

Telecommunications

A 5G manifesto for the CEO

The transition to a 5G world is far more complex and uncertain than the shifts to previous generations of wireless technology. Five key principles will help telco CEOs better prepare for the challenges that lie ahead.

February 2019

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Most operators today are priming for the rollout of 5G wireless technology. The majority are doing trials, some are busy acquiring spectrum, and a minority are deploying 5G in focused areas.

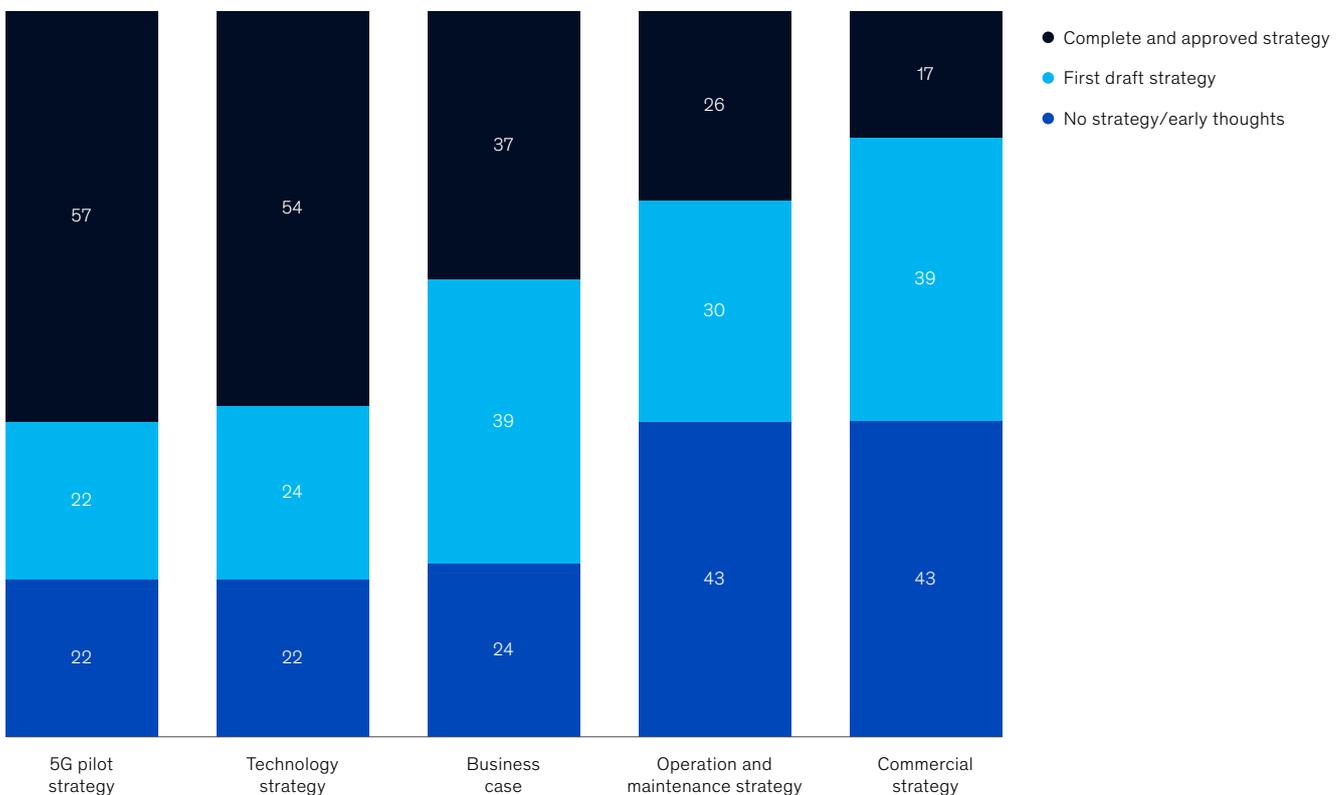
But all still face uncertainty about what the future might hold given untested use cases, regulatory issues, and unproven economics. As a result, most are proceeding cautiously. While many have made progress developing their technology and pilot strategies, few have moved beyond the early stages of developing their business cases and commercial plans, according to a new McKinsey 5G survey (Exhibit 1).¹

Our view is that no matter which stage operators find themselves at, five key principles will help guide the formulation of their strategies and help them better prepare for what might lie ahead.

