

# 6G: Can it really shape the future of connectivity?



**Fifteen years ago, 4G was about how we connected with each other through smartphones. Five years ago, the hype surrounding 5G centred on the introduction of new use cases, driven by increased speed, very low latencies, and enhanced reliability. With 6G, the focal point of the next-gen promise appears to switch from connectivity to sovereignty and advantage. The prevailing outlook on 6G indicates that those who recognise it as more than just faster speeds and lower latency are poised to gain substantial advantage. But is that true? And more importantly, will 6G really be able to deliver its promise?**

While 6G promises to bring much more to the table than the transition from any other previous generation, the situation in terms of the promised leap from 5G is actually quite similar to the one portrayed during the transition from 4G to 5G just a few years ago. However, the domain of the 6G transformation appears to be somewhat more promising, as 6G aims to bridge the gap between computation and connectivity, embedding native AI capabilities in networks, and offering more than 100 times the current peak data speed compared to its predecessor. Understanding what might distinguish this moment requires examining how each generation has expanded the boundaries of mobile technology, layer by layer: from voice to data; from data to intelligence.

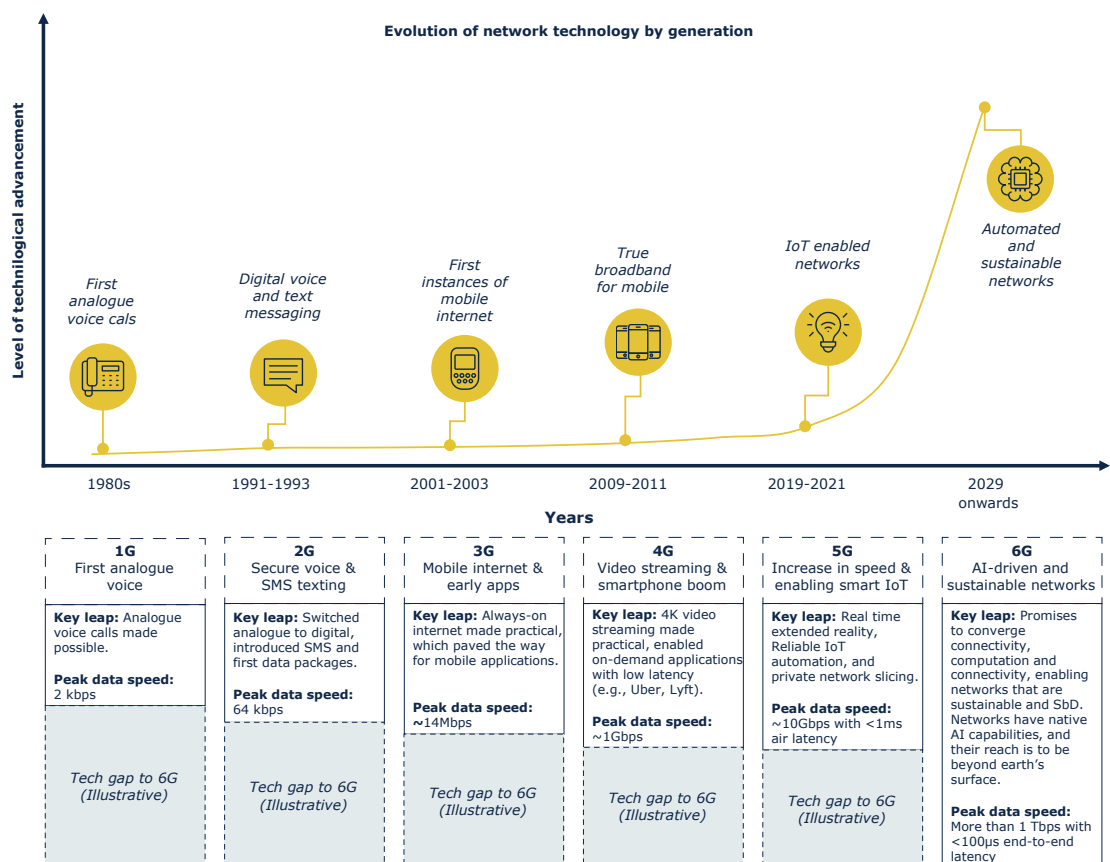


Figure 1: Comparison of network technology by generation

The technological advancements of 6G suggest that this transformation could not only shape the future of connectivity but also have transformative potential across economic, social, environmental, and security impacts on the networks.

