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The New Dimension of Accounting in the 21st Century: Space Accounting*

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1. Introduction

Beginning with Ancient Mayan astronomy, the curiosity of humans in outer space has continuously increased throughout history. It is a fact that the interest in and desire for space is as old as the history of humankind. Although humankind's desire to live on other planets was initially regarded as impossible, the world has reached the level of exploring space travel and the unknown through technology by the second half of the 20th century. Advances in technology will make spaceflight a regular part of our daily trips around the planet in the next 50 years. (Reed, 2017).

Economic and technological conditions that change over time require accounting practices to change and adapt to new processes. In this context, accounting science can recognize the developments expected to be experienced in space. For example, the claim that American astronaut Anne Mcclain accessed the bank accounts of her husband, who was about to get divorced from the international space station in 2019, went down in history as the first financial crime committed in space (https://tr.euronews.com/2019/08/24/uzayda-islenen-ilk-suc-iddiasi-astronot-bosanma-davasi-acan-esinin-banka-hesabina-girdi). While even going to space was perceived as a difficult task in the past, the science of law had a difficult time in the face of this event. It was faced with the questions of by which rules and methods the American astronaut should be tried. Undoubtedly, since the incident is related to a financial event, it will affect accounting science. Starting from this point, the need will arise for accounting to examine,

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evaluate, and report space activities within its field of interest, just like aerospace engineering and space law. As the size of the space economy grows, it will be necessary to seek and find answers to many questions that may arise within the science of accounting, which will be indirectly affected by this (Reed, 2017).

Due to the structural characteristics of the economic activities in the space industry, today's accounting practices and systems may need to be revised to solve such issues. An international accounting authority, including new measurement methods and measurement units, may be required for the healthy and reliable accounting and reporting of activities in space by their true nature. In other words, developing a common accounting language will be necessary to enable similar events to be understood and interpreted similarly.

2. Space Industry

Outer space, commonly shortened to space, is the expanse beyond Earth and its atmosphere and between celestial bodies (https://en.wikipedia.org/wiki/Outer_space). Radio broadcasts from space, discovered by an engineer named Karl Guthe Jansky by chance in 1932, led to the birth of radio telescopes in the following years, and thus, to listen to the depths of space and to find the sources and causes of those radio broadcasts (https://tr.wikipedia.org/wiki/Uzay).

Having started with a coincidence, space studies indicated superiority or prestige during the Cold War. Thanks to technological developments, space studies became vital, offering the opportunity and potential to contribute to security, economy, environment, and development.

On the other hand, the space industry includes regulating economic activities in developing and producing products and services such as ground stations, launch vehicles, and satellites within the scope of space studies. Today, the global space industry has become a fast-growing field of the high-tech market. Furthermore, many professions, such as engineering, architecture, and law enforcement, have reached a point to be fulfilled in terms of space.

While solely government organizations had invested in the space industry in the past, the number of private companies and states investing in the space industry, the budget transferred to the industry, and their activities have been increasing daily since the beginning of the 21st century. The Treaty, which was opened for signature in the USA, the United Kingdom, and the Soviet Union on January 27, 1967, to steer the space industry, entered into force on October 10, 1967. The Outer Space Treaty, officially known as the Treaty on the Principles Governing the Activities of States in the Exploration and Use of Space, Including the Moon and Other Celestial Bodies, forms the basis of international space law. This agreement includes the rules that the investing actors must follow to continue the space activities effectively without interruption, the satellites, the rockets that take them, the removal of the satellites whose function is completed out of the space ecosystem, space garbage, etc. The Outer Space Treaty, formally the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, is a multilateral treaty forming international space law. The pact includes the rules to be followed by the investing actors to continue space activities effectively without interruption, and the satellites, the rockets that carry them, and the removal of the satellites that fulfilled their mission out of the space ecosystem. (https://tr.wikipedia.org/wiki/D%C4%B1%C5%9F_Uzay_Anla%C5%9Fmas%C4%B1)

