

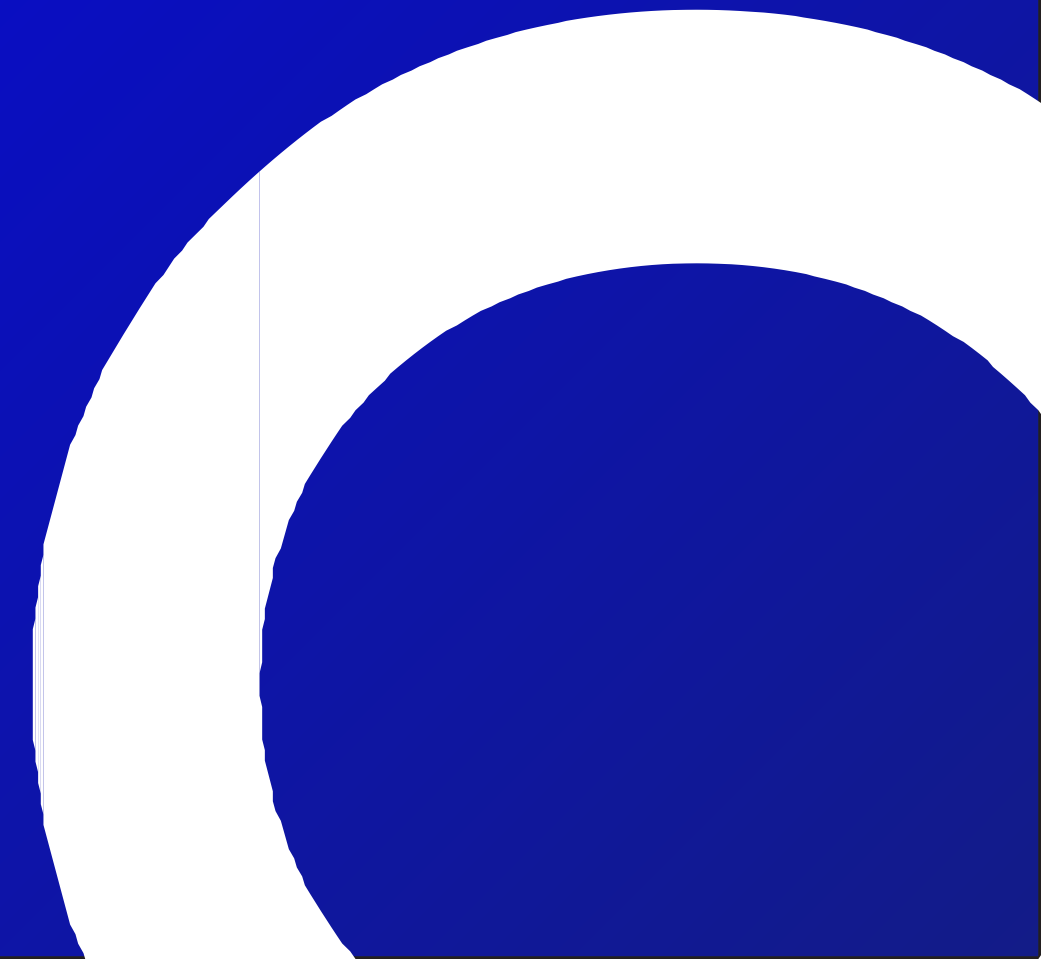


Beyond Earth: The Growing Role of MENA Countries in Space Exploration and Innovation

A whitepaper by  investopia

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INTRODUCTION

The global space economy is believed to have surpassed USD 500 billion in 2023, underlining the significant growth the sector has witnessed in recent years. The emergence of NewSpace, the private space industry, has propelled this growth. This industry comprises private launch companies, small satellite constellations, and suborbital tourism. The emergence of this has resulted in open access to space technologies and services that are increasingly affordable and accessible.

Morgan Stanley estimates that the global space industry will record over USD 1 trillion in revenues by 2040. Analysts likewise predict record-breaking investment in related areas, such as satellite broadband and high-speed product delivery.

While government space programs are still a recent development in the MENA region, countries have started to recognize the space industry as a strategic economic sector for the future. Seven Middle Eastern countries have established space agencies or developed new national space policies since 2015. The MENA region recorded USD 1.4 billion in public investments in the sector in 2023, a figure expected to reach USD 2.7 billion by 2032.

