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Disruptive Technology
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The 5G World

Impact on trade and beyond

5G is set to revolutionise both physical and digital trade flows with the advent of faster and wider reaching connectivity…

…potentially disrupting industries and altering existing supply chains in both EM and DM

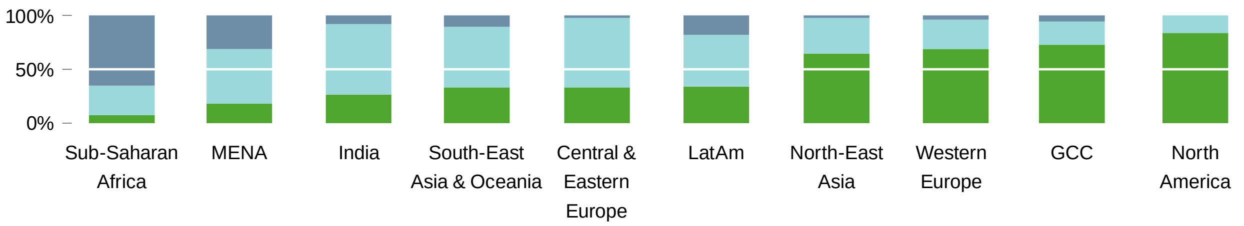
We examine how 5G can disrupt global trade and its impact on key sectors of the economy, with a look at ESG implications

This is an abridged version of a report by the same title published on 24-Aug-21. Please contact your HSBC representative or email AskResearch@hsbc.com for more information.