This agreement states that the use of space, including the Moon and other celestial bodies, will be carried out for the benefit and interest of all countries, regardless of their economic or scientific development level. In other words, it is accepted that space will be the province of all humanity. It is also stated in the same agreement that space, including the Moon and other celestial bodies, is not subject to national possession by claim of sovereignty, use, or occupation, or by any other means. (https://www.financierworldwide.com/can-spaca-activities-betaxed#.Y1UAzHZBxPY)

The paradigm's new players are universities with only space capability and newly established companies. Especially in the USA, some companies founded by visionary people successfully undertake large satellite projects by bringing together engineers and operators with no previous space experience but with high technological skills and using venture capital. Big space companies are only trying to catch up with this trend by following them up.

International cooperation has been a significant encouragement for such rapid development. The support of the United Nations and some states, such as Japan, in both satellite design and production phases and free launch has been necessary for those who took the first step into space. While there was no central institution to organize space studies in Turkey until recently, the establishment of the Turkish Space Agency in December 2018 has been considered to fill the existing void in this sense (https://tasam.org/tr-TR/Icerik/52506/uzay_ekosistemi_ve_guvenligi_calistayi_-_1_sonuc_raporu).

Looking under the hood of some developments in the space industry, Starlink satellites are produced in high quantities, six per day. SpaceX can genuinely create an economy. Elon Musk SpaceX is estimated to have annual revenues of $30 million by 2025 (May 2022: 55). Private companies compete to provide a competitively priced launch service to their customers and governments. The big breakthrough occurred when SpaceX launched its dual-stage Falcon 1 rocket on September 28, 2008 (May, 2022, p. 55).

A comprehensive report by Citigroup analysts announced that the space industry could reach $1 trillion in annual revenue by 2040, owing to a 95% reduction in launch costs. Citigroup states that rocket launch costs have fallen rapidly since the 80s. From 1970 to 2010, the average launch cost remained stable at around $16,000 per kilogram for heavy loads and $30,000 per kilogram for light loads. On the other hand, lower launch costs emerged with SpaceX's launch of the Falcon 9 in 2010. The Falcon 9 rocket has reduced the launch costs to about $ 2,500, which is 30 times lower than the costs of NASA's Space Shuttle and 11 times lower than the previous historical average. It is estimated that by 2040 it will decrease to about 30 dollars per kilogram. Thus, many more people can travel to space in the coming years. (Sheetz, 2022)

Table 1. Companies operating in the space sector

Space Transportation	SpaceX (http://www.spacex.com/), Orbital (http://www.orbital.com/) Virgin Galactic (http://www.virgingalactic.com/), Planetary Resources (http://www.planetaryresources.com/), Blue Origin (http://www.blueorigin.com/), Stratolaunch Systems (http://stratolaunch.com/), Sierra Nevada Corporation (http://www.sncorp.com/index.php).
Space Tourism	Mircorp (http://mircorp.org/corporate.html), Space Adventure (http://www.rocketshiptours.com/), RocketShip Tours (http://www.rocketshiptours.com/), Virgin Galactic(http://www.virgingalactic.com/).
Production of Vehicles Used for Space Transportation	Orbital Sciences Corp. (http://www.orbitalatk.com/), Scaled Composites (http://www.scaled.com/projects/), TSC (http://www.thespaceshipcompany.com/).
Satellite Production	ThalesAleniaSpace (https://www.thalesgroup.com/en/worldwide/space?LangType=2057), Boeing (http://www.boeing.com/), Israel Aircraft Industries (http://www.iai.co.il/2013/22031- en/homepage.aspx).
Satellite Service	Türksat Satellite Communications Cable TV & Operations AS (http://www.turksat.com.tr), GlobalCom SA (http://www.globalcom.cl), Danish Space Expo (http://www.spaceexpo.dk).
Production of Satellite Launch Vehicles	Arianespace (http://www.arianespace.com/), International Launch Services (http://www.ilslaunch.com/), SUPARCO (http://suparco.gov.pk/webroot/index.asp).
Production of Research and Exploration Robot	Brown Engineering Company (https://tbe.com/), Lavochkin (http://www.laspace.ru/)

