

WILL THE 5G TRANSITION BE THE NEXT DISRUPTIVE INNOVATION?

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It's easy to take for granted many of the technological developments that have reshaped our world in recent decades. Major disruptive innovations, such as the internet and the smartphone, have proven to be catalysts for further innovation, improving living standards and reshaping entire industries. In our opinion, we may be at the edge of another inflection point in technological advancement with the transition to the fifth-generation of cellular networking technology, referred to as 5G, over the next decade. While winners and losers will undoubtedly emerge, we believe this transition may offer significant opportunity for investors.

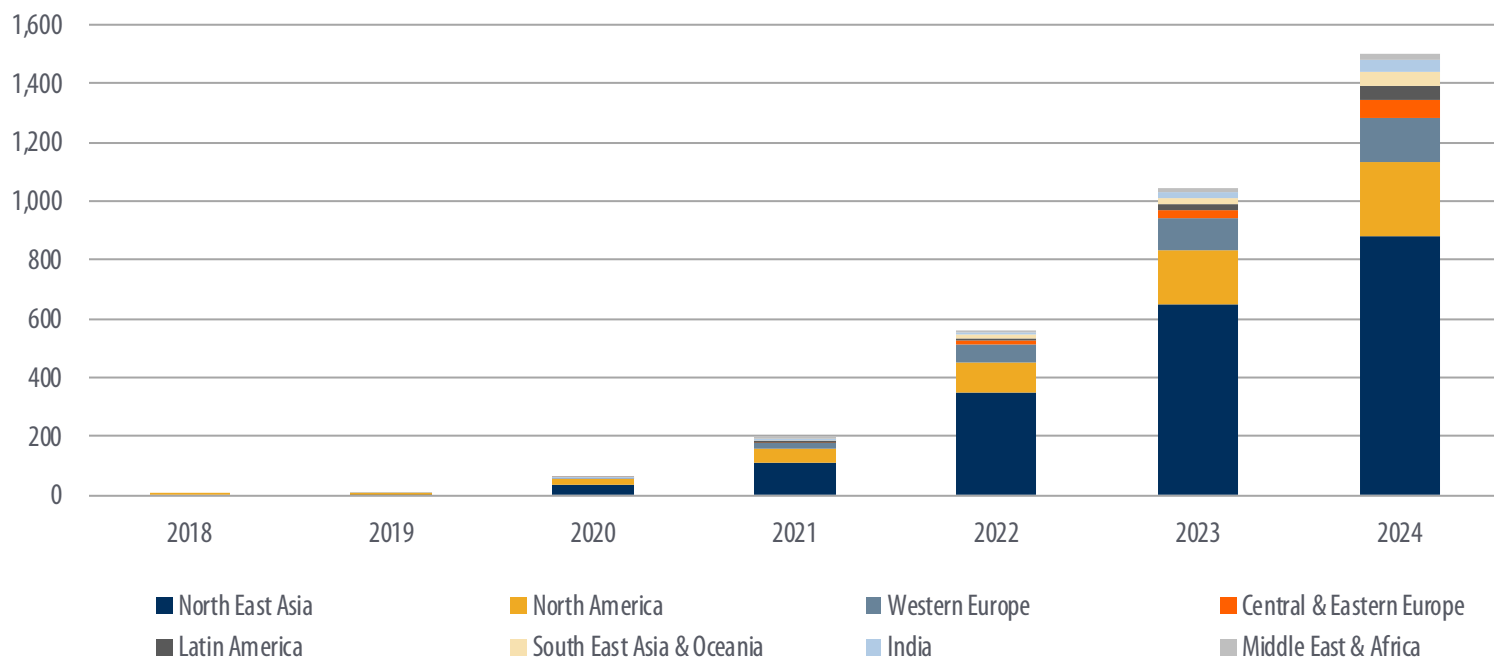
5G Technology is a Leap Forward

By utilizing new frequencies of the wireless spectrum, 5G aims to deliver higher bandwidth, lower latency, and support for more connected devices. The need for a faster and more reliable network has been driven, in large part, by the popularity of smartphones. As more mobile users access increasing amounts of data and streaming content, greater network capabilities are essential. AT&T estimates that by 2022, streaming video alone will account for 75% of mobile traffic. Fortunately for mobile users, the 5G network may increase speeds to as much as 20 times faster than today's 4G network.¹

