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2020 Technology, Media and Telecommunications Predictions

Fulfilling the promise of innovation

#DeloittePredicts



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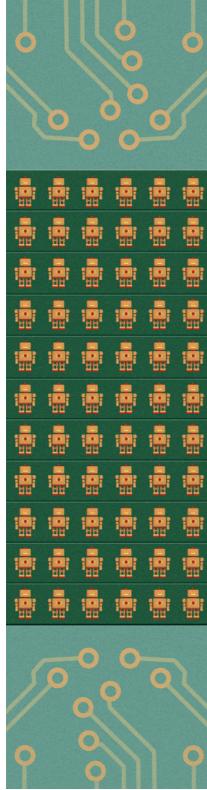
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Deloitte Global is pleased to share this summary of our 2020 Technology, Media and Telecommunications Predictions report. Our annual Predictions provide insights into “the smart future”: the technologies and trends that offer growth and transformation opportunities across the business landscape. This year’s Predictions focus on a range of relevant topics, including edge computing, private 5G, robotics, AI, content-delivery and -consumption trends, and more. **Download the full report at deloitte.com/predictions.**



Bringing AI to the device: Edge AI chips come into their own

DELOITTE GLOBAL PREDICTS that in 2020, more than 750 million edge AI chips—chips or parts of chips that perform or accelerate machine learning tasks on-device, rather than in a remote data center—will be sold. Further, it is likely that the market for these chips will grow twice as quickly as the overall chip market as they find their way into an increasing number of consumer devices, such as high-end smartphones, tablets, smart speakers, and wearables, and (over the longer term) enterprise devices such as robots, cameras and sensors.

In 2020, the consumer device market will likely represent more than 90 percent of the edge AI chip market, with the vast majority of these chips going into high-end smartphones.

Because edge AI chips are physically smaller, relatively inexpensive, use much less power, and generate much

less heat, they make it possible to integrate them into handheld devices such as smartphones as well as non-consumer devices such as robots. By enabling these devices to perform processor-intensive AI computations locally, edge AI chips reduce or eliminate the need to send large amounts of data to a remote location—thereby delivering benefits in usability, speed, and data security and privacy.

Significant as they will be in consumer devices, however, edge AI chips' greater long-term impact may come from their use in the enterprise, where they can enable companies to take their internet-of-things (IoT) applications to a whole new level. Smart machines powered by AI chips could help expand existing markets, threaten incumbents, and shift how profits are divided in industries such as manufacturing, construction, logistics, agriculture, and energy.

Cycling's technological transformation: Making bicycling faster, easier, and safer

MORE CYCLISTS ARE taking to the roads, and underlying this growth in bike-riding is an array of diverse technological innovations, including predictive analytics, product and application design, wireless connectivity, digital urban planning tools, and electrification. These innovations are making cycling more appealing: safer, faster, more convenient, and easier to track and measure.

Of the many existing bicycle-related technologies, e-bikes, which use batteries (increasingly lithium ion batteries, as opposed to lead acid) to assist pedaling, stand out for their potential to boost cycling's growth. By 2023, the number of e-bikes in circulation around the world should reach about 300 million, a 50 percent increase over 2019. Indeed, e-bikes may soon start to invade the niche currently occupied by automobiles thanks to their convenience, utility, and relatively low cost. Electric cargo bikes could become a preferred solution for last-mile delivery in cities.

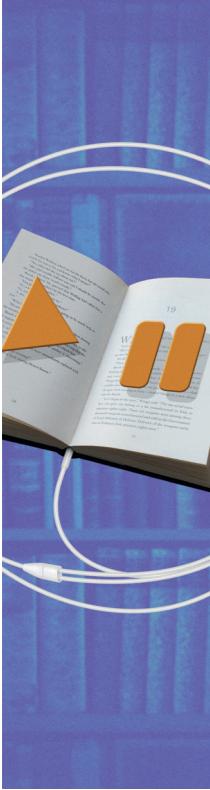
Electrification should also make bike sharing more appealing in the future by offsetting one of its major current drawbacks: the weight. Electrified bike sharing programs, docked as well as dockless, are likely to proliferate in 2020 and beyond.

Beyond electrification, technology can improve the cycling experience. For example:

- Smartphone apps can help cyclists plan their routes, estimate arrival times, avoid road blockages, and share information with other cyclists.
- Wearable airbags, automated turn signaling, and improved helmet technology can increase safety.
- Data and analytics can help urban planners redesign cities to be more bike-friendly.

The technology industry has a large role to play in encouraging greater bicycle use—a goal that can help society address many challenges arising from continuing global urbanization.





The ears have it: The rise of audiobooks and podcasting

AUDIOBOOKS AND PODCASTS are outgrowing their “niche” status to emerge as substantive markets in their own right. In 2020, Deloitte predicts, the global audiobook market will grow by 25 percent to US\$3.5 billion. We also predict that the global podcasting market will increase by 30 percent and surpass the US\$1 billion mark for the first time.

The United States’ audiobook market—predicted at US\$1.5 billion in 2020, and growing at a seemingly sustainable 20 to 25 percent per year for the next few years—is the world’s largest, with China’s audiobook market coming in second. We expect double-digit growth in audiobooks to continue in the longer term.

