



Disruption Bytes

Quantum GDP, LEOs latest and metaverse safety

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Disruptive Technology

Global

- ◆ **Future of quantum:** Is quantum computing good or bad for growth? And quantum network applications begin...
- ◆ **LEOs latest:** Will bigger LEO rockets launch soon? Another company announces plans for services
- ◆ **Metaverse safety:** How to make the metaverse safe for the next generation...

In this update, we look at some recent developments within HSBC's Disruptive Technology theme and any potential implications investors should note.

Future of Quantum... In the long run, new technologies typically create new opportunities, new efficiencies and refresh how industries function. However, in the short term, the introduction of a disruptive technology can slow growth, due to it taking time to be fully implemented seamlessly into operations.

We look at a report which suggests quantum computing could indeed have a positive impact on global growth in 15-30 years but might slow down GDP growth in the short term. We also highlight new partnerships being forged with quantum networks today between telcos, banks, and cloud services providers.

LEOs latest... To make space-based internet a scalable reality, larger, reusable rockets are part of the equation to make the economics viable. We take a look at the current LEO space and its recent activities. We also look at another LEO company seeking to launch satellites over the coming few years, focused on enterprise customers.

Metaverse safety... For the metaverse to take off and go mainstream, it will be vital to have the support of the younger generation. We look at what one of the metaverse leaders is doing to make it easier to permit younger users into the metaverse. We also look at what regulators are working on to make the next generation safe in the metaverse too.

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The future of quantum computers

Will quantum computing negatively impact GDP...?

QC's transformative promise may deliver a short-term hit to GDP first

In July 2023, *The Times* reported that quantum computers could initially slow down GDP before an uplift occurs. Citing a paper published in *Nature*, *The Times* said that quantum computers could result in a USD310bn annual hit to GDP in the United States because of productivity losses that companies face in adapting to this technology. Nevertheless, *The Times* article also highlights the fact that over the next 15-30 years quantum computers could create USD850bn in global economic value.

Just as classical computers did in the 1970's and 1980's

The paper cites the introduction of classical computers in the 1970's and the 1980's whereby for 15 years classical computers slowed productivity growth by 0.76% per year because companies had to invest in new equipment and adapt their workforce to use the new technology¹.

Quantum secure networks begin...

In 2021 Toshiba and BT partnered to build a quantum-secured metro network

In a previous report, we discussed the BT and Toshiba partnership to build the world's first quantum-secured metro network between the London Docklands, through the City of London, and the M4 corridor – offering QKD (quantum key distribution) and PQC (post-quantum cryptography).

The network has now announced its first banking partnership

In July 2023, HSBC announced that it would become the first bank to join the network, working in collaboration with Amazon Web Services (AWS). HSBC is trialling the quantum secure transmission of data between the HSBC's global HQ in Canary Wharf and a data centre in Berkshire (62km away). The QKD works by using particles of light and quantum physics properties to deliver secret keys between parties, which can then be used to encrypt and decrypt sensitive data in a way that is secure from quantum computer-based cyber-attacks.

Banks are already partnering with QC companies to develop use cases

One month earlier in June 2023, HSBC announced a partnership with Quantinuum, which will focus on cybersecurity, fraud detection, and natural language processing. According to the Quantinuum press release, the partnership will begin by demonstrating QC-hardened cryptographic keys to encrypt data, as well as PQC algorithms to protect against future QC-based cyber-attacks. The second part of the partnership will be built around developing QML (quantum machine learning) and QNLP (quantum natural language processing) for bank use cases, such as fraud detection².

¹ Quantum computers 'to hit GDP before uplift', *The Times*, 24 July 2023

² HSBC and Quantinuum Explore Real World Use Cases of Quantum Computing in Financial Services, Quantinuum, 30 May 2023

LEOs latest

SpaceX Starship explosion report submitted to the FAA

SpaceX Starship set for next launch...

On 20 April 2023, SpaceX's Starship rocket had a successful launch before being forced to self-destruct four minutes into the mission. Because of the explosion and the damage to the launch site it was estimated that it could take months for SpaceX to launch its next Starship mission. In August 2023, SpaceX submitted its report into the explosion to the Federal Aviation Administration (FAA). The FAA will now examine the report and identify corrective actions for SpaceX to take before a re-launch. In anticipation, SpaceX has begun to take corrective measures, such as installing a water deluge system underneath the launch mount to help sustain the power of the launch stage³.

Ambitious timelines?

It had initially been reported that SpaceX could be targeting a 31 August 2023 launch from Texas. The announcement came not from SpaceX but from the US Coast Guard, which put out a warning that "rocket launching activities may impact navigation interests" on that date. Nevertheless, given the regulatory requirements likely to be imposed on SpaceX following the submission of their report, this always seemed to us to be an ambitious timeline. Elon Musk has revealed that whenever the launch occurs, he thinks there is a roughly 50% chance that the Starship will reach orbital velocity⁴.

Starship is a key strategic leap forward for SpaceX

The reason the Starship is such an important next step for SpaceX is that it takes the launch capacity to >400 satellites per launch compared to the 60 that the Falcon 9 can carry today, according to SpaceX's President and COO⁵.

Telesat have a new supplier for their network, saving them USD2bn

Telesat to roll out network in 2026...

Recently, we took a deep dive into SpaceX, OneWeb, and Amazon. However, they are far from the only companies operating in low earth orbit (LEO). Canadian satellite communications company Telesat announced in August 2023 that they had changed suppliers for their global internet network – moving to listed Canadian space company MDA (previously using Thales Alenia Space) – which is set to result in a total capital cost saving of cUSD2bn⁶. According to CNBC, Telesat estimates the Lightspeed satellites will begin to launch in mid-2026 with a full network of 198 satellites (though the global service will be able to be rolled out when 156 satellites are in low earth orbit)⁷.

