Deloitte.

TMT Predictions 2020

Fuelling the future

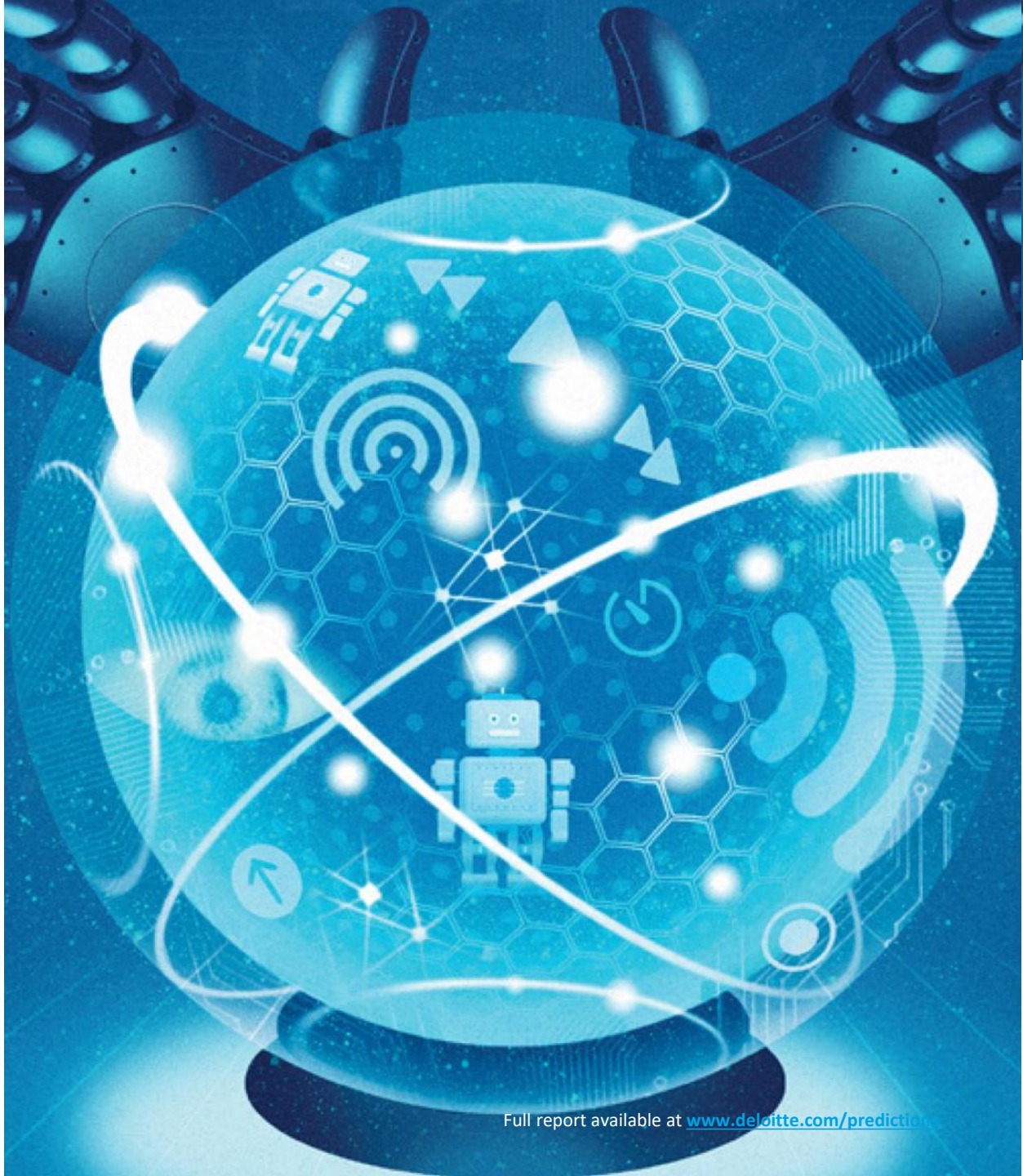
June 2020 – with COVID-19 updates

TMT Predictions 2020 COVID-19 update: Core assumptions

Global GDP, in our best-case economic scenario, will be weak in Q1, even weaker in Q2, and start to recover by Q4; GDP will be down 8.3% for the year as a whole.[1]

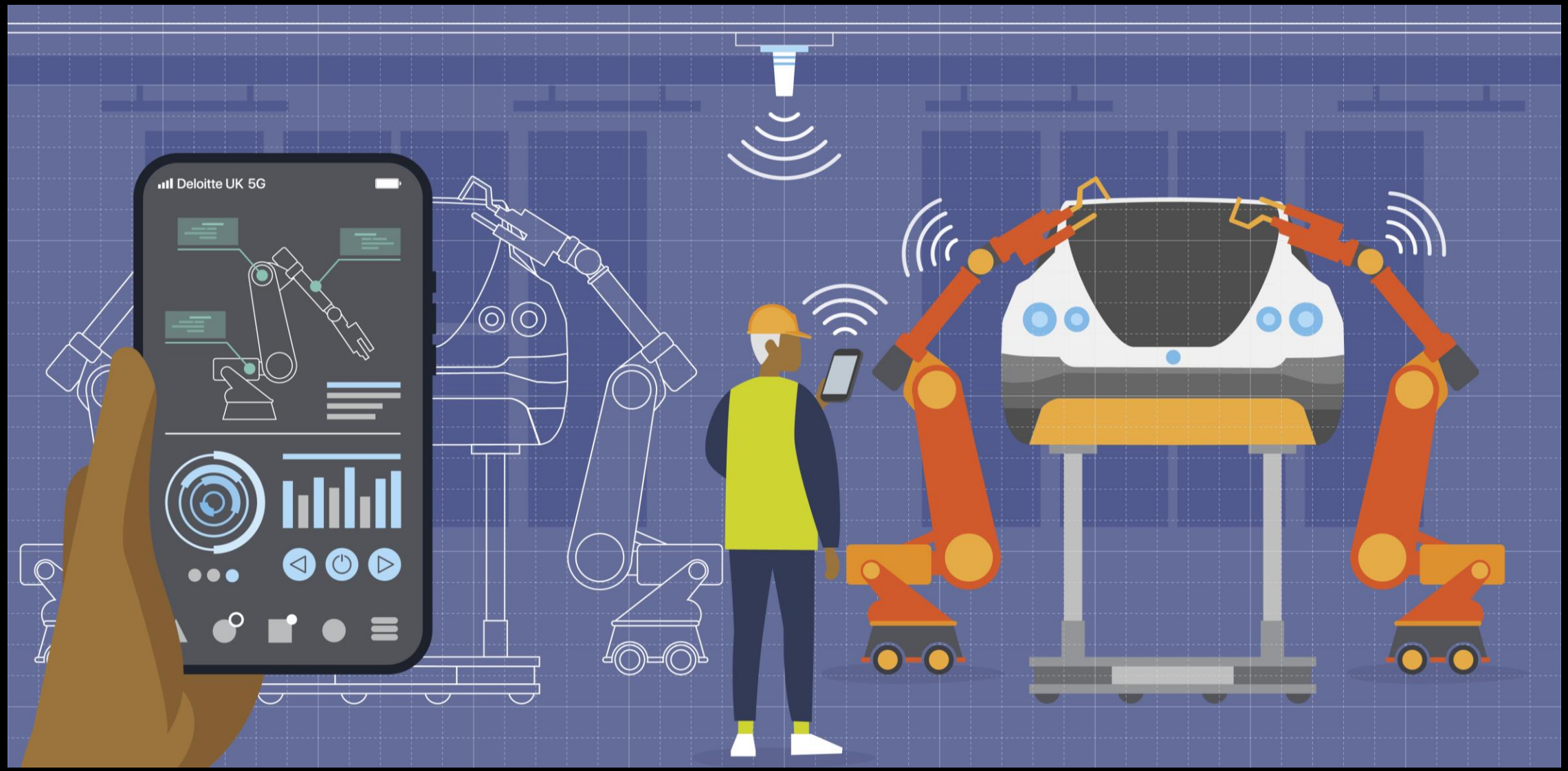
Smartphone sales were down 40-50% in February-April; we assume sales could be down 15-20% for 2020 as a whole.

Ad spending will be down 5 to 10% for the year.

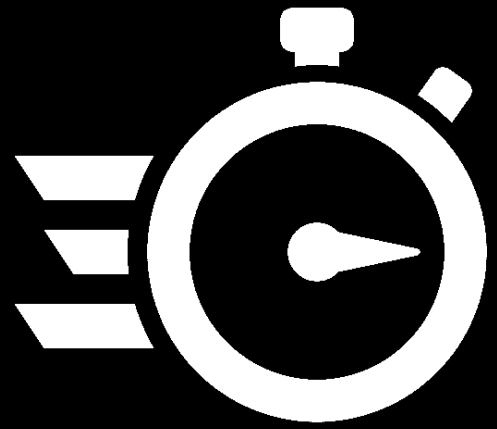


Full report available at www.deloitte.com/predictions

Private 5G networks: Enterprise untethered



The **NORTEL Meridian** was introduced in 1975 with a capacity of 100 to 7,600 lines. It was the first fully digital PBX when most other PBXs used electromechanical or hybrid technology. The Meridian enjoyed great success on the enterprise market, with 43 million installed users worldwide (2013).



FEATURES GALORE!

>$5 Trillion[1]

Global economic output in 2035 enabled by 5G in the following five categories

Manufacturing	Transport	Construction	Utilities	Mining
$3,364B	$659B	$742B	$273B	$249B

1. "The 5G economy: How 5G technology will contribute to the global economy" by IHS Economics / IHS Technology

Private 5G networks: Enterprise untethered

Original prediction: We expect that more than 100 companies worldwide will have begun testing private 5G deployments by the end of 2020, collectively investing a few hundred million dollars in labor and equipment.

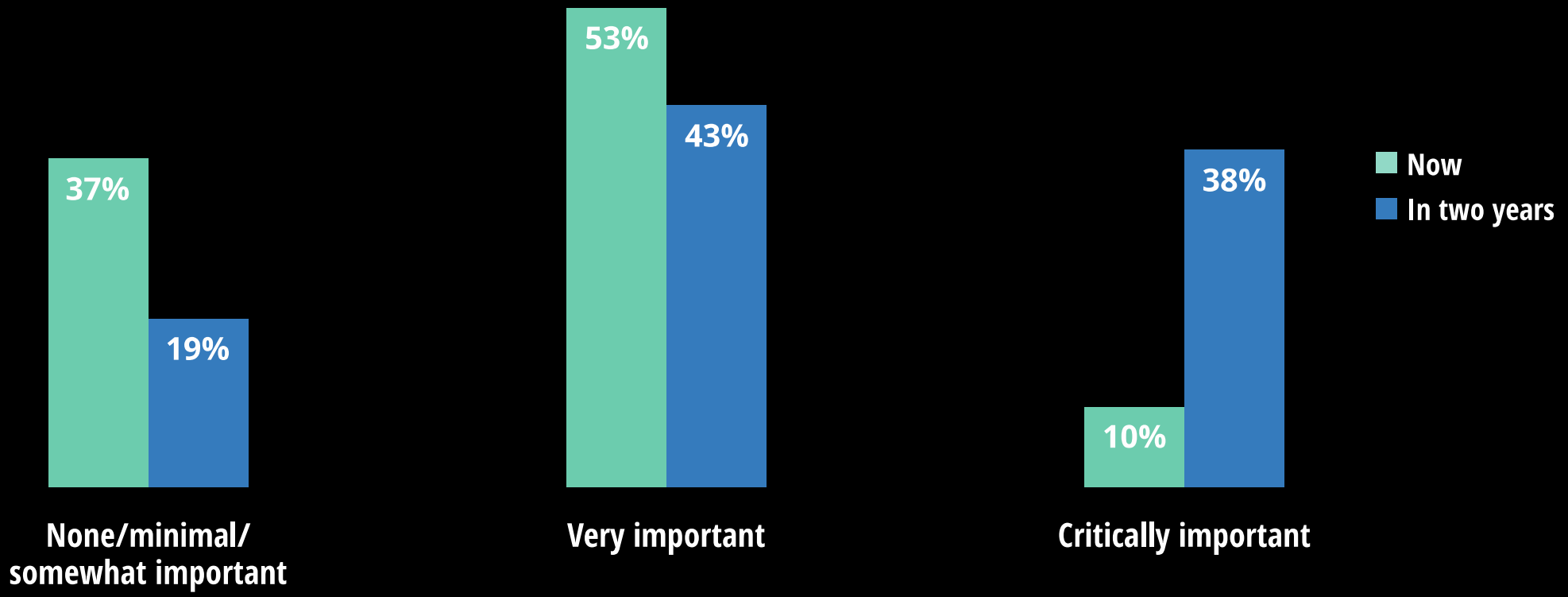
Revised prediction: Our original prediction was low. The number of companies testing private 5G deployments in Q1 was 130. We are on pace to be up to 1,000 at the end of the year.

Why? According to Deloitte's tracking of tests, the number of companies testing private 5G networks was far ahead of our forecast already in Q1, and tests don't cost much. COVID-19 may be a tailwind.

Full report available at www.deloitte.com/predictions

AI is becoming mission-critical

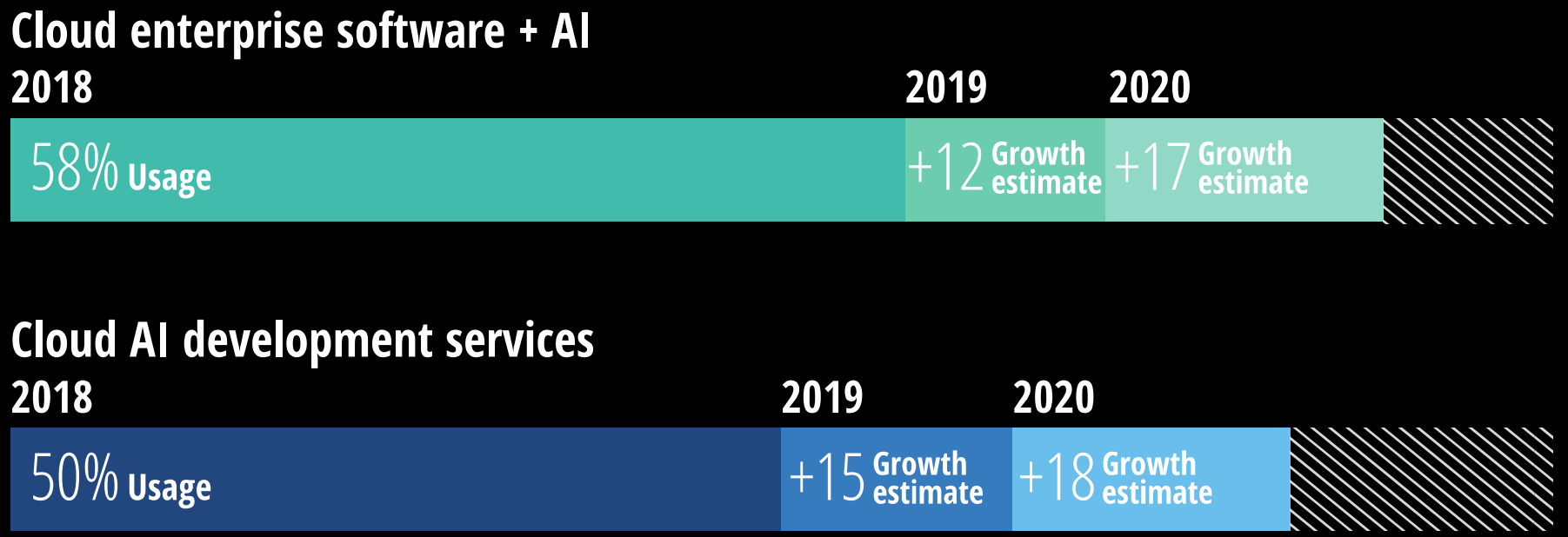
Executives report AI will become more strategically important to their companies' business success



Note: N = 1,900 global respondents.

Source: Jeff Loucks, Tom Davenport, and David Schatsky, *Deloitte's State of AI in the enterprise*, 2nd edition, Deloitte Insights, October 22, 2018.