(Bozkurt & Ercan, 2016, p. 4)

3. Space Economy and Space Accounting

The accounting transformation into the space dimension should include accounting practices, financial reporting, business processes, and auditing issues. The problems associated with space accounting include those that can be solved with the help of new concepts, principles, and multidisciplinary approaches. This shows that accountants should be ready to do business through a multidisciplinary approach. To put it more clearly, the accounting will need to consider those developments and develop a holistic understanding that covers much more than a change in accounting standards.

In this regard, some of the questions that need to be answered within the science of accounting are as follows:

- How will the space economy affect accounting science and the accounting profession?
- What is the place and significance of accounting in sustainable space activities?
- Will it be possible with the current accounting system to solve the problems that may arise in the accounting and reporting economic activities in space?
- How will the accounting records of the economic activities occurring in space be kept?
- How and in which accounts income and assets will be traced?
- Which methods and principles will need to be used in costing processes?
- How will taxation processes be conducted?
- Will specific measurements, value units, or even a brand-new monetary unit in space currency exist?
- Is it necessary to establish unions or organizations, such as chambers of commerce or industry, for matters such as commissioning, authorization, classification, limitation, permission, auditing, and surveillance at various stages of space activities, about the regular industry procedure?
- Who will be responsible for decision-making and drawing up regulations regarding the structure of this organization?

The above questions can be reproduced to provide a reasonable basis for thought and discussion about space accounting.

Space accounting can be defined as "*a sub-specialty branch of accounting science that enables the creation of accounting standards and information systems for monitoring and reporting all economic activities that occur during the discovery, research, understanding, management, and exploitation of space, and to enable the institutions to make conscious decisions on space activities and ensure sustainability*" (Tekbaş et al., 2022, p.19). The term "space" here refers to the activities conducted in space, rather than the space-related activities conducted on Earth.

Undoubtedly, space accounting will continue to take shape with the development of economic activity in space. It aims to produce information explaining the interaction between space activities and the economy. It can be an essential catalyst for space exploration and the space industry's growth. Space accounting is a multi-disciplinary concept in which accounting, space sciences, law, and economics are involved, and it will undoubtedly enable integrated reporting that considers the financial and non-financial data of the enterprises and explains the situation within the sustainability framework.

4. Key Issues Regarding Space Accounting

Accounting involves a set of assumptions, frameworks, and methodologies used to produce realistic and relevant financial reporting. As a constantly developing field of science, it should seek new ways of doing business, technological developments, and unique solutions to new information demands to adapt to today's world. As progress continues, especially in space exploration, asteroid mining, space tourism, and space production, issues that might need fixing for accounting will emerge. In this regard, there is a requirement for studies that scientifically examine the effects of economic activities in space on accounting.

Will accounting need to alter much when it deals with outer-space activities? Certainly not, but it must consider how financial reporting should be done, which accounting measurements and valuation methods should be used, and which currency should be used when preparing financial statements. It is necessary, though, especially after discoveries in space, to investigate and examine the kind of costing models, financial reporting standards, and skills required for accountants if space production is to commence. This is important for space activities to be sustainable.

In terms of being a remarkable accounting approach, it would be appropriate to examine the space ecosystem in two dimensions suborbital and superorbital. Today, it is possible to monitor suborbital activities with an accounting system based on the current legislation. Because orbital space activities are primarily based on predictions and certain activities might occur decades later, the current accounting and financial reporting standards may not meet the need.

The reflection of space activities in accounting will include more than financial reports. Many courses such as management accounting, cost accounting, auditing, environmental accounting, sustainability reporting, and integrated reporting that emphasize the need for financial and non-financial information to be included in the academic curriculum, which accounting and finance department professors teach, will have to include explanations on space activities.



Figure 1. Critical issues in the science of accounting may arise with space discoveries (Tekbaş et al., 2022, p.18)

Some answers will be sought on specific topics or questions emphasizing space accounting.