The region is now emerging as a pivotal player in space exploration and innovation, driven by significant investments in space programs, groundbreaking missions such as the UAE's Hope Probe to Mars, and strategic international collaborations. This allows the region to foster technological advancement alongside economic diversification, thus positioning it as a rising force in the global space industry.

Within this rapidly evolving economic landscape, Investopia serves to encourage dialogue between different countries as well as national and international institutions, resulting in partnerships that enable investment and opportunities in the space sector. Recognizing the potential of fast economic growth within the space industry and its strategic importance, Investopia is committed to supporting initiatives that support the shift towards investments and innovation in the industry. By fostering collaborations and encouraging partnerships, Investopia aims to bring together an array of investors, institutional and government bodies, and entrepreneurs to create an investment landscape where developments in the space industry serve as a catalyst for sustainable economic growth.

GROWTH OF SPACE EXPLORATION IN MENA

The MENA region has historically relied on oil and gas revenues as the primary driver of economic growth. However, countries in the region are now prioritizing the diversification of their economies and undergoing an economic transformation to bolster their global presence. This includes pursuing strategic initiatives, such as the development of the space industry in the region.

Countries in the MENA region have recognized the significance of investing in the space industry due to its economic and diplomatic advantages. The growth of this sector can be primarily attributed to governments that have either established new or revitalized existing national space programs. Leading the way in this endeavor are Saudi Arabia and the UAE. In 2020, the UAE made history by launching the Emirates Mars Mission, becoming the first MENA country to reach the Red Planet. Saudi Arabia has also been focusing on investing in satellite technology. Currently, ten countries in the region have space programs, and they are now reassessing their strategies and shifting their focus to developing space technologies within their own borders.

Countries in the MENA region also want to invest in space-related infrastructure, including satellite launch facilities and research centers, such as the Mohammed bin Rashid Space Centre. Some countries have introduced educational initiatives to further encourage long-term local development of the sector. This is expected to result in the development of local talent, ultimately reducing dependence on foreign resources as countries compete in the new frontier of space in the future.

Given the increasing focus on commercial space activities, there is a growing exploration of the potential for satellite communications and other related commercial enterprises, leading to a diversification of investments in the space industry.

The MENA region certainly recognizes the importance of investing in the space sector and its significant socio-economic implications, including job creation, economic diversification, and increased foreign investment.



KEY INITIATIVES AND PARTNERSHIPS

Countries in the MENA region have experienced a surge in the size of their space industry, involving a wide range of activities such as satellite deployments and ambitious interplanetary missions. The UAE launched KhalifaSat in 2018, the first satellite entirely designed by its own nationals, which is used for high-resolution Earth imaging. The Mohammed bin Rashid Space Centre in the UAE is responsible for managing the development and operation of key flagship Earth-observation satellites and advancing space exploration programs, including the Hope Probe. In January 2024, the Centre and NASA revealed that the UAE will be responsible for the “Emirates Airlock”, a crew and science airlock module, for NASA’s new lunar space station.

Saudi Arabia is also involved in the space industry through its own Saudi Space Commission, which has launched satellites for communication and educational purposes. Egypt joined the space race by launching a satellite in 2019 for Earth observation, aimed at supporting environmental and disaster-monitoring efforts in the country.



MOHAMMED BIN RASHID SPACE CENTRE

Countries in the MENA region have collaborated through the Arab Satellite Communications Organization (ArabSat) to provide communications and internet services. The organization recently signed a memorandum of understanding (MoU) with Telesat, a major global satellite operator, to establish a long-term strategic partnership.

Additionally, Saudi Arabia, the UAE, and Bahrain have signed the Artemis Accords with the United States, enabling collaboration with NASA on astronaut training and space exploration technologies. This agreement led to an Emirati astronaut flying to the International Space Station in 2019.

Several MENA countries have engaged with the European Space Agency (ESA) for technical and scientific cooperation on space science and exploration. Notably, Tunisia secured significant funding from the European Union Agency for the Space Programme (EUSPA) for the Urban Development Explorations using Natural Experiments project, which aims to create a virtual laboratory for urban developers using Earth observation data.

Furthermore, MENA countries have initiated collaborations with China in the space sector. For instance, Egypt has agreed to participate in China's International Lunar Research Station mission, while China has committed to investing USD 250 million in a Saudi aerospace manufacturing facility.

