

STATE OF THE MARKET 2024

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Solving the world's productivity problem through space

BY BOGDAN GOGULAN. CEO AND MANAGING PARTNER AT NEWSPACE CAPITAL

istorically, headlines related to the deep space sector (referred to herein simply as "space") have focused on rockets, exploration and space tourism. However newsworthy, these have distracted the

general public and investor community from the momentous transformation space has enabled within agriculture, transportation, mining, energy, communication and finance. As the impact of digital transformation on the efficiency of the global economy winds down, space provides an opportunity for returning to higher productivity growth. The last few quarters of data confirm that we are at the beginning of a space technology supercycle and signal a long-term growth trend in the industry and increased prominence.

The productivity conundrum

Global Financial Crisis ("GFC"), the world was awash with liquidity. The world's ten largest central banks nearly doubled the money supply (also referred to as M2)¹ in their efforts to support financial markets, employment, consumer confidence and corporate investments.

However, excess liquidity turns into inflation if the additional money supply is not used to invest in increasing productivity. Productive investments made have been to \$1.6 quintillion in assets. too few in number. As McKinsey's Future of Wealth2 study shows, net investment in advanced economies has been declining as a share of GDP. In the 2010s, this ratio was roughly 50% lower than before the GFC in Europe, and 40% lower in the US. Growth in capital stock per worker dropped to its lowest rate in the post-World War II period. The world went down the path of substituting productive investments for quick speculative returns.

This lack of productive investment resulted in a shortage of new efficiency-enhancing technologies just as the marginal productivity gains from the digital transformation of the 1990s wound down. As a result, both labour and total factor productivity ("TFP") started falling. The 2010s became the decade of lost Efficiency of space infrastructure productivity. In the US, labour productivity fell from the long-term trending annual growth rate of 2.2% to an average of 1.4%, and among G7 countries, it fell from 1.8% per year in 1980-2000 to 0.8% in 2000-2018.3 In the UK and some EU countries (for example, Spain and Italy), the TFP is now negative.⁴

Deceleration of productivity translated into slower real GDP growth. For example, in 2008, European and UK economies, with their poor productivity record, boasted a marginally larger economy than the US, at \$16.2 trillion versus \$14.7 trillion. They are now almost one-third smaller than the US. If you take the UK out of that equation, the EU is now 50% smaller, putting European hopes of 'strategic autonomy' some way off.5

Given that all the extra liquidity failed During the decade following the 2008 to generate productive investment and translate into accelerated productivity and real growth, the global balance sheet (debt and asset prices) expanded much faster than **GDP**. As the McKinsey report points out, by 2021, asset price inflation created about \$160 trillion in "paper wealth". Valuations of assets like equity and real estate grew faster than real economic output. Hence, every \$1 in net investment generated \$1.90 in net new debt. In aggregate, the global balance sheet grew 1.3x faster than GDP, quadrupling since 2000

> It was just a matter of time before a trigger pushed the world into inflation's bearhug. COVID-19 played a role in creating an external shock, disrupting supply chains, leading to spiralling inflation and levels we have not seen since the 1980s. The energy supply shock that followed made matters worse

> The global economy now faces a real challenge of boosting long-term growth, driving job creation, and normalising the global balance sheet, all while mitigating the climate crisis. McKinsey concludes that the only way of solving this is through higher investment in the acceleration of productivity.

Though its name might suggest otherwise, the space sector is bound to life on Earth. Some of its innovations are visible: wireless headphones, cushioned sneakers and smartphone cameras began life in the space sector; most of them are not. Space remains a force that is largely unseen, one that drives progress in an increasing number of ways. For this reason, **space investment and** innovation have a catalysing effect: progress here translates to progress in all the sectors space touches.

It can significantly increase the impact of financial capital by providing **cheaper**, more flexible and efficient infrastructure for the global economy, accelerating the fusion of technologies and enhancing the efficiency of traditional industries through new products and services. In fact, in the UK, the space sector alone underpins approximately 18% of economic activity.6

Now taken for granted and considered a basic part of modern navigation, we have the space sector to thank for the accurate location tracking which supports logistics, autonomous vehicles, 5G and more. We have space to thank for precision farming, which improves yields, irrigation management and sustainable farming in the agricultural sector. Around 40% of the global population, approximately three billion people,⁷ work in that sector and further innovation is necessary given that it will become increasingly harder to feed the world's growing population.

Space gives us the high-quality imagery essential for tracking climate events such as wildfires, floods and leaks of noxious greenhouse gas emissions, empowering companies and governments to take action to reduce global warming and improve the resilience of infrastructure. The space ecosystem is the reason why we have unjammable, undetectable and undisruptable laser telecommunications capable of transmitting massive amounts of data, enhancing global connectivity. Innovation in space also has positive implications in medicine, computing,

the miniaturisation of consumer goods, materials and many more essential sectors.

