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# Sink or swim

**Making strategic choices for the telecom industry of the future**



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# About the authors

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## EXECUTIVE SUMMARY

**It may seem as though everything is already online. But our current telecommunications infrastructure will be eclipsed by the digital innovations of the future. By 2025, zettabytes of data will interlace billions and billions of connected objects and areas — including HDTVs, refrigerators, clothing, shipping packages, industrial machines, farmers' fields, smart homes, and connected cars — all controlled through smartphones and other portable devices.**

As this expanded virtual world takes shape, interconnected with the analog physical reality of everyday objects and actions, telecom operators will face a challenge that will shape their business model and their enterprise: how to manage a ubiquitous communications platform, essential to everyone, that they own but do not unilaterally control.

This new world will come into being largely through the impact of 5G networking. Its combination of super-high speeds, increased bandwidth, near-zero latency, and low electric power requirements will transform how consumers and businesses capture, transmit, and use data in its broadest sense to create and control processes and experiences. This will inevitably lead, as the Internet and the smartphone did, to entirely new ways of looking at the world around us. New forms of entertainment, new forms of customer and employee experience, higher process productivity in all sectors, greater community engagement, and new ways to experience education and engage with government may well arise as a result.

One thing we know for certain: The vast amounts of data on which people depend will travel over the networking infrastructure built by the telecommunications industry. The key issue for telecom leaders, therefore, is how to build and profit from this transformative technology.

The challenges that operators face today will only grow more daunting in the 5G era, unless they begin now to make bold strategic decisions that can provide a path to profitable growth in the coming decade.



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## Decision time

Over the past few years, telecom operators in many markets have come under considerable pressure. Revenue growth has stalled, mobile and broadband markets have become commoditized, and companies from adjacent industries — notably technology — have picked away at the industry's once seemingly insurmountable barriers to entry.

With those challenges, it's all too easy to overlook the good news. But it's significant. The industry is on the brink of a sea change in how it delivers data and services to businesses and consumers. That's a major opportunity, given the sheer amount of data required by new technologies such as the Internet of Things, augmented and virtual reality, and artificial intelligence (AI) and machine learning. These technologies, deployed to enable huge numbers of use cases, will vastly increase the flow of traffic over telecom networks. To meet the demand, operators are turning to 5G and other networking technologies, which are expected to bring forth a brave new world of strategic possibilities.

Operators with the foresight, courage, and capabilities to take advantage of the options now appearing will have the opportunity to break the mold of slow growth and poor return on investment. But those that hesitate, that prefer to see what tomorrow brings before defining a clear strategic direction, will be left behind. They will risk irrelevance, while competitors with clear strategic goals capture the many opportunities available.

In this Viewpoint, we look at the current state of the industry and analyze the several paths that operators can take as they chart a course into this uncertain — but potentially prosperous — future.



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## The status quo

Despite the rapid digital infrastructure advances of the past two decades, telecom operators have been able to manage the pressure of change only by evolving gradually from their legacy business models. As fixed-line telephony declined, most operators shifted easily to mobile phone services and broadband connectivity, even though barriers to entry remained high. Because they had room to add subscribers, they could maintain pricing while rolling out new packages and bundles to attract customers. The amount of data flowing through their networks was manageable, and most succeeded in smoothly upgrading their mobile and broadband networks to meet the increased demand brought about by the advent of smartphones. For the most part, operators chose to grow organically rather than diversify into other industries.

That's all changing now. Virtually every telecom market around the world is saturated with subscribers, and those subscribers are no longer willing to pay more for new services. New players, notably technology and over-the-top (OTT) companies, are entering the market from adjacent industries, piggybacking on operators' networks and sometimes trying to compete directly. Regulators, too, are becoming more unpredictable, leaning sometimes in favor of operators and at other times toward a more customer-friendly view.

