase significantly. For the further development of the space tourism market, it is necessary to develop and improve flight logistics, as well as add and improve orbital services, the offer of which is not keeping up with the growing demand.

The implementation of the marketing policy of commercial space companies should focus on maintaining the high motivation of tourists so that they do not abandon the trip. It should also be oriented to the target audience that has a positive attitude towards space tourism, a strong desire to find various adventures, and inflated self-esteem. The task of the marketing department of space agencies is to ensure effective communication and training of space tourists. To this end, space agencies offer virtual and/or physical tours to familiarize tourists with the process of space flight.

Amidst the COVID-19 crisis, the global space tourism market, which was estimated at $651 million in 2020, is forecast to reach a revised size of $1.7 billion in 2027, growing at a compound annual growth rate of 15.2% between 2020 and 2027. According to forecasts, suborbital tourism, as one of the segments of space, will increase by 15.6% and reach $1.5 billion by the end of 2027. After a preliminary analysis of the consequences of the pandemic and the economic crisis caused by it for business, growth in the segment of orbital tourism got adjusted to 13.1% over the next five-year period. The U.S. space tourism market was valued at $175.3 million in 2020. China, the world's second largest economy, is expected to reach a projected market size of $401.6 million in 2027. Other geographic markets that deserve attention include Japan and Canada: each is forecast to grow by 11% and 13.2%, respectively, through 2027. In Europe, Germany is projected to grow by approximately 11.9% (*Global Space Tourism Market…*, 2021). Suborbital companies are expected to dominate space tourism services, with 82% of revenues coming from lower ticket prices and higher demand and competition.

The market of space tourism, of course, has its characteristics compared to the market of classical tourism, and this is primarily because of the space in which it functions. However, the basic marketing technologies used in traditional tourism are also relevant for space tourism. Thus, the modern economic mechanism for the development of the space tourism market is based on the concept of marketing with the adaptation of its main elements, which we have studied.

Undoubtedly, the space tourism market is customer-oriented. Today, the customers of companies that conduct business in space tourism are exclusively people with a very high level of income, that is, their target audience is group of millionaires and billionaires. Taking into account that the financial availability of space tourism may significantly increase in the coming decade, it is necessary to develop a new customer base, involving innovative marketing communications and technologies.

Space tourism marketing presents spaceflight as glamorous, innovative, and exciting, but also notes the risks associated with spaceflight. Once customers are aware of all the dangers, they may not accept the risk of death or serious injury. It should be noted that space tourism carries the existential threat of an accident involving the death or injury of customers. Such an accident will have a negative impact on customer demand,

and lead to a lengthy investigation into the incident, which will result in the implementation of new safety and oversight regulations. In addition to the risk, customers must devote a lot of personal time to preparing for spaceflight (which is required for quarantine, pre-flight training, ground activities, and travel) in exchange for 10–90 minutes of total flight time for suborbital flights. Orbital flights may require customers to commit several weeks to months of personal time in exchange for three days or weeks of total flight time. The option of sufficient time can be an obstacle for customers so it also requires original and sometimes individual marketing solutions.

With the development of the space tourism market, the nature of customer motivation is changing. For example, one of the top three motivations for being a space tourist is the desire to be a pioneer. In the future, space tourism will not be perceived as a pioneering activity, and this will also affect consumer demand. The motivation of space travellers will undoubtedly be influenced by several factors, including marketing by the space service provider, opinions of trusted leaders, and public sentiment (e.g. environmental impact). Space tourism service providers will focus on increasing motivation that matches the experience of working with a specific marketing product and target type of customers. On the basis of the main improvements in the space tourism market segmentation, it is important to take into account the threat of losing potential customers because of the long duration of preparation for a space flight, which is at least three months. At the same time, the space tourism market does not experience seasonal fluctuations; there is no dependence on weather conditions, and the target audience can do flights at any time of the year.

Private space companies, as a rule, do not own platforms for launching shuttles. To satisfy the demand for space tourism, they use the platforms of the International Space Organizations based on partner marketing. The possession of a platform for launching shuttles is a great competitive advantage for the company that conducts business in the field of space tourism because it strongly influences the formation of pricing policy.

The demand for space flights is international, as the target audience is to one extent or another scattered in different countries of the world. At the current stage of development of space tourism, there is a risk of almost one-time demand, when the client, having fulfilled his dream of flying into space, returns to his usual way of life. Another challenge to meet the demand for spaceflight is the lack of an available orbital destination. Currently, the only orbital facility open to space tourists is the International Space Station (ISS), and therefore there is a limited number of private space missions per year. Elon Musk's company offered an alternative way: orbiting the Earth on a SpaceX Crew Dragon with a special observation bubble attached to the nose of the space capsule.