Exhibit 1

The technology strategy is mature for most operators, while commercial strategy and business case remains immature for most

Current status of 5G strategy development,¹%



¹100% = 46 operators.
Source: McKinsey 5G Survey 2018

¹See previous article, "Cutting through the 5G hype: Survey shows telcos' nuanced views."

1. 5G strategy must be led by the CEO

The journey from second generation wireless technology, when voice was still king, to the data-focused fourth generation has been evolutionary, with legacy mobile networks gradually repurposed and improved over the course of two to three decades. Fifth generation networks are altogether different. 5G promises a step change in service—lightning-fast speed, incredibly low latency, and the capacity to carry massive numbers of connections simultaneously—ushering in all sorts of new communications possibilities for work, play and in between.

Yet the stakes for operators are high, as 5G requires big upfront commitments at a time when future rewards are still far from clear. For example, one way or another, operators need to commit to building costly new infrastructure. Yet strong returns on those investments are unlikely to lie in a mass market offering, as was the case with previous generation technologies. Instead, they're more likely to reside in specific new use cases, from the Internet of Things (IoT) to fixed wireless access (FWA) to ones not even dreamed up yet. But when those will start bringing in significant new revenues, and customers, is uncertain.

In addition, regulators are releasing a few different bands of 5G spectrum simultaneously. This adds further complexity, since bands used for different mobile technologies require different network upgrades, pushing upfront capital expenditure to unprecedented levels. Important too is the fact that it looks like network sharing will play a significant role, which could reduce the cost of 5G. But the long-term strategic implications of a commitment to network sharing—perhaps even with a competitor—are difficult to predict. In our survey, 93 percent of respondents said they expect network sharing to increase with 5G.

Because the stakes are so high, an operator's 5G strategy needs to be not just guided, but truly owned by the CEO. He or she cannot view (and treat) 5G as just another G, when the business case for network upgrades and expansion were clear and the CTO could, in large measure, be left to get on with the job. Yet according to our survey, in most companies it is the CTO who is still leading the way, with strategies that fall under his or her sphere of influence the most developed.

A CEO's top priority must be to decide the company's strategic stance. Some operators will choose to be network leaders, committing to fast, national or regional rollout to secure first mover advantage. Others may opt to focus more narrowly, perhaps on certain regions or cities, use cases, sectors, segments, or clients. Operators who serve stadiums, shopping malls, or private hotspots could focus on these areas first, for example, while those with a manufacturing client base could lock in these clients by helping facilitate smart, autonomous systems. The choice will depend on each operator's existing customer base, appetite to invest, and ambitions.

2025

Most operators worldwide plan to have their RAN sites upgraded by 2025.

2. Don't focus on RAN alone. Understand the investments required across the entire 5G architecture.

Radio access network (RAN) decisions are important, and rightly get a lot of attention. That's because RAN accounts for the lion's share of mobile operators' costs given the large number of sites in a network. These will need to be upgraded, and most operators worldwide have plans to do so by 2025. In addition, many small-cell sites will be needed to extend the coverage of mobile networks to indoor areas where outdoor signals do not penetrate well, or to add outdoor capacity in areas with very dense data usage. This will trigger a whole new set of considerations besides cost. The network design, access to adequate cheap infrastructure, and deployment timelines are all key to profitability.

Yet 5G will require investments in all network domains, not just RAN. These are rarely discussed. Here are some of the most significant:

- **Core network:** Equipment manufacturers are still developing the technology for core 5G networks. That presents some tricky decisions for operators, balancing the desire to be fast to market with the need for solutions that will be future-proof. Initially the choice shouldn't be that difficult. Since many elements of current 5G technology build on 4G networks, mobile operators can take an evolutionary approach to infrastructure investments, upgrading existing 4G core networks to support 5G ones and adding new 5G functionalities as needed. This incremental approach also makes sense from a financial perspective, given that investments can be kept down when revenue remains uncertain.