One result of the current state of the telecom industry, our research shows, is that most mobile telephony markets, and more and more broadband markets, have become commoditized. Commoditization is essentially a measure of market efficiency; we calculate it by analyzing both the average revenue per user (ARPU) spread (the difference between the highest and lowest ARPU among the operators in a particular market) and the market share spread (the difference between the largest and smallest shares of revenue in a given market).

Exhibit 1, next page, shows that just about every market for mobile telephony around the globe has been affected over the past decade. In contrast, commoditization in fixed broadband markets — driven primarily by the narrowing of market share spreads, as new rivals compete with incumbent providers — is not yet complete, and the trend varies considerably from market to market. But all of the major markets are now “on the edge” of commoditization, with the exception of North America.

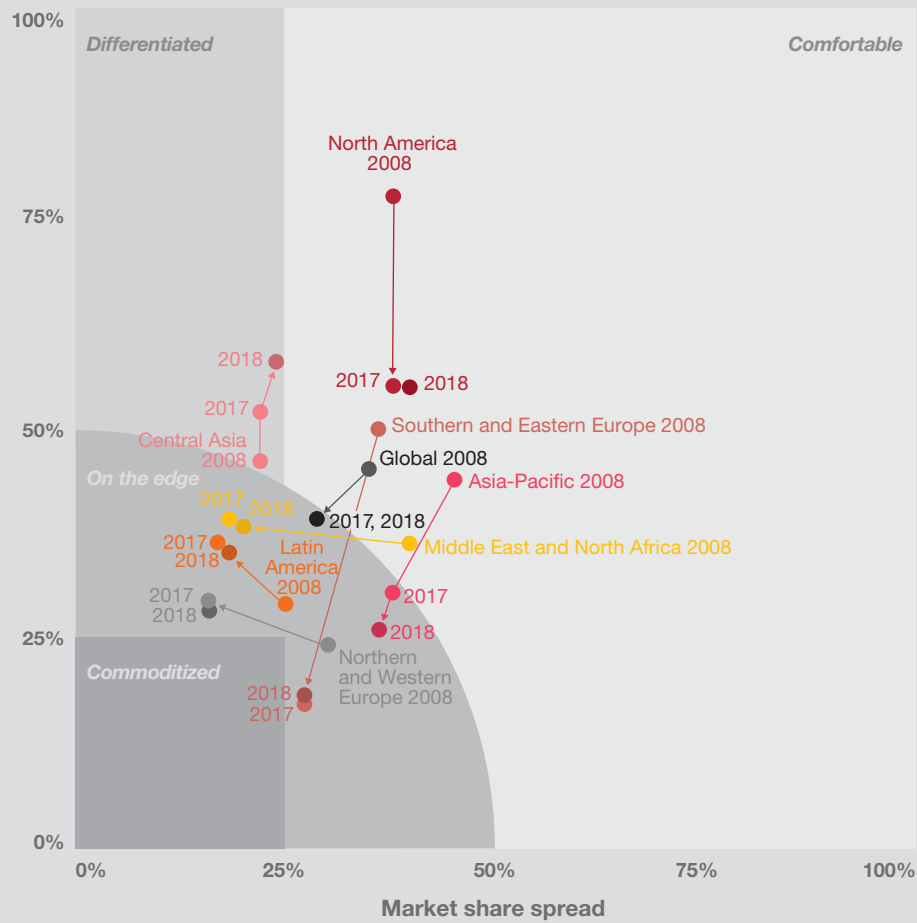
The result is dire for incumbent operators. In most markets, they have lost the ability to differentiate themselves, forcing them to compete mainly on price. And that, in turn, has led to a steep decline in margins for many of them.

The effect of market commoditization — combined with the struggles telecom companies have faced as they try to grow revenues in an increasingly competitive environment — can be seen clearly in the poor returns most operators have provided shareholders in recent years. Total shareholder return (change in share price plus dividends) for a basket of 40 telecom companies around the world from 2016 through 2018 came to just 10 percent for the three-year period, in sharp contrast to the 29 percent increase in the total market index. Virtually all of that return came in the form of dividends paid; share prices actually fell 3 percent during the period. Results varied by region, of course: Greater concentration in North America enabled operators to generate total returns of 29 percent, but in Europe, which is far less concentrated, total returns fell by 11 percent (see Exhibit 2, page 5). So far, telecom operators have had little success in reversing this downward spiral and restoring their luster among investors.