These partnerships with international agencies and companies have helped MENA countries accelerate their learning curve in space technology and establish a presence in the competitive space exploration industry. Through these strategic moves, the MENA region aims to carve out a niche for itself in the global space industry, striving for a sustainable and innovative future in space exploration.

ADVANCEMENTS IN SPACE TECHNOLOGY

The MENA region is currently focusing on nurturing local talent and developing local skills. In 2023, the UAE established the National Space Fund with the aim of promoting national infrastructure and enhancing domestic manufacturing abilities. This initiative was funded by an investment of over USD 800 million.

MENA countries are increasingly investing in smaller satellites, such as Nano and CubeSats, for research, educational purposes, and technology demonstration. These smaller satellites are cheaper and more convenient, with a CubeSat being built for as low as USD 100,000 compared to the cost of traditional satellites, which can reach hundreds of millions of dollars. They are quicker to develop and can be used in constellations for comprehensive coverage. Given their low cost of development, they can be easily integrated into training programs, allowing youth in the MENA region to have access to them. This will ultimately result in positive socioeconomic impacts for the region.



Oman has announced the development of Etlaq, the Middle East's first spaceport, which is scheduled to be operational by 2030. The Etlaq Space Launch Complex, overseen by the National Aerospace Services Company (NASCOM), will include three launch complexes capable of handling rockets of different sizes. Its equatorial positioning makes it an attractive location for rocket launches. In addition, efforts are underway in various countries to develop and improve rocket propulsion technologies to support deeper space missions.

Some countries in the MENA region are exploring environmentally friendly propulsion options, such as electric propulsion systems, which can reduce costs and environmental impact. These systems are expected to revolutionize aircraft components, making airplanes more efficient by reducing fuel consumption and emissions. This will also lead to a rethinking of aerodynamic designs by engineers and a focus on developing lightweight materials by manufacturers. Ultimately, new technologies will need to be integrated into aerospace manufacturing, leading to changes in the industry's operations.

Researchers in the MENA region are conducting experiments in microgravity, which is expected to contribute to human health, physics, and other sciences. For example, UAE astronaut Sultan Al Neyadi spent six months in space at the International Space Station conducting around 200 scientific experiments utilizing microgravity, which is weightlessness due to very low gravity.

Advancements in satellite technology and propulsion systems have significantly increased the region's capability to undertake more complex and ambitious space missions, including the exploration of Mars and other deep-space missions. These technological advancements have paved the way for MENA countries to contribute to global scientific knowledge, particularly in areas such as climate change, space sustainability, and planetary science. Furthermore, the local development of space technologies has led to technological independence, the creation of a local aerospace industry, and an increase in educational opportunities.

ECONOMIC OPPORTUNITIES AND CHALLENGES

The growth of the space industry in the MENA region will contribute significantly to job creation, particularly high-skilled jobs. It will act as an economic catalyst, contributing to the economy through direct and indirect channels, ultimately increasing the GDP and diversifying the economy away from the traditional model of natural resources. It is also attracting foreign investment, encouraging global companies to establish operations in the region.

The successful development of the aerospace industry will result in the growth of the manufacturing of advanced technologies. Partnerships with international space agencies and corporations will aid the transfer of cutting-edge technologies to MENA countries. This will not only help develop local capabilities in space technology but also cultivate innovation across other technologically-advanced industries. The adoption and adaptation of space technologies will propel advancements in sectors like telecommunications, navigation, IT hardware and environmental monitoring. The advancements of other technologies will, in turn, bolster key sectors including agriculture, water management and urban planning.

The growth of the space industry will likely mark a shift in strategy for the MENA region, with a diversification of investments across the spectrum of opportunities presented by the growth. In 2023, over 60% of the region's space expenditures, accumulating to USD 895 million, were focused on civil activities. A major portion of this amount was directed towards the areas of telecommunications and Earth observation. While funds will continue to be directed towards these areas, there has also been an increased emphasis on launch programs that provide space access and scientific missions that result in technological and other advancements. As a result, MENA countries have recorded a remarkable 600% rise in public funds allocated to both crewed and uncrewed missions over the past decade.

As the global trend towards the militarization of space continues, countries in the MENA region are strategically increasing their defense budgets. This financial commitment is not only a step towards reducing reliance on foreign nations, but also a testament to the region's determination to develop vital assets that ensure their defense capabilities across land, sea, and air. This escalation reflects a broader regional focus on strengthening security and sovereignty through advanced military technologies, including those deployed in space, instilling a sense of security and confidence in the region's capabilities.

