



TMT outlook 2017:

A new wave of advances offer opportunities and challenges

The Technology, Media and Telecommunications series

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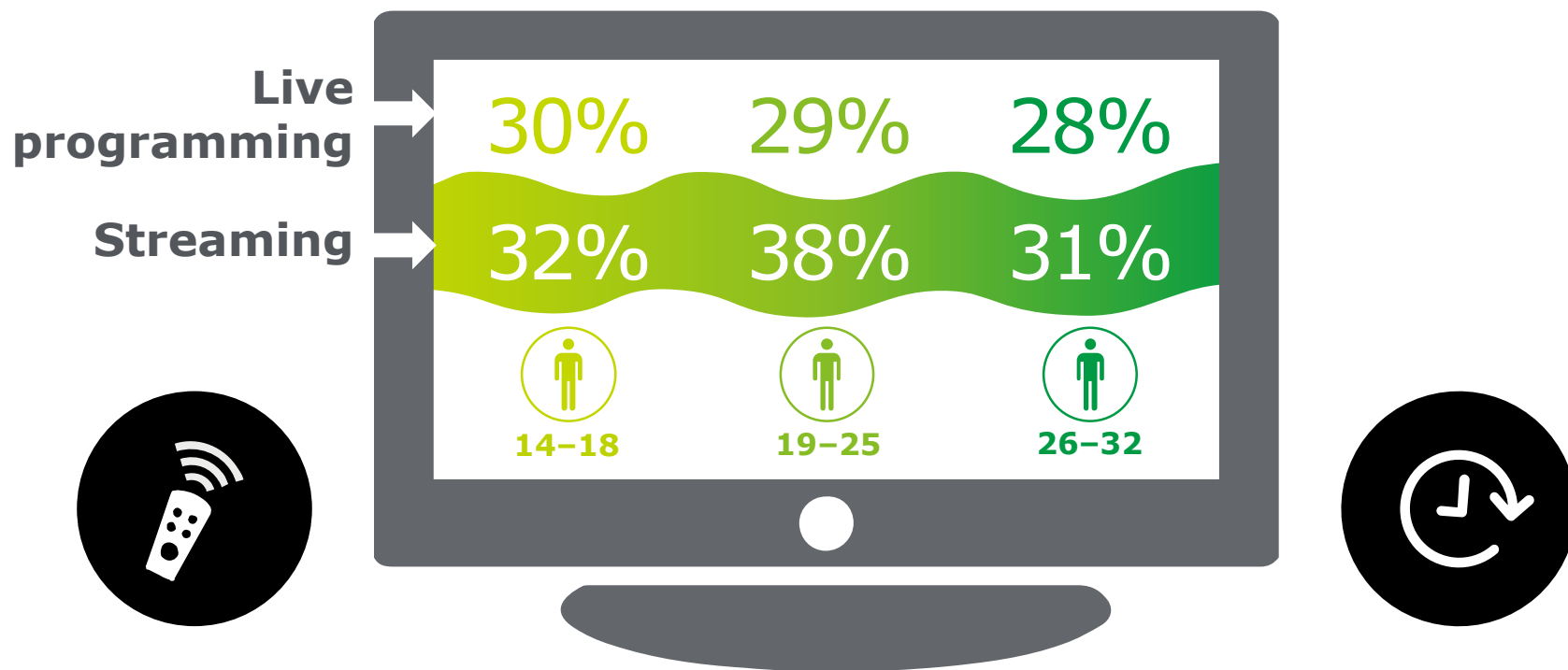
Craig Wigginton, Partner, Deloitte & Touche LLP