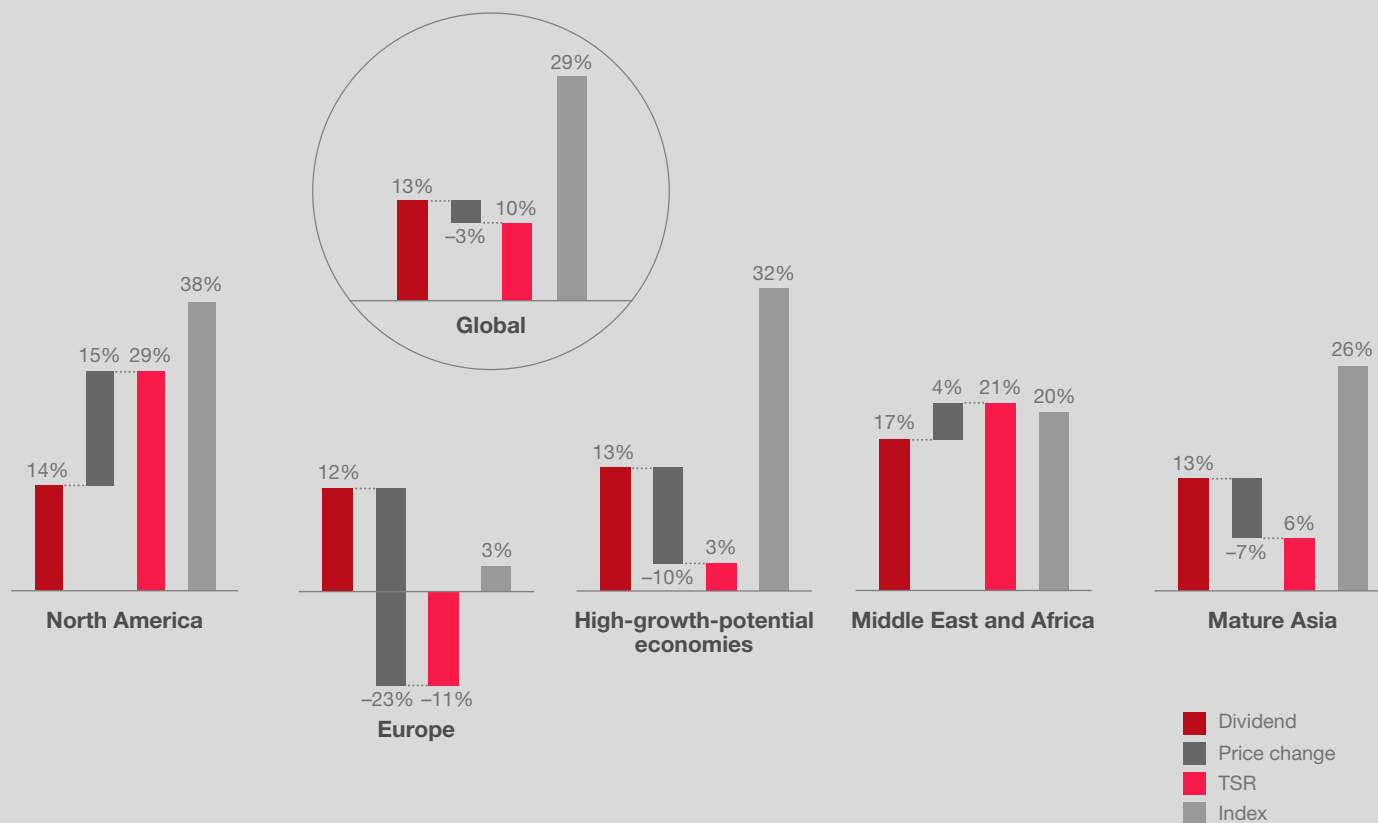
# EXHIBIT 1

## Mobile telecom regional markets on the edge of full commoditization, 2008–18

ARPU spread



Source: PwC's Strategy&

**EXHIBIT 2****Three-year total shareholder return (TSR) across the telecom landscape, 2016–18**

Note: Numbers show total shareholder return from 2016 through 2018 as a percentage of investment. TSR by region is calculated as a weighted average of major telecom companies in each region. Regional indexes used are MCSI indexes for large and mid-cap companies, covering about 85 percent of free float-adjusted market capitalization in the region. High-growth-potential economies are China, Malaysia, Brazil, India, and Russia. Mature Asia is Japan, South Korea, Australia, and Singapore.

Source: Bloomberg Terminal, analysis by PwC's Strategy&







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## The technological imperative

Meanwhile, new technological trends are further changing the telecom landscape. The first trend is convergence, the seamless combination of mobile and broadband services, which is already affecting how some operators offer services to consumers. The second is 5G networking, discussed above, which is only now being deployed in a few markets, but which will eventually lead to even greater convergence in most markets.

Some operators are already taking a first step into convergence, offering bundles of as many as four telecom services (fixed voice, fixed broadband, mobile, and television). For example, the difference between the mobile and fixed market shares of individual operators in Germany, a key indicator of convergence, is considerably lower than in virtually every other market. This reflects the narrowing of the relative market shares of all the big German players. Other markets have been much slower to converge; in India, for example, the build-out of fixed broadband services has lagged far behind mobile, but this is likely to result in the use of hybrid technologies such as fixed wireless access (FWA) broadband in combination with 4G, and eventually 5G.

Although those who are first to achieve convergence in any market will likely gain both market share and pricing power, this advantage will probably not last long; others will soon follow suit. Indeed, as more and more operators achieve this level of convergence and begin to compete aggressively for market share on the basis of price, the trend toward commoditization will only grow.

The second step, full network convergence, will come about only after operators have deployed new technologies such as fiber-to-the-node and, ultimately, 5G.