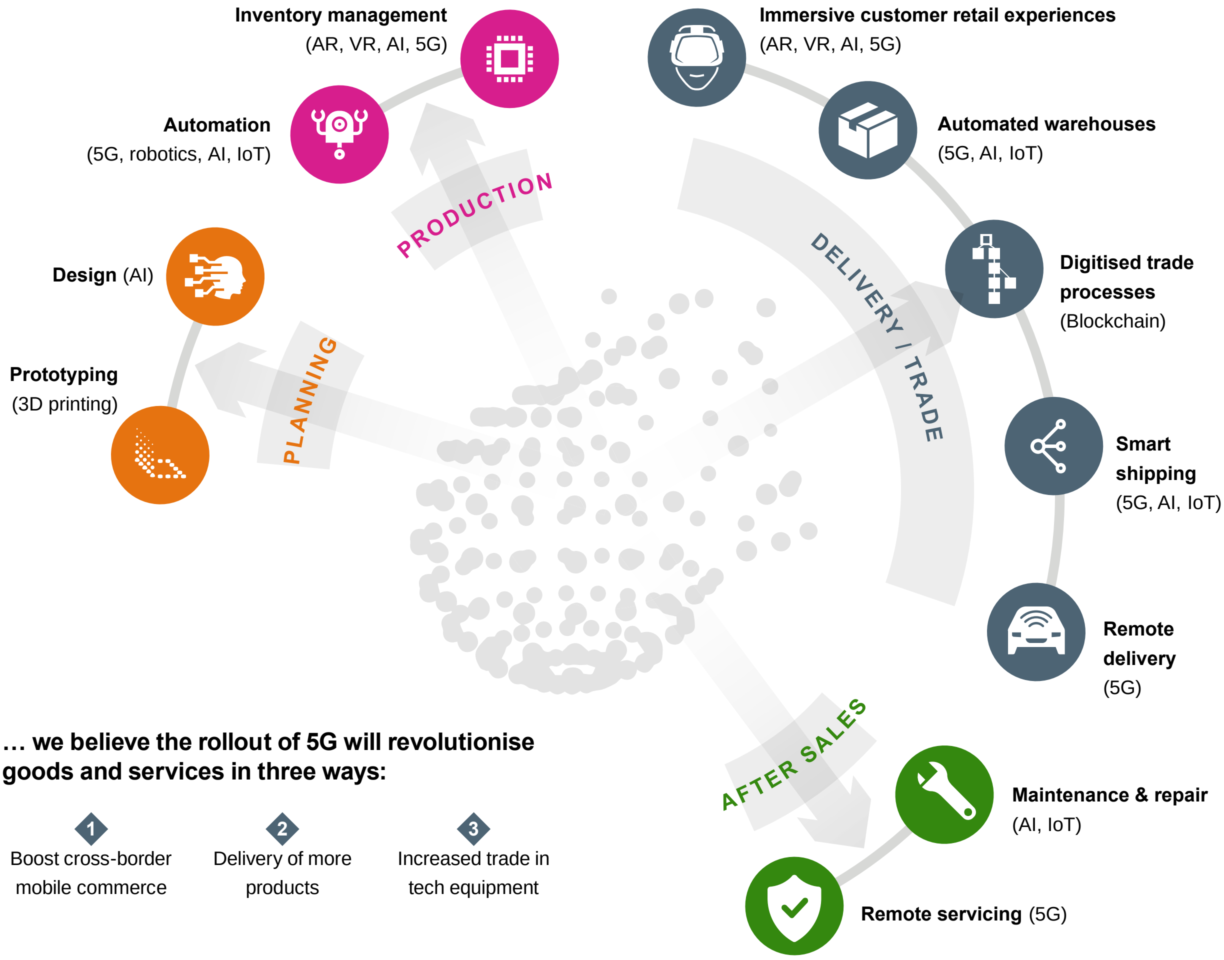
Disruptive technology and global trade

5G mobile subscriptions look set to rise significantly by 2026 …

Mobile subscriptions by region and network



… with applications disrupting industries and altering existing supply chains …



… we believe the rollout of 5G will revolutionise goods and services in three ways:

1. Boost cross-border mobile commerce
2. Delivery of more products
3. Increased trade in tech equipment

c961,000
Number of 5G base stations in China as of the end of 1H21 (around 70% of total market) with 283 million network users

USD156trn
Estimated global cross-border payment flows in 2022e (EY)

USD4.5trn
Estimated global m-commerce sales by 2024e – nearly 70% of total retail e-commerce sales (eMarketer)

Source: Ericsson Mobility Report June 2021, EY, eMarketer, HSBC

Impact of 5G on trade

- 5G is set to revolutionise goods and services trade in the coming years…
- …by spurring trade in tech components and enabling more goods and services to be traded digitally across borders
- We examine the implications of 5G for global trade and how the technology might be used in key sectors

What's in this note?

5G: Trade disruption and sector level perspectives

Trade will look very different in the future from how it does today. Various digital technologies are already playing an important role in global trade, from digitising trade documents to enabling greater cross-border e-commerce. And looking ahead, the role of tech in trade is only likely to expand. Key disruptive technologies could impact future trade flows. In this note, we take a look at how the advent of 5G could disrupt global trade, as well as specific sectoral applications ranging from autos to healthcare to retail and the ESG implications.

What is 5G?

5G is the fifth generation of mobile telephony that is currently being rolled out globally. It will offer a combination of:

- Faster connectivity speeds than 4G
- Ultra-reliable and low latency
- Greater bandwidth

These factors should help to enable cross-border transactions to happen more quickly and more products to be delivered digitally. Although in many instances 4G and wifi connections are sufficient to support standard e-commerce, 5G could help facilitate better connectivity via mobile phones and make it easier for consumers to shop online and from abroad. It could also help to take consumer shopping experiences to the next level.

Table 1 provides a summary of sectoral applications of 5G.