Early adopters have their heads in the clouds



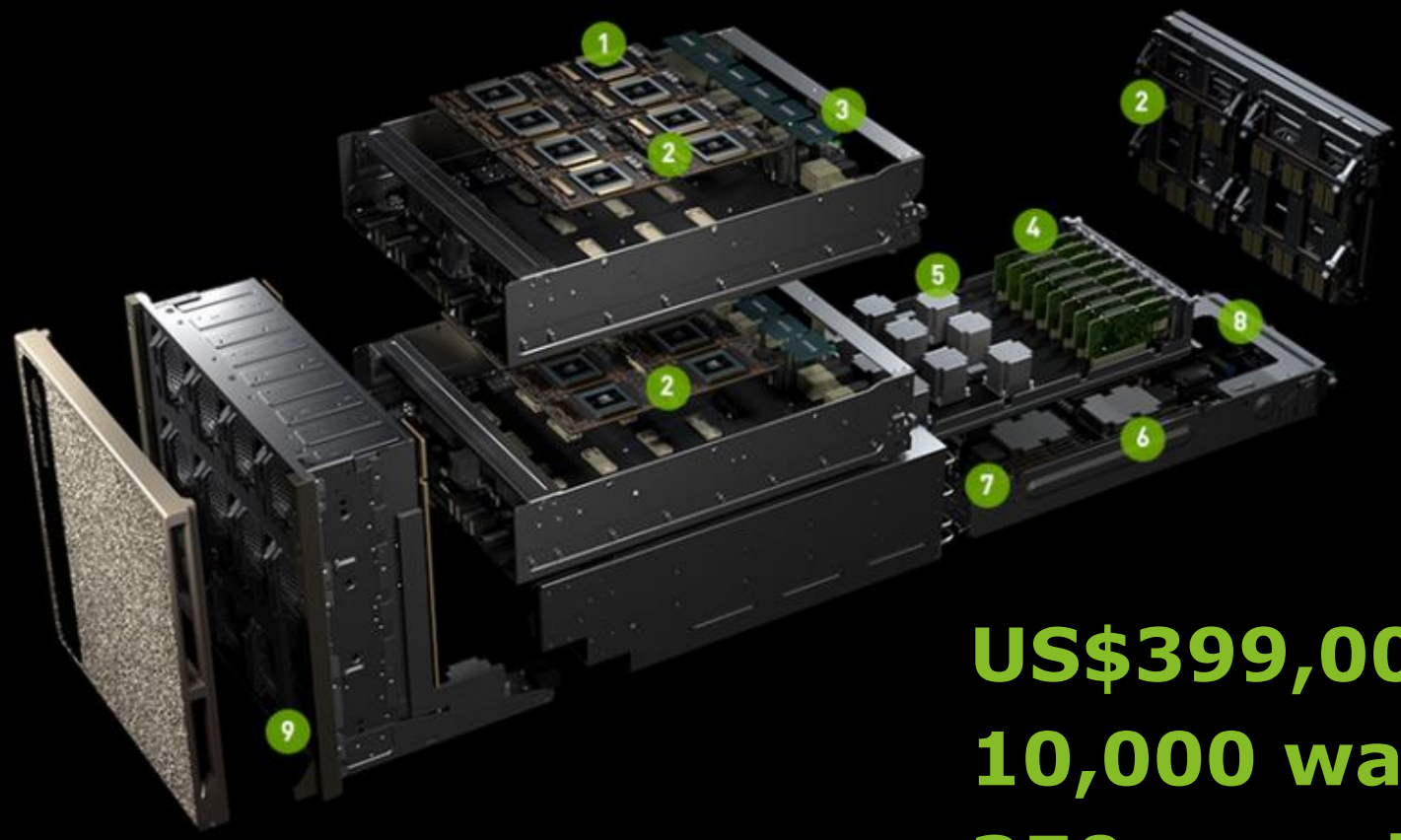
Note: N = 1,900 global respondents.

Source: Jeff Loucks, Tom Davenport, and David Schatsky, *Deloitte's State of AI in the enterprise*, 2nd edition, Deloitte Insights, October 22, 2018.

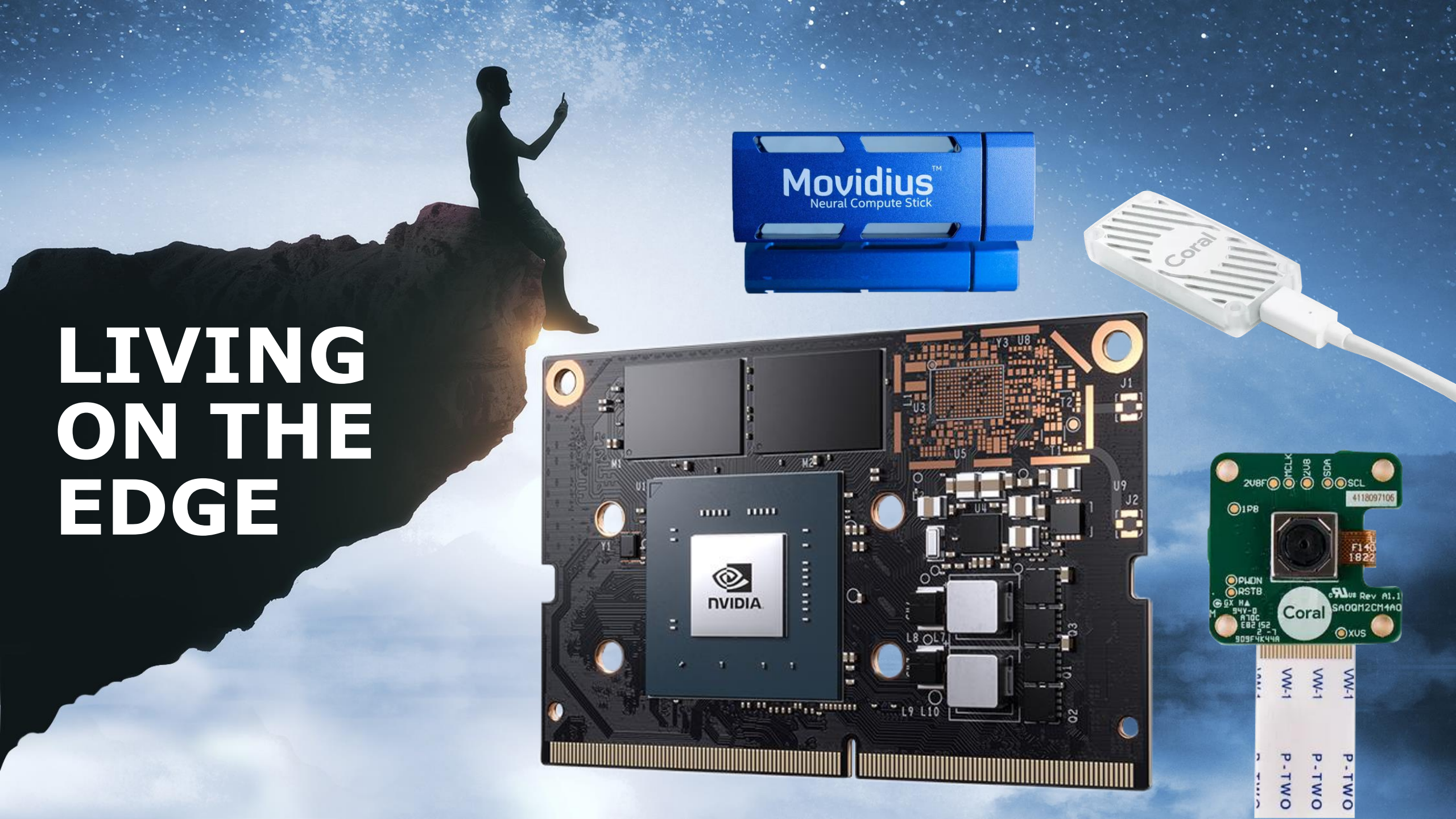
NVIDIA DGX-2

Explore the powerful components of DGX-2.

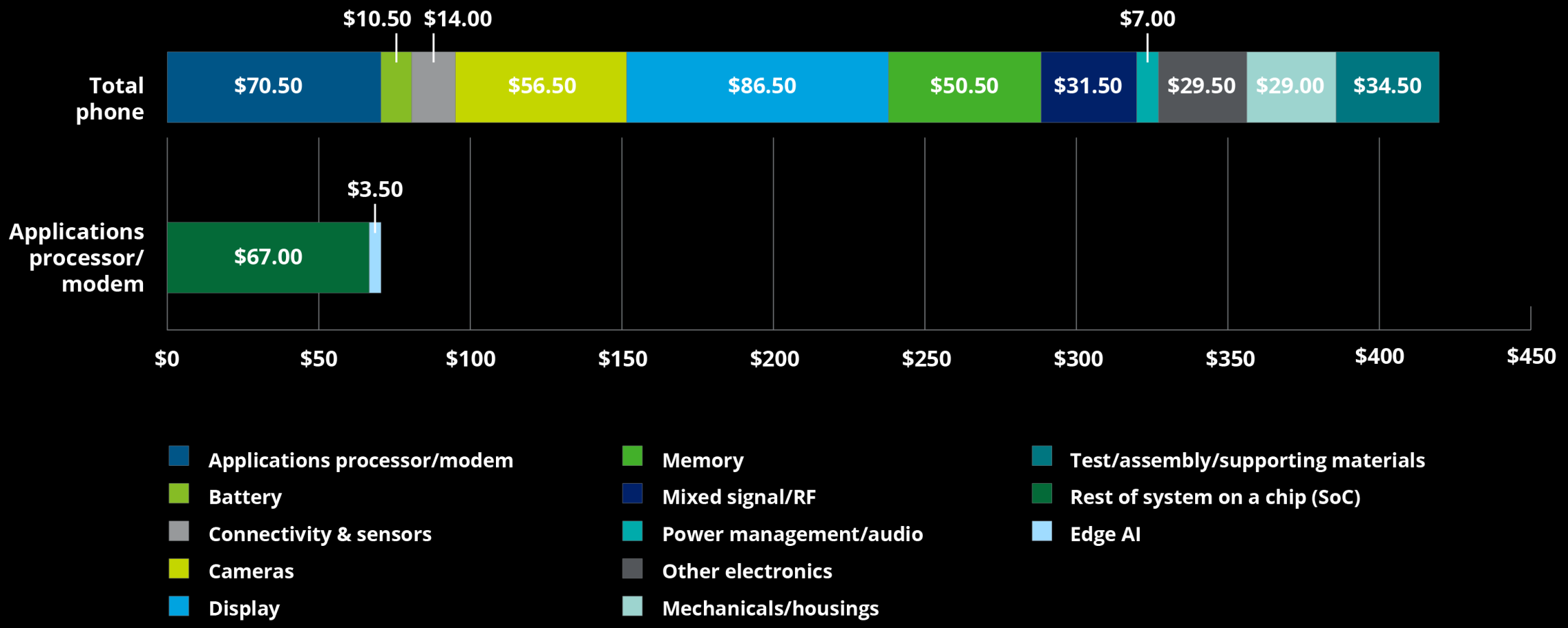
1. NVIDIA TESLA V100 32GB, SXM3
2. 16 TOTAL GPUS FOR BOTH BOARDS, 512GB TOTAL HBM2 MEMORY
   Each GPU board with 8 NVIDIA Tesla V100.
3. 12 TOTAL NVSWITCHES
   High Speed Interconnect, 2.4 TB/sec bisection bandwidth.
4. 8 EDR INFINIBAND/100 GbE ETHERNET
   1600 Gb/sec Bi-directional Bandwidth and Low-Latency.
5. PCIE SWITCH COMPLEX
6. TWO INTEL XEON PLATINUM CPUS
7. 1.5 TB SYSTEM MEMORY
8. DUAL 10/25 GbE ETHERNET
9. 30 TB NVME SSDS INTERNAL STORAGE



US$399,000
10,000 watts
350 pounds


LIVING
ON THE
EDGE
Movidius™
Neural Compute Stick
Coral
NVIDIA
Coral
2V8F
MCLK
I2V8
SDA
SCL
1P8
PWDN
RSTB
XUS
P-TWO
VW-1

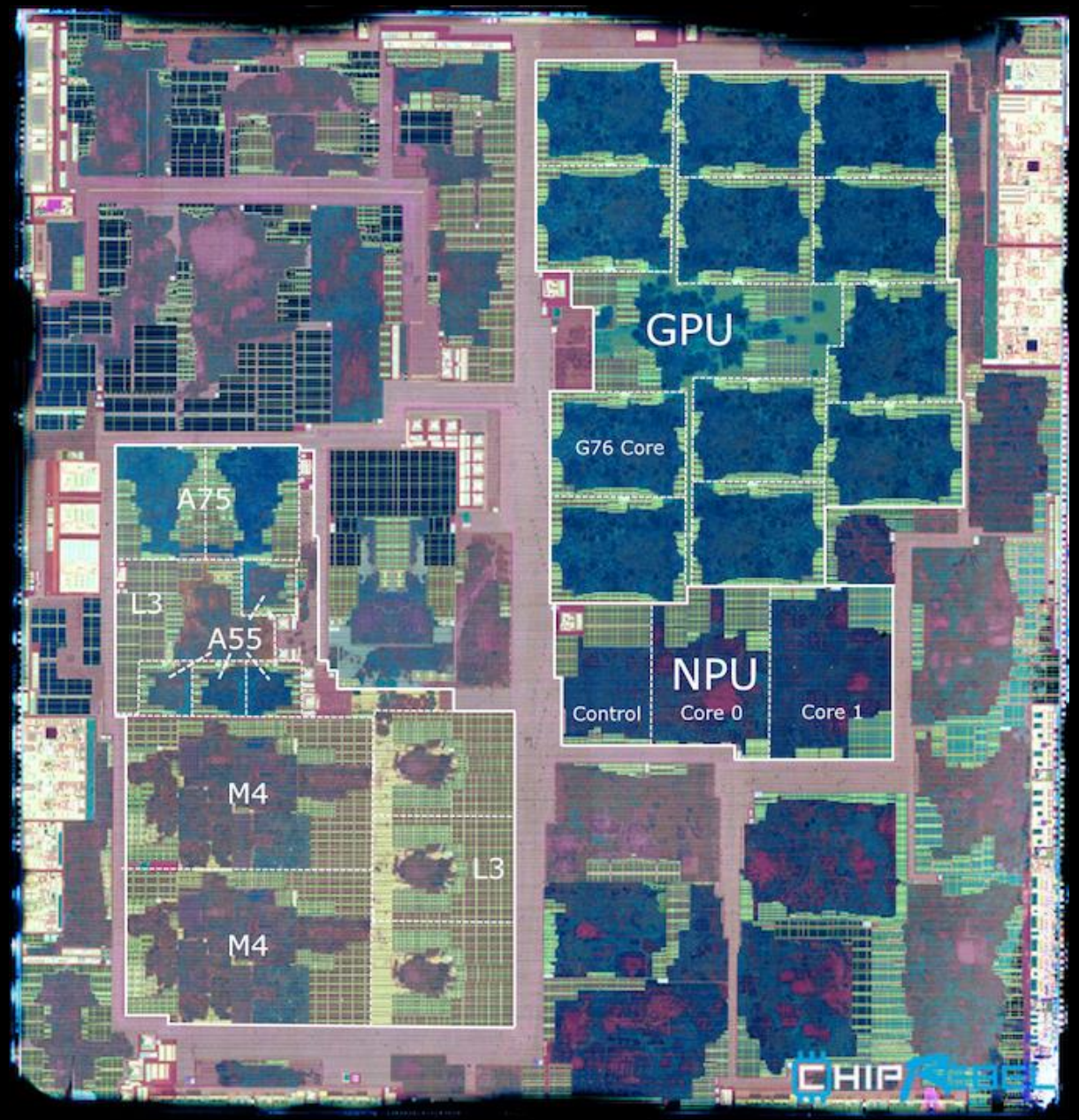
Bill of materials cost for a 2019 Samsung Galaxy S10, including breakout for edge AI