4.1. International Financial Reporting and Auditing Standards

At the center of the current discussions lies the opinion that, probably, the accounting, auditing, and reporting standards in practice today will not be sufficient for accurate and requirement-oriented reporting of new economic activities such as space exploration, space tourism, space mining, and space production.

If we consider these new economic activities and space industry concepts, we can imagine there will be a demand for the activation of vehicles that will transport passengers to space; there will need to be construction, activation, and a cost determination of living areas to be established on any planet or star, hotels to be accommodated, and satellite stations to be fueled in space.

International Accounting Standards must provide a system of rules and principles that determine the format and content of financial statements. These standards should cover accounting for stocks in space, depreciation, research and development costs, income taxes, investments, and tangible and intangible assets. A practical, understandable, and applicable set of space accounting standards will provide significant added value to businesses operating in space.

In this regard, space accounting is a field of expertise that will ensure that the activities in space are reflected in the financial statements consistently and accurately, that the financial statements can be understood in the same way by all parties, and that similar events are interpreted similarly. Space activities will introduce the need to add to and modify existing

international accounting standards and even the need to develop new standards, such as in agriculture, construction, or insurance accounting.

4.2. Space Commodity Exchanges and Their Operation

A new space paradigm called "New Space" has taken hold in space technologies and the use of space in the new century. Space is no longer a field used only by big nation-states or related giant companies. The widespread and easy availability of technological developments, especially the downsizing of electronics, paved the way for many non-state new players in satellite design, production, launch, and operation (https://tasam.org/tr-TR/Icerik/52506/uzay_ekosistemi_ve_guvenligi_calistayi_-_1_sonuc _raporu).

For instance, the "Lunar Hilton" is a project heard long ago within the scope of lunar tourism. In addition to accommodation in this hotel, scenic tours to the historical Apollo landing sites and new sports activities that can be done in one-sixth of the world's gravity will attract the attention of space tourists (May, 2022, p. 105).

Fiber optic cables are another product produced in space instead of factories worldwide. They have more excellent conductivity than old-fashioned copper cables. The performance of the fibers can be enhanced by using fluorides of heavy metals (ZBLAN zirconium, barium, lanthanum, aluminum, sodium)). However, most of the yield of this substance, which can be produced in tiny crystals, is lost due to the conditions on Earth. However, it is possible to have higher quality in space with metals in a weightless environment of the planet (May, 2022, p. 98). Moreover, Axiom Space is one company that wants to carry its production activities to space. The company is working on the viability of production in the area, including optical fibers, superalloys, and medical implants (May, 2022, p. 99).

Due to the high-priced investment, the commercial activities of the private sector in space are limited. However, it is assumed that the private sector's interest in this field will increase daily, depending on the technological developments and the incentives given by the public. In particular, the increase in startup companies reflects the potential envisaged in this transition. All these developments in space trade take the accounting function to a much more critical position in terms of the sustainability of private sector businesses established for profit.

Considering all those developments in space trade and space industry, managing Earth from space appears as an idea. At this point, it may be beneficial to establish space commodity exchanges with regulations on the correct calculation of pros and cons related to space activities, incentives for investments, and protection of investors.

Thus, companies will be supported in providing long-term funds for developing the space trade market. This, in turn, will contribute to forming space financial markets and spreading space-oriented financial instruments, thus enlarging space activities.

4.3. Cost and Valuation Methods of Space Activities

Today, while space vehicles' design and production processes are shrinking to one-tenth, one hundredth, or even one thousandth in terms of time and cost, the number of satellites in operation

is expressed in less than tens but in thousands. While design and production periods decrease from years to months, satellite sizes and masses decrease from tons to kilograms or even below, and costs decrease from hundreds of millions of dollars to millions of dollars and much down (https://tasam.org/tr-TR/Icerik/52506/uzay_ekosistemi_ve_guvenligi_calistayi_-_1_sonuc_raporu).