February 8, 2017

Media and entertainment outlook

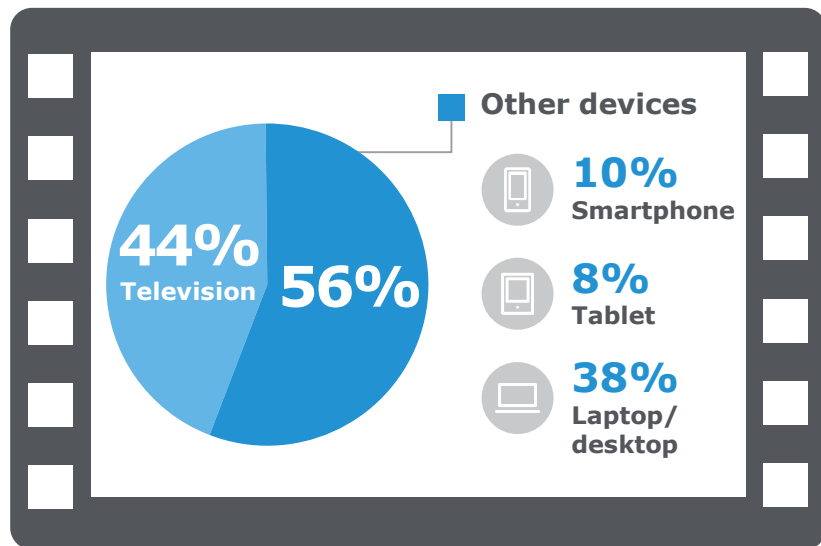
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Millennials spend more time streaming content than watching live television

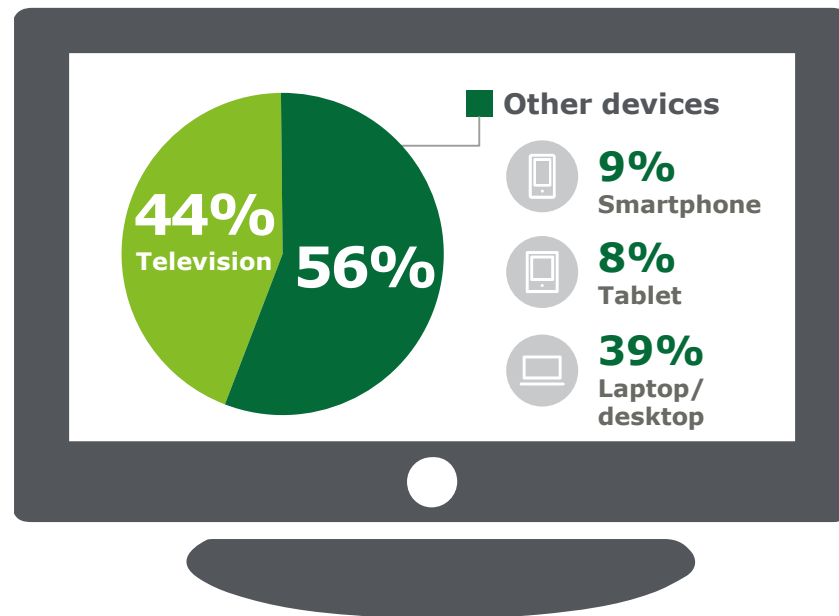


Millennials aged 19-25 spend more time watching content on devices other than TVs

