The 5G Economy in a Post-COVID-19 Era

The role of 5G in a post-pandemic world economy

November 2020

Executive summary

The early days of 2020 were still heady times for 5G. Rarely had the world so enthusiastically awaited the arrival of a communications technology often described as "disruptive," "transformational," and a "general purpose technology." As its early versions emerged—with much more expected to come over the next 10-15 years—pundits were espousing the ways 5G will change or materially influence almost every aspect of human activity.

Global priorities underwent an unexpected reset starting in February 2020, as the SARS-CoV-2 virus (the virus that causes coronavirus disease 2019—COVID-19) began rapidly cascading from country to country. The world has witnessed catastrophic losses of lives and rates of infection—as of the writing of this report (November 2020), almost 1.3 million deaths from just under 53.0 million infections globally.

The social and economic upheaval caused by COVID-19 has raised questions about 5G's role in a post-pandemic world. Indeed, the isolation induced by efforts to contain COVID-19 has underscored the importance of communication technology in keeping social networks connected and economic systems resilient. IHS Markit expects the continual and deepening deployment of 5G (and the products, services, and experiences that will likely flow from it) to fundamentally support and enable the emergent requirements of the post-pandemic world for connectivity, flexibility, and resiliency. This will encourage on-going investments in 5G technology in the form of capital expenditures (CAPEX) and research and development (R&D) that will build a communications infrastructure to transform how industries deliver value on a local and global level.

Various mobile network operators (MNOs) have already announced acceleration of 5G deployment and supply chains firmed up as China emerged from its early battles with COVID-19. Smartphone-makers started releasing 5G handsets over a range of price points to attract consumers in different affordability circumstances. Unlike previous generations of cellular technology, industrial requirements are being baked into 5G standards due, in part, to the participation of many industrial companies in the standardization effort. Those use cases will drive value in terms of cost savings and efficiencies, new sources of revenue, more "intelligent" products, and better customer experiences. Many enterprises and industrial companies are taking advantage of 5G's long-game nature and are currently engaged in trials and proofs-of-concept to validate 5G's technical suitability for their use cases and returns on investment.

The economics behind the value of the 5G use cases in a post-pandemic world is one reason that investment in 5G technology did not fall off the cliff during the economic downturn that followed the onset of COVID-19; even as many other investment activities saw sharp declines. In fact, IHS Markit's new forecast shows a 10.8% net increase in global 5G investment and R&D during 2020-35 compared to the 2019 forecast. It is evident that the need for expanded connectivity in the COVID-19 era is invigorating 5G investment growth.

Prepared for Qualcomm Technologies, Inc. in partnership with Omdia

This report presents IHS Markit's latest assessment of the global economic impacts of 5G in the post-pandemic world (2020-35) and is an update of a similar report issued prior to the onset of COVID-19 (IHS Markit, 2019).

Economic impacts of 5G in a post-COVID-19 world

The key findings explore three measures of the macroeconomic benefits of 5G over the period 2020-35. These are the emerging ***5G value chain***, ***sales enablement***, and the ***net contribution to global GDP***.

