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Weekly Brief

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Space: The Final Frontier

Business leaders have their work cut out for them as they navigate the incredible advances in artificial intelligence and a whole host of other fast-evolving changes.

And that's just here on earth.

It's also time to get used to the idea of a space economy. For CEOs, space offers a new frontier in innovation and sources of value. It's important for all business leaders to get smart about how much they depend on space already (think GPS and connectivity) and to get moving on the potential benefits ahead. The commercialization of space is lowering barriers to entry and providing companies with powerful opportunities in communication, observation, and location.

I recently chatted with my colleague Troy Thomas, who leads BCG's space topic, about the space economy, its potential for growth, and the challenges ahead.

To Boldly Go…

Opportunities in satellite services offer huge potential for industrial goods companies through precise communication, navigation, and earth imagery. Satellites can provide data-driven insights, enhance operations, help with sustainability goals, and unlock significant value.

Troy and his team estimate that some industrial goods companies can see up to a 15% increase in gross profit margins, 25% revenue increase, 10% decrease in operating costs, and 10% reduction in fuel within one year of rolling out integrated space-based services.

There's a broad range of industries that can benefit, including

agriculture, aviation, automotive, logistics, energy, mining, and construction. Logistics companies could reap benefits from fleet management, equipment monitoring, and autonomous operations, leading to improvements in productivity and reductions in cost. Long-haul trucking can use satellites to enhance smart navigation and optimize routes, increasing efficiency and cutting back on fuel.

John Deere is a great example of an organization digging into these opportunities. The company recently announced one of the largest ever satellite communications partnerships, with SpaceX's Starlink. Satellite connectivity will further transform smart agriculture for John Deere, enabling automated planting and harvesting in remote locations that lack internet service.
Volkswagen Group is another interesting example. The company has partnered with Germany's Isar Aerospace to use satellite connectivity for self-driving cars.

Make It So

The space sector is expected to have a market value of more than $1 trillion by 2040. That growth will come primarily from four areas of digital and advanced manufacturing:

- **Small satellite manufacturing**, with commercial, cost-effective, off-the-shelf components that increase affordability and advances such as the use of ceramic composites, which reduce weight and protect satellites from radiation
- **Payload modernization**, with new software-defined sensors, high throughput transponders, and on-orbit processing of data powered by AI
- **Faster connectivity**, with high-speed downlink radios and relays and laser-based communications among satellites, forming a smart, global, ultra-high-speed network that connects with terrestrial 5G
- **Next-generation launch capabilities**, such as fully reusable launch vehicles, satellite "ride shares" to reduce costs, commercial spaceports, and "green" propellants

Essentials to Live Long and Prosper

The commercialization of space comes with increased congestion, and there have been numerous close calls involving debris, satellites, and spacecraft—even crewed space stations. The likelihood of collisions will continue to grow. There are right now about 4,400 satellites in different "orbital bins," and it's estimated

there will be thousands more by 2030. The increased debris from spacecraft is particularly hazardous, with more than 30,000 such objects currently being tracked and moving at speeds of up to 29,000 km/hour.

To manage the risk of collision, government and industry will need to work together to advance technologies in space environment management, ensuring safe and sustainable space operations.

I can't write about space without also mentioning geopolitical competition. As space grows in business importance, it's also growing in strategic military importance. A key challenge of our time is ensuring the sustainable development of the space domain while seeking to avoid conflicts that extend into space.

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As we focus on the commercial opportunities in space, the promise of space exploration still looms large. The James Webb Space Telescope, the recent return to the moon, and other success stories ignite the imagination and provide enormous scientific value.

As someone who grew up with Isaac Asimov, Arthur C. Clarke, and *Star Trek*, it's been remarkable to see the concept of space move from the realms of science fiction and science to a much more everyday reality for business. We'll need to see collaboration in order to advance a responsible and sustainable space economy, but the opportunities for businesses to create value and competitive advantage—on earth and beyond—will skyrocket.

Until next time,

Rich Lesser
Global Chair

Further Reading

Space Sector Consulting and Strategy

BCG's space sector consulting experts can advise and support clients across industries to achieve their commercial space goals.

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Strategies for Space Agency Success in a Commercial Era

Private sector players now launch rockets, operate satellites, and offer other services once handled exclusively by governments. Space agencies need a plan to work with this growing industry.

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Herding Rockets: Improved Space Traffic Management Will Accelerate Industry Growth

Sustainable growth of the space economy will depend on a market ecosystem that incentivizes the development of space traffic management technologies.

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