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## Betting on 5G

The promise of 5G is huge — but fulfilling that promise will be no easy task. The technology offers the potential to manage the exponential growth in demand for data across telecom networks while presenting opportunities to supply even more data. This in turn will enable three overarching business applications:

- **Extreme mobile broadband**, supporting consumer and business use cases such as virtual reality gaming and connected medical scanners
- **Critical machine-to-machine communication**, enabling reliable and low-latency applications such as automated factories and smart mobility
- **Massive machine-type communication**, supporting systems demanding high scalability and low power, such as smart cities and drone-based logistics

As exciting as these opportunities appear now, the road to full implementation of 5G will be long. The capital investment needed to fulfill 5G's promise is huge. Low-latency applications will also require edge-computing infrastructure. Moreover, operators will need to develop or buy the software and device management capabilities needed to run 5G networks. And whether consumers or businesses will be willing to pay up for 5G services remains to be seen. Will operators ever be able to extract enough value to make their 5G investments worth the effort and expense, or will those investments just lead them deeper into the same commoditization trap they find themselves in now?



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## Two roads diverged

If operators are indeed going to make the investment pay off, they must devise a strategy that will give them the right to win in their markets, and they must do so soon. As we see it, the choice of strategies is clear, at least with regard to their general outlines: top-line growth through diversification or bottom-line growth through doubling down on infrastructure while carefully managing costs.

**Diversification.** Many operators have found it hard to resist the temptation to diversify into other industries. The results have been mixed. Some efforts, including French telecom company Orange's move into financial services, seem to have met with a reasonably high degree of success. For others, however, the jury is still out. Operators' struggle to present themselves as growth stocks can be observed, as noted, in their poor returns to investors: Virtually all the total shareholder returns achieved by our basket of global telecom companies between 2016 and 2018 came through dividends; their actual share price declined 3 percent over the period.