Some matters, such as how the cost of the produced goods will differ during the production in space or how the wear level of fixed assets in space will be measured, become prominent. Substances used as superconductors in high-tech products such as yttrium and niobium, for instance, are present in lunar rocks, albeit in small quantities. It may be possible to detect and extract these mines on the moon and bring them to Earth more cost-effectively. Moon Express, one of the companies participating in the Lunar X-Prize, has already devised such an idea (May, 2022, p. 107).

In 2022, based in Houston, Orion Span plans to build the first luxury hotel in space (Neagu, 2018, p. 23). It is necessary to establish a set of rules that determine with what values the financial events and transactions considered to take place in space, such as the depreciation method to be applied for the assets of the hotel to be built, the valuation and costing methods of stocks, will be recorded, how they will be classified, and which reports will be presented.

The accurate and realistic reporting of space activities will depend on the accuracy and effectiveness of the methods to be determined and selected regarding cost and valuation. This topic falls within the field of study of space accounting expertise.

4.4. Legal Infrastructure of Space Operations and Taxation Problem

In addition to its civilian economic benefits, space is also of military importance. Advances in reconnaissance, intelligence, navigation, and communication provide military forces with superior advantages that cannot be obtained from the ground. This feature of space, along with other civil-purpose applications, has revealed the need for international regulation and led to the field of space law.

Since the first satellite, Sputnik, launched in 1957, space law development studies have been conducted in various environments, including the UN. The General Assembly established the UN Committee on the Peaceful Uses of Space (COPUOS) in 1959 (https://www.unoosa.org/oosa/en/ourwork/copuos/index.html). Under the committee's leadership, the OST Outer Space, forming the basis of international space studies, and a series of other regulatory agreements following it were put forward, and declarations were published in accordance. Although all these have the signature and approval of many states, a consensus has yet to be reached, and some issues of significance still need to be discussed.

The basis of other space treaties, especially the Outer Space Treaty, is using space for peaceful purposes. Free access to and benefiting from space has been accepted as the inalienable right of every state. In military matters, it was forbidden to place weapons of mass destruction (nuclear, biological, chemical, radiological) in space, but no prohibition or provision has been made regarding other weapons (https://tasam.org/tr-TR/Icerik/52506/uzay_ekosistemi_ve_guvenligi_calistayi_-_1_sonuc_raporu).

The functionality of accounting will only be possible in the light of legal regulations, for the accrual of the income and expenses of the enterprise will depend on them. In other words, all legal regulations related to the space economy will appear first, allowing normative regulations in accounting. Suppose an enterprise operating in space by international law, for instance, encounters a situation that gives rise to compensation. In that case, the responsibility will belong to the country of residence of the enterprise. As the recourse of the resulting compensation to the company will vary depending on the legislation of the relevant country, in such a case, the provision of doubtful receivables will be set aside, and its reflection in the financial statements will depend on the legislation in the relevant country.

Space accounting will function as a tool to seek answers to the questions such as how the tax legislation will be prepared, how the expenses of tax will be calculated, how the tax base will be created for the calculation of earnings, income, cost, and tax value, by whom the tax will be released, who will be responsible if some specific applications such as DVTA-Double Taxation Agreement will be available.

The problems of taxing the commercial operation of space have been introduced previously. Many lawsuits are filed in the UK Tax Courts due to tax disputes arising, especially regarding satellite activities in space. For example, in the case of Vodacom Nigeria and FIRS (CA/l/556/2018), the Nigerian Court of Appeals decided on the Value Added Tax incurred on applying satellite technology. A satellite operated by a Dutch company provided bandwidth capacity for use in Nigeria. The Dutch company transmitted the bandwidth to the satellite in geostationary orbit, transmitting the power to a Nigerian company's ground station in Nigeria. The court ruled that the supply was one of the services provided in Nigeria and was subject to VAT. (Schwarz, 2019)

4.5. Technology Infrastructure, Contracts, Human Resources, Training and Talent Sets, Space Labor Law

Satellites operate in almost every aspect of space exploitation. Earth observation, communication, technology development, and scientific applications are of great dominance in space studies. Applications not thought of before in observation and communication or believed to be carried out only by big states, companies, or universities in financial and technological terms are being developed rapidly. These include taking pictures of any region at least five times daily, providing video from space, and direct internet access via satellite sets in low earth orbit. For instance, by determining the location with a distance error of only 15-20 cm, the project of autonomous vehicles is in progress.