1. Summary of sector applications of 5G

Sector	Summary of 5G applications
Automotive	Support vehicle to vehicle (V2V) communication by accommodating an increased number of sensors and data. Key for over-the-air (OTA) updates and will enable vehicles to be constantly connected with their fleet management platforms. Will also enable customers to quickly access data (e.g. streaming movies, attend Zoom meetings) through their in-car interface.
Aviation	Help to provide secure, real-time, predictive and historical views of airport operations, which could improve collaboration for example between airports and airlines, and enable pro-active maintenance, quicker aircraft turn-around, and an improved customer experience. 5G-connected AI could help match passengers to their bags or use facial recognition to smooth movement through security controls.
Banks	Help to enhance the customer experience (e.g. via virtual banking assistants), increase the size and frequency of semi-automated retail payments, enable quicker trading of retail securities, and improve fraud detection and security.
Building materials	Help to accelerate adoption of wireless connection of building automation systems with key building functions like HVAC, lighting, security, and elevators in commercial buildings, and could drive faster adoption of connected devices in homes.
Consumer staples	Enable visual or interactive consumer experiences (e.g. through tutorials and virtual try-on apps).
Esports and gaming	Could help to support the adoption of cloud gaming, which will enable consumers to stream games on the go.
European Chemicals	Enable chemical manufacturers to develop new high-tech processes, support information flow between different product ranges, and make use of Internet of Things applications, virtual and augmented reality and AI.
Healthcare services	Facilitate real time monitoring that can take place remotely (e.g. telemedicine or intra-hospital monitoring), support better image quality and fast transmission of medical data, enable the development of medical AI, support specialist diagnostic and testing, and enable remote surgery and teaching.
Industrials	Enable enterprises to be better connected (e.g. via Internet of Things), and support augmented reality applications in an industrial setting (e.g. for maintenance) and autonomous logistics.
Luxury & Sporting Goods	Enable new customer ecosystems and reimagined customer experiences (e.g. VR, AR) for luxury goods, and enhance the e-commerce infrastructure for sporting goods.
Metals & Mining	Increase demand for metals used as inputs in the 5G value chain (e.g. copper). 5G could also facilitate greater automation of mining activities, which could help to improve efficiency and safety.
Real estate	Support the Future City evolution (e.g. by enabling real-time traffic management and massive sensor networks) and potentially enable more rapid enablement of real estate (e.g. by driving more flexible use of space in buildings, use of sensors to provide information on building use, more adaptable buildings, and virtual replicas of buildings to improve design).
Retail	Enhance the consumer shopping experience including via apps, and help facilitate a new wave of innovation and product development in consumer electronics.
Technology - Asia Hardware	5G deployments will continue to benefit industries in Asia such as transceivers, RF, CCL and analog semis. However, near-term headwinds of slowing deployment in China and temporary migration to 4T4R architecture for 700MHz and 2.1GHz continue to weigh on the current upgrade cycle and demand outlook.
TMT	5G rollouts will be important for the sector but end-to-end 5G architecture is still required for the technology to deliver all the benefits of high speed and low latency. Many partners in the TMT ecosystems are testing and developing hardware but also software solutions to extract the most value from stand-alone 5G.
Transport	Support rollout of IoT technologies to implement real-time data exchange between all parts of the shipping ecosystem and provide shippers with real-time visibility of their cargoes. Ports are also being used to test 5G applications (e.g. artificial vision technologies, environmental measuring, real-time monitoring of traffic).

Source: HSBC

The digital brick road to 5G

Why we need 5G

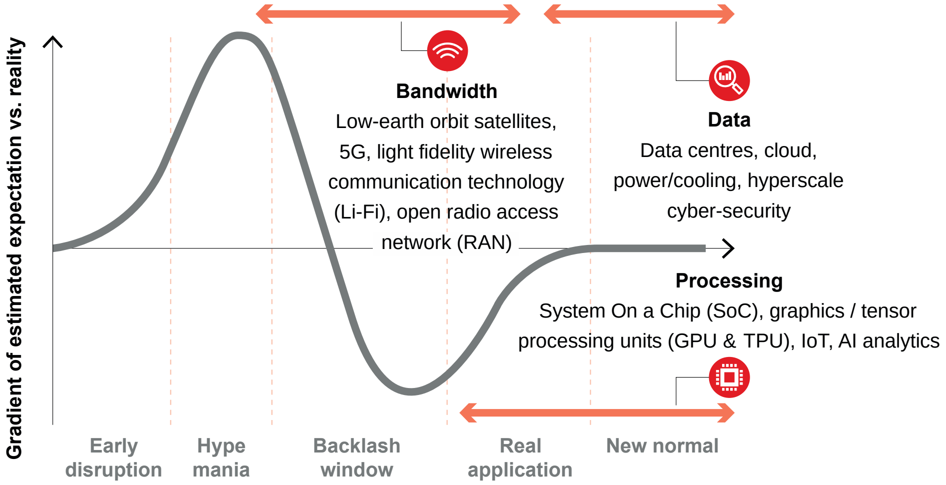
Evolution of mobile connectivity: 3G to 5G

4G networks have already taken our smartphones and tablets to the next stage, digitising many physical products of the past, in a small handheld form factor. Although this was also the promise of 3G (at least from vendors at the beginning of the century), one could argue that mobile broadband applications only really took off with 4G in the last decade. Today, 4G accounts for more than 50% of mobile connections globally and around 56% of mobile connections in India and 80% in China, according to GSMA.