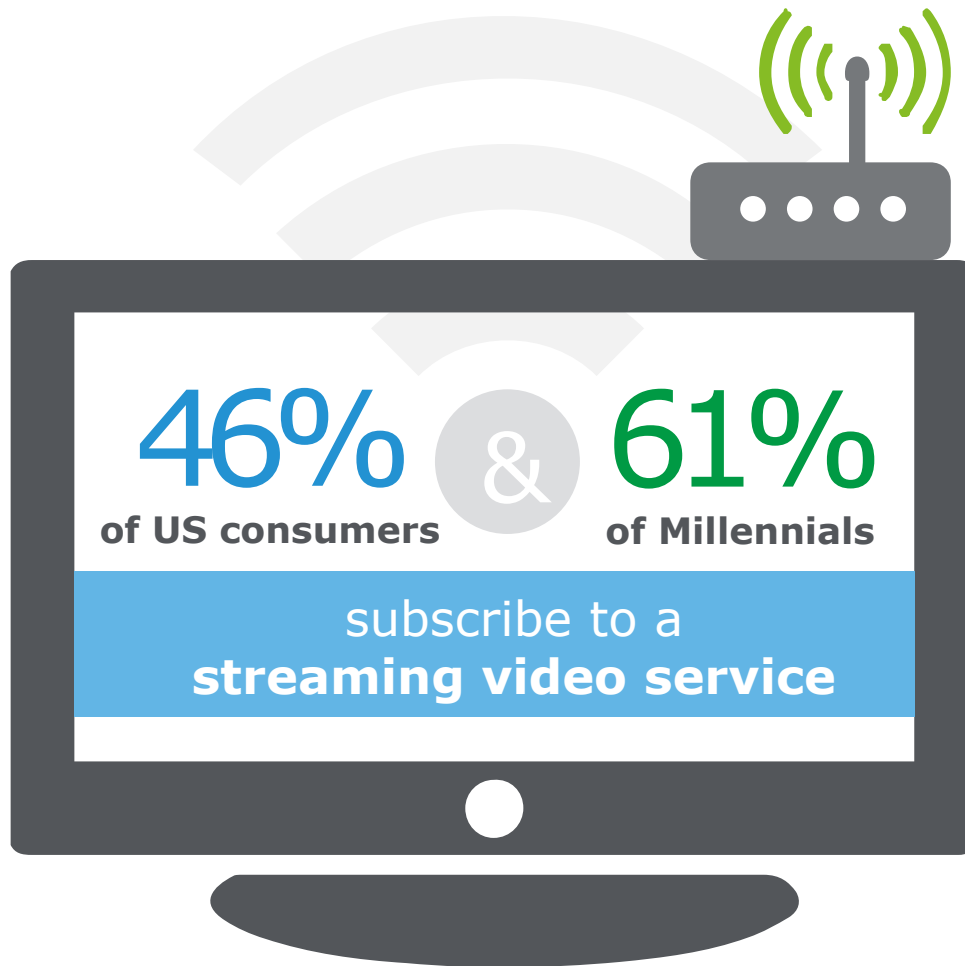
Movies



TV shows



Streaming services are growing rapidly, especially among Millennials



Average number of paid video subscription services by generation



14-18

Two



33-49

Two



19-25

Two



50-68

Two



26-32

Three



69+

One

Millennials value their streaming video subscriptions more than Pay TV

Home Internet



95%

of US consumers



Pay TV



79%

of US consumers

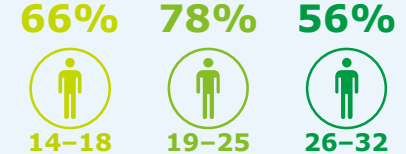


Streaming Video Services



61%

of US consumers



Traditional Pay TV packages are losing their appeal with consumers as alternative models gain ground



49%

Only channels I watch

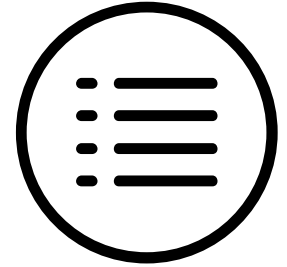


39%

**Traditional package
of channels**

What does this mean?