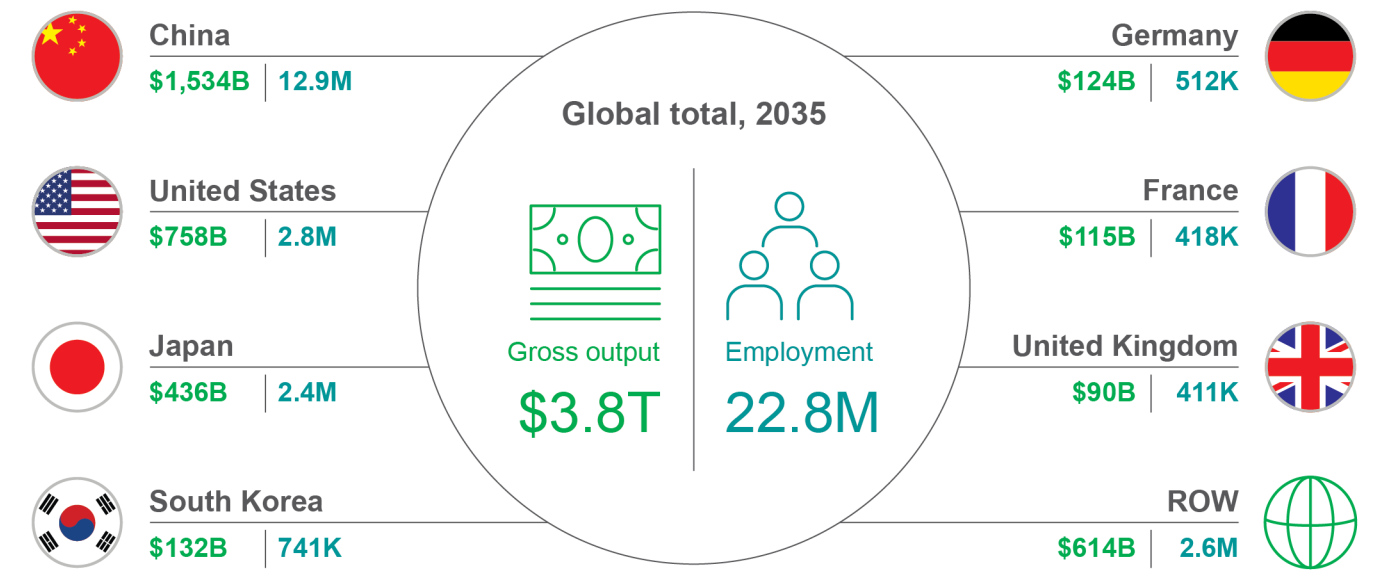
Value chain

Macroeconomic benefits of 5G can be measured by the global contribution of 5G to the value chain around that technology. This reflects the economic impact of investments in 5G infrastructure and associated R&D.

- IHS Markit anticipates that 5G-related investment (both CAPEX and R&D) from 2020 through 2035 by firms that are part of the 5G value chain within just seven countries (China, United States, Japan, Germany, South Korea, France, and United Kingdom) will average over $260 billion annually.
- IHS Markit currently estimates that the 5G value chain will generate $3.8 trillion of gross output and support 22.8 million new jobs by 2035. Moreover, the seven countries will account for nearly 84% of the contribution to global 5G-related gross output and over 88% of the contribution to new employment.

By virtue of a significant ramp-up in 5G related investment (CAPEX as well as R&D), China is expected to capture a higher share of the 5G value chain in 2035—about $400 billion (or 36%) higher at $1.5 trillion than the $1.1 trillion that was forecast in 2019. In contrast, the share of the Rest of the World is expected to be about 19% lower. The slower economic growth trajectory of in the post-COVID-19 world may be felt disproportionally by smaller countries that lack the resiliency to snap back as quickly as larger economies. This will affect their investment priorities and assert downward pressure on 5G-related spending.

The economic contribution of the 5G value chain, 2035



Source: IHS Markit analysis based on data provided by Omdia

Sales enablement

Sales enablement refers to the additional sales that businesses across virtually all industry sectors will realize by exploiting the unique capabilities of 5G (over and beyond existing 4G) to improve their executional efficiency, expand their ability to reach customers, and create unique product or service offerings. IHS Markit believes 5G use cases will fall into three broad categories. **Enhanced mobile broadband** (eMBB) use cases will leverage 5G's extended cellular coverage and improved capacity. By coupling 5G's low power requirements with its ability to operate in licensed and unlicensed spectrum, **Massive Internet of Things** (MIoT) use cases will bring dramatically more scale and flexibility to machine-to-machine and Internet of Things applications. The combination of high reliability, ultra-low latency connectivity, and strong security will be hallmarks of **Mission Critical Services** (MCS) use cases. 5G will enable sales to both end users (final goods and services) and producers (intermediate goods and services). IHS Markit estimates that, by 2035, each of the three categories of applications will produce roughly equal levels of sales enablement (in excess of $4 trillion each for a total of just over $13 trillion).