Samsung Exynos 9820

5% of die, US$70.50 SoC

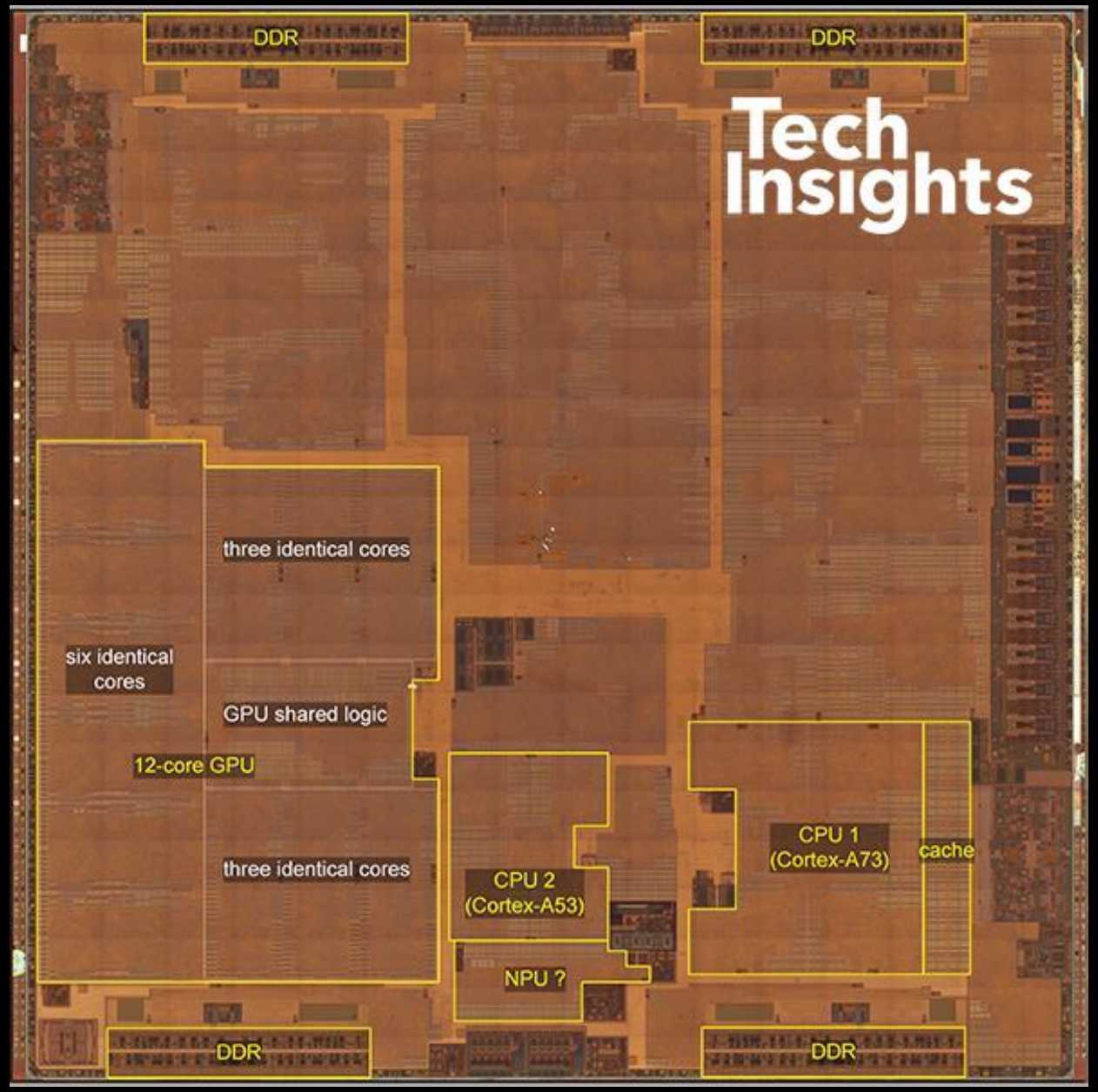
NPU=US$3.50



Huawei Kirin 970

2.1% of die, US$52.50 SoC

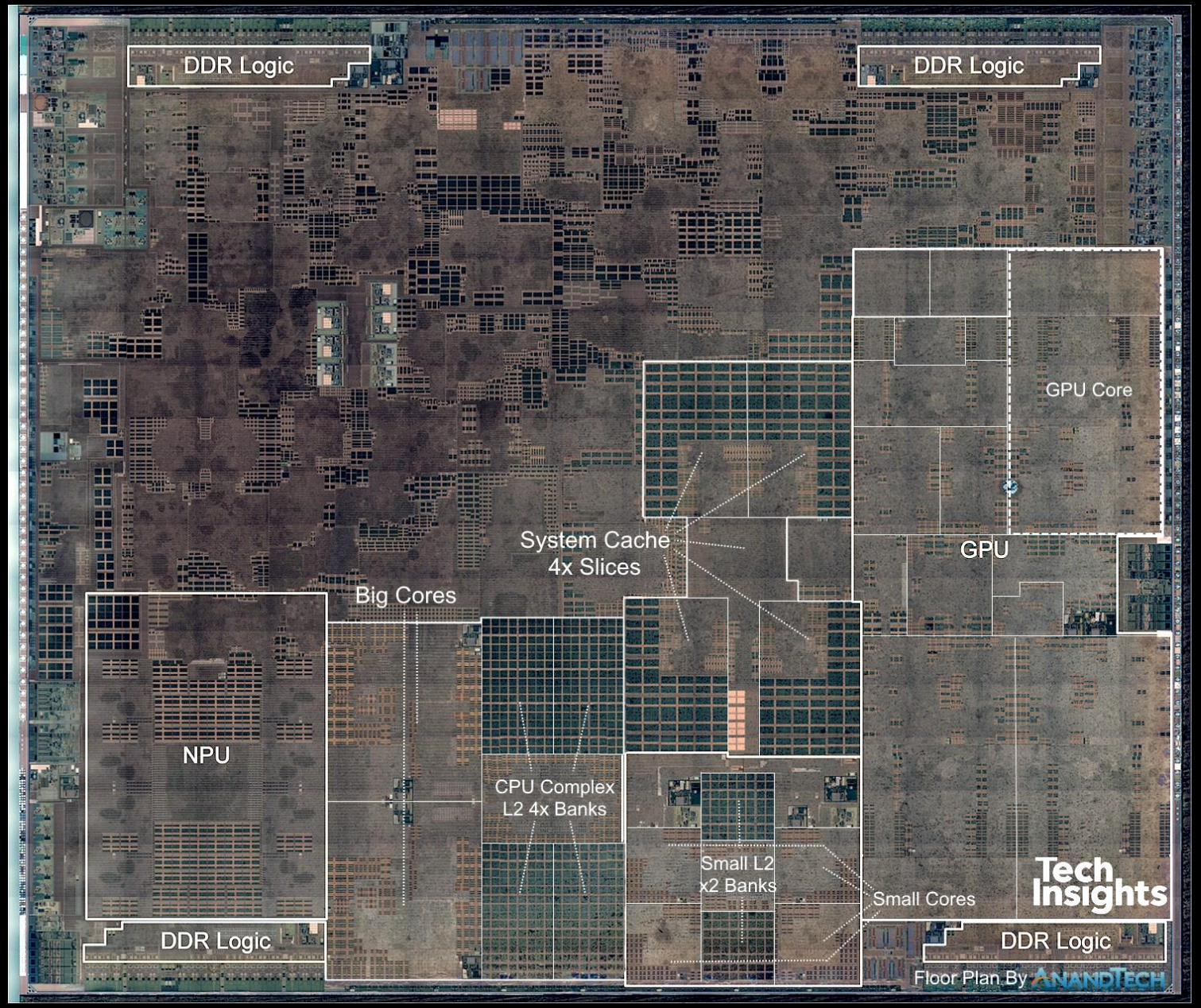
NPU=$US1.10



Apple A12 Bionic

7% of die, US $72 SoC

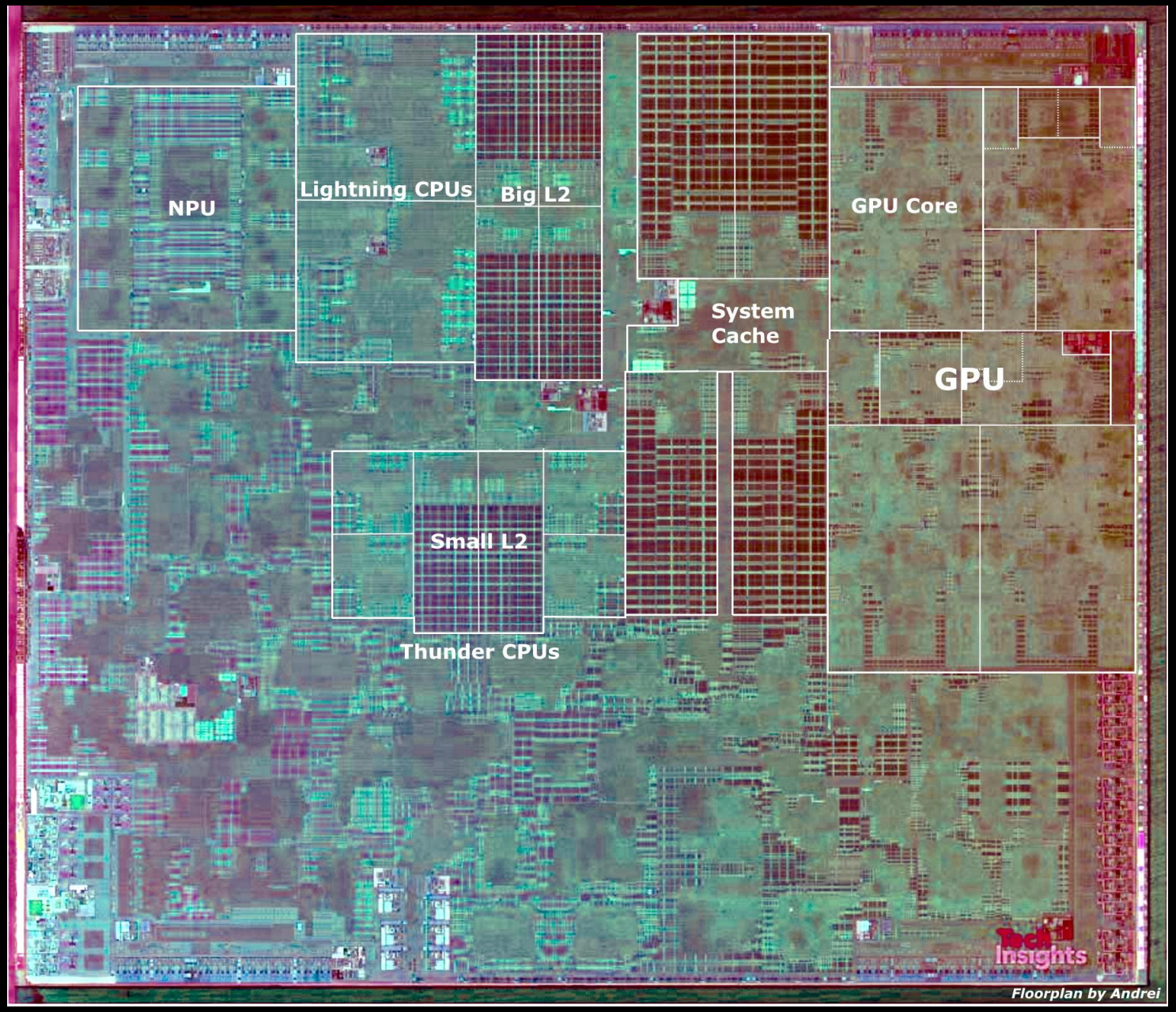
NPU=US$5.10

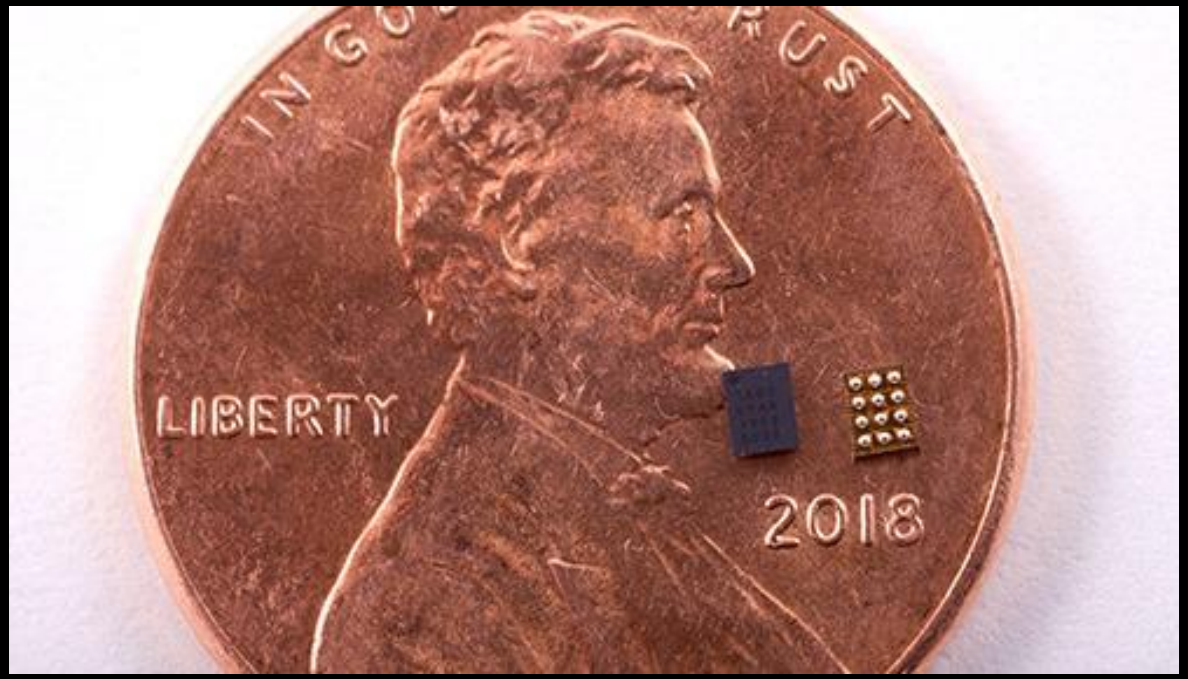


Apple A13 Bionic

4.7% of die, US$64 SoC

NPU=US$3.01

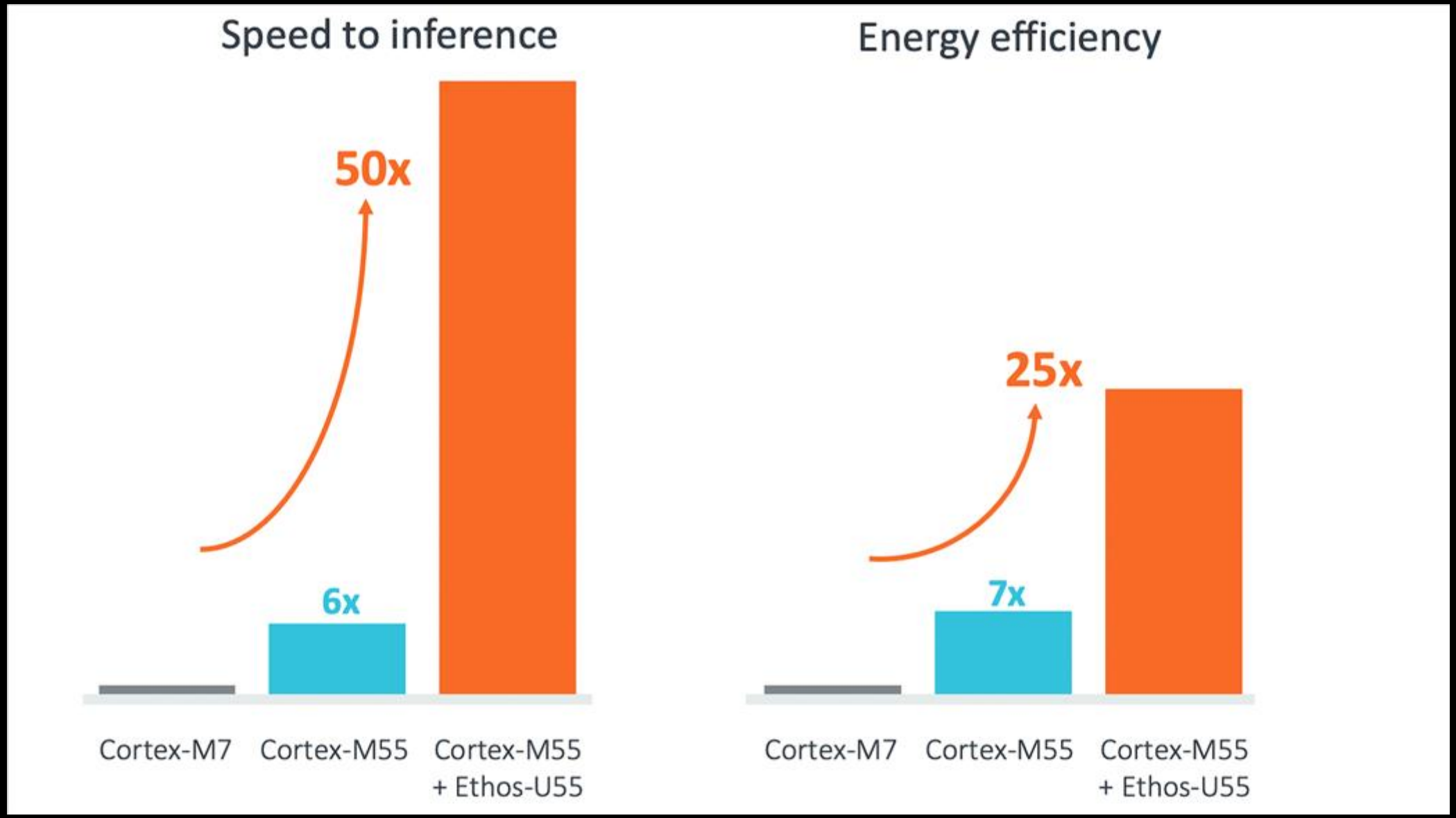




CES 2020 INNOVATION AWARD PRODUCT

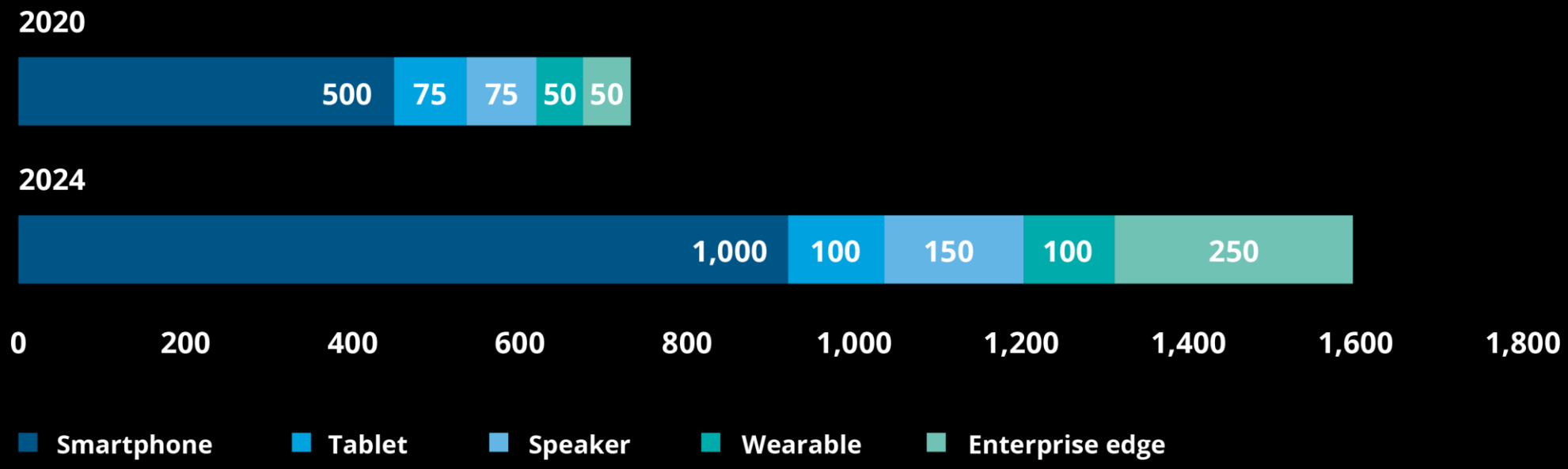
Syntiant® NDP100™ Neural Decision Processor™

By Syntiant Corp.


Speed to inference
50x
6x
Cortex-M7
Cortex-M55
Cortex-M55
+ Ethos-U55
Energy efficiency
25x
7x
Cortex-M7
Cortex-M55
Cortex-M55
+ Ethos-U55

The edge AI chip industry is poised for growth

Edge AI chips by device, 2020 and 2024 (millions of units)



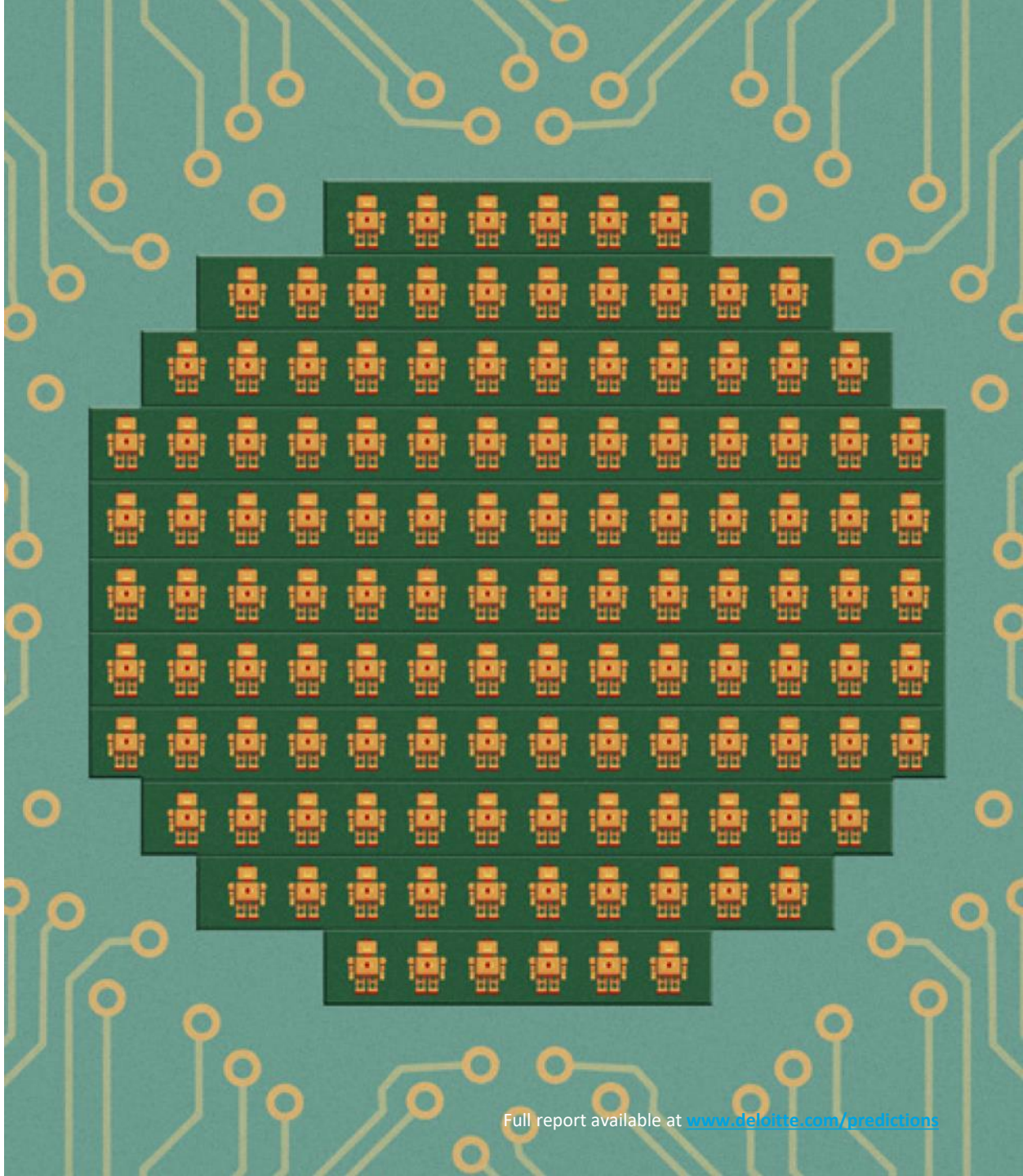
Source: MarketsandMarkets, *Edge AI hardware market by device (smartphones, cameras, robots, automobiles, smart speakers, wearables, and smart mirrors), processor (CPU, GPU, ASIC, and others), power consumption, process, end user industry, and region—global forecast to 2024*, April 4, 2019: Deloitte analysis.

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

Original prediction: We predict 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 … representing a cool US$2.6 billion in revenue.

Revised prediction: 650 million chips worth US$2.2 billion.