- But there will come a time when network upgrades are no longer sufficient to support the new use cases, and new build-out will be required. When should that shift—with the accompanying costs—be made? Indeed, some argue that it makes sense to build a greenfield core network, deploying stand-alone architecture and advanced 5G capabilities from the very start. The advantage is that the operating model can then be entirely cloud-based, and much of it automated. However, that may be a risky option until equipment makers have finalized the technology road map. And even once that is settled, the network would need backward compatibility with 4G to allow for handovers of the use cases that will run on both

- **Transport network:** Many operators' transport networks still aren't ready for 5G. Fiber-only will become essential, because fiber can best support 5G capacity as well as latency requirements and small-cell deployment in urban areas. This will take time and money

- **OSS/BSS:** There has been no shortage of talk about new network capabilities ushered in by 5G, from leveraging latency to enabling more quality guarantees. Yet according to the McKinsey 5G survey, most operators still see investment happening in the network, rather than the enabling layers like operational support systems (OSS) and business support systems (BSS). These are the very systems needed to be able to market, sell, price, provision, and operate the oft-touted new use cases, such as connected cars and mission-critical solutions. Our experience suggests that many operators underestimate their role in enabling a 5G strategy.

3. Pinpoint the cost-saving opportunities

Most operators believe the shift to 5G will be expensive.¹ They have a point. When network upgrades are no longer sufficient to support the increased traffic, operators will need to build new macro sites or small cells, which will be the primary driver behind network cost increases.

However, what many overlook are the opportunities to keep costs in check. First, many operators assume they will have to fund nationwide coverage like the first generation of mobile networks. Not so. As discussed above, they need to pick their geographic, client, and use-case focus with care. Indeed, blanket coverage should be avoided without a clear idea of how to monetize deployment.

In addition, whatever the extent of coverage, there are ways to temper investment costs. For example:

- Where possible, upgrade and retrofit existing macro sites
- To densify networks, build new, small cells instead of macro ones, installing them on lampposts, traffic lights, etc. The best locations for this infrastructure will vary by city and operator. Some operators may choose lampposts if they can strike a good deal with the local utility. An integrated incumbent may rely on the street cabinets it already uses to house its own equipment
- Optimize the network rollout with the help of analytics to know exactly who is using what level of data. A number of operators have done exactly this to maximize returns on investments at the same time as improving the customer experience, with some reducing 4G capital expenditures by up to 30 percent

- Consider network infrastructure partnership options. There may be cities and municipalities keen to push ahead with 5G development that will agree to the use of their infrastructure if it helps deliver certain public services—such as emergency service communications. And operators should not dismiss sharing with other operators, particularly if they are considering deployment in an entirely new location. The cost of small-cell deployment can be reduced by up to 50 percent if three players share the same network, for example.² However, the rationale for sharing extends beyond cost. Sharing could address other roadblocks to the deployment of 5G in urban areas, such as disruption to roads and traffic during installation, and concerns about “visual pollution” caused by so much equipment.



¹ Seventy two percent of respondents in the McKinsey 5G 2018 survey foresaw higher capital expenditure relative to sales.

² See Ferry Grijpink, Alexandre Ménard, Halldor Sigurdsson, and Nemanja Vučević, “Network sharing and 5G: A turning point for lone riders,” February 2018, McKinsey.com.

4 . Embrace cooperation. Your future depends upon it

Far too often, we see companies plowing ahead with their technology strategies without sufficient regard for other stakeholders with whom they will need to cooperate.

Take vendors. Operators have always had to cultivate relationships with them, of course. But with 5G, much more depends on how they work together. That's because in the past, it was relatively simple to move in lock-step with vendors as technology options were limited and spectrum released were aligned to a specific technology. Today, with so many technology choices and different bandwidths, operators could find their decisions leaving them out in the cold if vendors settle upon other technologies that then become industry standards, or that are compatible only with certain spectrum bands.

This aspect of the business will be further complicated by the fact that operators will have to work with a much broader range of vendors. This is largely due to the growth of software-based networking, which has removed many of the high barriers to entry and prohibitive costs that kept newcomers at bay when hardware dominated the sector. In our survey, 57 percent of respondents said start-up vendors would win RAN market share because of 5G.

