

The Realities of Creating a  
**5G-Ready World**



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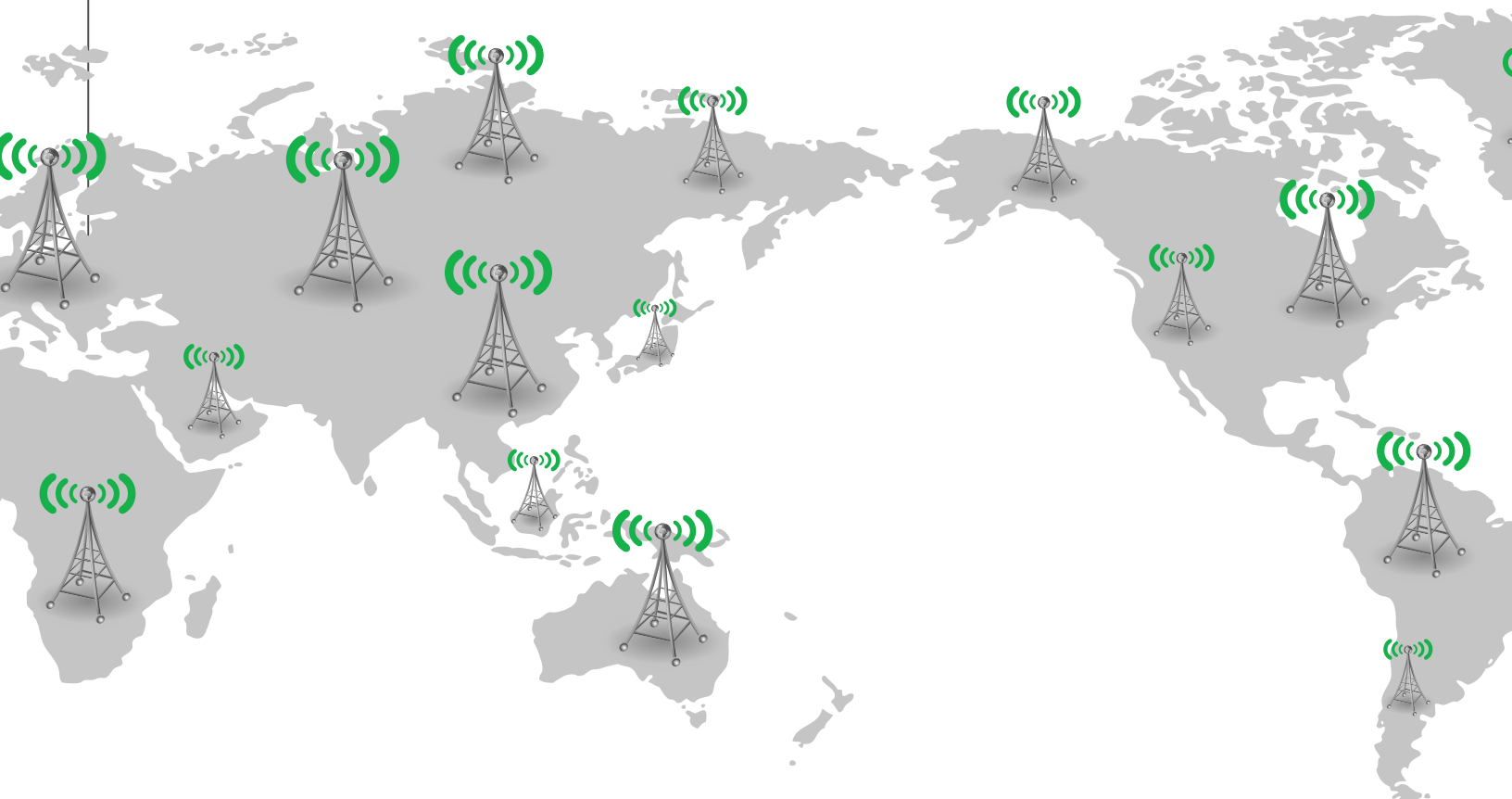


## 01

## Executive Summary

The 5G rollout has focused the world's attention on how telecommunications will be transformed in the 2020s. With the kind of attention 5G has drummed up worldwide, it is no surprise that operators, tower companies, and network service providers want to gain the first mover advantage in rolling out 5G services. However, provisioning for network set up and upgrades have concerned decision makers. Companies not only have to invest in the improvement of network components, like radio towers and small cells, but also ensure they have required manpower to pull off large-scale projects.