Why? We expect a decline in global smartphone sales of about 15-20% for the full year, and smartphones are the biggest users (two thirds) of edge AI chips for now.



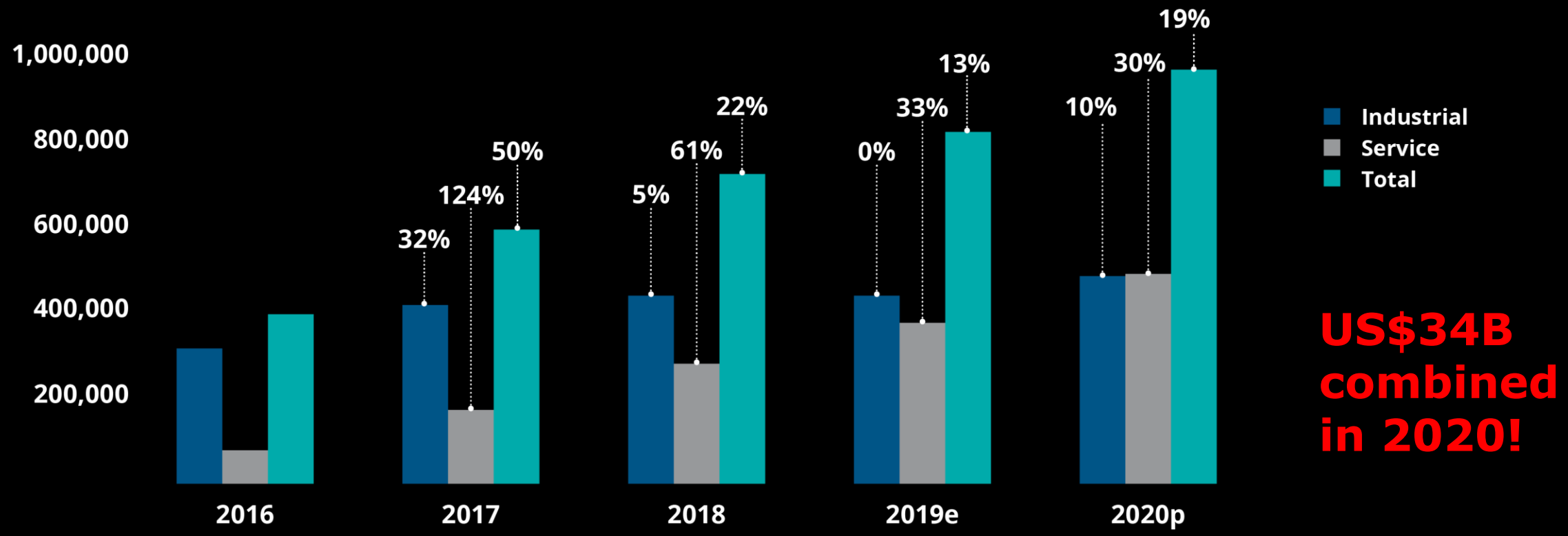
Full report available at www.deloitte.com/predictions

In this hypothetical fulfillment centre or warehouse, the orange arm is an industrial robot, and the two low-wheeled vehicles are professional service robots

Source: Shutterstock

The professional service robot market is growing much faster than the industrial robot market

Annual global robot unit sales for enterprise use, 2016-2020

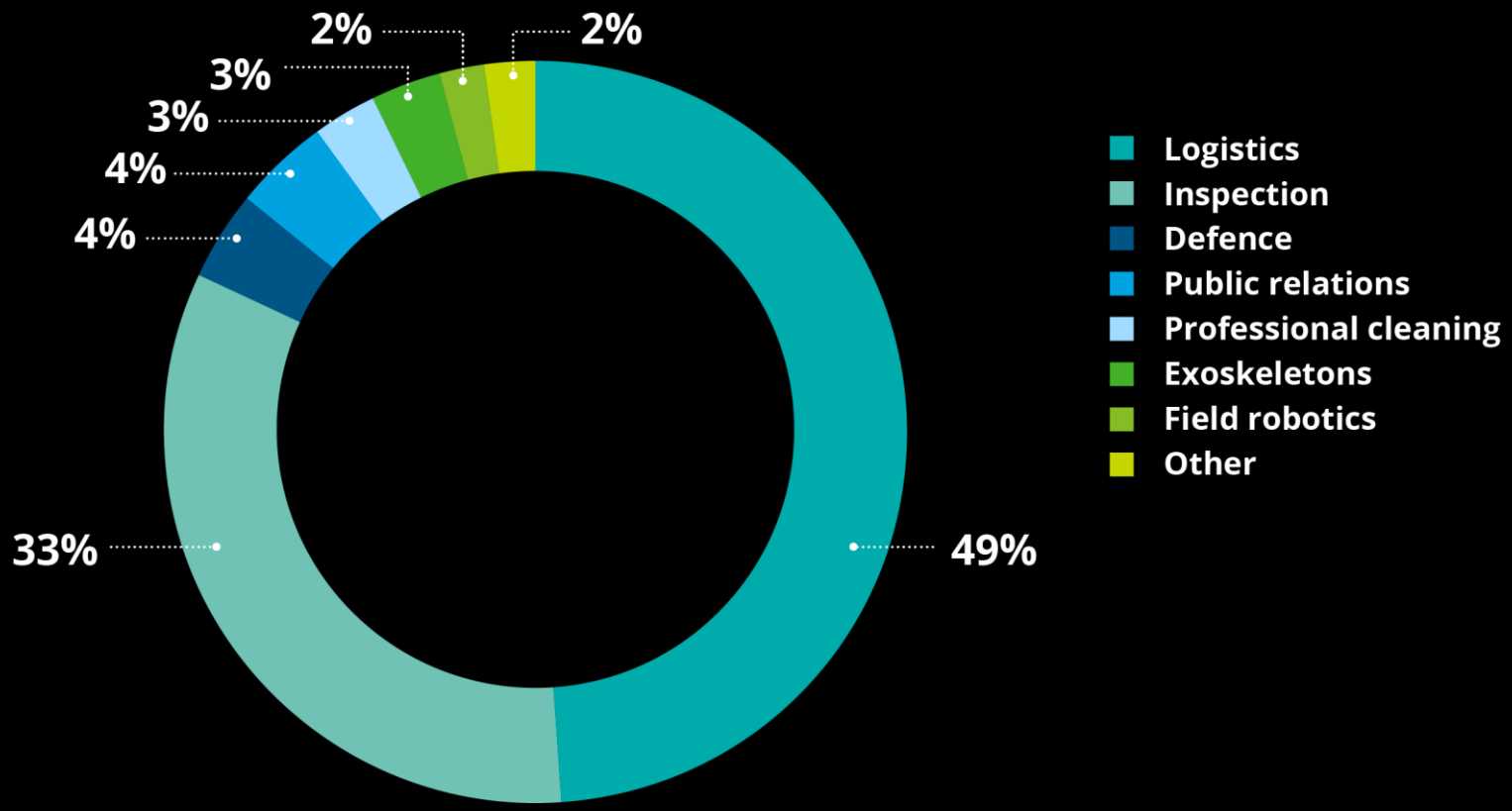


Note: The percentages above the columns denote annual growth rates.

Sources: IFR press conference presentation, Shanghai, September 18, 2019; Deloitte analysis and prediction for 2020.

The logistics industry accounted for nearly half of all the professional service robots sold in 2019

Breakdown of professional service robot unit sales by industry, 2019



Sources: IFR press conference presentation, Shanghai, September 18, 2019.

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

Original prediction: We predict that the number of units of professional service robots sold in 2020 will surpass industrial robot arms for the first time ever, growing by 30 percent over 2019 compared to industrial robots growing by only 10 percent.

Revised prediction: Professional service robot sales may grow by closer to 40 percent, while industrial robot sales will decline by 10 percent or more.