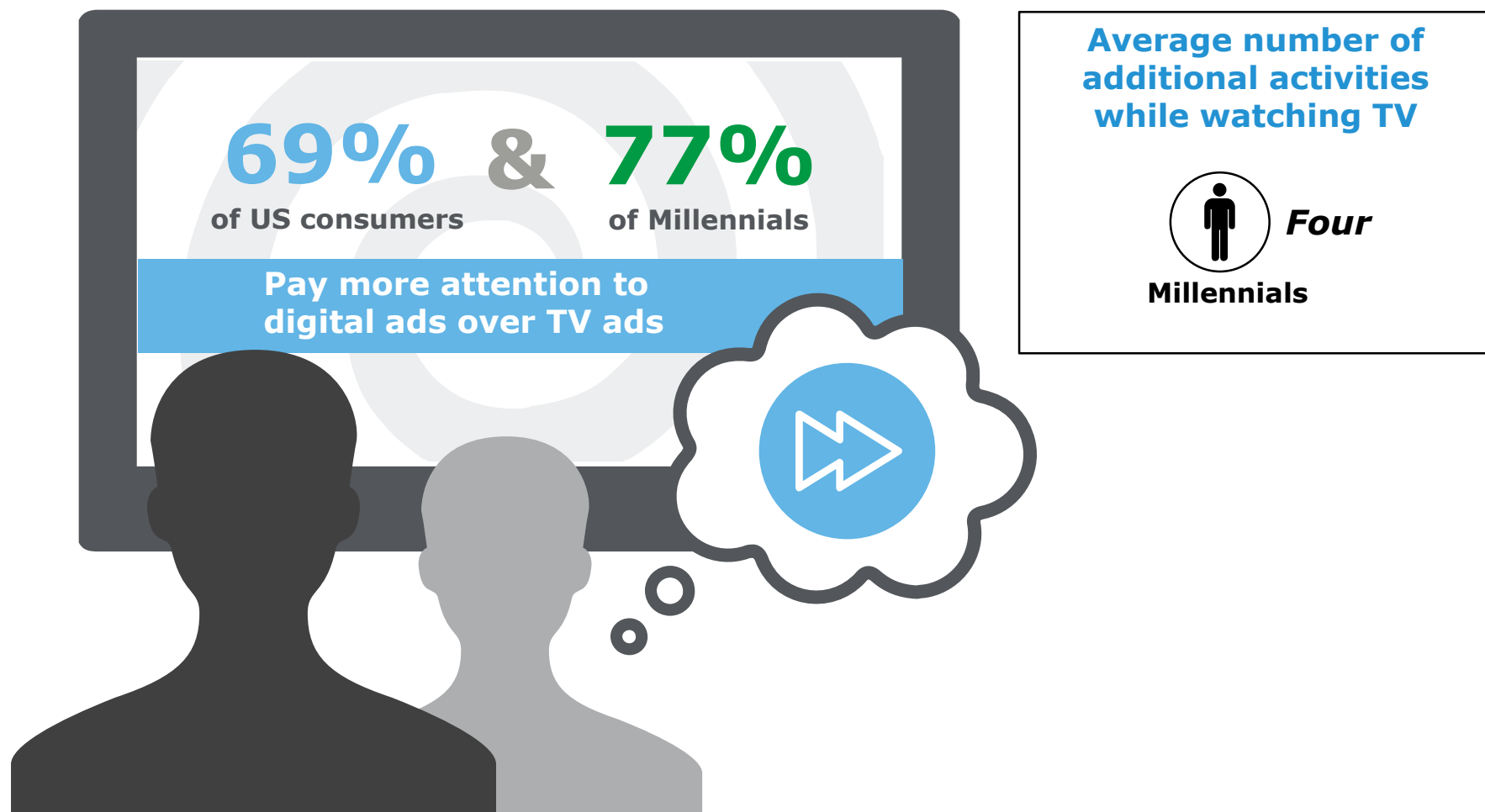
Poll question #1



How many activities do you typically engage in while watching TV?

- One
- Two
- Three
- Four
- Five or more
- Don't know/don't multitask while watching TV

Consumers pay more attention to digital ads than TV ads and Millennials are the most distracted while watching TV



The buying influence of online reviews in social media has surpassed TV ads for 19-32 year olds



73%

**Online reviews within
social media circle**

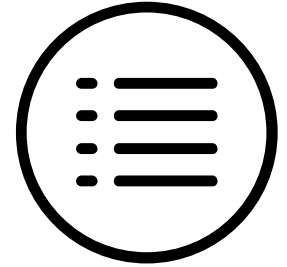


39%

Television advertising

VR/AR and the Future of Mobility

Poll question #2



Do you own a VR headset?

- Yes
- No
- No, but I plan to purchase one in the next 12 months
- No, but I might purchase when more content is available
- I don't know what a VR headset is

Technologies driving change in Media & Entertainment

Virtual Reality



As of October 2015, 234 companies working on VR had raised a total of \$3.8 billion in capital according to VentureBeat, with a combined market value of \$13 billion.