Audiobook consumption will likely differ across geographies and demographics. In 2019, for example, 74 percent of audiobook listeners in the United

States listened to them in their cars. Countries where commute times are longer may thus see higher revenues, growth rates, and opportunities for audiobooks.

While the physical page is still the dominant form of consumption, accounting for 78 percent of all US trade book revenues overall, it is likely that at current growth rates, audiobook revenues are on a trajectory to pass e-books by 2023 or so.

For their part, podcasts could be a US\$3.3 billion-plus business by 2025 if future growth remains as high as in the past few years. For this to happen, however, the podcast industry must further expand globally, add new listeners, and—most crucially—get better at monetizing its large listener base.

Robots on the move: Professional service robots set for double-digit growth

OF THE ALMOST 1 million robots we expect to be sold for enterprise use in 2020, we predict that just over half of them will be professional service robots, generating more than US\$16 billion in revenue—30 percent more than in 2019. This market is poised to take off with a vengeance, fueled by new developments in 5G telecom services and artificial intelligence (AI) chips. The use of these together can solve many challenges that currently limit professional service robots’ practicality, making them more useful—and more attractive—to enterprise buyers.

Professional service robots are mainly used outside of manufacturing, and usually assist humans rather than replace them. Just as the industrial robot sector is dominated by automotive and electronics, the professional service robot sector is dominated

by logistics. Just under half of the roughly 360,000 professional service robots sold to enterprises in 2019 went to logistics companies, with inspection and defense companies the next largest buyers. While both types of robots will improve their capabilities as a result of 5G and edge AI chips, the improvement opportunity is far greater for professional service robots.

In addition to the robots used by enterprises, there are two large and growing consumer robot markets: consumer service robots (for tasks such as vacuuming, lawn mowing, and washing windows) and entertainment robots. As time goes on, however, the distinction between various types of robots is becoming less clear. Perhaps the broader lesson is that it’s not what one calls a machine that’s important—it’s what the machine can do.





Private 5G networks: Enterprise untethered

FOR MANY OF the world's largest businesses, private 5G will likely become the preferred choice, especially for industrial environments such as manufacturing plants, logistics centers, and ports. Deloitte Global expects that more than 100 companies worldwide will have begun testing private 5G deployments by the end of 2020. Over the next decade, hundreds of thousands of companies are likely to deploy private cellular networks.

Private 5G promises superior performance to that of other wireless standards and greater flexibility than wired networks. Unlike a public network, a private 5G network can be configured to a location's specific needs, and configurations can vary by site. A private network also allows companies to determine the network's deployment timetable and coverage quality. Security can also be higher.

Moreover, with the next phase of the 5G standard, known as 3GPP Release 16, 5G has the potential to become the world's predominant LAN and WAN technology over the next 10 to 20 years. These enhanced capabilities can take wireless connectivity where no standard has gone before, opening up many previously infeasible locations and uses. Several of 5G's Release 16 capabilities will be crucial in industrial settings.

As more companies undertake transformations on the back of 5G, the shape of industry itself will alter, perhaps dramatically. If and when that happens, history will likely view 5G not just as a technological marvel, but as an elemental force that reshaped the way companies do business. 5G's Release 16 could be the most disruptive mobile technology yet.

Ad-supported video: Will the United States follow Asia's lead?

DELOITTE GLOBAL PREDICTS that revenue from ad-supported video services will reach an estimated US\$32 billion in 2020. Asia (including China and India) will lead with US\$15.5 billion in revenue in 2020, nearly half of the global total.

Over a billion people in Asia watch ad-supported video services, thanks to the advent of affordable 4G connectivity, low-cost smartphones, and business models that allow consumers to exchange their attention for free (or low cost) TV shows, movies, and sports. In China in 2019, smartphones surpassed TVs as the primary entertainment device, partly due to the popularity of ad-supported video services. Pay TV in India is inexpensive, and in some states, nearly 90 percent of households have a television. But overall penetration rates remain below 70 percent. By focusing on mobile users, ad-supported video services have put TV into the hands of hundreds of millions and given some consumers their first access to video entertainment.

In the United States, by contrast, most direct-to-consumer video offerings are pursuing the ad-free subscription model. Yet evidence is emerging that Americans are growing frustrated at managing and paying for so many subscriptions to watch what they want. Deloitte has found that, much like Asian consumers, US consumers are willing to exchange their attention for content. That means ad-supported video services could grow rapidly. The recent growth in the number of ad-supported video services is evidence of this.

Could ad-supported video provide a model that brings consumers a greater variety of content in one place, at low (or no) cost? Could it support entertainment platforms serving gamers, music buffs, and sports fans? If so, ad-supported video could be the latest successful Asian import to the United States.





Coming to a CDN near you: Videos, games, and much, much more

CONTENT DELIVERY NETWORKS (CDNs) are designed to improve media quality, speed, and reliability by bringing content physically closer to the user. We predict that the global CDN market will reach US\$14 billion in 2020 and that the market will more than double by 2025.