The most prominent example, which started the shrinking trend brought about by the new space period, was the cube satellite (CubeSat). This type of satellite, whose basic dimensions are well-defined but can grow up to 27 times in scale, has provided rapid design, production, and launch opportunities by introducing many subsystems and components as nearly ready-to-rack products. Cube satellites (pico: 0.1-1 kg, nano: 1-10 kg or microsatellite: 10-100 kg) or non-cube satellite micro-satellites, used by many countries and private enterprises in space whether they are wealthy or space-capable, has paved the way for the introduction of technologies and applications. With the rapid growth in the field, the number of satellites launched in record numbers in 2017 and 2018 is expected to increase further in the future, breaking new grounds (https://tasam.org/tr-TR/Icerik/52506/uzay_ekosistemi_ve_guvenligi_calistayi_-_1_sonuc_raporu).

As accounting is a system that records and reports actual and existing financial transactions and events, one might ask how accountants can form an opinion on an event that has yet to happen. However, it will be necessary to understand and interpret space activities based on expected scenarios and adapt them by regulated accounting processes. For this purpose, we need working groups to create the necessary simulations, projections, and models to bring the complex economic activities in space closer to reality. These working groups should include personnel with the appropriate knowledge, experience, and competence to discuss and investigate topics such as space tourism, space life, space production, asteroid mining, and space discoveries; the department of Space Accounting could be established in universities to train these experts.

In parallel with technological infrastructure developments, it will be necessary to plan regarding matters such as contracts to be made within the framework of space activities, human resources, training and skill sets, and space business law and space business ethics for both people and institutions within the scope of space activities, which eventually turn into an industry.

Space accounting experts will be expected to know the terms, concepts, measurements, weights, and calculations used in space activities in this field and be competent to manage each process. In this context, internationally recognized professional competency-certified programs in space accounting should be organized for space accounting professionals. When determining the certificate education program, science branches or disciplines such as physics, biology, mathematics, engineering, and internet and information technologies should also be utilized to provide the necessary skills for space research.

4.6. Sustainability and Integrated Reporting in Space Activities

The use of space is now considered together with other current issues on Earth. Climate change, environmental pollution, sustainability of agriculture and natural resources, energy, and social development are now observable effects and are predictable with data from space technologies. While observation from space provides essential information on these issues, it also contributes to sustainable development with its communication and navigation services (https://tasam.org/tr-TR/Icerik/52506/uzay_ekosistemi_ve_guvenligi_calistayi_-_1_sonuc_raporu).

Space mining may alter the issue of the scarcity of resources on Earth at any time. Thus, while space activities contribute to the world's sustainability by offering an alternative to the scarce resources on Earth, sustainability needs to take the necessary measures to ensure that these activities can continue without interruption. Helium-3, which is another valuable element that is likely to be mined on the moon and cannot be obtained on Earth, has the potential to save humanity from seeking energy for the next 1000 years (May, 2022, p. 107).

How will the provisions regarding the liabilities that the business will face due to the creation of space waste be calculated? How will the shares of the parties involved (business, state) in the obligation to insure (insurance costs) assets sent into space be calculated? Which legal regulations will the necessary explanations in the activity reports or integrated reports to determine the risks related to space activities and to minimize these risks be based on? Space Accounting will be the key to finding answers to such questions.