As we have discussed previously, connectivity is paramount for the functioning of society and enabling people to get access to employment, healthcare, entertainment, commerce and services both in the DM (~80% people online) and EM (~45%) irrespective of where they are physically located.[1] Most of the themes we discuss in Global Research depend on universal connectivity at some point in the supply chain.

1 ITU 2018

2. HSBC Disruption Framework: Connectivity infrastructure



Source: HSBC

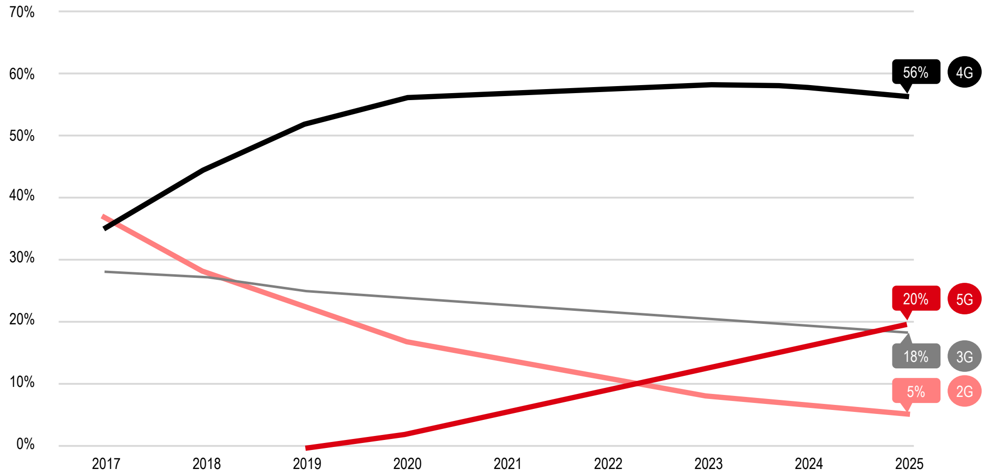
But given the fast growing use of mobile internet in the modern era (typically, data usage volume is growing at 30-40% per annum) and also the rise of more sophisticated applications on mobile phones (i.e. beyond simply reading articles or watching a HD video), 5G offers the combination of a more efficient technology together with new bands of spectrum.

Our discussions with operators globally indicate that without 5G, 4G networks would face severe congestion in less than two years. **Hence 5G is not just about implementing a new technology but also a necessary step forward to keep up with the demands of the data revolution.**

Ready for take-off

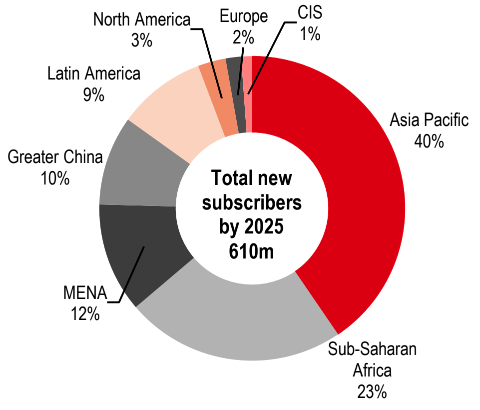
According to GSMA, 5G is expected to take off in the coming years and is forecast to account for 20% of global mobile connections by 2025 (Chart 3). However, intentions to upgrade vary across the world, with 5G uptake likely to come from South Korea, China and the Middle East. Overall, GSMA expects 5G to add USD2.2trn to the global economy between 2024 and 2034 with sectors such as manufacturing/utilities (especially in China) and professional/financial services (MENA and North America) expected to benefit the most. Chart 5 shows us the breakdown of telecom investments by country and the percentage of total capex in 5G.