Due to competing demand for vendors and contracting services, the availability of experienced technicians often gets called into question. Operators and telecom companies have to gauge whether contractors are aligned to their requirements and undertake thorough prequalification processes. In the long run, this helps companies ensure worker safety while minimizing the risk of damage to operations and brand reputation.



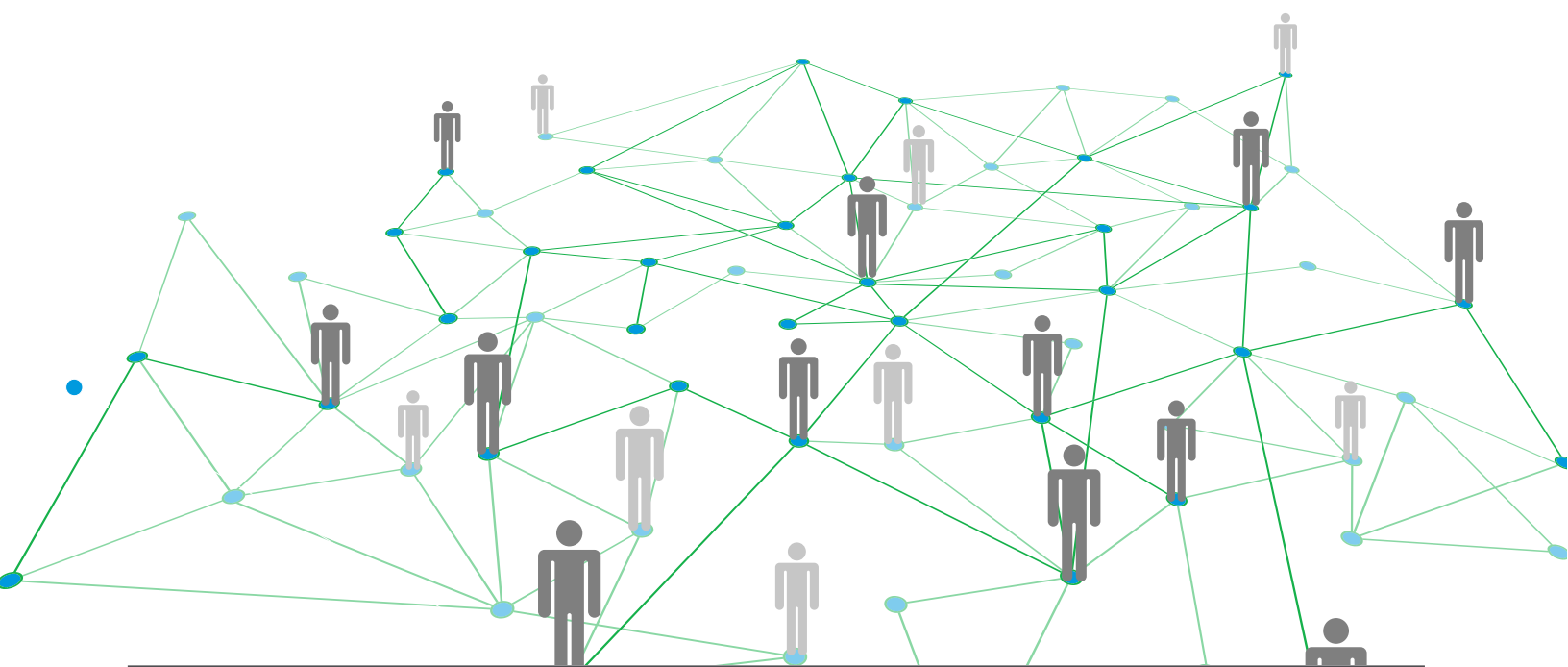
## Connectivity in Its Latest Iteration

We live in an age where fiber optic cables are to telecommunications, what railway lines were to trans-continental transportation — connection and movement at an unprecedented velocity and scale. As the world tears headlong through the Fourth Industrial Revolution, 5G represents another leap forward in the way businesses and individuals connect.

With mobile broadband networks gradually becoming the primary form of subscriptions, 5G is billed as the technology that will enhance data consumption. Industry reports reveal that 5.7 billion mobile broadband subscribers worldwide account for 74% of mobile subscriptions.<sup>1</sup> Within the U.S., the third quarter of 2018 registered 380 million mobile broadband subscribers. It's estimated that within the next five years, in North America alone, 5G will account for more than half of all mobile subscriptions.

