Frost Radar

Frost Radar: 5G Network Infrastructure, 2023

A Benchmarking System to Spark Companies to Action - Innovation that Fuels New Deal Flow and Growth Pipelines

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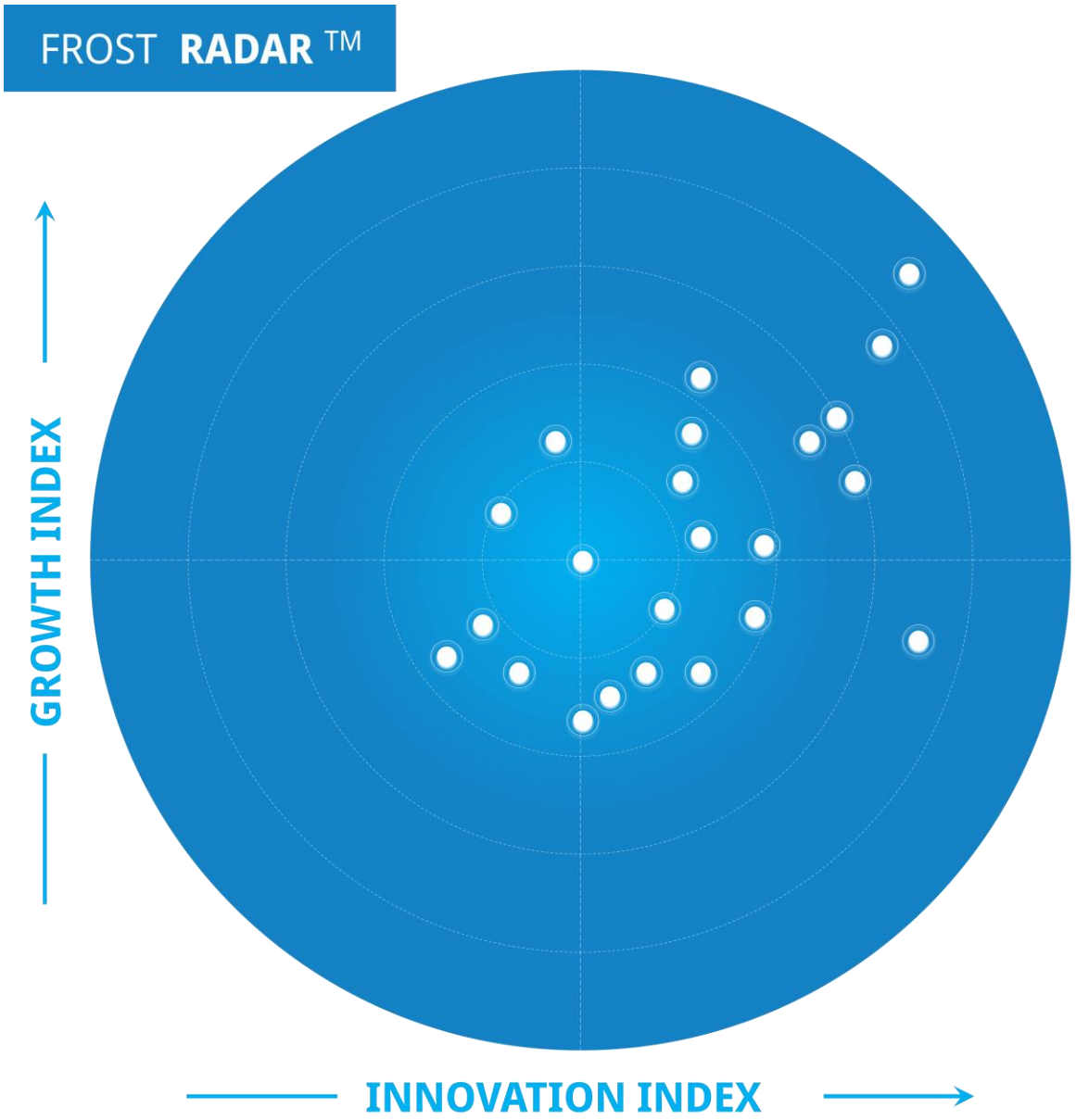

Research summary

This Frost Radar covers the year 2022.