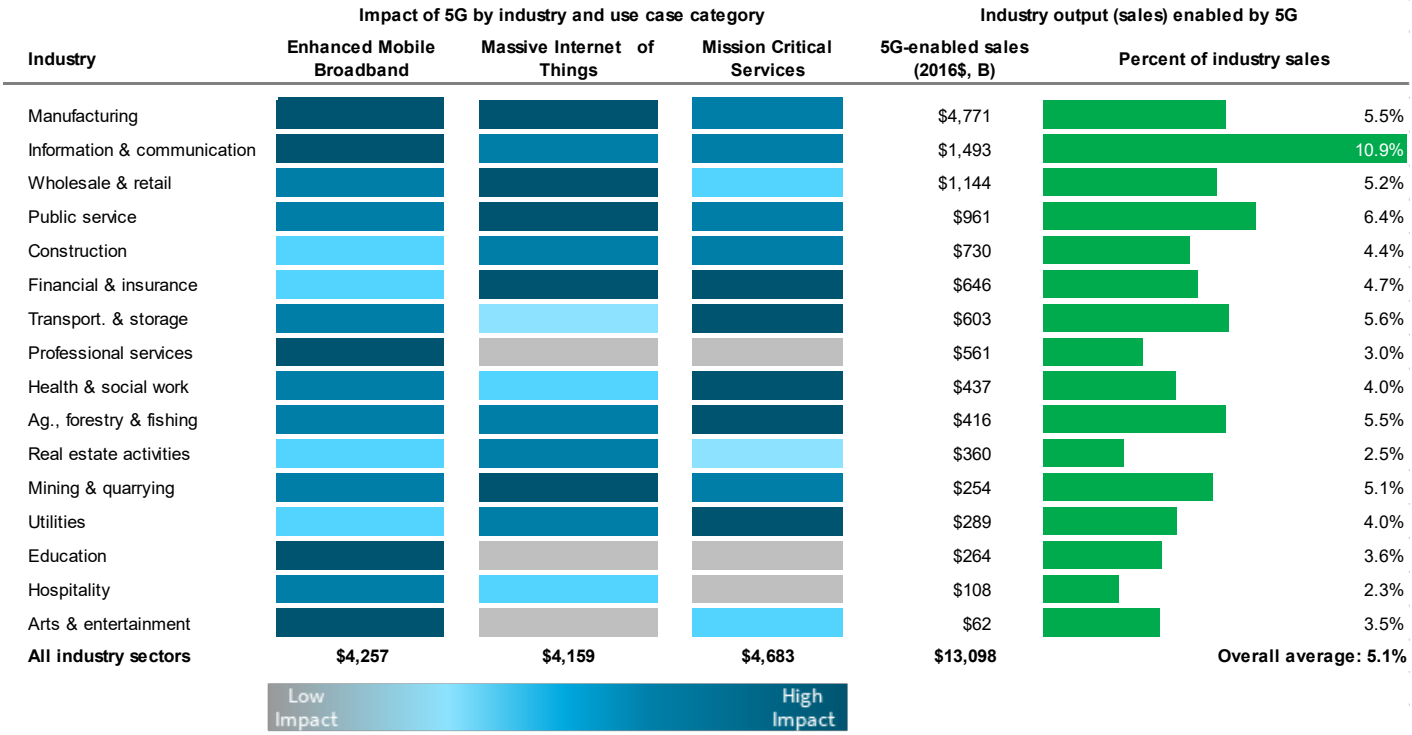
These applications will, of course, produce the greatest amount of sales in different clusters of industries.