While these figures look promising, they also spell turbulent times ahead for the industry. 5G requires a paradigm shift in the way companies approach network deployment. Current regulations governing physical wireless infrastructures take into account 200-foot tall monolithic cell towers. But 5G networks will involve thousands of small cells embedded into street poles or other structures.

The Federal Communications Commission (FCC) has taken measures toward modernizing regulations and streamlining wireless infrastructure development.<sup>2</sup> This proposal was drafted by the commission after extensive consultation with network builders, wireless carriers, and federal agencies.



5G also represents a radical shift in business models. Besides a growing cohort of regular mobile internet users (Figure 1), 5G users will also include millions of sensors and machines, the connectivity to which will have to be purchased by the companies who operate these devices.

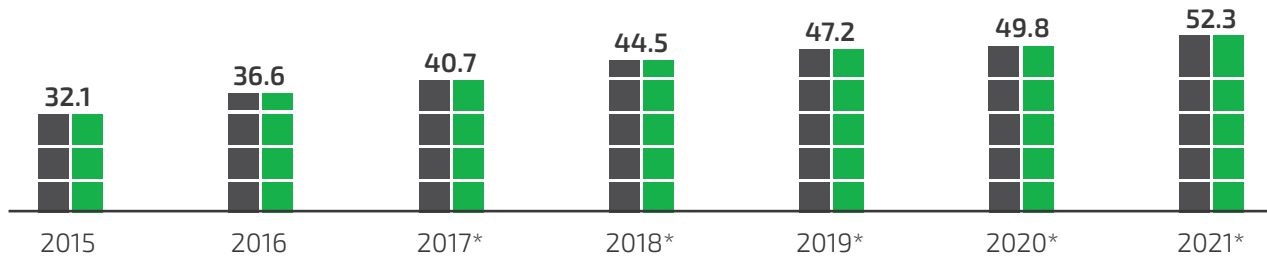


Figure 1: Number of mobile-only internet users in the U.S from 2015 to 2021 (users in million)

Source: Statista<sup>3</sup>

5G is poised to deliver higher bandwidth capacity, lower latency, higher speeds, and greater energy savings. This is apparent in the new specifications unveiled by the Third Generation Partnership Project (3GPP), an international consortium that defines telecommunications standards. Release 15 issued by 3GPP sets 5G New Radio (NR) as the "acceptable" 5G standard.<sup>4</sup> It primarily comprises Multiple Input-Multiple Output (MIMO) beams, small cells, and millimeter waves. The new Millimeter Wave MIMO system will help 5G to transcend three critical technical thresholds:

- **Wireless internet speeds will exceed the throughput offered by conventional cable broadband and fiber optic cable**
- **The Internet of Things (IoT) will enjoy mass industrial and domestic applications for the first time**
- **Staggeringly low network latency (as low as 1 millisecond end-to-end round trip delay)<sup>5</sup> will give rise to advanced and tactile internet applications like remote surgery**

Transformative technologies also demand transformative infrastructure changes. The performance of 5G networks will hinge on the accuracy of tower positioning, small cell deployment, and fiber miles. However, engineers and technicians face a significant degree of risk while mounting these structures. Furthermore, with competitiveness pivoting on first mover advantage, major telecom players are looking to complete their projects on time and without incident. Achieving this calls for vast amounts of manpower with skill and experience ranking high on the priority list. Choosing vendors who can supply high-skilled workers is therefore a necessity.

The 5G transition is likely to have a broader economic impact than the previous wireless generations. Projections have shown that the 5G infrastructure market will grow at a compound annual growth rate (CAGR) of 50.9% every year, eventually reaching a market value of \$33.72 billion by 2026.<sup>6</sup> The time to prepare for this incoming wave is now.