Relationships with business customers could also prove particularly important in the 5G era, as locking in the right ones early could turn out to be more important than fast deployment. These "anchor" B2B customers may be willing to partner with telcos, as well as other ecosystem players, to experiment with use cases. But that will only be the case if operators can develop much closer relationships with customers than ever before, given how deeply they will be involved with their operations.

Then there are relationships with competitors to consider. In a world of network sharing, they could prove pivotal to success, as players frozen out of strong partnerships could suffer higher 5G costs and a slower rollout.

Finally, much will depend on relationships with government agencies and regulatory bodies, given their power to influence the industry's economics. Their decisions on which and how much spectrum to release first—low bands (700 MHz), mid to high bands (3-4GHz range), or mmWave—will be a key component of network costs. Early release of higher bands forces operators to build out new capacity earlier, thus raising costs.³ How the spectrum is auctioned will also determine costs: auctioning off, say, two small chunks and one large piece in a market with three or more bidders could push bids for the large, more desirable chunk, very high. In addition, some governments extract coverage and network sharing commitments from operators in return for spectrum—commitments that could determine whether rollout will end up being profitable.

In some cases, local government authorities also determine infrastructure access rules, such as whether to allow more than one network access to street furniture or to public hotspots.

All this makes clear why your 5G strategy cannot be built in a vacuum.

~50%

The cost of small-cell deployment can be reduced by up to 50 percent if three players share the same network.

³ Releasing 700 Mhz first allows for low cost rollout as it can be infilled by 3-4GHz4 and millimeter wave.

5G networks will be highly automated and IT networks will converge. That means new tools will be needed for network resource management and new talent.

5. Prepare now for 5G's operational challenges

Uncertainty about how quickly demand for 5G services will grow, and their profitability given the investments required, tends to focus minds on how best to build the network. What gets overlooked are the operational challenges that will ensue, of which there are many. For example:

- Networks will be significantly more complex. There will be more frequency bands. A recent auction of 5G spectrum in Italy offered three different frequency bands, on top of the six bands currently used for 2G, 3G, and 4G, making a total of nine bands for use by operators. As a result, network load will need to be balanced between 3G, 4G and 5G across many frequency layers, and handovers managed not only between the different technologies but between different vendors too
- Network slicing promises great advances in customer experience and delivery, as well as new business models. But its true potential, whereby operators provide dedicated virtual networks with functionality specific to the service or customer over a common network infrastructure, will only be achieved when end-to-end reconfiguration is possible in real time. That degree of sophistication will require high levels of network intelligence and automation⁴

- 5G networks will be highly automated and IT and networks will converge. That means new tools will be needed for network resource management and new talent. Operators will need engineers with native cloud programming and engineering skills, for example—skills that are currently in short supply in the industry. To lure that new talent, they will have to compete with the high-tech giants and small start-ups whose reputations as fast-moving companies with more flexible work cultures—and in many cases better compensation—could seem more attractive.

In sum, the operating model requires reinvention.⁵ Unless operators address these challenges, their deployment ambitions might not be realized.

The transition to a 5G world is far more complex than the transitions to previous generations of wireless technology, and it is not for the fainthearted. Big commitments are needed even though the best path ahead, and the financial return, is not entirely clear. To help make the transition profitable, CEOs should take a firm lead in determining the company's 5G strategy, and be prepared to invest across the entire network, not just RAN. Simultaneously, they should home in on cost-savings, while looking outwards to build partnerships and strong relationships with vendors, eco-system partners, regulators and even competitors. Finally, they need to start tackling 5G's operational challenges. That's a heavy agenda. But being clear about what is required to succeed in the new 5G era can be half the battle won.

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The authors wish to thank Lorraine Salazar and Nemanja Vučević for their contributions to this article.

⁴ See Kim Baroudy, Sunil Kishore, Nitin Mahajan, Sumesh Nair, Halldor Sigurdsson, and Kabil Sukumar, "Reinventing telco networks: Five elements of a successful transformation," January 2019, McKinsey.com.

⁵ See previous article, "The building blocks telcos need to create their digital-and-analytics DNA," January 2019, McKinsey.com.