- IHS Markit estimates that, among 16 industries,[1] eMBB will enable sales most in manufacturing, information and communication, professional services, education, and arts and entertainment;
- MIoT sales enablement will be highest in manufacturing, wholesale and retail trade, public service, financial and insurance, and mining and quarrying; and
- MCS will have the highest sales enablement in financial and insurance, transport and storage, health and social work, agriculture, forestry and fishing, and utilities.
- In 2035, the greatest sales enablement in absolute 2016 dollar terms is expected to occur for manufacturing (almost $4.7 trillion), while as a percent of total industry sales, it is expected to be highest for information and communication (10.9%), more than twice the expected overall industry average (5.1%).

IHS Markit anticipates that post COVID-19 global economic growth trajectory will be lower than the pre-pandemic forecasts that informed the 5G economic contribution assessments in the IHS Markit 2019 report. Indeed, the IHS Markit current forecast for global gross output (sales) in 2035 is about 2.8% lower than the pre-pandemic forecast, and the world real GDP forecast is lower by 3.1%. In contrast, IHS Markit's revised forecast for 5G sales enablement, of $13.1 trillion, is a contraction by only about 0.6%, significantly less than the global contraction in gross output and GDP. Furthermore, 5G sales enablement share of overall industry output is forecast to actually increase to 5.1% from 5.0% of global sales in 2035. Both of these indicate that 5G will continue to be viewed as a critical lever for generating sales across a broad range of industries.

[1] These include Agriculture, Forestry, and Fishing, Arts and Entertainment, Construction, Education, Financial and Insurance, Health and Social Work, Hospitality, Information and Communication, Manufacturing, Mining and Quarrying, Professional Services, Public Service, Real Estate Activities, Transport and Storage, Utilities, and Wholesale and Retail Trade.