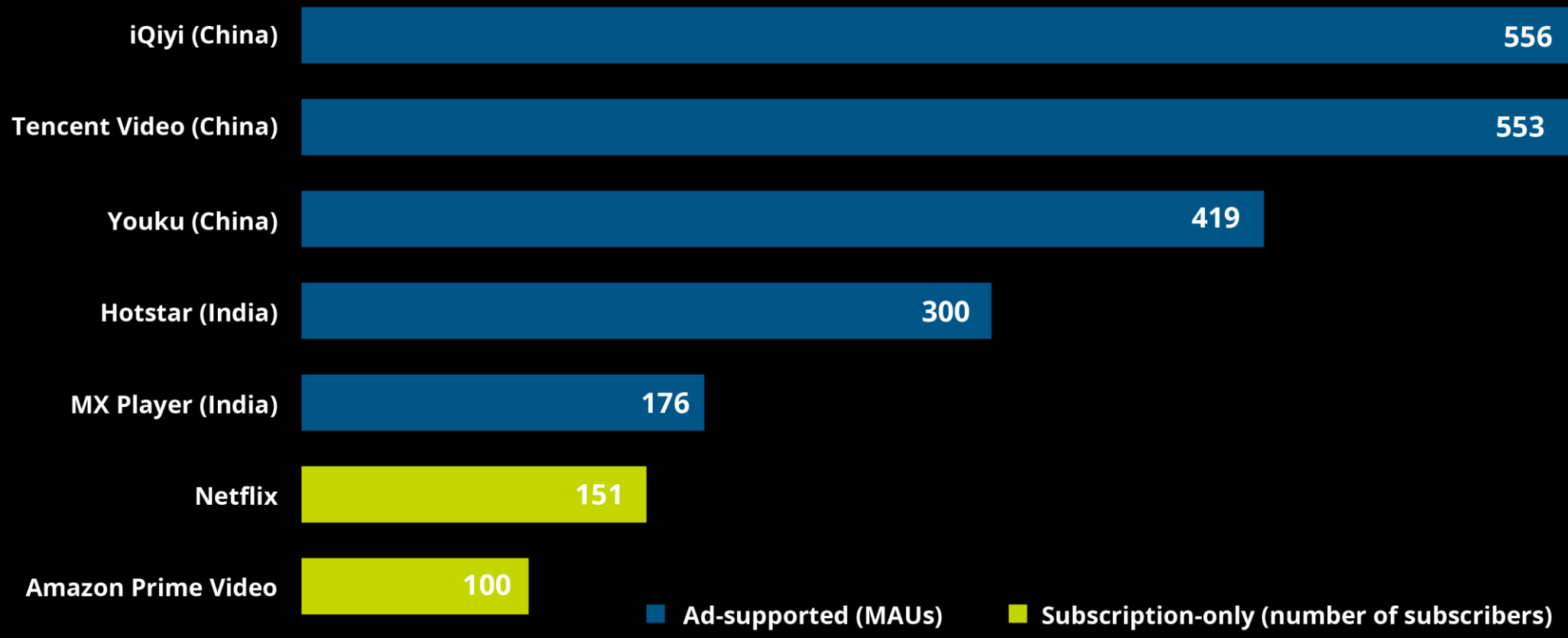
Why? More than half of professional services robots sold are for the surging warehouse, logistics, and medical verticals, while 60 percent of industrial robots are for the weaker automotive and electrical/electronics industries.

Full report available at www.deloitte.com/predictions


AVOD
Hollywood's Rising Star

Monthly active users (MAUs) of Chinese and Indian ad-supported services surpass those of global subscription-only leaders

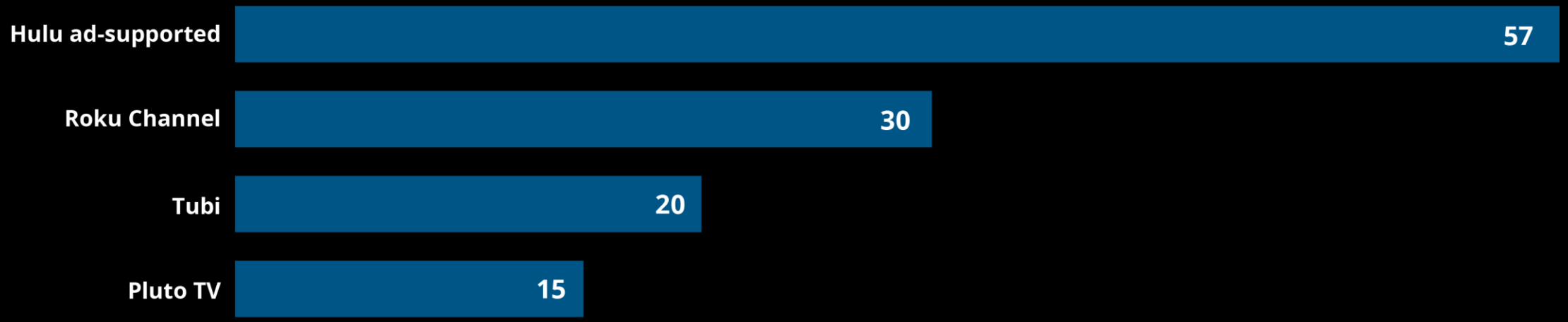
User bases for ad-supported video services versus streaming video services, 2019 (millions)



Sources: QuestMobile, 2019; China Internet Watch, 2019.

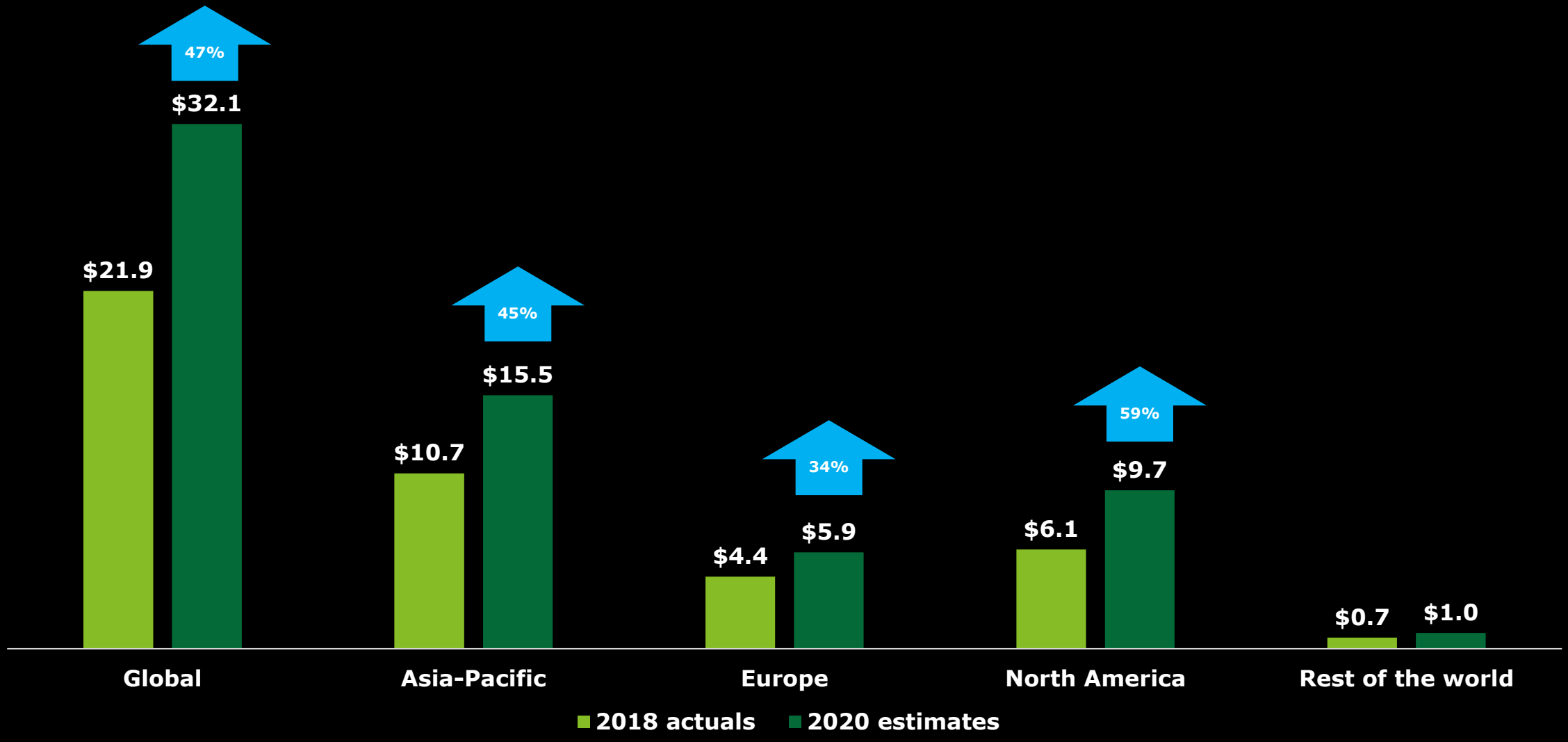
Ad-supported video services have quickly built sizable user bases in the United States

US user base for ad-supported video, MAUs (millions)



Sources: Hulu: Todd Spangler, "Hulu Says 70% of it 82 million viewers are on ad-supported plan," *Variety*, May 29, 2019[49]; Roku: Ben Muson, "Roku claims more than 30M active accounts," FierceVideo, August 5, 2019[50]; Tubi: Andrew Blustien, "Tubi takes aim at competition in its largest out-of-home campaign," The Drum, August 7, 2019[51]; Pluto TV: Ben Munson, "Pluto TV now has more than 15M active users," FierceVideo, April 9, 2019.

Global ad-supported video revenues, 2018 and 2020 (US$ billions)



Source: Digital TV research, "Global AVOD Forecasts," June 2019; Deloitte analysis.

Annual AVOD revenues per MAU, US$, 2018

Source: Deloitte analysis.

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

Original prediction: We predict that revenue from ad-supported video services will reach an estimated US$32 billion in 2020, with Asia-Pacific at US$15.5 billion and North America at US$9.7 billion.

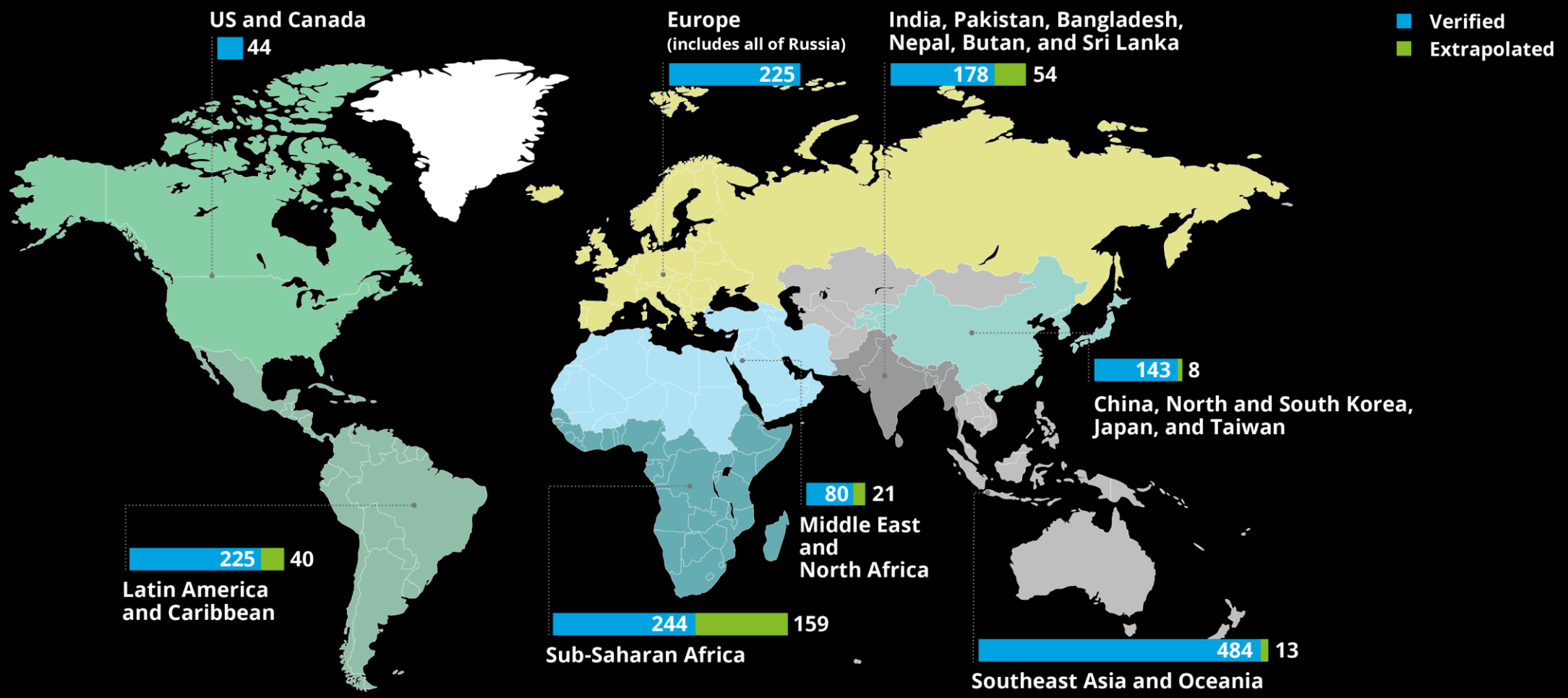
Revised prediction: Global ad-supported video revenues will likely be under US$30 billion, with Asia-Pacific at less than US$14 billion and North America closer to US$8.5 billion. A lot will depend on China and how it recovers.

Why? The number of viewers and minutes of viewing will likely both be up massively (40 percent?) in all markets due to pandemic lockdowns and people working from home. But with ad spending down, and the Summer Olympics pushed out, ad-supported video may not be able to monetize all of that growth … at least in 2020.

Full report available at www.deloitte.com/predictions

Rumours of antenna TV's death have been greatly exaggerated

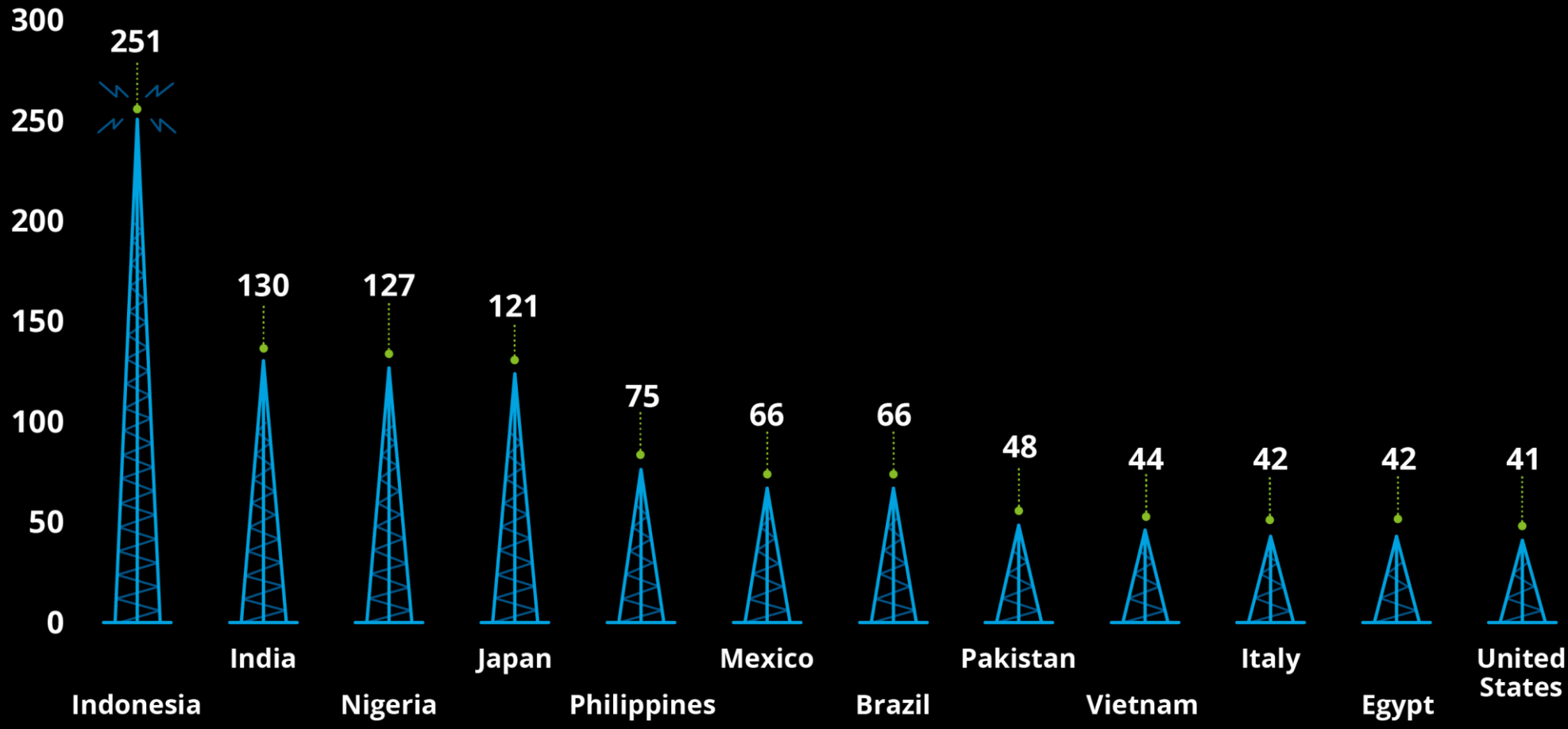
Predicted number of antenna TV viewers in 2020 (millions)



Source: Deloitte analysis of public data.