The nearly instant communication between connected devices over the 5G network, or low latency, may be a key factor for many new technological innovations to become widely adopted. For example, 5G may result in vehicle-to-vehicle communication, enabling autonomous vehicles to "see" each other and reduce accidents. In healthcare, advancements in robotics may leverage the low latency of 5G to improve upon remote surgery technology. Low latency also has the potential to bring greater efficiency to the manufacturing industry. "Lights out" manufacturing that utilizes fully autonomous industrial robots that can more easily communicate with each other may greatly reduce costs, increase efficiency and provide companies with greater flexibility.

The capacity for 5G to support many more connected devices may create an entire ecosystem of connected devices, referred to as the "Internet of Things." The ability to connect so many devices may allow companies to more easily collect real-time data from mobile assets and battery-powered sensors across the world. For municipalities, this could mean smart traffic lights with the ability to manage congestion or connected street lights to reduce energy consumption. With the speed and reliability of a 5G network, the Internet of Things could grow to as many as 20 billion devices by 2020.²

Chart 1: Projected 5G Mobile Subscriptions



Source for Chart: Ericsson. There is no assurance these trends will continue or forecasts will be achieved.

All opinions expressed constitute judgments as of the date of release, and are subject to change without notice. There can be no assurance forecasts will be achieved. The information is taken from sources that we believe to be reliable but we do not guarantee its accuracy or completeness.

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Keys to 5G Growth

Before 5G can be widely implemented, the existing cellular network infrastructure must be upgraded to transmit 5G frequencies. While large, high-power cell towers transmit the current 4G network over long distances, the 5G network will also rely on many small, low-power “small cells” located in places such as rooftops and streetlights. Telecommunications companies have already been deploying capital to lay the groundwork for 5G. Between 2010-2017, companies invested \$250 billion on acquiring wireless spectrum and upgrading infrastructure, and are expected to invest over \$100 billion between 2018-2020.³

Beyond the massive infrastructure investment, a favorable regulatory environment is another critical ingredient for the transition to 5G. The FCC appears committed to promoting and facilitating the development of 5G in the US. The agency’s 5G FAST Plan aims to free up spectrum (the airwaves that enable communication) through a series of auctions. So far this year, the FCC has successfully held one 5G spectrum auction, with more planned later in 2019. The plan also streamlines infrastructure policies to make sure regulations that were designed for large cell towers are modernized to reduce impediments to deploying the small-cell towers needed for 5G. Finally, the plan includes overhauling outdated regulations to promote more installation of optical fiber, which is critical to carry additional 5G traffic around the country.⁴

What’s the Outlook for 5G?

With much of the network infrastructure in place and a favorable regulatory environment, we believe 5G is poised for rapid implementation. Mobile providers have begun rolling out 5G in a few markets, and smartphone makers are beginning to sell models with 5G capabilities. 5G usage is expected to reach 100 million mobile connections in the US and 1 billion worldwide by 2023.^{2,5} By 2030, 5G is expected to become the primary cellular network around the world.⁶

It’s difficult to predict what other new innovations 5G networking technology may enable, but with millions of users and vast new capabilities, we believe the potential is immense. Although competition is fierce among those seeking to gain a foothold in the global 5G transition, and geopolitical considerations add to the difficulty in picking which stocks will be the eventual winners and losers, we believe this transition to the next generation of cellular networking technology may be a compelling theme for investors in the years ahead.

¹Source: *The New York Times*. What Is 5G? Here’s What You Need to Know About the New Cellular Network.

²Source: Gartner. *Leading the IoT*.

³Source: GSM Association. *The 5G Era in the US*.

⁴Source: Federal Communications Commission. *The FCC’s 5G FAST Plan*.

⁵Source: Ericsson. *Ericsson predicts 1 billion 5G subscriptions in 2023*.

⁶Source: Gartner. *Gartner Survey Reveals Two-Thirds of Organizations Intend to Deploy 5G by 2020*.

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