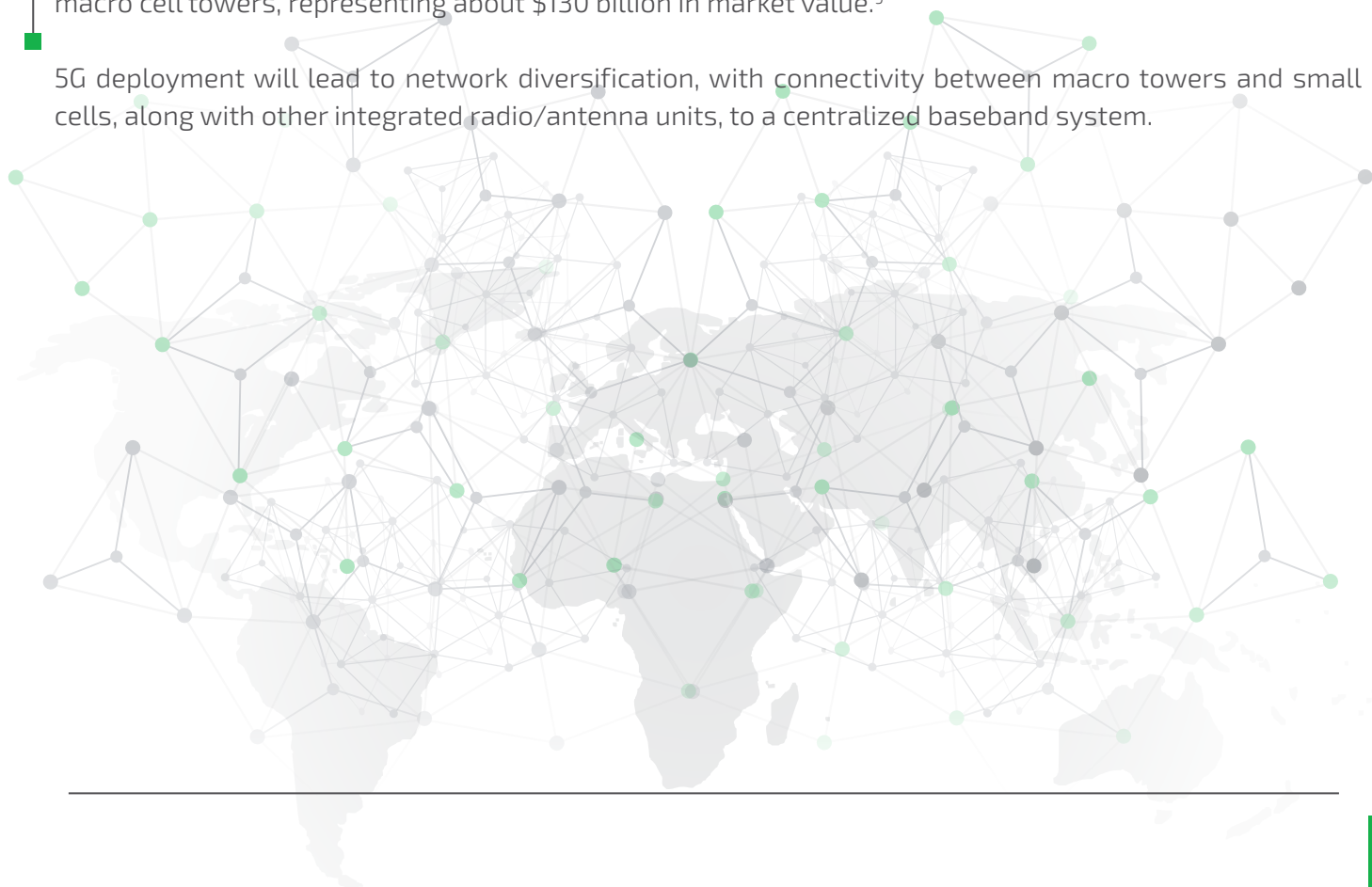
## What Comprises Comprehensive 5G Infrastructure

Shreveport, Louisiana has witnessed a 5% decline in population density over the last five years.<sup>7</sup> An economic plan aimed at reviving the Shreveport-Caddo area has been designed to inject a new lease of life into this historic city. The plan is to attract new human capital to a smart city transformed with the help of cutting-edge 5G wireless technology by 2030.<sup>8</sup> Compounded with a consistent push for expanding 5G into rural areas, scenarios like this provide ample evidence that the magnitude of infrastructural change required to make 5G functional will be massive.

With larger applications in edge computing, autonomous vehicles, AR/VR, smart factories, and so on, prominent telecommunication companies — Nokia, Samsung, Ericsson, Dell — have emerged at the forefront of the 5G infrastructure brigade. However, with simultaneous improvements to radio access networks (RAN) emerging as the norm, cell tower companies play an equally influential role.