¹AAA 2015 Driving Survey

Future of Mobility



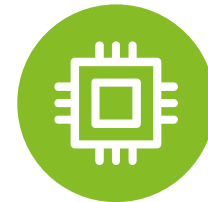
Telecom



Auto



Media



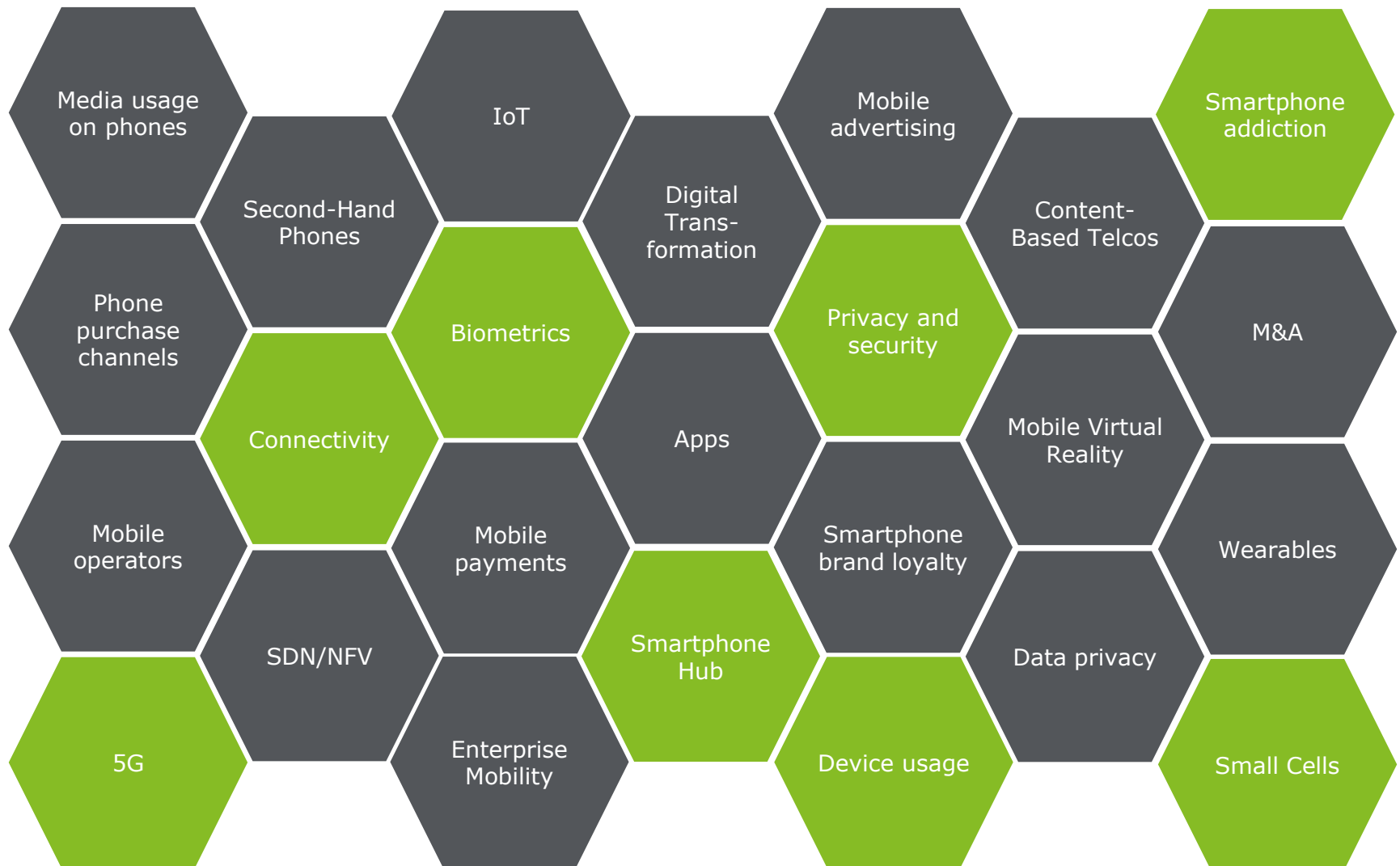
Tech

In the US, roughly 160 million hours are spent driving from point A to B annually.¹ That's 46 minutes per person, every day.