While there is a strong interest in space programs in the MENA region, securing a continuous and sufficient stream of funding remains a challenge for many countries. The high costs of space missions and the need for advanced technology underscore the importance of sustained investment. However, balancing budgetary allocations between space programs and other national priorities may pose a challenge in the future, highlighting the need for strategic financial planning.

Significant capital and technological expertise are crucial for developing the infrastructure for space exploration. Any delay in this development will have a knock-on effect on space missions. The urgency and necessity of developing native capabilities in areas like satellite manufacturing, propulsion systems, and mission planning cannot be overstated. These capabilities are not only critical for long-term sustainability and independence, but also for the region's competitiveness in the global space industry.

Establishing a comprehensive space policy and regulatory framework is essential for the growth of the space industry in the MENA region. These frameworks need to address a spectrum of issues including space debris management, frequency allocations, and licensing of space activities. Developing these policies can be a complex, long drawn-out process that requires alignment with international frameworks.

GLOBAL DIPLOMACY

The MENA region is increasingly becoming a hub for space activities, and it will be crucial for countries in the region to focus on building global collaborations as they reconsider their space strategies. These partnerships not only provide access to advanced technologies and expertise but also promote mutual understanding and peace among participating nations. By working together, countries can pool global resources, reduce mission costs, and increase scientific and technological outputs. Diplomacy in the space industry is also important to align MENA countries with international policies and practices, ensuring that their space programs meet global standards and contribute to shared objectives such as space safety and sustainability.

One of the most notable partnerships in the region is the collaboration between the UAE and NASA, which has involved the training of Emirati astronauts at NASA facilities and their participation in missions aboard the International Space Station (ISS). This collaboration also extends to research and Mars exploration, particularly with the Emirates Mars Mission (Hope Probe).

Saudi Arabia has engaged with Roscosmos, the Russian space agency, resulting in sending Saudi astronauts to the ISS and collaborations on satellite technology.

The MENA space industry has significant potential for future collaborations, involving both existing and emerging space-faring nations. There is room for more partnerships focusing on specific space missions, such as planetary exploration, asteroid mining, and space science experiments, which could benefit from shared financing, technology, and expertise.

Furthermore, there is growing interest in commercial space activities, including satellite launches, space tourism, and telecommunications. Partnerships with private companies like SpaceX, Blue Origin, and others could accelerate the development of commercial space capabilities in the MENA region. Collaborations with international universities and research institutions could also provide MENA students and professionals with opportunities to gain advanced knowledge and skills in space science and technology.