Telecom leaders considering a diversification strategy must take two primary considerations into account. The first is whether they have the capabilities needed to compete in the industry they're looking to enter. Do they have the marketing and innovation proficiency, for example, to glean user insights that lead to powerful new products and services and to bring them to market quickly, involving partners and developing new business models?



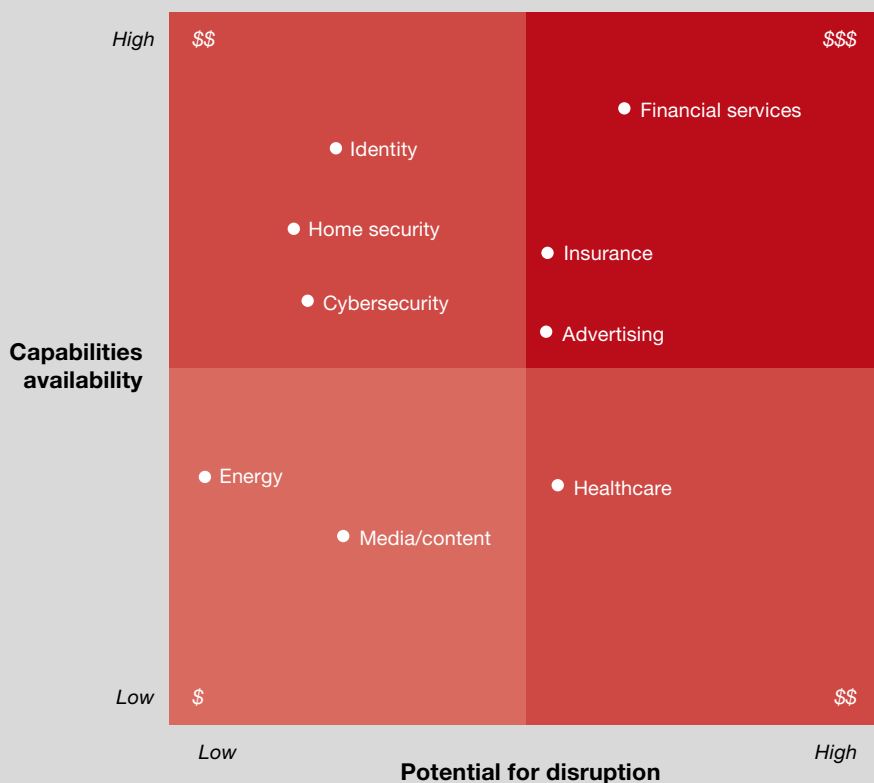


The second is whether the targeted industry is ripe for disruption. The financial-services sector is already undergoing considerable change as companies and consumers alike turn to digital services; given the right capabilities, telecom companies entering the field stand a good chance of making a mark. The media and entertainment sector, on the other hand, is already in the throes of massive realignment, and even the most experienced players are struggling to find the right direction forward (see Exhibit 3).

**Infrastructure.** The other side of the coin involves telecom companies that already possess strong infrastructure and networking capabilities and see a way forward in leveraging those capabilities. By creating and maintaining industry-leading networking infrastructure; reducing costs to a minimum; and managing customer, partner, and regulatory relations skillfully, these operators can provide investors with a reliable long-term dividend stream. But this strategy requires operators to be willing to invest substantially in maintaining and improving their position in infrastructure — and that will be expensive, especially as they roll out 5G.