The formation of demand in the space tourism market results from a number of factors. Firstly, the limited space fleet. Secondly, a small number of passengers (from 2 to 6 people) that a spacecraft can carry in one flight. Thirdly, the long-term preparation of the spacecraft for the second flight. Fourthly, legal regulation and coordination of space flights with air flights to avoid the threat of a collision. Fifthly, human factors, which are manifested in the training of qualified personnel and the duration of crew training. The crew is subject to high requirements for physical fitness and health. The formation of

demand in the space tourism market is also influenced by the insufficient number of training centres for both clients and crew. Interest in space is growing, although companies operating in the space tourism market have not yet carried out space transportation for a client. This indicates the development of competition in the future.

The space tourism market has special promotion channels and most often space companies use marketing-related promotion tools which are common for the luxury segment. Considering that the target audience is the group of the richest people on the planet, effective means of promotion will be publications in business magazines and business resources on the Internet, speeches at specialized business conferences, participation in international space forums, etc. In other words, the global business community and the top management of the world's largest companies are the guidelines for the marketing policy of promotion in the space tourism market.

The formation of the pricing policy for space flights is the complete prerogative of space companies since potential customers do not have an understanding of the adequate cost of a flight or accommodation in a space hotel. Today, thousands of people in the world are ready to pay tens of millions of dollars for a short flight around the Earth's orbit. Some people are ready to pay money for a big adventure (the cost of a trip to orbit varies from $30 to $40 million, and the cost of going into outer space is $15 million). Under such conditions, space companies have the opportunity to set inflated prices for space services to increase profitability and shorten the payback period of their projects. On the other hand, space companies need to understand that the lower cost of space services in the early stages can create an additional pool of potential customers with revenues below the highest. Research on the space tourism market shows that the space tourism market is very price elastic and as the price of space travel decreases, the number of potential customers will increase. When ticket prices drop to about $100,000 per passenger, the demographic nature of the customer will change and the space tourism market will expand. And the marketing of space companies must be ready for this.

Marketing research has shown that specialists and experts in space tourism market have been discussing the interesting idea of the Japanese company Obayashi for a long time, which plans to build a space elevator in 2050 (*Japanese Company Wants to Build…*, 2021). The value of this idea is that it will significantly reduce fuel costs to overcome Earth's gravity, which will certainly contribute to the development of space tourism. The planned capacity of the cabins is up to 30 people. They believe that the space elevator will replace expensive and dangerous rockets launched from ground-based launchers. The advantages of the space elevator are evidenced by the following argumentation: the delivery of cargo to orbit in the traditional way costs almost $22,000 per kilogram, and the space elevator costs approximately $200. The construction of space elevators will bring the development of the space tourism market to a completely new level. Another advantage of the space elevator is the possibility of creating a huge network of solar panels to provide the Earth with cheap energy.

The marketing communication policy of space companies recommends various directions for the popularization of space flights. First of all, it is a space lottery when every person has a chance to win a ticket. This idea was proposed by the astronaut and the head of the ShareSpace Foundation Buzz Aldrin (*Astronaut Aldrin plans…*, 2007). Secondly, the space tourist will have the opportunity to sell the exclusive photos and other video footage taken during the space tour and partially pay for the trip. Thirdly, it will soon be possible to get married on a spaceship board, celebrate a family holiday, or a corporate event. Fourthly, exciting walks in outer space are planned to be done in spacesuits and with appropriate preparation. Leading space companies are expanding not only the range of additional space services, but also planning the construction of space housing for tourists so that they can spend a week in space, or maybe even their entire vacation.

Conclusions

An important criterion for the development of a successful business is the demand potential. More than half a century ago, humanity came to the conclusion that flights into space are not limited to scientific purposes, but may be successful business projects. One of them is space tourism. The implementation of this project was long and thorny. But already in the 21st century, the flight of an earthly tourist into space is not a project for the future, but it is actively being carried out and developed. Companies that do business in the space tourism market offer different types of space flights that attract more and more attention from target customers. Of course, this activity is a “costly affair with an expensive taste” and it requires special training, but it is quite important that modern tourists are interested in it and are ready to pay for space flights to satisfy their ambitions.

The role of space tourism in international economic activity is constantly increasing, and the market itself is acquiring new trends and features. International corporations, private space companies, and individuals annually invest hundreds of billions of dollars in the development of space technologies so that space travel becomes a trend not only for wealthy people. The value of space tourism as a new concept is that it will contribute to the development of vital technologies that will lead to new destinations in the solar system in the future.

Space tourism is an extreme type of tourism that involves taking tourists into Earth’s orbit and space. In the future, the services of the space tourism market will expand due to orbital flights around the planet, accommodation in hotels in the orbit of the Earth, flights to the Moon and other planets, as well as going into outer space in a spacesuit.

The conducted marketing analysis of the space tourism market allows making a conclusion about its huge potential. Space travel has become a reality, and in the near future space tourism will become massive; the industry of space experiences will develop at an accelerated pace, stimulating the emergence of other profitable submarkets.

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