3. Connectivity for 5G set to grow into the middle of the decade



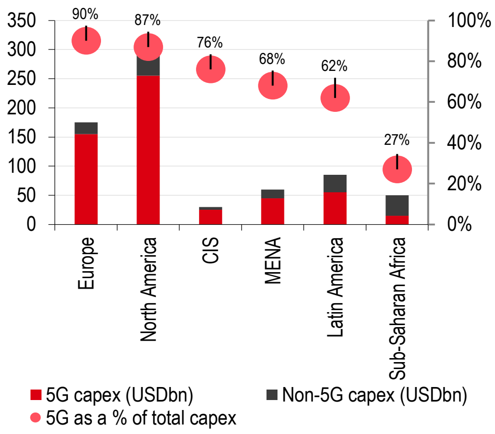
Source: GSMA

4. Asia Pacific and Africa to add to internet users in 2020s



Source: HSBC, GSMA

5. Connectivity investments set to total USD1.1trn by 2025



Source: HSBC, GSMA

Operators have dual rollout strategy: from 4G to 5G

Therefore, the next generation of mobile connectivity is set not only to bring better technology but also more capacity, and could help to make the internet accessible to more consumers and businesses around the world. This includes emerging markets too, where 4G network coverage is still not complete. In these economies, we could see operators working on a dual strategy – whereby they continue to invest in 4G while also preparing the infrastructure for 5G, to provide more time for 5G handset penetration to increase.

Short-term 5G tech catalysts

According to our Head of Asia Technology, Frank Lee, China continues to lead global 5G deployments, as the government is eager to stay at the front of the 5G race. As of the end of 1H21, China has a total of 961k 5G base stations (around 70% of total market) and 493m 5G tariff users. We estimate it had 283 million 5G network users (global subscribers expected to reach 580 million by the end of 2021 according to Ericsson). However, due to certain entity bans, 5G base station deployment has been subdued since 4Q20. We also think China's share in 5G infrastructure builds will be lower in the coming years as the US and EU ramp up their deployments.

5G to disrupt trade

We believe the rollout of 5G in the coming years is set to revolutionise goods and services trade.

Broadly speaking, we expect 5G to impact future trade flows in three ways:

1. Boost cross-border mobile commerce
2. Enable even more products to be delivered digitally or remotely
3. Increase trade in tech equipment

Boost mobile commerce

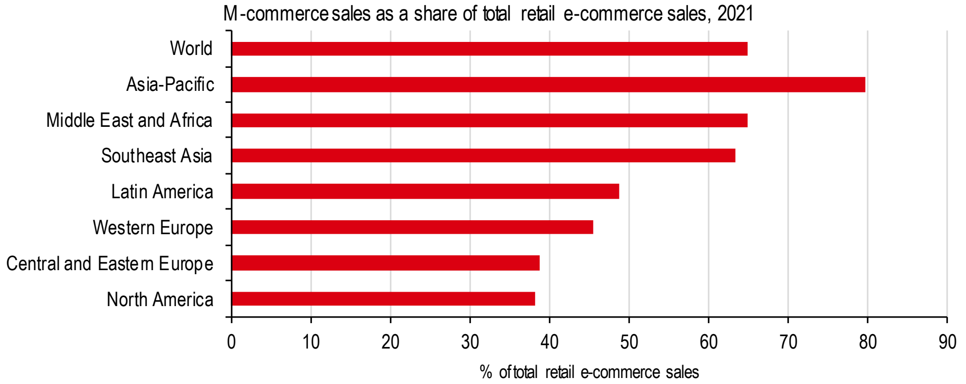
Mobile commerce to reach 70% of e-commerce by 2024

Good quality connectivity (that 5G should support) could help to boost cross-border mobile commerce (or m-commerce) and trade in goods going forward. M(obile)-commerce already comprises a large share of e-commerce sales (Chart 6), with eMarketer estimating that global retail m-commerce sales could reach nearly USD4.5trn (nearly 70% of total retail e-commerce sales) by 2024.

Roll-out speed could be a bottleneck

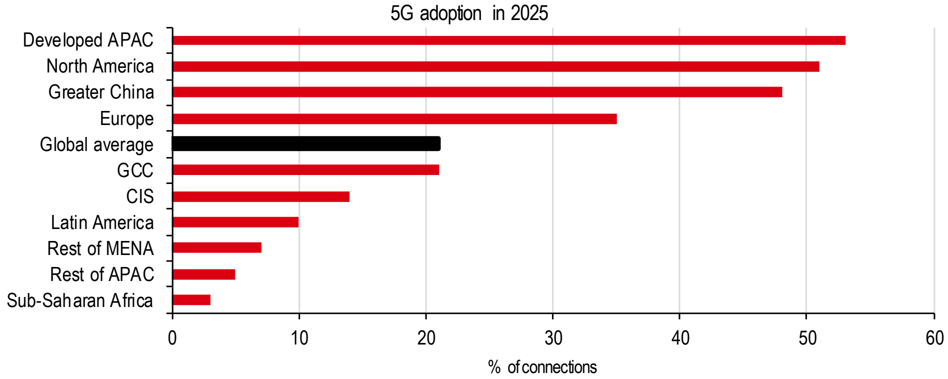
Better connectivity via mobile phones could also displace traditional commerce, with consumers increasingly choosing to shop online rather than in person. However, the potential for 5G to boost cross-border trade flows will largely depend on how quickly the technology is rolled out, and as shown in Chart 8, this may lag in some parts of the developing world.