Telecommunications Outlook

Craig Wigginton, US and Global
Telecommunications Leader
Deloitte & Touche LLP

Today's Coverage of 2017 Telecom Outlook Items

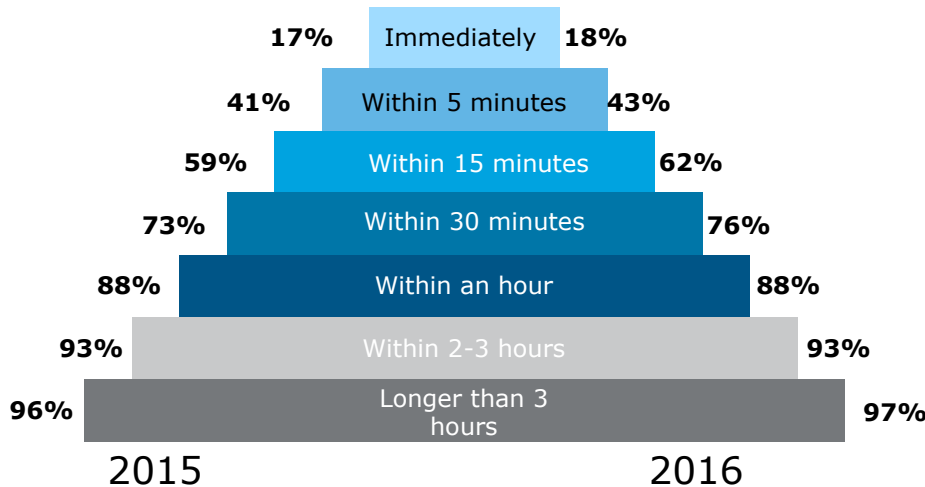


Device usage

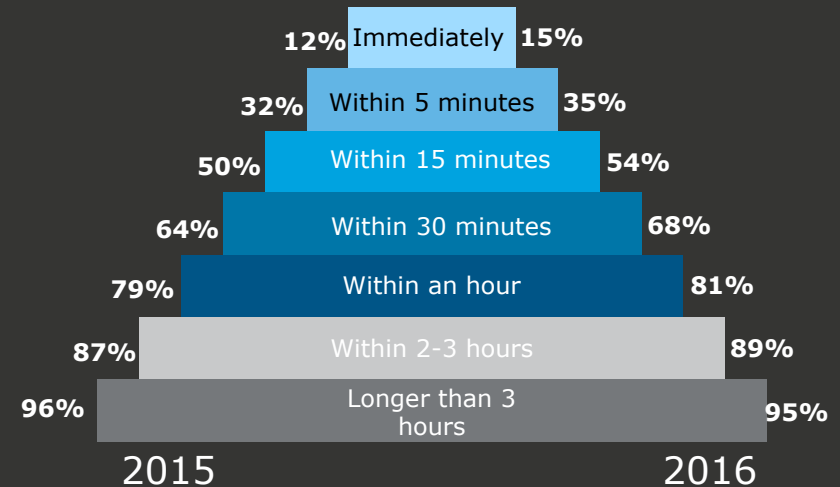
Nearly 50% of consumers surveyed look at their phone within 5 minutes of waking up. At night, consumers are slightly less phone-tethered



Typically how long is the interval between waking up and looking at your phone for the first time?



At the end of the day, typically how long is the interval between looking at your phone for the last time and preparing to sleep?