Currently, the three largest cell towers, Real Estate Investment Trusts (REITs), American Tower Corporation (AMT), Crown Castle Incorporated (CCI), and SBA Communications (SBA), comprise 80% of the 100,000 macro cell towers, representing about \$130 billion in market value.<sup>9</sup>

5G deployment will lead to network diversification, with connectivity between macro towers and small cells, along with other integrated radio/antenna units, to a centralized baseband system.



## Macro Towers

Tower companies and telecom operators have been moving ahead with equal gusto on expanding network infrastructure. In August last year, SBA CEO Jeffrey Stoop commented that all four major operators were pushing ahead at a steady clip to establish macro cell towers.

SBA itself has spent over a 150 million dollars acquiring over 200 communication sites to add to their own tower portfolio.<sup>10</sup>

## Small Cells

While small cells are set to become an intrinsic part of the 5G infrastructure, only one of the three major tower companies, CCI, has made significant investments in the same. The company deployed around 5,000 to 7,000 small cells a few years ago. Now, they deploy anywhere from 10,000 to 15,000 small cells.<sup>11</sup>

According to analyst Nick Del Deo from MoffettNathanson LLC, "With their small size and ability to further strengthen existing networks, small cells are likely to be seen as a way to address expected surges in data traffic, taking a less invasive approach than building a tower in a residential neighborhood or digging up the ground for fiber."<sup>12</sup>

# 04

## The Rich Competitive Tapestry of Telecom

In telecom, technology outgrows its purpose within short spans of time, requiring frequent leaps of innovation. This is most evident in consumer-facing technologies — eleven iPhone generations in as many years — but is also true of networks, chips, and other manufactured components. To catalyze further innovation, operators and telecom majors have begun developing their own network offerings, software and managed services to remain competitive. Ericsson, a manufacturer of mid-range cell phones, was gradually falling behind the competition. They found their footing by manufacturing state-of-the-art network infrastructure and offering managed services like network rollout, systems integration, and so on. In the U.S., carriers like Verizon and AT&T have diversified from end user-based business models to offering enterprise IoT solutions.

The large functional overlaps resulting from deals, mergers, or revenue diversification has left the competitive landscape in telecom looking like a mosaic.