6. Consumers are increasingly shopping online with their mobile



Source: eMarketer

7. The pace of 5G rollouts is expected to vary by region



Source: GSMA. Note: Developed APAC includes Australia, Japan, Singapore and South Korea.

Enable experiential immersive commerce

On a practical level, 5G will enable shoppers to view products more quickly and consume content at a faster rate than currently possible. It may also facilitate more immersive shopping experiences for consumers virtually.

Although some retailers offer similar solutions already, for example by enabling shoppers to visualise furniture in their home using augmented reality (AR) on their smartphones before actually purchasing the products, 5G could take these experiences to the next level. For instance, 5G may enable shoppers to interact with a realistic human avatar with AI that could help them with any questions related to their purchase. Higher throughput of data pipeline (e.g. higher bandwidth) offered by 5G will make this more frictionless with less lag. Eventually 5G could help to support augmented reality glasses for more immersive commerce experiences.

Supportive of payments for cross-border transactions and trade

Additionally, 5G could help to speed up the payment process and its rollout will coincide with the shift towards even more mobile-based payment methods (e.g. Apple pay), which may also help to accelerate and support the trend towards m-commerce. For example, EY expects global cross-border payment flows to reach USD156trn in 2022, with international consumer to business transactions (e.g. for e-commerce and offline tourism spend) to reach USD2.8trn (EY, February 2021).

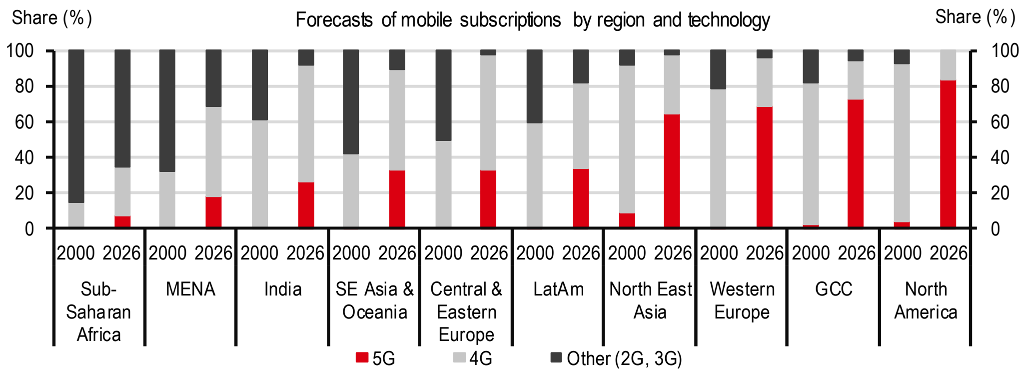
Which regions gain from m-commerce?

The productivity gains that 5G can deliver over 4G will also support the affordability of mobile internet. However, there is a risk that operators could take advantage of the change in technology to charge more for 5G services (at least at the outset). Nevertheless, they are in a position to offer more data volumes usage too and a more-for-more strategy (i.e. more benefits for a higher price) could help to reduce the unit cost per MB, to the benefit of the user.

This could be particularly advantageous for businesses and consumers in developing markets, where there is an emerging cohort of digital shoppers linked to middle class growth and increasing adoption of digital technologies. Large exporters of consumer goods such as mainland China, European and ASEAN economies stand to benefit from greater cross-border m-commerce flows, facilitated by 5G, going forward (Chart 8).