5. The Difference Between Space Accounting and Conventional Accounting

Since space is an area without borders, it can be stated that the economic activities in space will be in a wide range. Space is abstract and infinite. In other words, space is everything beyond Earth. On the other hand, today's accounting standards have focused on preparing and reporting financial statements, depending on the developments in the world's economic field. (Mikail & Aslan 2017). In other words, the accounting principles, standards, and practices we use today have emerged from the necessity of meeting the information needs of third parties regarding the commercial activities carried out within the borders of the world. For this reason, the need for high-quality, global financial reporting standards may arise when we go beyond the world's borders.

Regarding space accounting, new elements can be added to the worldwide financial statement elements. In addition, new cost methods may be needed due to production in a gravity-free environment. In the future, new measurement methods that we do not know and cannot even predict may emerge to meet the economic activities in space. For this reason, space accounting will involve the following and reporting of all economic activities that occur in space, different from the measurement and reporting in conventional accounting. While traditional accounting focuses on commercial activities on the borders of Earth, space accounting goes beyond the world's accounting systems. It requires a broad and futuristic view of space industry issues. The development of space accounting depends entirely on the increase in economic activities in space, new assets, and new financing tools and effects in space law. At this point, it will be understood more clearly that the arrangements within the framework of space accounting are different from today's conventional accounting, depending on the short, medium, and long-term developments in the space ecosystem.

6. Conclusion

There has never been a time in the history of the world when businesses have shown such interest in space activities. We have celebrated relatively minor victories, such as the first moon landing 50 years ago. Today, companies sell tickets for low-orbit commercial flights and dream of colonizing Mars. Although a large part of today's space economy includes satellite and R&D activities, sectors such as space tourism, space mining, and logistics are gaining importance daily. Today, the global space industry emerges as a rapidly growing and shaping area of the high-technology market. It is considered that the global space economy, with a value of 388 billion dollars in 2021, will increase significantly soon, thanks to space mining and space tourism. According to the estimation of economists interested in the space market, the size of the space economy may increase to 2.5 to 3 trillion dollars in the next three years. Of course, accounting will inevitably be at the intersection of all these economic developments and monetary changes. (https://www.businesswire.com/news/home/20220414005509/en/Global-Space-Economy-Market-Analysis-Report-2022-with-Comparisons-of-SpaceX-Astra-Blue-Origin-Relativity-Rocket-Labs-and-Virgin-Orbit---ResearchAndMarkets.com)

Will accounting need to alter much when it deals with outer-space activities? Certainly not, but we will encounter fundamental issues such as how financial reporting should be done, which accounting measurements and valuation methods should be used, and which currency should be used when preparing financial statements. It is necessary, though, especially after discoveries in

space, to investigate and examine the kind of costing models, financial reporting standards, and skills required for accountants if space production is to commence. This is important for space activities to be sustainable.

Due to the structural characteristics of the economic activities in the space industry, today's accounting practices and systems may need to be revised to solve such issues. After all, all legislation and scientific foundations are based on events and needs in today's world. An international accounting authority, including new measurement methods and measurement units, may be required for the healthy and reliable accounting and reporting of activities in space by their true nature. In other words, developing a common accounting language will be necessary to enable similar events to be understood and interpreted similarly.

There will be a need for an expert authority that ensures integrity and uniformity by considering the properties specific to space when providing solutions to critical problems – such as the technological infrastructure, contracts, human resources, currency to be used, valuation methods, international agreements, costing models, auditing, skill sets, taxation, sustainability, and integrated reporting which are assumed to constitute the scope of space.

The International Space Accounting Standards Board can be recommended as the authority that will ensure the activities of the working groups to be formed to closely monitor the economic activities in space and the selection and authorization of the persons to be assigned. In this way, it will be possible for accounting science to follow and analyze more closely the economic developments in space, such as engineering, astronomy, and physical sciences so that the relevant accounting science will be fully established by the time the related field of business starts to operate.

In conclusion, developments in space are changing both the accounting application processes and the skill sets that will be required. Strategies for sustainable space activities will be based on information developed on the mutual interactions between economy and accounting. The primary purpose of space accounting is to present space exploration and economic data together and comparably, aiming at sustainability.

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