5G will enable $13.1 trillion in global sales activity in 2035



Source: IHS Markit

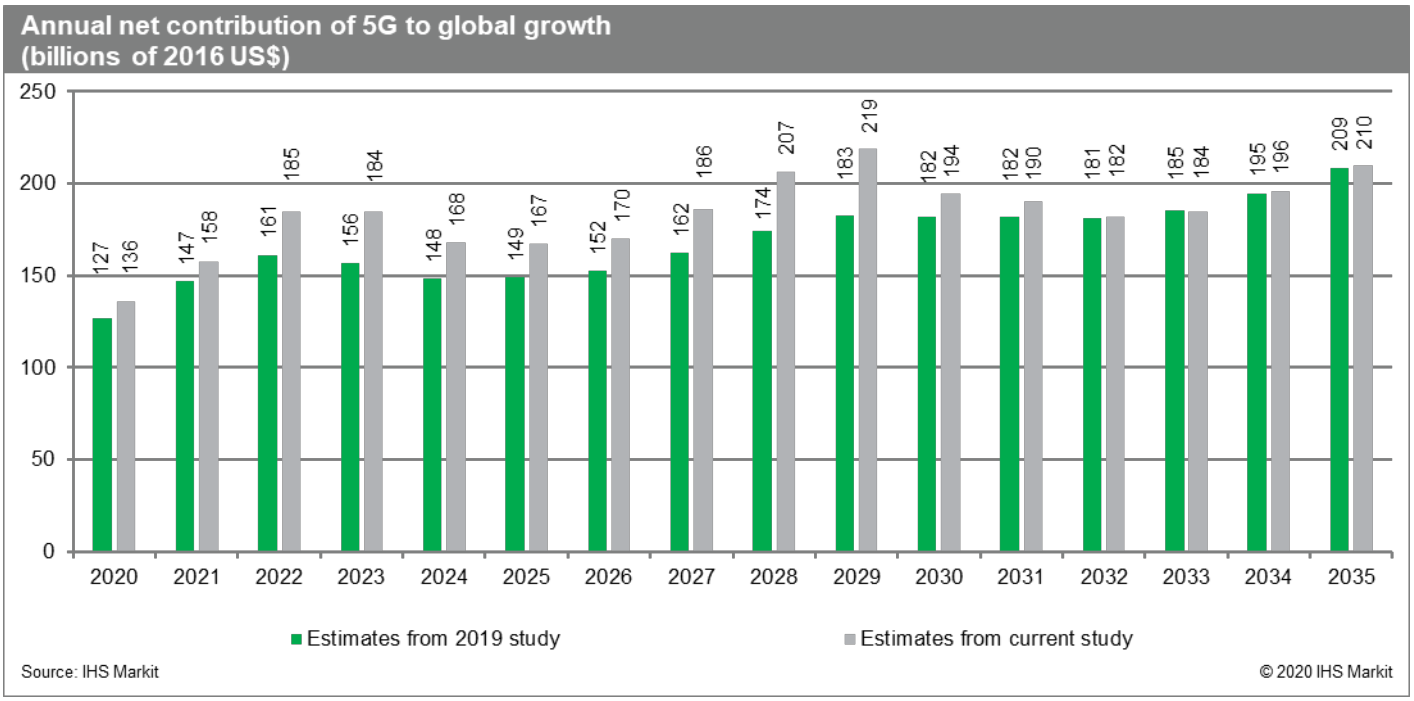
Contribution to global GDP

The third measure of macroeconomic benefits of 5G is the net contribution it makes to global GDP. This net contribution takes into account the possible diversion of investment and R&D spending from non-5G opportunities to 5G and, therefore, the loss of economic benefits elsewhere.

- Based on its proprietary Global Link Model, IHS Markit analysts estimate[2] that the net contribution globally through 2035 (in net present value terms) will amount to about $2.3 trillion in constant 2016 US dollars—roughly the same as France's current GDP.
- Moreover, over that period, IHS Markit analysts forecast that global real GDP will grow at an average annual rate of 2.7%, of which 5G will contribute almost 0.2%. These are both clear indications that 5G will make a significant economic contribution worldwide.

The current estimate of 5G's net contribution to global GDP is slightly higher than that in IHS Markit's 2019 report. Given the excess capacity in the global economy induced by the COVID-19 pandemic, investments can have a slightly higher impact as the opportunity cost of using resources to build out 5G are likely lower than in our previous forecast. In other words, when there is excess capacity, there are more idle resources; therefore, hiring them to build out 5G is not taking them away from another profitable opportunity. The dynamics show that the effects become slightly greater in the medium term in response to a second wave of 5G-related investment.

[2] IHS Markit (2019) describes the procedure.



Regardless of any debate over the impact of COVID-19 on 5G, it is hard to argue that the 5G train is already in motion, and the only question is when or how soon it will get to the many destinations along the track. The economic benefits of 5G technology can be realized, but it will require the ecosystem to work together to speed deployment. This includes policymakers and regulators as well as the system integrators, MNO's, etc. The economic impacts can be viewed as the lower bound estimate. Impacts can be higher if the technology is more quickly deployed. Impacts can also be higher if entrepreneurs and innovators harness this technology to solve some of our most pressing challenges. These solutions, particularly those that help bridge the digital divide so that more people can participate in the information economy, will unleash value streams that will help grow the global economy for everyone.

Research team

Aniruddha Banerjee
IHS Markit
Director, Economics & Country Risk Consulting

Karen A. Campbell
IHS Markit
Associate Director, Economics & Country Risk Consulting

Bob Flanagan
IHS Markit
Director, Economics & Country Risk Consulting

Brendan O'Neil
IHS Markit
Executive Director, Economics & Country Risk Consulting

Bill Morelli
Omdia
Senior Research Director

Julian Watson
Omdia
Principal Analyst, Internet of Things

Josh Builta
Omdia
Research Director, Internet of Things

Daryl Schoolar
Omdia
Practice Leader, Fixed & Mobile Networks