Frost & Sullivan defines 5G network infrastructure to include the following:

- Radio access networks (RAN)
- Transport networks
- Core networks, which may include one or more edge networks

The 5G network infrastructure market includes public networks run by communications service providers (CSPs) and private 5G networks that enterprises in many industry verticals use.

Strategic imperative

5G introduces many disruptive technologies, from new chips and devices to new network architectures, that will affect all areas of network infrastructure.

The promise of 5G for consumers and for enterprises is huge. The impact to communications service providers (CSPs) and their suppliers is equally large (in a good way). Growth opportunities abound.

5G core and edge networks are now entirely cloud-based, and the 5G RAN is quickly moving to the cloud. The industry is exploring open interfaces and new architectures for the 5G RAN (which Frost & Sullivan refers to as open and virtual RAN), enabling new suppliers to compete in the market. The 5G transport network ties together the RAN, the edge, and the core and also is cloud-based.

Functions from the core network and from the RAN are moving to edge networks to reduce latency and enable new use cases.

While CSPs are heavily investing in 5G, how financially successful the 5G era is for them remains to be seen. This will depend largely on how they monetize the technology and how successful they are with the enterprise segment, which has the potential to grow significantly.

Device and infrastructure suppliers are succeeding now with CSP investments, but new business models need to be created for the providers themselves to cash in.

The consumer market, which has been the bread and butter for CSPs, will remain important, but profit margins will remain low.

The business and enterprise market will become key to the success of CSPs. Network slicing and private wireless networks will be areas of focus. Slicing will become more widespread as 5G networks become stand-alone, utilizing a 5G core network. This is slowly happening worldwide.

The chaos caused by the COVID-19 pandemic has affected 5G, but surprisingly the impact has been relatively muted. The 5G rollout continues with relatively minimal impact (and it is continuing to roll out faster than 4G did more than a decade ago.)

A greater impact to 5G has come from the United States pushing to block Chinese suppliers from competing in parts of the world. This primarily affects Huawei and ZTE, two leading network infrastructure providers. Some suppliers have looked to take advantage of the situation, with Samsung increasing market share in certain geographies and now NEC also looking to expand outside of Japan.

Growth environment

Frost & Sullivan believes that global CSPs altogether invested just over $60 billion in 2022 on their mobile and wireless network infrastructure, depending on what is included. This investment will increase at a compound annual growth rate (CAGR) of approximately 3.7% over the next five years. The majority of that spend is on the RAN, with smaller spend on transport and core networks.

While the 5G era is underway, investments in 2G, 3G, and 4G networks continue. 4G networks remain in the majority and will be for the next few years, so investment is still considerable but is already flattening and will soon begin to decline. Investment in 5G networks will accelerate and become dominant. Investment in 2G and 3G networks is limited and is declining.

Frost & Sullivan studies related to this independent analysis:

- Global 5G Network Infrastructure Growth Opportunities, January 2023
- Global Open and Virtual 5G Radio Access Network Growth Opportunities , October 2022
- Global Private 5G Network Growth Opportunities, July 2022
- Global 5G Network Automation Growth Opportunities, May 2022