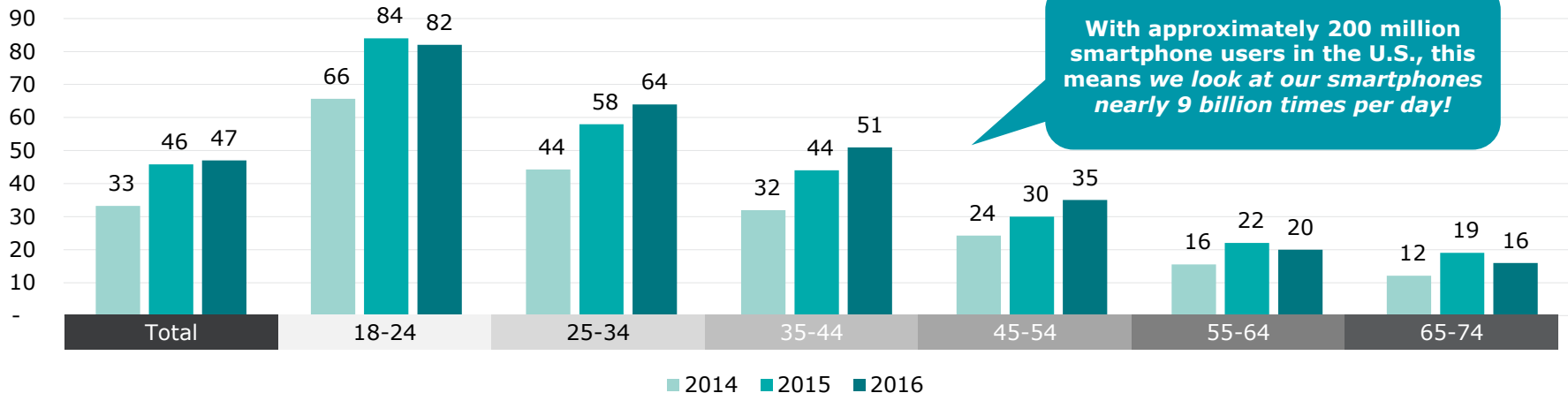
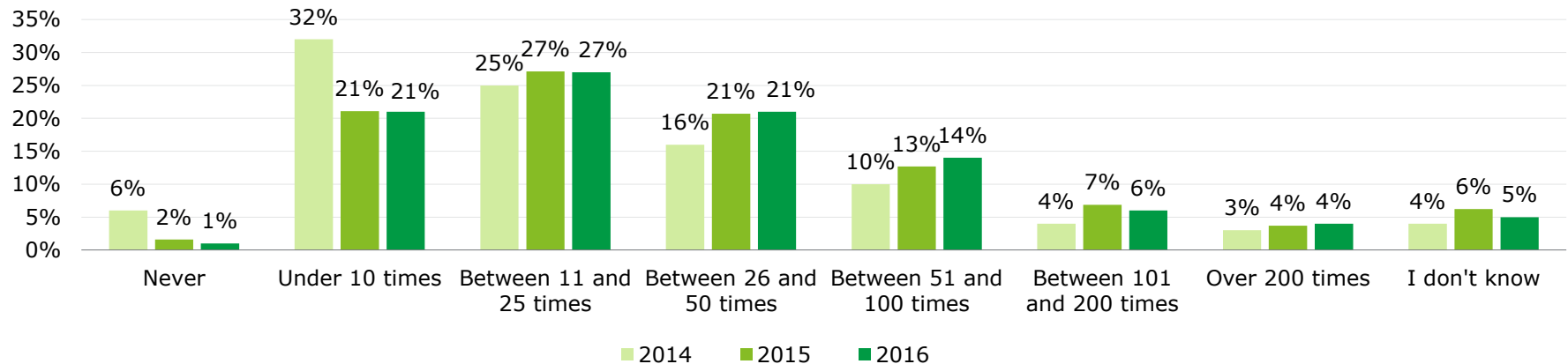


Source: USA edition, Deloitte Global Mobile Consumer Survey
Base: Smartphone owners 2014: 2015: 1,458, 2016: 1,530

The 18-24 year old age group still dominates when it comes to how many times a phone is looked at in a given day



How many times would you estimate you look at your phone in a day?