This growth is being driven primarily by increasing consumer hunger for streaming video over the internet, now amplified by the migration of more broadcast and cable TV onto direct-to-consumer over-the-top (OTT) internet delivery networks. Live video streaming and the emergence of streaming video games may further spur growth and technical innovation.

By 2022, CDNs are expected to carry 72 percent of all internet traffic. In addition to existing CDN providers, a growing number of media and telecom companies are developing CDNs as well.

The largest driver of growth for the CDN market will likely continue to be the rising demand for video over the internet. That video traffic is fueled by the continued growth in streaming video on demand services (SVOD). With several major new SVOD services launching, global subscriptions to streaming services could grow significantly.

Streaming video games will be the next big challenge, as their richer and more dynamic interactive content places greater demands on CDNs to manage the necessary synchronization. Some leading game publishers have announced their interest in developing cloud streaming for their top franchises, and may look to CDN providers for the assist. All this rising demand means that, in the near term, the CDN market is poised for strong growth.

High speed from low orbit: A broadband revolution or a bunch of space junk?

IN 2020, COMPANIES' efforts to bring internet access to the world will take off—literally. We predict that by the end of 2020, there will be more than 700 satellites in low-earth orbit (LEO) seeking to offer global broadband internet, up from roughly 200 at the end of 2019.

The biggest impact of satellite broadband constellations and mega-constellations—should they be successfully deployed and activated—can be to bring low-latency, high-speed connectivity to the multitudes around the world who don't have access to the internet or suffer sluggish speeds. The potential customer market is vast.

Three main drivers are helping today's satellite broadband players:

- Getting into orbit has become less expensive.
- Satellites and their manufacturing methods are becoming more advanced.

- The demand for connectivity has increased in every part of the world.

Some providers are targeting the direct-to-consumer market, competing against traditional telecom players providing cable or fiber-based broadband internet. Others are looking to sell dedicated broadband connectivity to enterprises. Other players are pursuing more specialized applications.

There are challenges and concerns as more satellites are deployed. Regulations around deployment rate, frequency allocation, and/or orbital debris mitigation will likely be modified. There will also be disagreements among operators, and regulatory issues to contend with in different countries.

It is not yet clear whether satellite broadband will create a communications revolution. But the race is on, and in spite of the challenges it faces, this nascent industry should not be dismissed.





The smartphone multiplier: Toward a trillion-dollar economy

WHILE SMARTPHONE SALES are big business, even that market may soon pale next to the sums commanded by the sale of products and services that depend on smartphone ownership—the so-called “smartphone multiplier,” which includes selfie sticks, ringtones, and mobile ads and apps.

We predict that the smartphone multiplier will drive US\$459 billion of revenue in 2020 alone. And we expect that market to grow between 5 to 10 percent annually through 2023, meaning that in 2023, the smartphone multiplier is likely to generate revenues of more than a half-trillion dollars per year.

In 2020, we expect the three largest elements of the smartphone multiplier to be mobile advertising, apps (mostly games), and hardware accessories (such as headphones, batteries, and cases). Mobile advertising, the smartphone multiplier’s top moneymaker (US\$176 billion), will continue to grow strongly, having already

overtaken TV advertising as the world’s biggest advertising category in 2019.

The second-largest component of the smartphone multiplier market is apps, expected to generate US\$118 billion in 2020, with game apps making the most money by far.

The value of smartphone hardware accessories alone (US\$77 billion) is multiple times that of other entire device categories (including tablets, wearables and smart speakers).

The smartphone market’s power as a foundation for multiple associated revenue streams—advertising, hardware, content, and services—is growing apace. Within the next five years, these ancillary revenues may exceed the value of smartphone sales. This means that the best opportunities may lie not in the smartphone market itself, but in the vast and growing markets the smartphone has created.

My antennae are tingling: Terrestrial TV's surprising staying power

WE PREDICT THAT in 2020, at least 1.6 billion people worldwide, representing 450 million households, will get at least some of their TV from an antenna. And that’s the low end of the estimate: it is possible that number may even be as high as 2 billion, with Indonesia, India, and Nigeria expected to have the most antenna TV viewers. But it’s not just the developing world: over 40 million Americans now watch antenna TV, up 48 percent from 2011.

Antenna TV’s resilience shows that up to two billion viewers worldwide are willing to watch some commercials (sometimes a lot of commercials) in exchange for free TV. The willingness to do this is not confined to antennas and terrestrial broadcasts. With the growth of ad-based video on demand (AVOD), we expect hundreds of millions of viewers in 2020 will be willing to watch some percentage of advertising content in exchange for free, or at least discounted, quality

video entertainment.

Antenna TV’s resilience is a bright spot in the overall TV landscape, as the traditional TV industry as a whole (pay TV and antenna TV combined) is facing headwinds. Several signs point to challenging times ahead for the important US market, where we predict the number of pay TV subscribers will decline by 5 million in 2020. On a global scale, however, three-quarters of the world’s pay TV operators will likely gain subscriptions between 2018 and 2024, and two-thirds will see their revenues increase over that same period.

TV may not be growing at the rate it did 20 years ago, but neither is it collapsing, and both advertisers and broadcasters need to think of it in those terms.