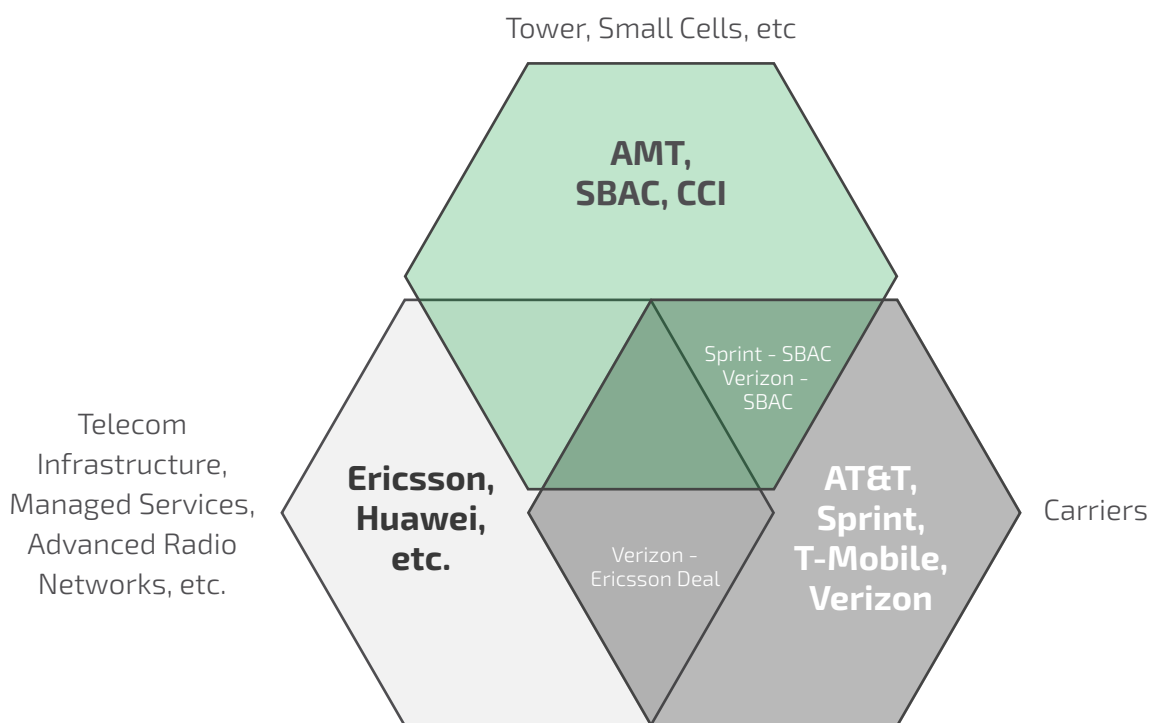


Figure 2: The Overlapping Landscape of Telecom Industry

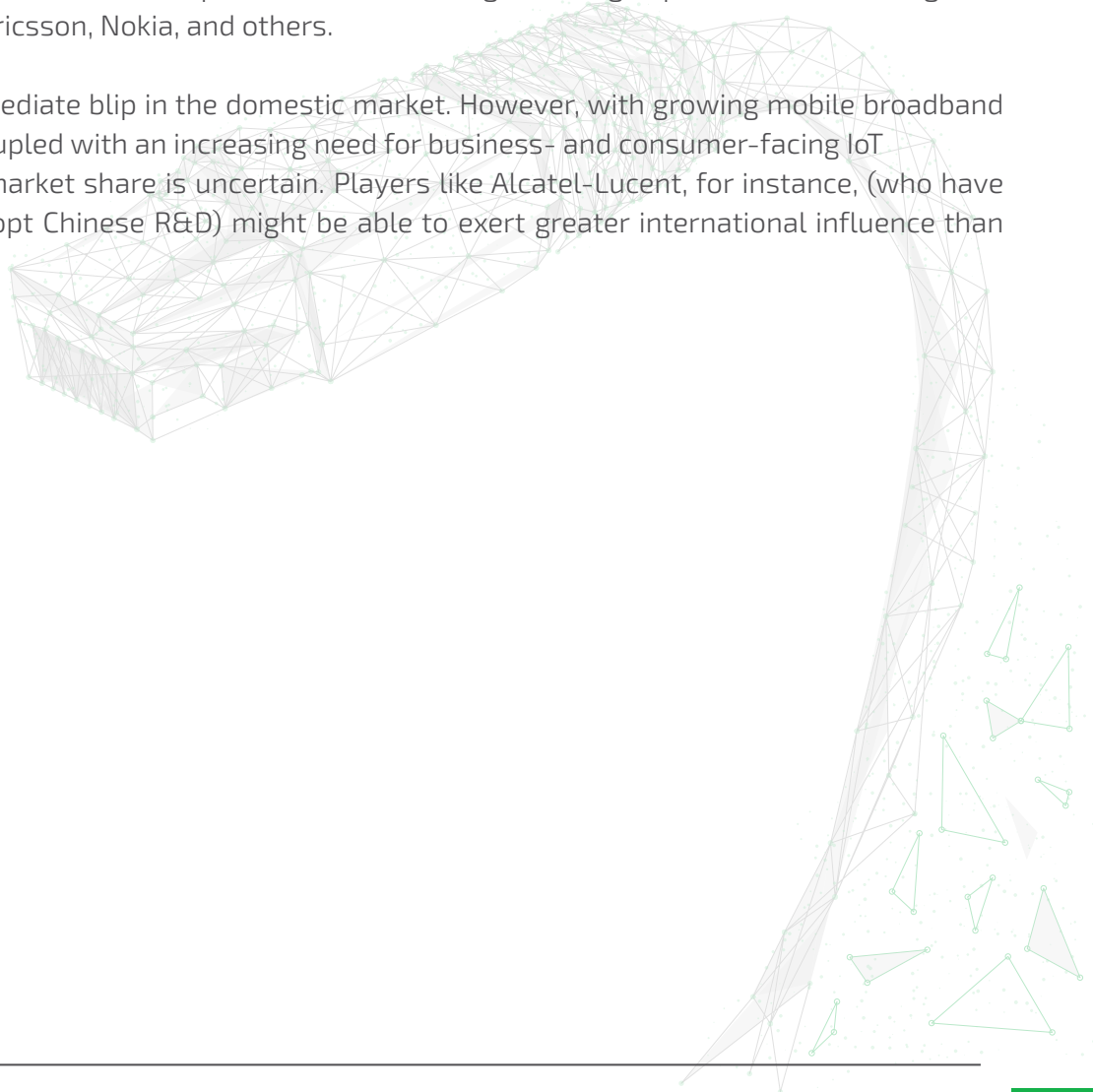


And, with the 5G rollout underway, revenue projections remain in the green for each category. Cell tower REITs, especially, continue to remain competitive since site leasing requirements are not going to abate any time soon. In fact, according to a 2018 survey, respondents reported a 75% increase in leasing activity in the second quarter.<sup>13</sup>

The T-Mobile and Sprint merger has seen both parties moving forward at a steady clip with their own deployment plans. However, tower companies do not see this affecting their prospects in the near future. According to Rich Rossi of AMT, this development “could create an environment that is net neutral.”<sup>14</sup> Jay Brown of SBA has echoed this, saying this will have no impact on their organic leasing activities.