There is another important factor in the growth of the space industry: its high added value and resource efficiency in comparison to the economic benefit it creates. Rather than "growth at all costs", the space industry helps to fuel more sustainable economic **growth** at a time when natural capital costs are moving from the realm of policy debate into the companies' balance sheets. Unlike terrestrial infrastructure, space tech does not require wired infrastructure (which has a large carbon footprint) or land, and is not as costly to install, update and maintain. In what Antonio Guterres has called "the era of global boiling",⁸ productivity must be considered in light of the climate challenge.

grids and upgrades Smart to infrastructure, which will be necessary to incorporate new forms of renewable energy, are underpinned by space tech. ESG reporting and carbon credits are made more reliable by space tech. Measuring the environmental impact of heavy industry, such as mining, and assessing the quantity of emissions released by complex supply chains are made possible by space tech. It is not too bold to say that countries' net-zero ambitions and the fulfilment of the Global Methane Pledge depend on the continued growth of the space sector. Already, sluggish growth is posing a threat to the ability of countries to keep to their climate commitments.9 Space can help us solve the productivity problem now and well into the future.

A 2022 Globant study¹⁰ estimates that satellite-enabled technologies from three sectors alone (agriculture, transportation and energy) contribute to the removal of 1.5bn gigatonnes of CO2, the annual equivalent to all activities in the UK, France and Germany **combined.** This could be approximately 6x higher today if the technology was more widely adopted. If satellite technologies are fully deployed across the agriculture, transportation and energy sectors before 2030 and emerging satellite technologies are fully adopted before 2040, we could reach net zero as early as 2040 - 10 years early.

Therefore, the impact of the space industry is not limited to one technology or sector. It has many applications, from enabling precision agriculture and autonomous vehicles, to more efficient supply chain investor returns on the way. management and advancements in material science. It generates new manufacturing techniques and propagates advancements through fusion of technologies. It provides more efficient infrastructure that makes existing products cheaper and better, while enabling new products that increase productivity across the economy. This impact of space explains why, for example, in the

UK, 64% of corporate investment into the space sector comes from non-aerospace and defence companies.¹¹

Growth in the sector

The good news is that the space ecosystem is experiencing rapid growth even in the current slowdown. This can be seen in just one standard of measurement: the year-onyear increase in the speed of communications and connectivity between ground and space. With every passing year, the data gathered by satellites and made usable on Earth gets closer to real time. In 2023, the bandwidth reached 48 terabits per second; in 2021, it was 2.7 terabits¹² – that's an increase of 1,678%. It is not surprising that Morgan Stanley predicts that the revenue generated by the global space industry could hit \$1 trillion by 2040,¹³ from \$450 billion in January 2023.¹⁴

Owing to the growing recognition of the importance of space for productivity, both private and public funding is now starting to flow liberally into the sector, freeing its thinkers and doers to undertake research and development, "fail fast" and scale. These investments are not concentrated in the US. In fact, in 2023, Europe overtook the US in investment for the first time ever, which signals a clear intention from European governments and investors to provide a boost to the sector. Although the US will surely reclaim first place in the years to come, it is now indisputable that Europe is a major player in the new space race. After India's successful lunar landing,15 as well as the launch of Japan's own Moon mission¹⁶ (both in September 2023), worldwide interest in the space sector will continue to grow, leading to positive effects for productivity everywhere.

The world's new back office

A key takeaway is that space is establishing itself as the new "back office" of the global economy, effectively turning every company into a space company. That means that we all have good reason for wanting the sector to flourish. For that to happen, however, it needs investment. Investment that will allow the full potential of existing and emerging space technologies to be felt. From telecommunications to transportation, from agriculture to energy, from mining to finance, space can have a major impact; it already has. Hence, space holds the key to solving the productivity problem, while creating a more sustainable world and offering attractive 5. Financial Times, "Europe has fallen behind America and the gap is growing", by Gideon Rachman (June 2023)

6. PwC Strategy& UK in association with UK Space Agency, Expanding frontiers: The down to earth guide to investing in space (May 2023)

7. According to the World Bank

8. According to the Guardian article, "Era of global boiling has arrived, says UN chief as July set to be the hottest month on record," published on 27 July 2023. Antonio Guterres gave a speech in a press conference in July 2023, after scientists confirmed that July 2023 was on track to be the hottest month ever recorded

9. According to the Washington Post article, Europe blinks in its commitment to a green transition, published on 6 August 2023

10. Immarsat, "Can space help save the planet?" (2022) 11. PwC Strategy& UK in association with UK Space Agency, Expanding frontiers: The down to earth guide to investing in space (May 2023)

12. Jason Rainbow, "Connecting the Dots | SES-Intelsat merger would face uphill regulatory struggle", Spacenews (25 April 2023)

13. Morgan Stanley, Space: Investing in the Final Frontier (July 2020)

14. McKinsey & Company, A giant leap for the space industry (19 January 2023)

15. "India's historic Moon landing", World Economic Forum, (11 September 2023)

16. "Moon Sniper: Japan launches Slim probe on precision landing mission", Guardian (7 September 2023)



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^{1.} M2 is a measure of the money supply that includes cash, checking deposits and other types of deposits that are readily convertible

^{2.} McKinsey Global Institute, The future of wealth and growth hangs in the balance (May 2023)

^{3.} McKinsey Global Institute, Rekindling US productivity for a new era (16 February 2023)

^{4.} G. Calcagnini, G. Giombini & G. Travaglini, "The Productivity Gap Among Major European Countries, USA and Japan", Ital Écon J 7, pp.59–78 (2021)