Chapter 4
Availability of 5G by Country

ABSTRACT

The deployment of 5G marks a global shift in connectivity, offering high speed, ultra-low latency, and the ability to connect billions of devices. It enables transformative uses in smartphones, autonomous vehicles, and IoT. However, access varies widely. Countries like the U.S., South Korea, and China lead with extensive 5G networks, while many developing nations remain in planning or pilot phases. Infrastructure, regulatory, and financial barriers slow progress. By 2025, over 10% of mobile connections are expected to use 5G, reflecting its key role in innovation and digital growth—despite persistent deployment challenges.

INTRODUCTION

The rollout of 5G, the latest advancement in wireless networking technology, marks a significant milestone in global connectivity. The development of the first international 5G modem illustrates the hardware advancements driving next-gen connectivity (Evans, 2017). *With the potential to revolutionize industries and everyday life, 5G technologies offer unparalleled speed and ultra-low latency, enabling the seamless connection of billions of devices*. 5G promises to enable many transformative applications, from smartphones and smartwatches to connected vehicles and IoT devices. A report details the growing ecosystem of 5G devices, including smartphones and industrial modules. For example, various 5G use cases, including industrial automation and telemedicine, illustrate its transformative potential across different sectors, (DIGI, 2025). Monetization strategies for 5G use cases hinge on convergence with AI, edge computing, and vertical-specific applications such as smart grids and connected vehicles (Chhabra & Rogers Communications Inc., 2023). Monetizing 5G requires alignment of use cases with AI, IoT, and edge computing,

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enabling revenue generation in smart cities and industrial automation, (Chhabra & Rogers Communications Inc., 2023).

Global 5G research efforts focus on innovations in radio access, low-latency communication, and device connectivity across various industries, including automotive and healthcare, (Pirinen, 2014).

However, the availability of this cutting-edge technology varies widely across countries, reflecting disparities in infrastructure readiness, economic resources, and regulatory frameworks. Transport Control Protocol (TCP) and its multipath variant (MP-TCP) must be re-evaluated for compatibility with the high-speed, low-latency nature of 5G mmWave networks (Polese, Jana, & Zorzi, 2017). *For instance, Edge computing enabled by 5G unlocks real-time analytics and low-latency applications, redefining operational models* (Deloitte, 2025).

Furthermore, Field tests comparing 5G speed across global markets reveal significant disparities based on infrastructure and spectrum availability (Dolcourt, 2019). *Real-world trials and global measurements of 5G network speeds reveal performance variations driven by infrastructure, spectrum, and urban deployment models* (Dolcourt, 2019).

The deployment of 5G is expected to significantly contribute to global GDP, while also driving innovation, job creation, and economic transformation in emerging markets (GSMA, 2020). *The exponential rise in 5G subscriptions and infrastructure investments signals the technology's central role in future digital economies and service ecosystems (GSMA, 2023).* For instance, the adoption of massive MIMO in 5G networks dramatically increases spectral efficiency and user capacity by employing large-scale antenna arrays that enable spatial multiplexing and improved beamforming (Bishen, 2019).

With 5G adoption gaining momentum, projections show that by 2023, more than 10% of global mobile connections will rely on this technology. This rising adoption rate highlights 5G's pivotal role in advancing economic development, innovation, and digital transformation. 5G is identified as one of the top 10 strategic technology trends influencing enterprise innovation in 2020, (Panetta, 2019). *However, the pace and breadth of its rollout are shaped by various factors, including governmental policy, spectrum availability, and the level of investment by telecom providers*. 5G is emphasized as a strategic asset that can drive national competitiveness and technological leadership over the coming decade (Deloitte, 2025). Leading nations, such as the United States, South Korea, and China, have already established robust 5G infrastructures. The 2020 Global Telecommunications Outlook identifies 5G as a catalyst for industry transformation and new consumer experiences (Deloitte, 2025). In this context, many developing countries are still in the preliminary phases of planning and experimentation.