### EXHIBIT 3

#### A framework for diversification strategies



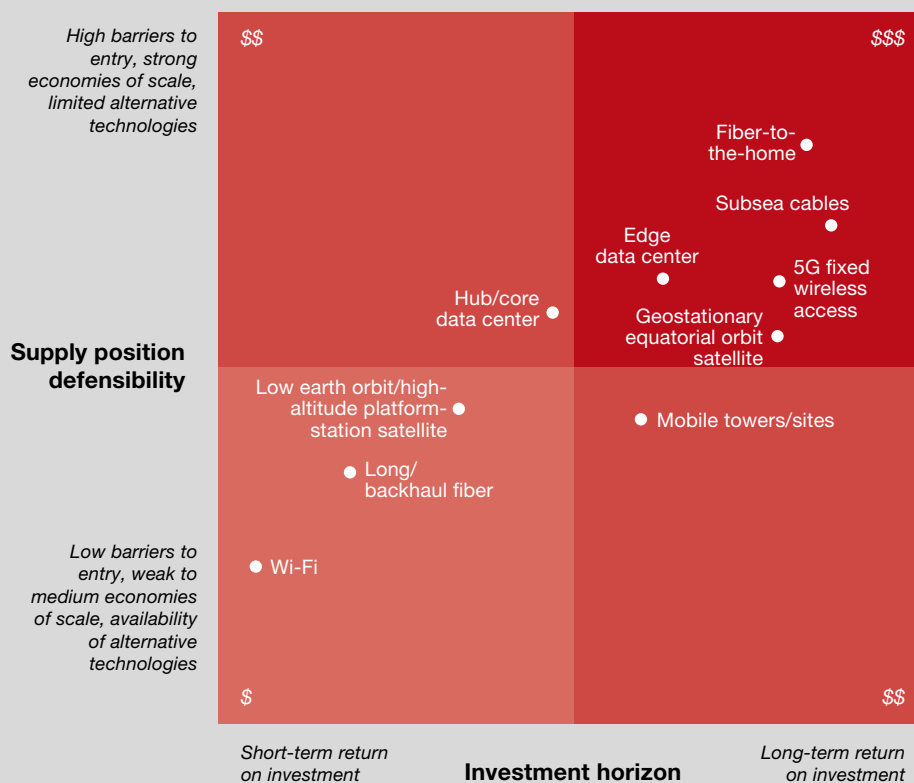
Note: Relative opportunity for monetization is indicated by \$.

Source: PwC analysis based on observations of industry dynamics and technological trends. The mix of strategies and their placement will vary depending on the circumstances of the company.

As with diversification, success as an infrastructure player depends on two interrelated strategic considerations. The first is the time horizon for expected returns from the type of infrastructure the operator chooses to invest in. The second is the ability of the operator to defend its new investments from competition through economies of scale or high barriers to entry. Deploying public Wi-Fi spots is relatively easy, and it can bring quick — if lackluster — returns, but many companies can jump into the business. Building out fiber-to-the-home, on the other hand, is far more expensive, and getting a return on the considerable investment will take much longer. But for just those reasons, operators that do so first will most likely have the field to themselves for far longer (see Exhibit 4).

The key to success as an infrastructure player lies in developing a network that's fast and flexible enough to be different things to different kinds of customers. Through software-defined networking and network function virtualization, the operator can offer high speeds, high reliability, unlimited bandwidth, near-real-time latency, strong security, or any combination of

**EXHIBIT 4**  
**A framework for infrastructure strategies**



Note: Relative opportunity for monetization is indicated by \$.

Source: PwC analysis based on observations of industry dynamics and technological trends. The mix of strategies and their placement will vary depending on the circumstances of the company.

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the above to customers, depending on their specific needs. In this scenario, an operator might offer high-speed, reliable networking and business services to mobile virtual network operators (MVNOs), mobile infrastructure to fixed-network operators, or superior speed and bandwidth to OTT content and experience providers. Over time, these so-called networking-as-a-service offerings could replace most of the operating cash flow the operator had brought in from its traditional retail business.

Some telecom leaders might even see the current concerns about digital privacy and security as an opportunity. Given that operators control the network itself, they could decide to create a central solution for managing their customers' digital identity and mediating between consumers and the online companies with which they do business. The goal would be to give consumers far more control over their personal data — and even, potentially, to enable them to profit from its sale.



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## The capable partner

No matter whether operators opt to diversify, focus on their networks, or do both, they will be looking to collaborate closely with companies in a variety of verticals — such as financial services, healthcare, automaking, and industrial manufacturing. This is particularly true as the shift to 5G opens up an even greater range of strategic opportunities for operators with the foresight to move quickly.