While the headline for the transition from 4G to 5G was the promise of enabling new use cases across multiple industries through ultra-low latency, increased reliability, and better coverage for device-dense environments, the reality is that the main benefit of 5G has only been limited to speed so far. The transition to 6G may also carry this peril, although based on the key technical leaps we are likely to see, this new transition also has the potential to become about building a platform that extends to the social from the technical; one that allows for a vast array of new services, fuels sustainable growth opportunities, widens the reach of network connectivity, and embeds quantum-era-ready security to the design of the networks. 6G seems not only to be able to enable new possibilities across telecom and technology sectors, but also to have a knock-on effect on the broader industry and the society we will live in across four pillars:



Figure 2: Four pillars of 6G impact

These four pillars of impact from the new networks can be important to the discussion on 6G, as this new generation of connectivity promises to serve as the foundation for a future society that is more people-centred, sustainable, and efficient. However, the actual impact across these four pillars, and whether this impact would ultimately change how we approach the future era of connectivity, will be determined by how the unique capabilities offered by 6G are leveraged into the novel generation of mobile networks.

## Capabilities offered by 6G network may deepen the depth and breadth of its potential impact

One of the exciting promises of 6G is that network elements are usually more than just network elements in the traditional sense. In some cases, they are driven by machine intelligence; in other cases, they act as sensors. They also reshape how we define coverage in both indoor and outdoor spaces. These, in turn, could allow for a new set of capabilities that were not possible in the previous generations of telecommunications technology:

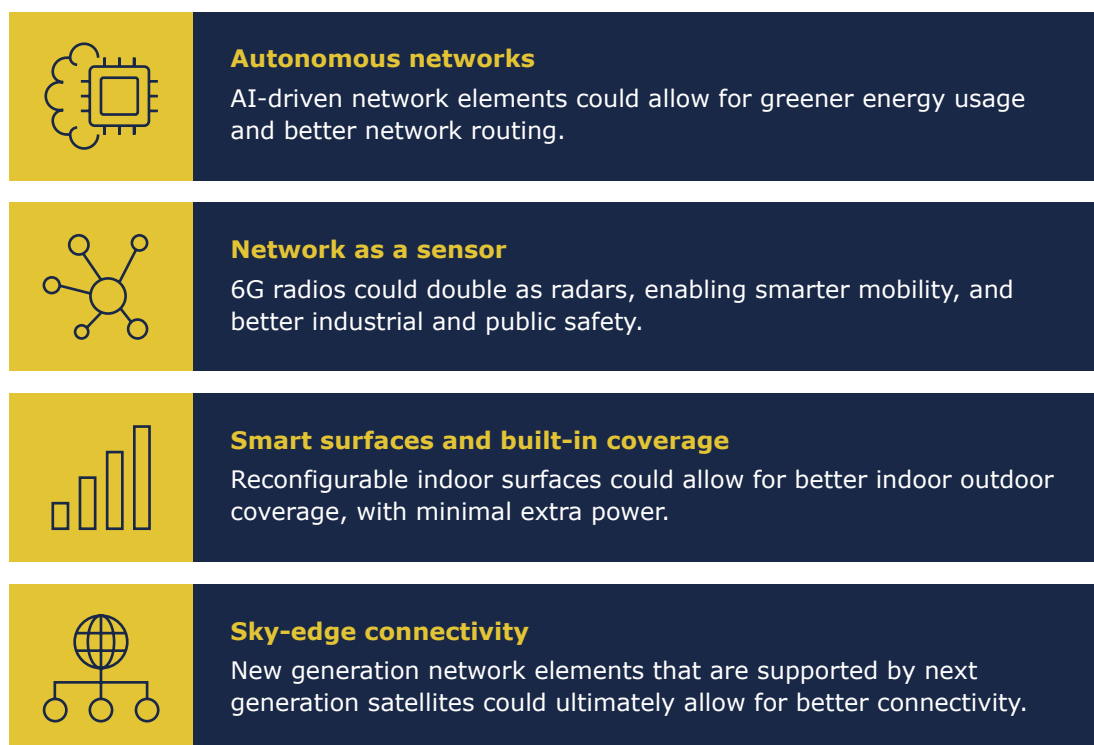


Figure 3: The new capabilities offered by 6G network elements

6G networks are set to come with native AI that continuously tunes energy consumption and steers traffic in real time, delivering smoother connectivity and easing congestion with almost no human touch. Network elements can also serve as sensors, which in turn may enable spatial awareness capabilities that can be leveraged for a wide range of use cases, from emergency rescue operations to navigating autonomous vehicles and industrial robotics.

As a novel and potentially transformative network element, Intelligent Reflecting Surfaces (IRS) intelligently reflect and manipulate electromagnetic waves, allowing for improved indoor and outdoor coverage. Through their passive, programmable nature, these network elements could enable easier, precise indoor connectivity without the usual power requirements of traditional antennas. This is further supported by next-generation satellites, which promise to deliver nearly effortless universal coverage.

This seemingly unmatched level of technological advancements presented by the newer network elements implies that this transition will not just be about faster radios, but also about gaining vertical ownership of the complex infrastructure that enables the deployment of 6G. However, whether these networks can be deployed at scale remains uncertain. Issues such as potential scarcity in spectrums, lack of standardised architecture, and potentially astronomical deployment costs cast doubt on whether this new generation will be able to live up to the benchmark set for them, or simply roll out as a slightly improved version of 5G.

Such challenges have sparked responses from the international community, with several jurisdictions already dedicating large budgets for research, and with others field-testing this new generation of connectivity. As is the case with any new technology, the race to dominate the emerging 6G landscape from the outset is evident.

## **Several jurisdictions have already placed themselves in the 6G race**

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From Washington to Wuhan, the race to gain an edge on 6G is already underway, marked by commitments to native hardware development, large-scale field tests, and strategic blueprints that emphasise inclusivity, trustworthiness, and sustainability. A key area of focus across many countries is investment in hardware R&D, with initiatives in countries such as the USA, South Korea, and India pursuing the development of native 6G components. Meanwhile, Japan and China are already running field tests and early demos of 6G capabilities. The European Union is taking a distinct approach, prioritising sustainability and inclusivity as central pillars of its 6G research and deployment strategy.



Figure 4: Key international developments for 6G networks

The highlight of these initiatives is that they encompass a diverse range of strategies unified by a single goal: to seize the first-mover advantage in the next generation of connectivity, thereby gaining economic power and digital sovereignty for the next decade. However, even if first-mover advantage through hardware research and field tests is arguably an essential milestone, the EU's "Hexa-X-II" vision serves as an important reminder that there is more to these networks: they should be designed with the future in mind.

### **So then, what does the future and 6G hold for us?**

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6G is no longer a distant concept; it is starting to emerge as a potential strategic point that could interweave economics, sustainability, social impact, advanced technology, and geopolitics. Across the globe, there is a common agreement: 6G has transformative potential, and consequently, the potential to determine who owns future prosperity, offers better security, and is more committed to the environment. It challenges enterprises and societies alike to fuse sensing, connectivity, and intelligence more deeply than ever before. At the same time, it raises concerns about data sovereignty, algorithmic accountability, and technological equity. The road ahead demands a delicate balance: driving rapid innovation while navigating the potential implications of this novel technology. Whether 6G fulfils its promise or falls into the trap of premature hype will depend on how such challenges are navigated. One thing is certain: the next five years will be decisive and incredibly exciting.

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**Disclaimer:** The views expressed herein are based on best-available data and independent analysis of public sources. This article is intended to inform strategic dialogue and does not constitute legal, regulatory, or investment advice.

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