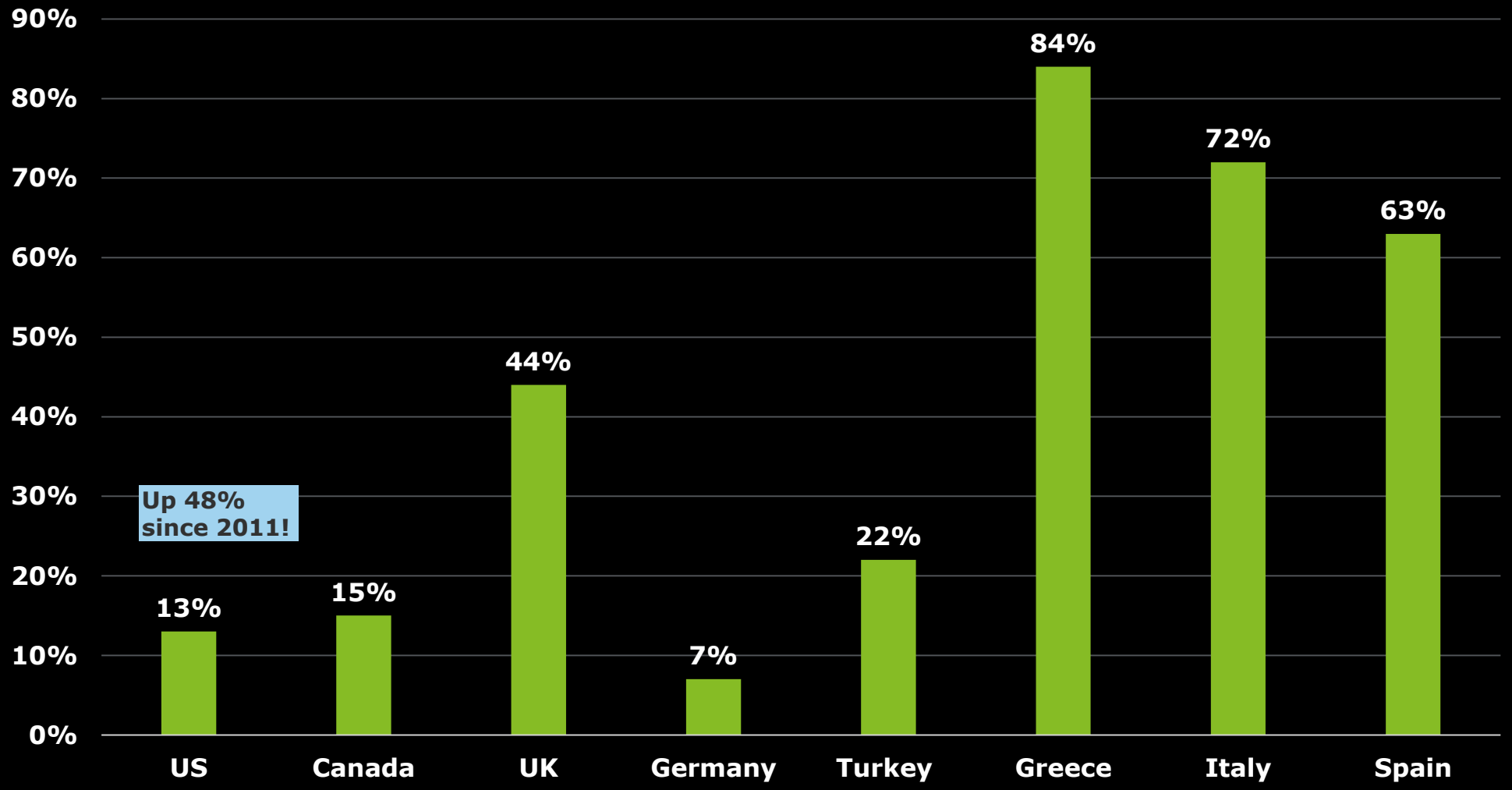
Indonesia, India, and Nigeria top the list of antenna-TV viewership

Predicted top 12 antenna-TV-watching countries in 2020, verified data (millions of people)



Source: Deloitte analysis of public data.

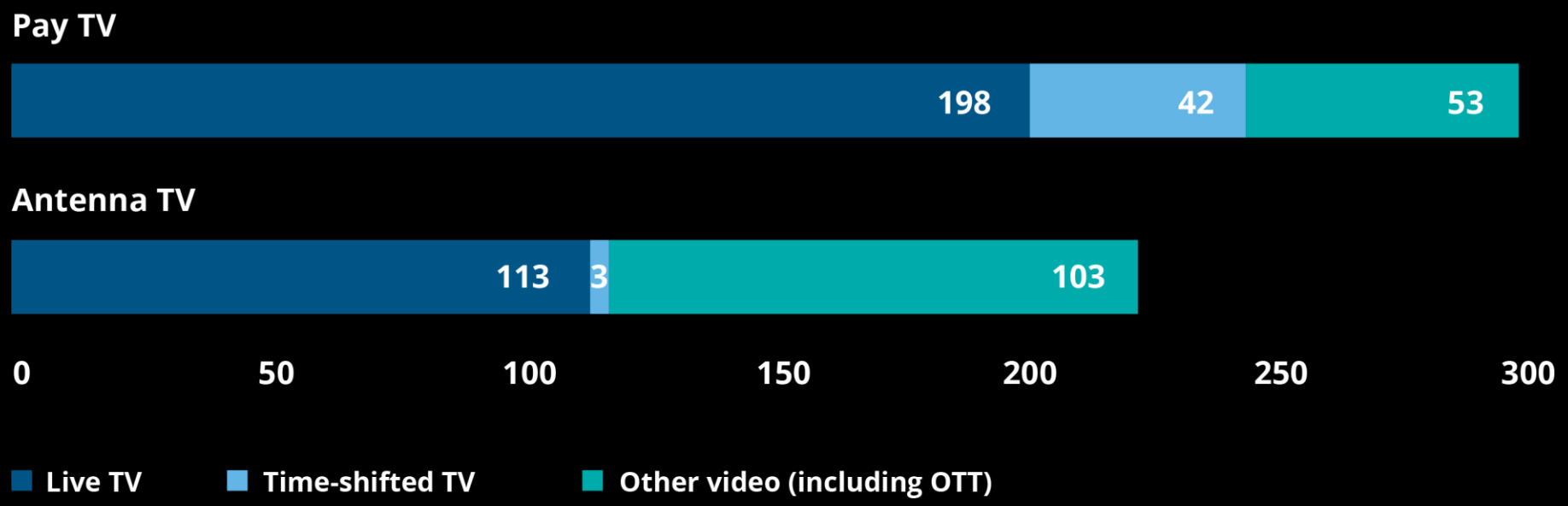
Percentage of population who watch some or all of their TV via a terrestrial antenna (OTA), selected countries, 2020



Source: Deloitte analysis from multiple sources.

Antenna-TV viewers watch far fewer minutes of recorded TV than pay-TV viewers

Daily video minutes watched by US adults with streaming, pay TV, and antenna TV, 2019



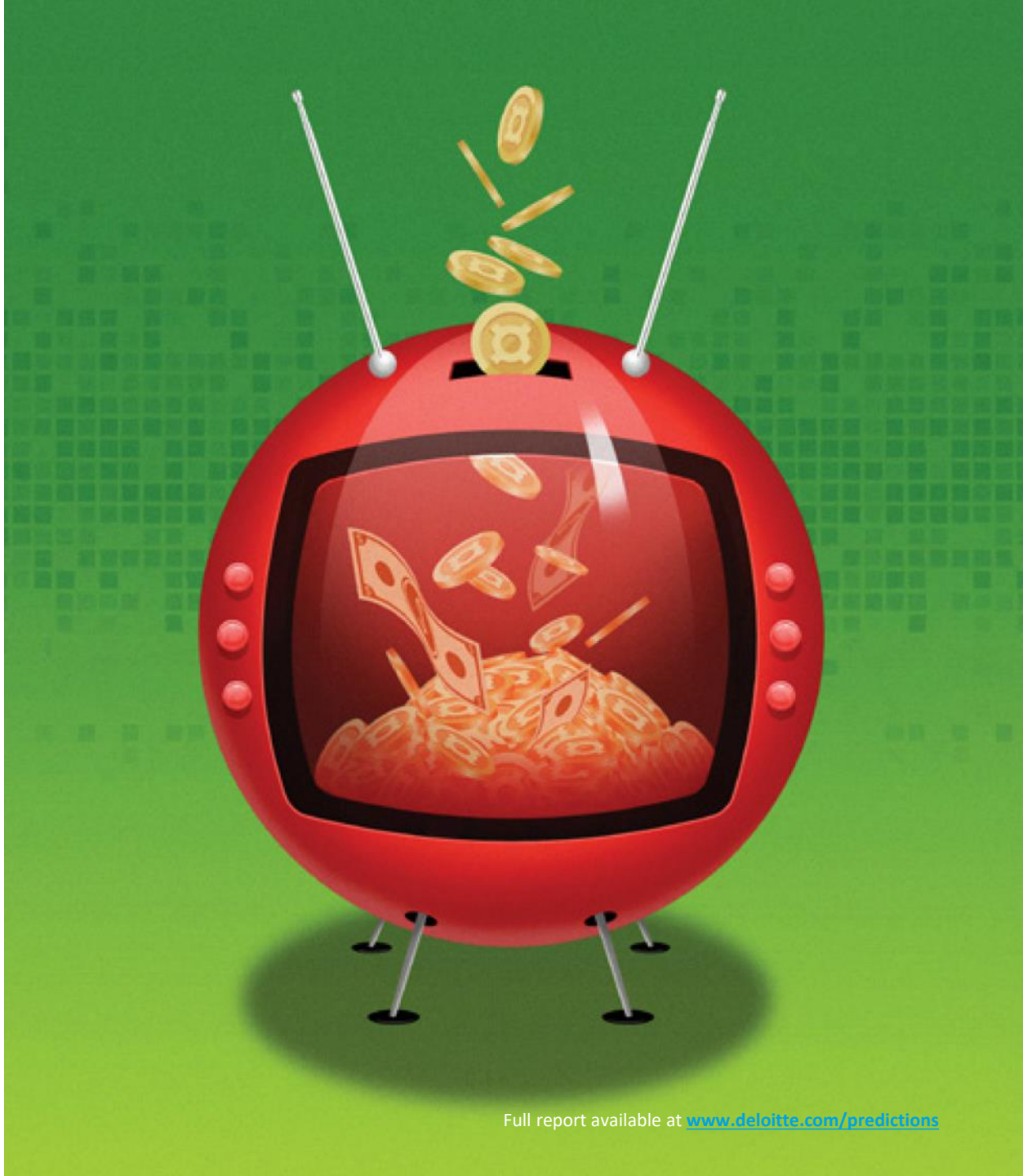
Sources: Nielsen, *Nielsen local watch report: TV streaming across our cities*, August 2019.

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

Original prediction: 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.

Revised prediction: Unchanged, possibly up a bit in some markets. (North America)

Why? 1.6 billion is such a big number that it is unlikely to move materially. But for those pinching pennies due to economic weakness and layoffs, it's hard to beat 20 to 30 channels of free TV. Cord cutting in NA is accelerating, and some cordcutters are buying antennas.



Audiobook and podcast predictions for 2020

AUDIOBOOKS

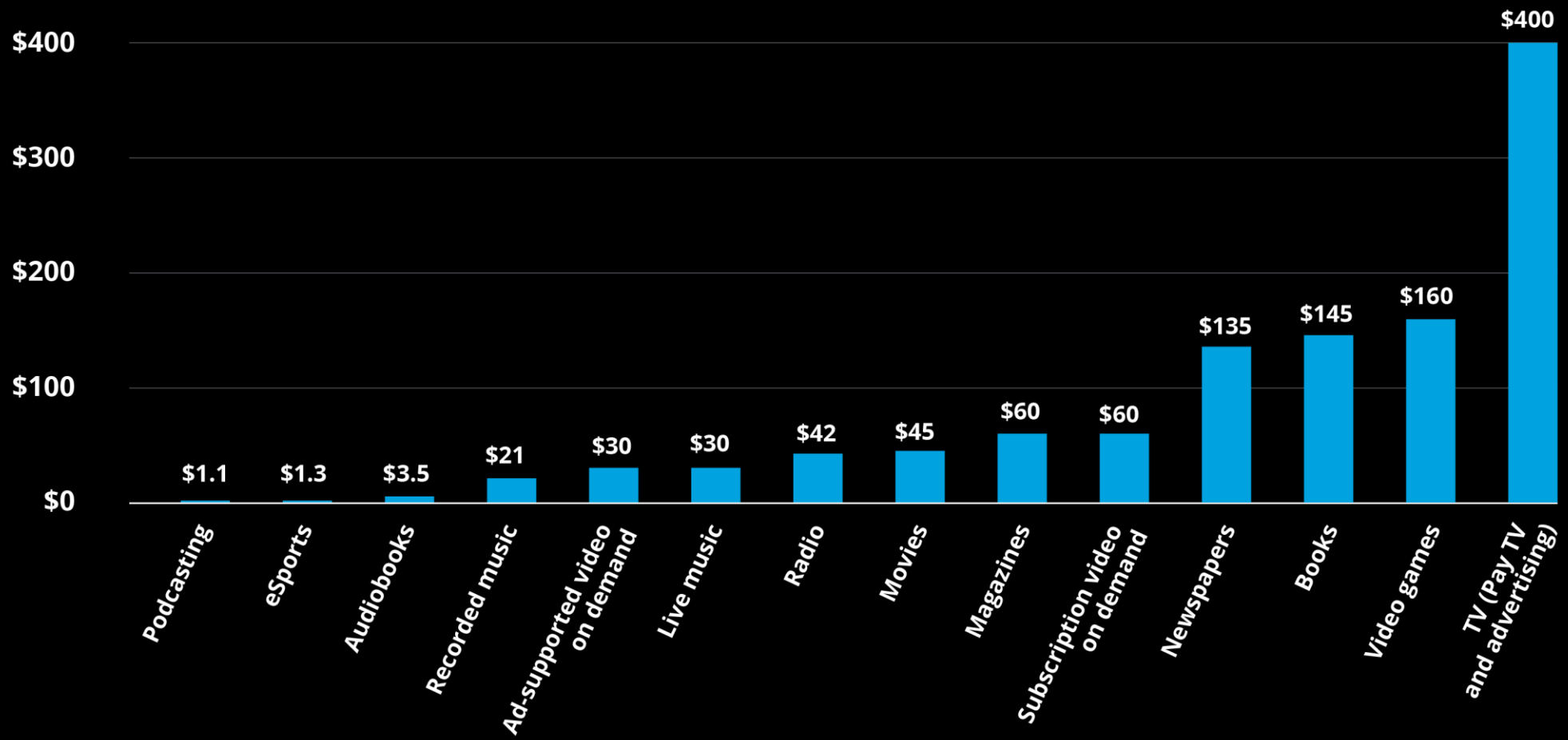
US$3.5 billion in revenues
+25% over 2019

PODCASTS

US$1.1 billion in revenues
+30% over 2019

The audiobook and podcast markets, while relatively small, are poised to grow

2020 global media revenues by category (US$ billions)



Source: Deloitte analysis based on historical data and growth rates from various sources, including comScore, Entertainment Software Association and NPD, Digital TV Research, Bookmap, PwC, and the World Press Trends database.