Tangles with the executive branch and the FCC also affect competitiveness. Regulatory authorities like the FCC have exerted some control in the form of millimeter wave auctions and new rules pertaining to small cell placement on public property. In a high-profile case, the City of Seattle has taken the FCC to court over how much companies can be charged for setting up 5G cells on public property.<sup>15</sup> Government regulations have also limited the import of Chinese components and technologies, though operators have managed to strike lucrative deals with Ericsson, Nokia, and others.

This may not create an immediate blip in the domestic market. However, with growing mobile broadband adoption internationally, coupled with an increasing need for business- and consumer-facing IoT platforms, the fate of U.S. market share is uncertain. Players like Alcatel-Lucent, for instance, (who have shown no reluctance to adopt Chinese R&D) might be able to exert greater international influence than American carriers.<sup>16 17</sup>



## How Competition Affects Vendor Selection

Operators are clearly burdened with immediate infrastructure demands in a competitive landscape. Grappling with issues of vendor and resource scarcity has become business-as-usual. For instance, SBA's lucrative deal with Dish Network to set up narrowband IoT infrastructure is yet to get off the ground due to various reasons like pending approval from the FCC. To counter this, operators and network majors need to adopt practical solutions which ensure projects remain on track and deadlines remain uncompromised.

### Cooperating with the administration

Now more than ever, telecom companies across all three categories will have to find mutual ground with regulatory authorities like the FCC and forge positive working relationships. These dynamics can decide how favorably a company is positioned to receive funding, bandwidth access, rent on infrastructure, and so on.

### Network sharing

While prominent carriers continue to invest in infrastructure buildouts, network sharing continues to yield practical benefits, allowing companies to reduce costs while renting prime communication sites. This is already a practice in the industry. More of such strategic partnerships between operators and tower companies can ensure smooth operations.

### Creating a seamless supply chain

Access to high-performing 5G connections will depend on an intricate chain starting from fiber to street furniture. Operators will need to work in conjunction with their supply chain partners like wireless providers to ensure all activity is on track.

Right now the telecommunication industry is knee-deep in strategic partnerships and new projects thanks to the promise of 5G. With only a finite number of entities facilitating project rollout, the prospect of vendor scarcity is real. In such situations an in-depth supply chain management scorecard based on goal-alignment, performance metrics, and a robust track record will ensure reliable operations and minimize unforeseen overheads for cell tower companies. This can be achieved by having a robust contractor management system in place.

**Prequalification:** Location, availability, and project scale are the key determinants of vendor requirements. It is of utmost necessity to gauge whether they are aligned to the requirements of contracting parties. Usually this calls for a unified documentation platform which captures the track records of contractors in full and make them accessible when required.



**Auditing:** Working as a contractor for tower companies requires a specific knowledge base and skill set. Projects may run on tight deadlines, furthering the need for speed and efficiency. It is therefore important to screen for contractors and suppliers who are not only capable of performing the tasks at hand but also do so safely and diligently. One important way of doing this is by screening candidates for proper insurance documentation and certifications.

## 06 The Future is 5G

The necessity of skilled workers makes it impossible not to think of the men and women who sparked change during a previous industrial revolution, creating behemoths of glass and steel, symbolic of the aspirations of that generation. As they began dotting urban landscapes with increasing frequency these structures became an indomitable sign of progress.

5G has brought us to the cusp of such a transformational time again. As innovation marches forward, robust infrastructure and manpower are, once again, undeniable necessities. The possibility of these critical components running in short supply remains an imminent reality.

Mitigating this risk calls for meticulous planning — thinking a few steps ahead will ensure resource allocation is on track and worker safety remains uncompromised. This will be of benefit to both parties: Planning ahead will not merely ensure the safety of people at the frontlines of progress but also reduce the chances of damage to brand reputation, litigation, settlements, and blowback.



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