THE FUTURE OF SPACE EXPLORATION IN MENA

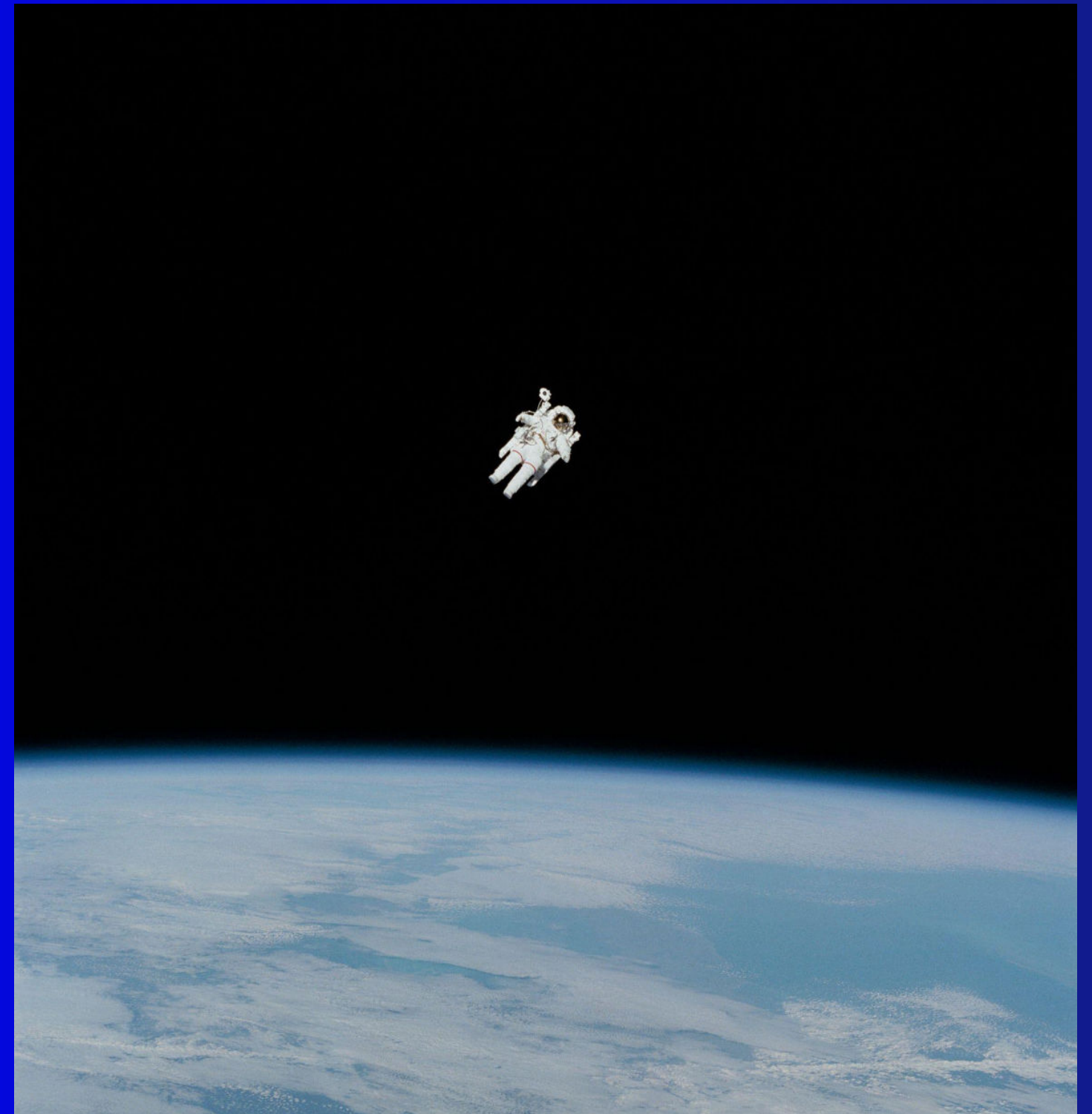
The MENA region is projected to expand its space capabilities by developing more advanced satellites, propulsion technologies, and possibly human spaceflight programs. This expansion is expected to involve establishing comprehensive space infrastructures, including ground stations, research labs, and assembly facilities.

Space expenditures in the Middle East alone are expected to increase by 92% over the next ten years.

The space tourism segment is also expected to experience significant growth in the coming years, with many countries conducting market and feasibility studies. Space tourism facilities may be integrated into future airports and infrastructure development plans. Moreover, space hotels may become a feature in the tourism industry, integrating space exploration with tourism and making the space industry a part of individual citizens' lives. As an example, Abu Dhabi's Aabar Investment Group has already made a substantial investment in Virgin Galactic, which offers regular commercial sub-orbital flights.

As the space industry grows, it will also lead to the integration of AI into aerospace manufacturing, enhancing efficiency, productivity, and contributing to advancements in design, safety, and overall innovation within the aerospace sector. Additionally, the industry is likely to witness the emergence of new startups.

The expected growth of the space industry is likely to attract foreign commercial space entities from North America, Asia, and Europe, as they all seek to gain stakes in the growing market.



CONCLUSION

The strategic location of the MENA region has not only made it a trade and logistics hub but also holds the promise of becoming a space hub in the future by facilitating global connectivity between different regions. The region is currently undergoing an unprecedented economic transformation, and the space industry is expected to play a significant role in this transformation, with revenues projected to increase exponentially until 2032.

Global collaboration and diplomacy are essential for the MENA region to advance its space exploration and innovation strategy. By forming successful partnerships and exploring new collaborative opportunities, MENA countries can enhance their technological capabilities, foster international goodwill, and establish themselves as significant contributors to the global space sector.

The investment potential for achieving more accessible and affordable entry into outer space could be substantial, offering opportunities in areas such as satellite broadband, rapid product delivery, and potential human space travel. Developing the necessary infrastructure for space exploration, such as launch facilities, research centers, and training facilities, requires significant capital and technological expertise.



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