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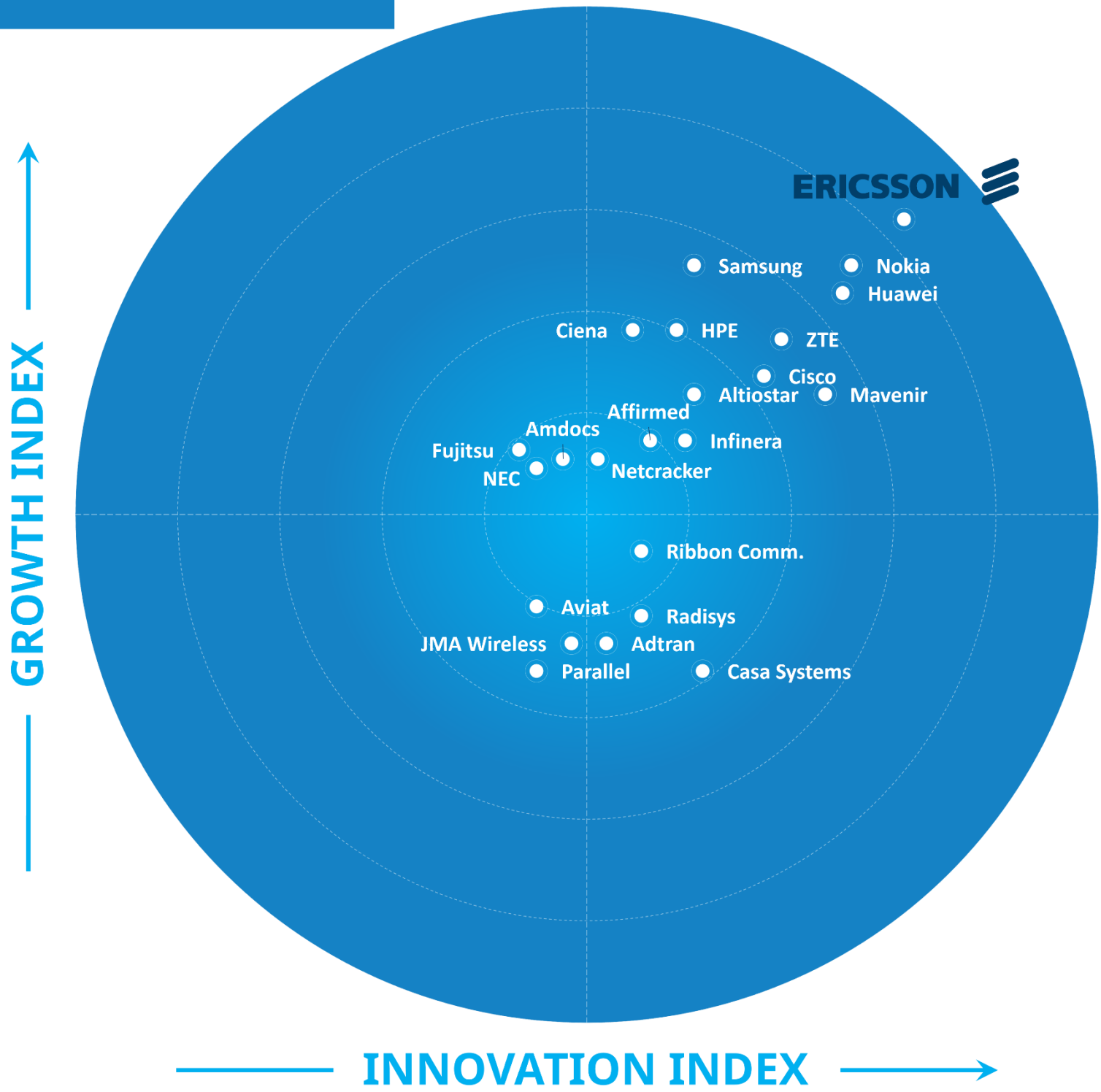

Source : Frost & Sullivan

Competitive environment

In a field of more than 100 global industry participants, Frost & Sullivan independently plotted the top 23 companies in this Frost Radar analysis. These companies either lead the market overall, lead a market segment, or are thought leaders in certain segments.

The 5G network infrastructure market is emerging and built upon the established 4G network infrastructure market; therefore, it is unsurprising that leaders from 4G place highly here.

The architecture of 5G brings the possibility of many suppliers working together in each of the areas of network infrastructure: RAN, core/edge networks, and transport networks. In other words, the core network is likely not from a single supplier, but from many suppliers each providing one or more network functions. This opens the market to new suppliers. Increased competitive intensity raises the level of innovation.

The Frost Radar measures growth rates in addition to absolute revenue and combines them with several other factors to measure companies' performance along the Growth Axis. The Frost Radar measures innovation for each company by assessing its product portfolio, the scalability of its innovations, the efficacy of its R&D strategy, and several other factors.