The ears have it: The rise of audiobooks and podcasting

Original prediction: We predict that 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 to reach US$1.1 billion in 2020.

Revised prediction: Audiobooks may reach US$4 billion, but podcasting is likely to stay under US$1 billion.

Why? Audiobook sales seem to be up so far in 2020, likely due to lockdown and sales of kids' books. But podcast listening in the United States is likely to be down about 10%. This is likely due to fewer commuters listening to podcasts in their cars and during transit. Plus, 75 percent of podcast revenues are from ads, and ad spending is down.

Full report available at www.deloitte.com/predictions

The smartphone multiplier: Toward a trillion-dollar economy

Original prediction: We predict that the smartphone multiplier will drive US$459 billion of revenue in 2020 alone.

Revised prediction: The smartphone multiplier is likely to be closer to US$420 billion.

Why? Earphones and cases are tied to sales of new phones, and we're expecting phone sales to be down. But people are using more apps and games, so those should be up. And people are using their phones more, so mobile ad weakness will likely be less bad than other forms of advertising.

Full report available at www.deloitte.com/predictions

The not-so trillion dollar smartphone ecosystem ($ billion)

By the end of 2020, there will be **more than 700 satellites in low-Earth orbit** seeking to offer global broadband internet — up from roughly 200 at the end of 2019.

Though these won't be enough to connect all of the world's consumers and enterprises, they may be **offering partial service in late 2020 or early 2021.**

All of this has happened before… or has it?

Getting into orbit has become less expensive

Average cost of launching an object into orbit:

1970-2000: US$18,500/kg

Today: US$2,720/kg

Satellites and manufacturing are more advanced

-Mass production approach

-More modular designs

-Standardized buses

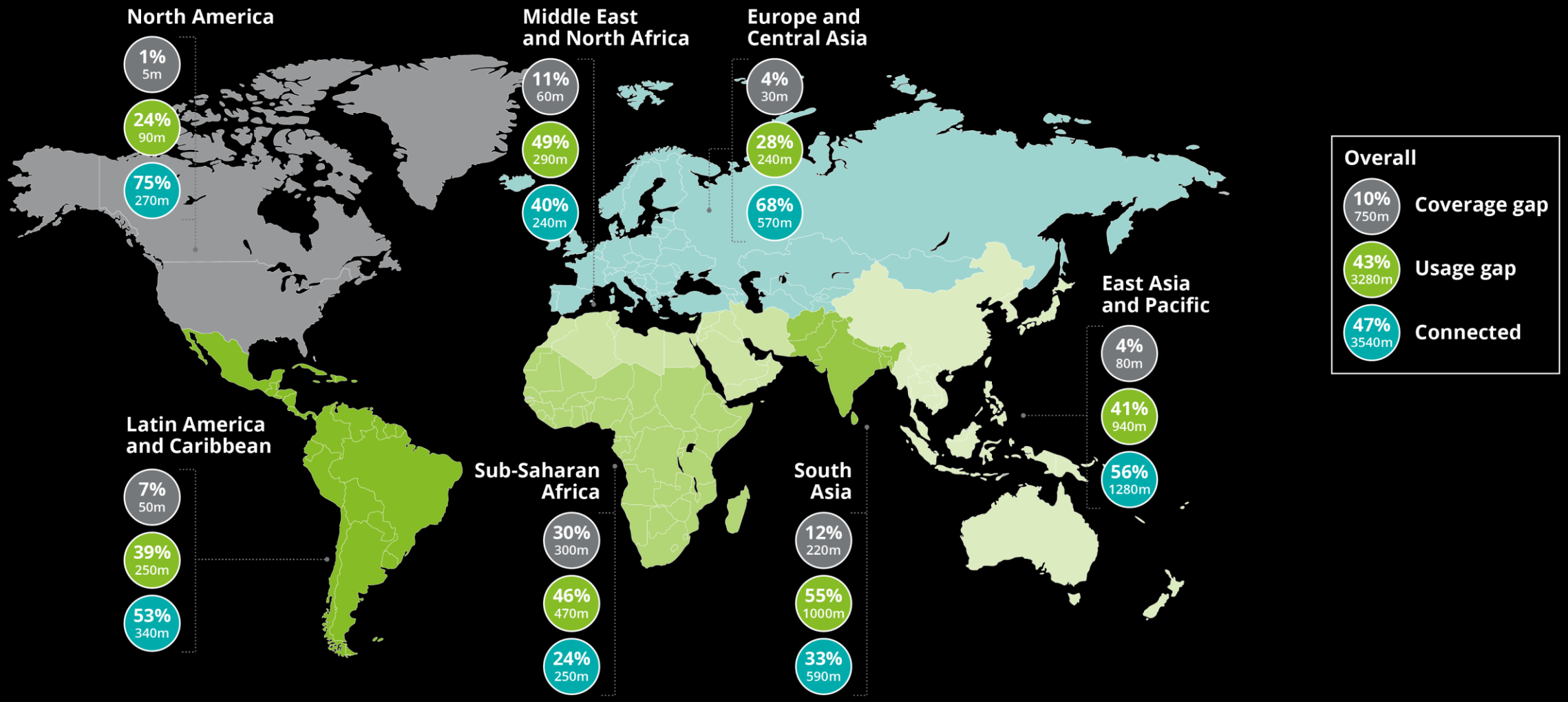
-Smaller, more advanced components

The demand for connectivity has increased

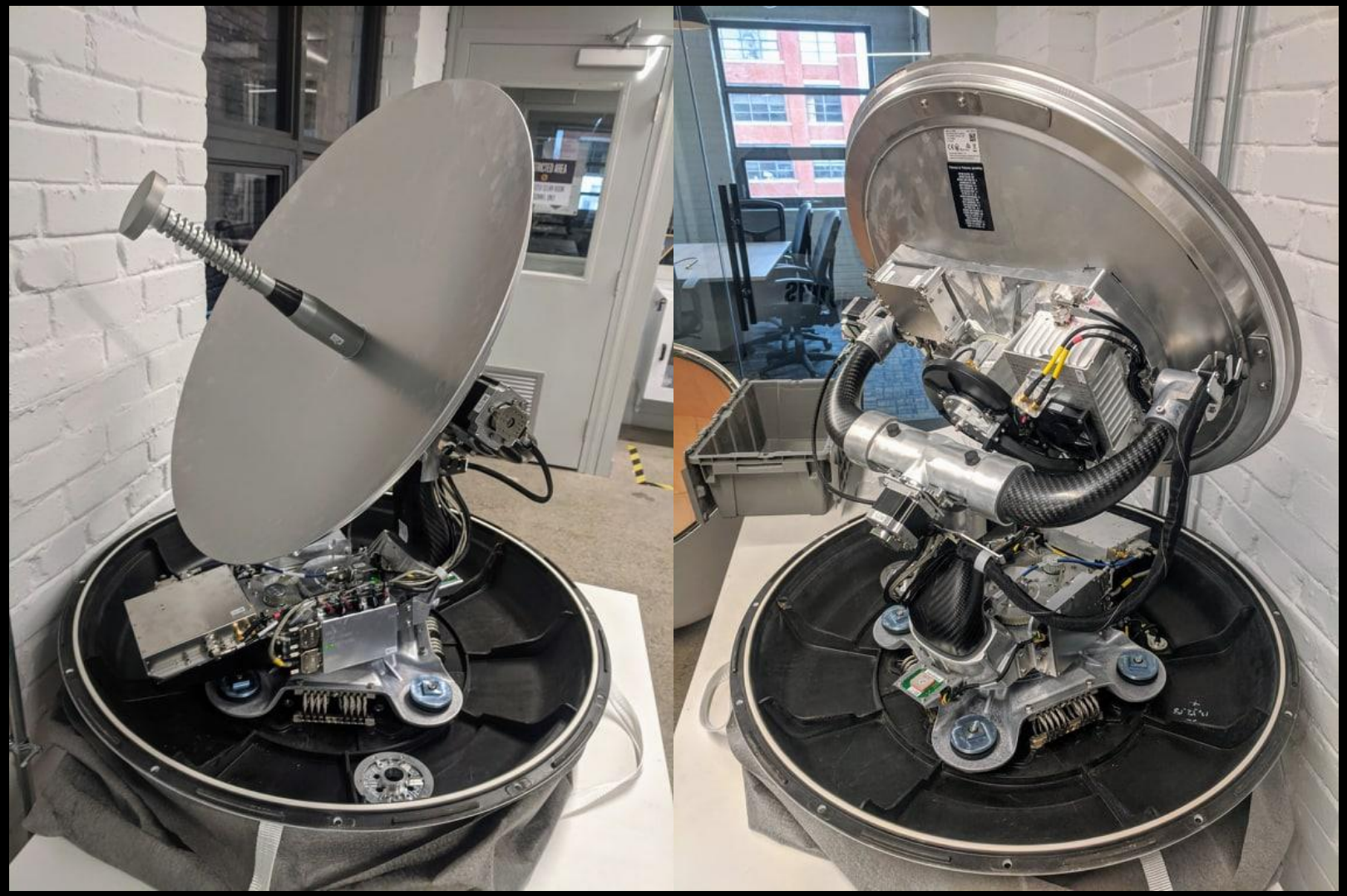
Consumers, companies, and governments expect to be able to stay connected no matter where they are

State of global mobile internet connectivity by region, 2018

Base: Total population (millions)



Source: GSMA Intelligence, 2018.



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

Original prediction: 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, or 500 more.

Revised prediction: We now predict over 1,000 LEO satellites in orbit by the end of the year.

Why? Although OneWeb has gone bankrupt, it did place 68 satellites in LEO in Q1, and those will likely be bought by someone. Starlink placed 360 satellites in LEO so far (June 4), and even assuming that it slows to 60 per month, it will end up with around 780 new satellites in orbit for 2020.

Full report available at www.deloitte.com/predictions

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

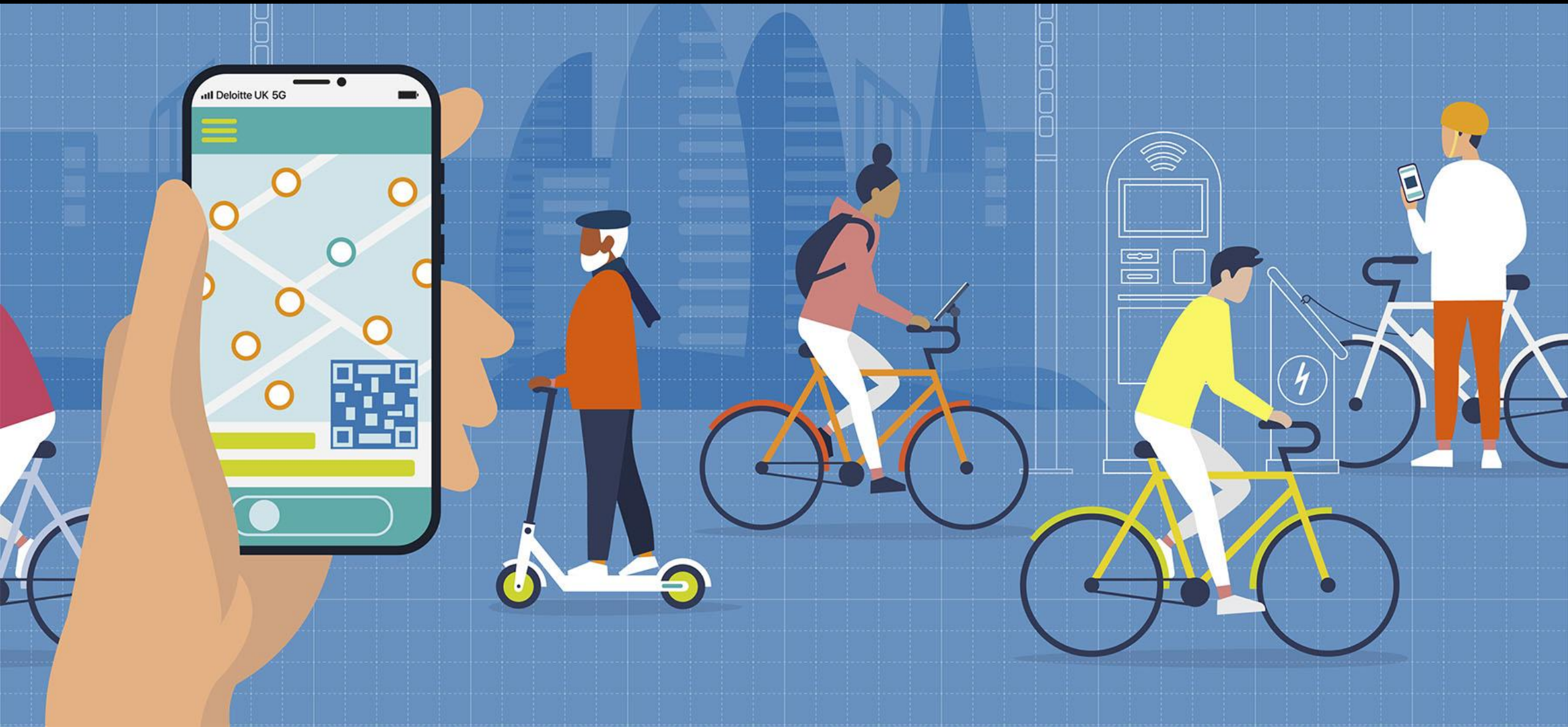
Original prediction: We predict that the global content delivery network (CDN) market will reach US$14 billion in 2020, up more than 25 percent from 2019's estimated US$11 billion.

Revised prediction: Likely to be higher—perhaps 30 to 40 percent annual growth, or up to US$15.5 billion. This is pull forward spending.

Why? Video and game streaming are up 20 to 70 percent due to lockdowns, school closings, and people working from home,[7] so the demand for CDNs is higher than ever. But they take time to build, and spending may be constrained due to economic weakness.