According to Ericsson, 5G is forecast to account for 7% of Sub-Saharan Africa's mobile subscriptions in 2026, and 34% of Latin America's mobile subscriptions. Brazil and Colombia, for example, have already launched commercial 5G services, while other LatAm economies such as Argentina, Chile and Mexico are investing in and deploying 5G. The equivalent forecast for India is 26% and 33% for South East Asia and Oceania as a whole.

8. 5G mobile subscriptions are set to rise significantly by 2026



Source: Ericsson Mobility Report June 2021

Digitisation of trade flows

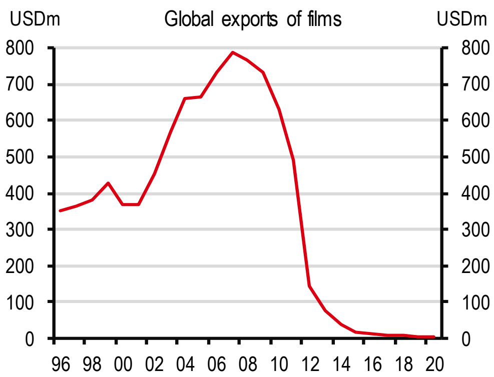
Acceleration of physical to digital world…

5G could offer more frictionless data flow on devices, which may facilitate and accelerate the ongoing shift away from physical goods towards digital products, and could help to boost digital trade flows.

This digitisation of physical goods has already occurred for products such as music and movies, which have moved from physical products to digital files under streaming models (Charts 9 and 10). And looking ahead 5G could enable video games, which have a lower tolerance for latency, to be increasingly streamed online rather than run locally on devices.

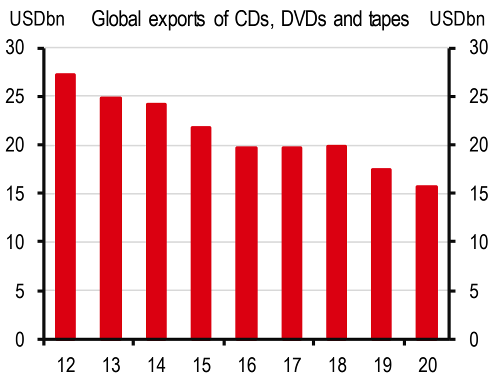
As real time and high data intensive services like computer games shift more towards the cloud, the demand of this new type of access to previously localised services could increase demand for faster data transmission, like 5G, especially for younger consumers. The opposite argument is also valid, where high bandwidth wireless streaming like 5G becomes so good, that it also drives the demand of new types of high bandwidth services unforeseen previously.

9. Global exports of physical films have declined over time…



Source: UNCTAD, WITS, HSBC

10. …as has trade in sound media



Source: UNCTAD, WITS, HSBC

Digitisation of physical services

Services that traditionally have been delivered in person could also become digitised thanks to 5G. For example, telemedicine and remote surgery using haptics may become more viable due to more reliable, lag-free and faster connections, while 5G could also give rise to new types of cross-border services trade such as remote-based maintenance and virtual tourism.

Such advances may reduce the need for professionals to travel abroad to deliver certain services – known as Mode 4 services trade – which currently comprises just over 3% (USD416bn) of global services exports.

This shift towards the remote delivery of services is already happening in the wake of the COVID-19 pandemic, for example with many workers conducting meetings with foreign clients and colleagues virtually rather than in person due to travel restrictions.

Increased trade in tech equipment

5G infrastructure, trade and issues…

The advent of 5G will also have implications for exporters of tech equipment such as chipsets and mobile phones. However, competition for 5G technology has led the US to progressively tighten export restrictions on 5G equipment to certain entities.

This is an abridged version of a report by the same title published on 24-Aug-21, which includes sector applications and ESG implications of 5G. Please contact your HSBC representative or email AskResearch@hsbc.com for more information.

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*A stock was classified as volatile if its historical volatility had exceeded 40%, if the stock had been listed for less than 12 months (unless it was in an industry or sector where volatility is low) or if the analyst expected significant volatility. However, stocks which we did not consider volatile may in fact also have behaved in such a way. Historical volatility was defined as the past month's average of the daily 365-day moving average volatilities. In order to avoid misleadingly frequent changes in rating, however, volatility had to move 2.5 percentage points past the 40% benchmark in either direction for a stock's status to change.

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2 All market data included in this report are dated as at close 17 August 2021, unless a different date and/or a specific time of day is indicated in the report.

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