It is unlikely, however, that operators' legacy B2B or B2C business models — in which operators sell connectivity to businesses or consumers, who then use digital services from OTT players — will succeed in the 5G age. Most consumers and businesses will resist paying more just because they can get a faster connection, and unless they have specific use case needs, the many other virtues of 5G connectivity (lower latency, higher reliability, and the like) will probably be lost on them.

We believe that the most promising 5G business model will be business-to-business-to-X, or B2B2X. This model could work in two ways. In the first scenario, a third party, such as a cloud provider or video streaming service, would include 5G connectivity sourced from the telecom company as part of its own offering, marketing the bundled offering to its customers, while paying the telecom company for the network usage, either as a network charge or by sharing the revenue from the bundled offerings.

In the second scenario, the operator would bundle third-party products and services with its core 5G connectivity, and market the bundled solution directly to its own customers. For example, the operator could offer its customers a 5G data plan that comes complete with VR gaming, including a VR content subscription and a headset, at attractive packaged rates.

The virtue of this model is that it avoids the trap of being nothing more than a commoditized pipe through which others' services flow. Nor does it depend on operators trying to diversify into areas far beyond their core strengths and then hoping to sell them directly to consumers and businesses. Instead, it generates revenue in partnership with companies experienced at providing such third-party offerings.

A partnership approach may be the most promising option, allowing both the telecom operator and its business partners to profit from the sale of 5G connectivity. If operators are to go this route, they will have to develop and perfect their partnering capabilities. Partnering has not been a core strength of most telecom operators, given their scale, their many decision layers, and, in many cases, their risk-averse culture. To succeed, they must be willing to become far more open to opportunities outside their traditional businesses and to move fast to seize partnership opportunities as they present themselves. In short, they must stop viewing themselves as mere service providers and become willing to participate actively in new business models in all sorts of industries.



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## Securing 5G

In a world where just about everything imaginable is online and connected, the need to secure it all will be great. The 5G technology will be able to connect as many as 1 million end points per kilometer. Much of the work that supports 5G low latency will take place in so-called fog computing — an architecture that relies on edge devices to carry out a lot of the work. That's a million potential points of attack for malicious hackers and cybercriminals. Other possible victims are the hugely complex networks, cloud structures, data centers, and applications that tie everything together.

Connectivity at this scale also threatens personal privacy — not just the theft of sensitive personal data, but the loss of personal privacy in any form. Data on people's location, for example, will become much more vulnerable to attackers and cyber-stalkers, as will data emanating from people's houses, their cars, and even their clothes. Moreover, the decentralization of the network will make it much harder to control who gets access to what kinds of data.

Securing all this will be difficult, to put it mildly. One solution will be to take what we call a zero-trust approach, which involves identifying, profiling, and assessing the potential security risks inherent in every device connected to the network, and then allowing access only to the services each device needs to perform its function. All communication between end devices and services must be strongly encrypted, ultimately through the use of AI. Systematic orchestration of entire networks will likely be possible only through the use of AI and machine learning techniques designed to both manage and update security policies and constantly detect potential threats.



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## Thinking imaginatively

New technologies, most notably among them 5G networking, are creating all sorts of possibilities for telecom operators. If their organizations are to grow and prosper in this world, telecom leaders must be imaginative, even daring, in considering their strategic options. Settling on the right strategy is hard; executing it successfully is harder. Success will depend on a careful analysis of all factors involved in giving companies the right to win. The landscape is changing rapidly, and competitors need to become proficient fast, too — not only compared with other telecom companies, but compared with the tech industry as well.

Early movers with well-constructed 5G strategies will have the opportunity to escape the commoditization spiral. Operators that find ways to disrupt other sectors can leverage their existing customer bases to grow quickly, while those that make a bold commitment to network excellence can create high barriers to entry for competitors. There will certainly be an investment premium attached to operators that can break the mold by clearly and convincingly communicating their strategy and showing proof points on their journey toward it.



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