Telesat is targeting enterprise clients rather than direct-to-consumer

Telesat's CEO has previously announced that Telesat will not compete with Starlink and Kuiper via direct-to-consumer connectivity. Instead, they are to focus on enterprise customers, such as cruise ships, airlines, and rural municipalities⁸. The company has also announced an additional USD2bn in funding from the Canadian government (Federal and Provincial), with the government expected to be an anchor customer for Telesat⁹.

The company now plans to launch in mid-2026 and roll out services in late 2027

Telesat had initially planned to roll out 298 satellites in 2020 and commercial services in 2021, however, Thales Alenia Space suffered from pandemic-related supply chain problems, which led to delays and a reduction to a 198-satellite constellation. Telesat's CEO expects 156 satellites to be in orbit by late 2027 and global services to be rolled out at that stage¹⁰.

³ SpaceX submits Starship mishap report to the FAA, Space.com, 16 August 2023

⁴ Next SpaceX Starship launch from Texas targeting no earlier than late August, mariner warnings show, Yahoo News, 16 August 2023

⁵ SpaceX adding capabilities to Starlink internet satellites, plans to launch them with Starship, CNBC, 19 August 2021

⁶ Telesat Contracts MDA as Prime Satellite Manufacturer for Its Advanced Telesat Lightspeed Low Earth Orbit Constellation, Telesat, 11 August 2023

⁷ Telesat stock surges 50% after satellite internet company swaps suppliers to save \$2 billion, CNBC, 11 August 2023

⁸ Telesat to build a \$5 billion global satellite network to bring fiber-like internet to businesses, CNBC, 9 February 2021

⁹ Canada's Telesat to get 198 communication satellites for low-Earth orbit, Yahoo News, 11 August 2023

¹⁰ Telesat's initial LEO constellation fully funded after manufacturer switch, SpaceNews, 11 August 2023

Why is safety the key for the future of the metaverse?

Younger metaverse users

Meta plan to allow 10-year-olds to use their VR headsets

In June 2023, Meta announced their plan to lower the recommended age for using their Quest headsets, dropping it from thirteen to ten years old. Parental approval would be required to create an account, with only age-appropriate apps and content to be made available¹¹. As with all digital technologies, this naturally presents questions about online safety and data privacy.

...Meta previously lowered the age limit for the VR social metaverse – Horizon Worlds

This is not the first time Meta have lowered the age at which young people can access the metaverse; in April 2023, Meta announced they would allow under-18's to use Horizon Worlds – Meta's VR social metaverse – setting a lower limit of >13 years old¹². The announcement comes amid calls from Congress and regulators to enhance privacy and safety protection for children online, including proposals to ban children under 13 years old from accessing social media¹³.

It is hoped that the move will encourage more age-appropriate content

According to *The Verge*¹⁴, Meta are making the move as research shows kids want to use VR headsets and Meta also want to avoid encouraging children to lie about their age in order to access metaverse content. Meta hope that lowering the age to 10 years old will allow the company to provide them with age-appropriate content and allow the company to avoid litigation, such as the 2022 FTC (Federal Trade Commission) lawsuit against Epic Games for breaching online privacy protection laws for children and having a purchasing setup that allowed them to make in-app purchases by accident¹⁵.

Concerns over online safety are rising...

The US government is exploring the link between mental health and social media

In May 2023, the US Surgeon General issued a public warning over the social media risks to young people's mental health and well-being. The report recommended that social media companies enforce minimum age limits and set up default settings with the highest safety and privacy standards. It recommended the government set up age-appropriate health and safety standards for tech platforms¹⁶.

Some estimates show Gen Alpha could spend 10 years of their life in the metaverse

Research from the UK-based Institution of Engineering and Technology (IET) shows that the next generation will spend c10 years of their lives in virtual reality – the equivalent of 2hrs 45mins per day. Strikingly, 62% of parents of children aged 5-10 do not understand the metaverse, and so this could mean that parents may find it difficult to safeguard their children in the metaverse. The IET report showed that 21% of children aged 5-10 years old already have a VR headset or have asked for one, with an additional 15% having tried VR¹⁷. 66% of all children have now used VR, with 25% doing so on a weekly basis¹⁸.

As a result, UK lawmakers are acting to regulate metaverse content

Given the recent rise in concerns over online safety, UK lawmakers have made it clear that the Online Safety Bill, which is nearing the final stages of approval, will apply to the metaverse as well. The CEO of Ofcom (UK's communications regulators) has said that "VR experiences are very immersive and the degree of harm that can be created is much more intense"¹⁹.

¹¹ Meta is lowering the minimum age for the Quest to 10 years old, *The Verge*, 16 June 2023

¹² Meta to Lower Age for Users of Virtual Reality Headset to 10 From 13, *The New York Times*, 16 June 2023

¹³ Congress is flooded with bills for childproofing the internet, *The Verge*, 5 May 2023

¹⁴ Meta is lowering the minimum age for the Quest to 10 years old, *The Verge*, 16 June 2023

¹⁵ Epic Games reaches \$520 million FTC settlement over Fortnite privacy violations, unintended purchases, *The Verge*, 19 December 2022

¹⁶ Surgeon General Warns That Social Media May Harm Children and Adolescents, *The New York Times*, 23 May 2023

¹⁷ Children likely to spend 10 years of their lives in VR metaverse, study suggests, *Engineering and Technology*, 20 April 2022

¹⁸ Gen A spending more time online, than offline, new IET research reveals, *IET*, 8 June 2023

¹⁹ UK's New Online Safety Bill Applies to the Metaverse, *Lawmakers Agree*, *CoinDesk*, 13 July 2023

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