Full report available at www.deloitte.com/predictions

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




MAUISPORT.CA
ePeak 17
GT WEB X-COUNTRY

Lithium-ion batteries enable the reinvention of the vehicle; this enables the reinvention of processes, such as last-mile delivery

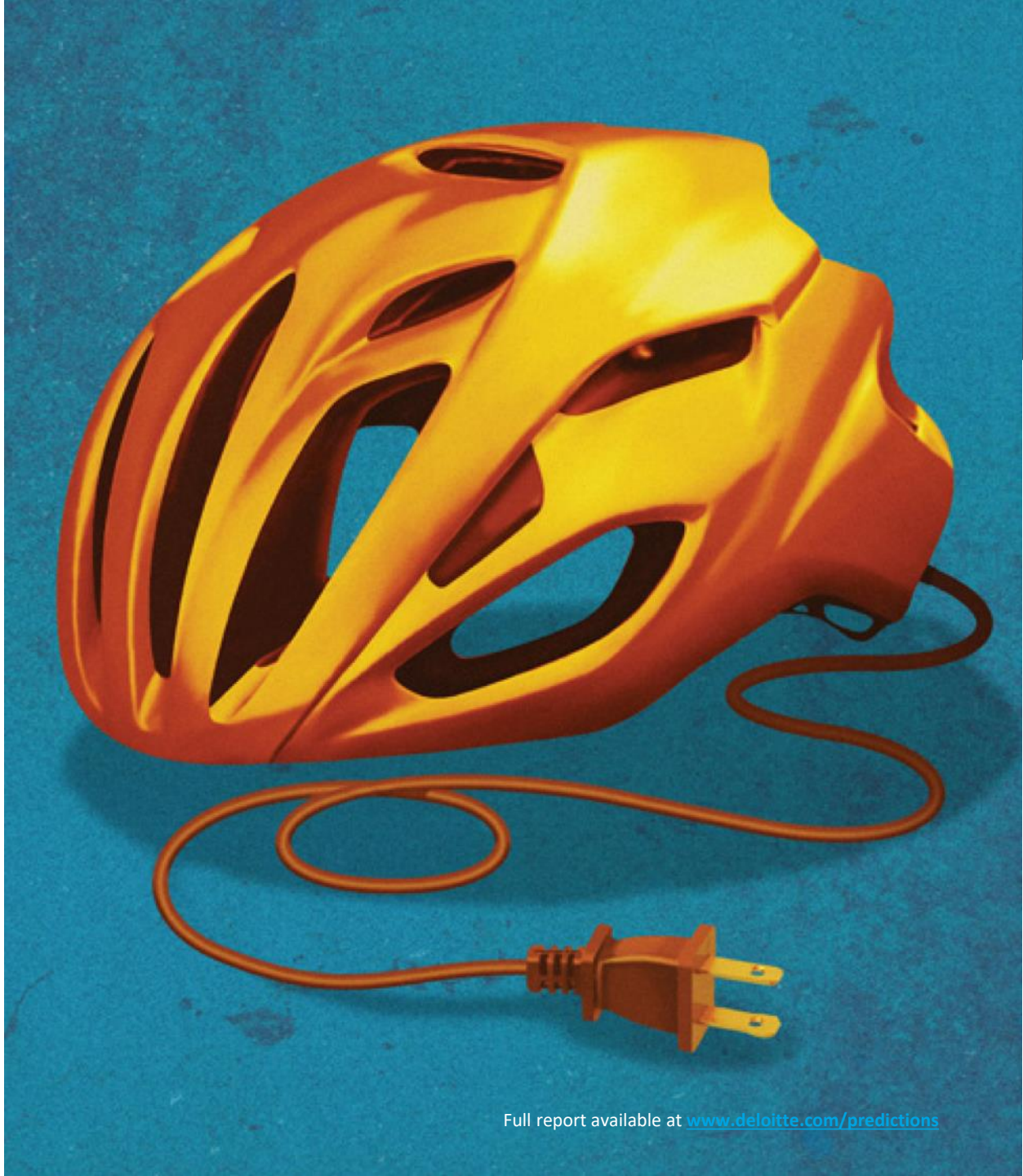
Battery-powered electric vehicle fleets by category, 2018 (estimated) and 2023 (forecast) in millions

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

Original prediction: We predict that a 1 percentage point rise in the proportion of people who bike to work during the three years from 2019 to 2022.

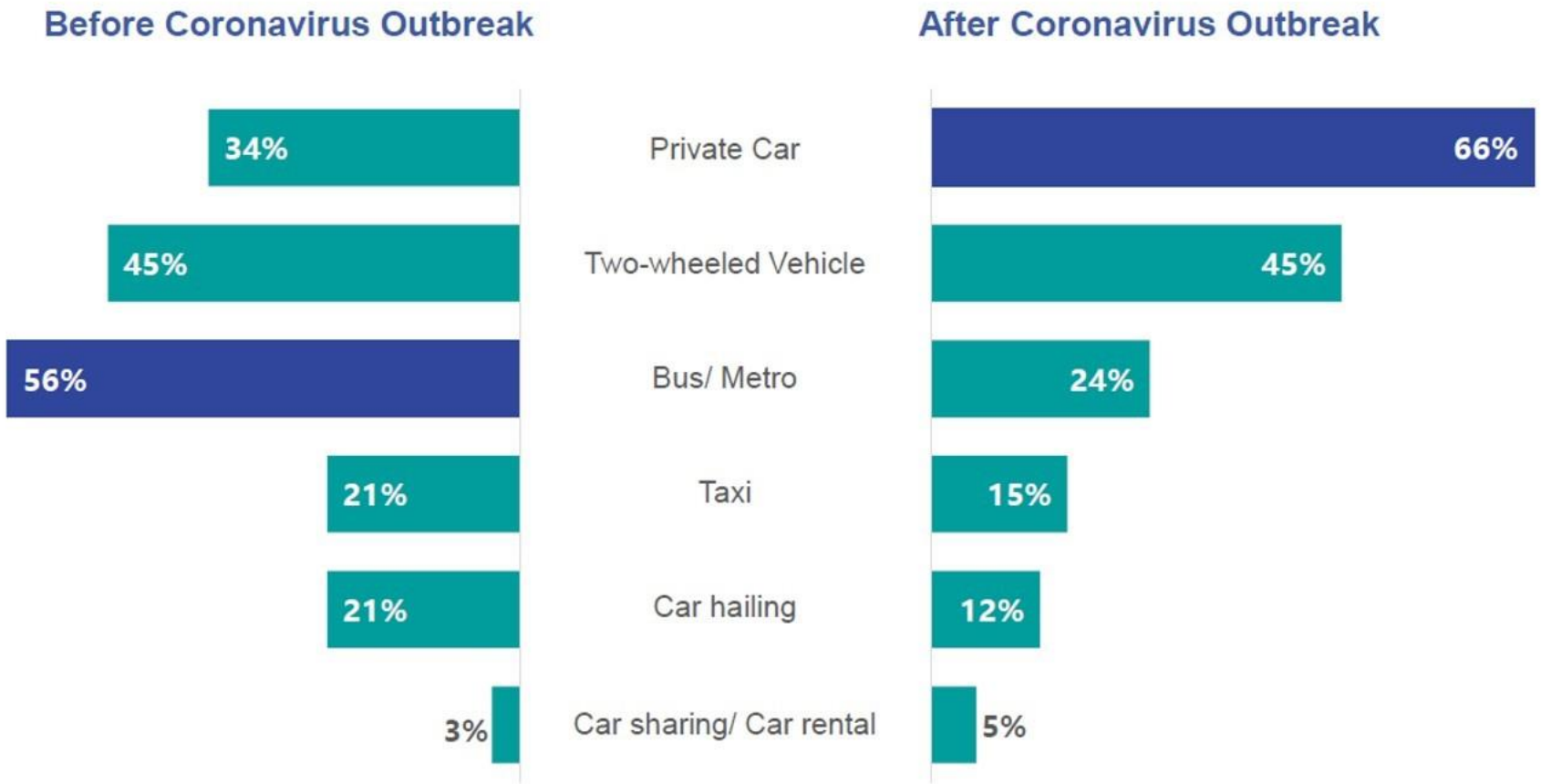
Revised prediction: Bike trips may grow even faster due to COVID-19.

Why? As a result of work from home and lockdowns, there are decreases in all forms of commuting. Offsetting that, bikes (and eBikes) are seen as lower risk of infection than shared modes of transport, so we may see a bike spike!



Full report available at www.deloitte.com/predictions

CONSUMERS TEND TO USE MORE PRIVATE CARS AND LESS PUBLIC TRANSPORTATION



Total respondents (N=1620)

NEW CAR PURCHASE INTENTION IS INCREASING AMONG CONSUMERS WHO CURRENTLY DO NOT HAVE A CAR, DUE TO LACK OF TRUST OF PUBLIC TRANSPORTATION

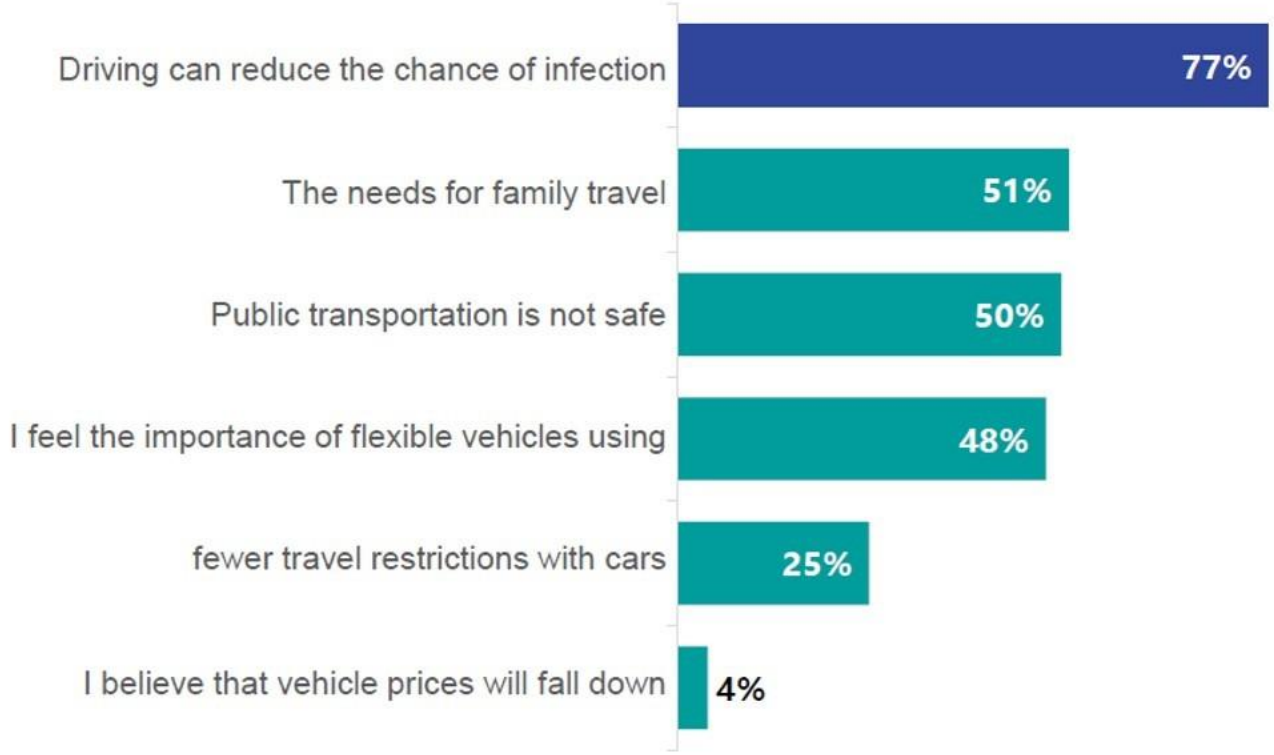
72% **Strengthening Purchase Intention**

Especially in severe outbreak region and tier 1 cities

66% **Would Like to Purchase a Car within 6 months**

Who currently do not have a car (N=601)

Reasons of New Car Purchase



1st time buying intenders (N=430)

Chongqing traffic

CURRENT WEATHER

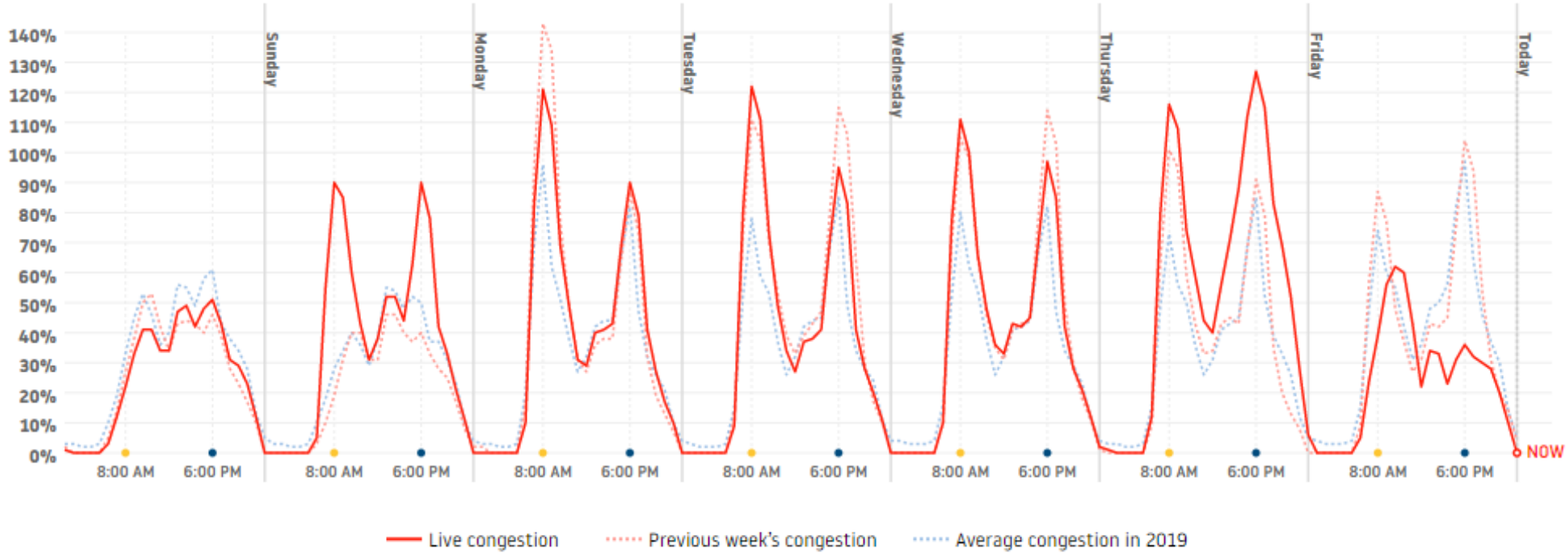
22°C

LOCAL TIME

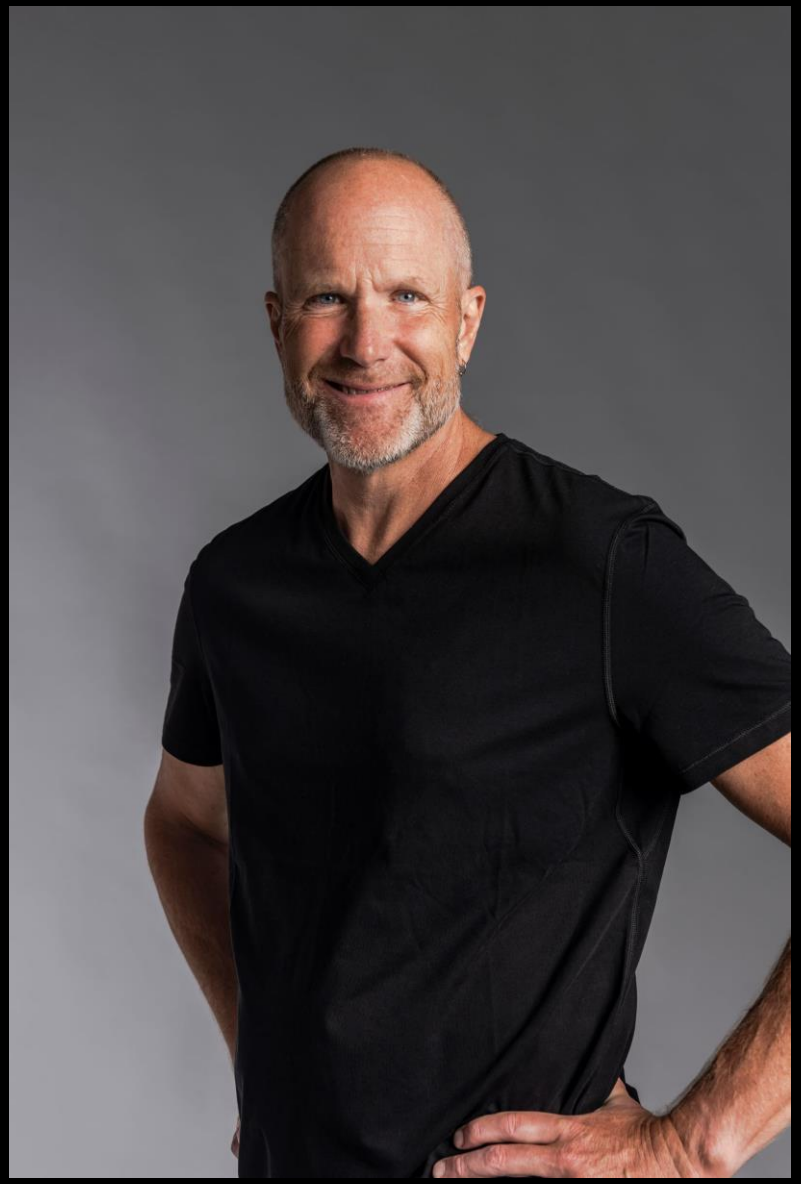
12:16 AM

CONGESTION LEVEL

LAST 48 HOURS | LAST 7 DAYS



TMT Predictions: custom events



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