In this analysis, Ericsson ranked highest on the Frost Radar followed by Nokia and Huawei. All were leaders in 4G network infrastructure and continue to lead the 5G network infrastructure market. Their offerings include RAN, transport networks, and core/edge networks.

ZTE also ranked highly. ZTE was in a similar position in the 4G network infrastructure market, and has strong initial success in 5G, particularly in China.

Samsung also has had strong initial success in the 5G market, moving into new geographies and offering itself as an alternative to the leaders, particularly in locations where there is resistance to Chinese suppliers, such as the United States.

The five suppliers just listed hold a combined market share of approximately 85%. Most of the rest either focus on a limited part of the infrastructure market or are smaller suppliers (or both).

Mavenir ranks highly in innovation. This is notable given that the company is much smaller than the top five. Mavenir supports core/edge networks and is actively involved in the open and virtual RAN movement.

Cisco offers core/edge solutions and transport solutions and also ranks highly in innovation.

HPE also ranks highly even though its focus is only on core/edge networks. It continues to offer the "infrastructure for the infrastructure," providing hardware that underlies the telco cloud and software network functions for core and edge networks.

Ciena is strong in growth but only supports transport networks. Infinera also supports only transport and ranks higher in innovation but is roughly half the size of Ciena.

A number of smaller suppliers focus on open and virtual RAN but are thought leaders in space, including Altiostar and Radisys.

Ericsson

Innovation

Ericsson has proven its ability to scale its innovations globally with 2G, 3G, 4G, and now 5G. For 5G, the company currently reports 145 live 5G networks in 63 countries (the highest level that Frost & Sullivan has seen publicly reported).

The company invests significant amounts in R&D; this is essential in a market in which technology is always evolving.

Ericsson's product portfolio includes all areas of 5G network infrastructure as well as previous generations of network infrastructure. Ericsson also offers private networks and is an active participant in the O-RAN Alliance.

The CSP market is Ericsson's primary focus; the company's strategy continues to center on evolving CSP needs in all areas of the world. However, with its 2020 acquisition of Cradlepoint, Ericsson is also focusing on expanding its role with enterprise customers.

Growth

As a leader in the 4G infrastructure market, Ericsson enters the 5G market with a large customer base.

The company has done an excellent job keeping its current customers and adding new customers. Ericsson maintains a significant pipeline of customers that have yet to move to 5G but will over the coming years.

Ericsson has spent the last few years adjusting its overall strategy to focus on profitability. The company has indicated that its strategy has been successful, even with the challenges brought by the pandemic.

Frost perspective

The 5G era is just beginning but will be long-lived. While the company's turnaround strategy has been declared successful, the battle to continue to grow and maintain profitability is just starting and will need a sustained focus.

Energy efficiency is now the buzzword. While early 5G RAN solutions focused on proving the technology, Ericsson's current 5G RAN solutions tout being smaller and lighter and saving energy, which is answering its customers' needs.

Participating in the nascent open and virtual RAN movement is essential. While significant sales may be years away, eventually open and virtual RAN will become the norm.

The market for private 4G and 5G networks is growing rapidly, and that growth should continue for many years. Ericsson must work with its CSP customers to target these new opportunities in the enterprise world.

Strategic insights

Growth opportunities abound in the 5G market, from network infrastructure suppliers to their CSP clients and, in some cases, their enterprise clients, and from CSPs to their consumer and enterprise customers. Growth in the 5G network infrastructure market is just getting underway and will present opportunities for the next decade or more. This is a large market—in the many tens of billions of dollars annually.

The architecture of 5G has moved much of the network infrastructure to be software-driven in a cloud environment. This has opened the market to many new suppliers. Companies that were once called "network equipment providers" still lead the market, but they face much more competition as the market moves from hardware (equipment) to software (network functions).

Open and virtual RAN covering 5G and previous generations is a niche market now but will grow significantly over the next decade. Private 4G and 5G networks are also a small submarket at this point but will experience strong growth in the coming years. Both areas should be considered for all 5G network infrastructure suppliers. Both new niches also give smaller suppliers new inroads into the market.