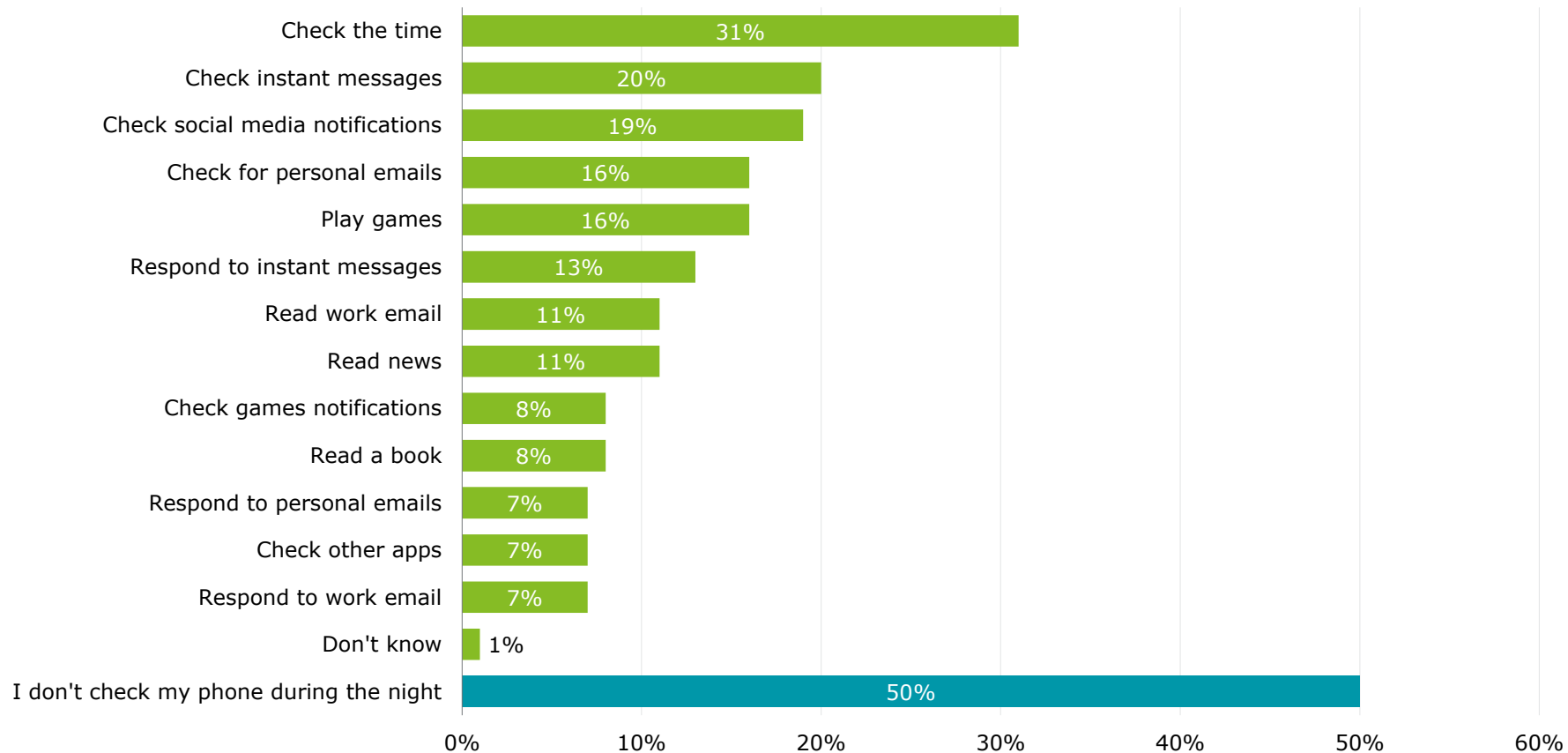
Source: USA edition, Deloitte Global Mobile Consumer Survey, June 2016

Base Graph 1: Smartphone owners 2014: 2015: 1,458, 2016: 1,530

of Smartphones Source: Statista, 2015

Surprisingly, ½ of consumers check their phones in the middle of the night. Reasons vary, but they're primarily personal activities

 Which of the following activities do you do if you check your phone in the middle of the night?



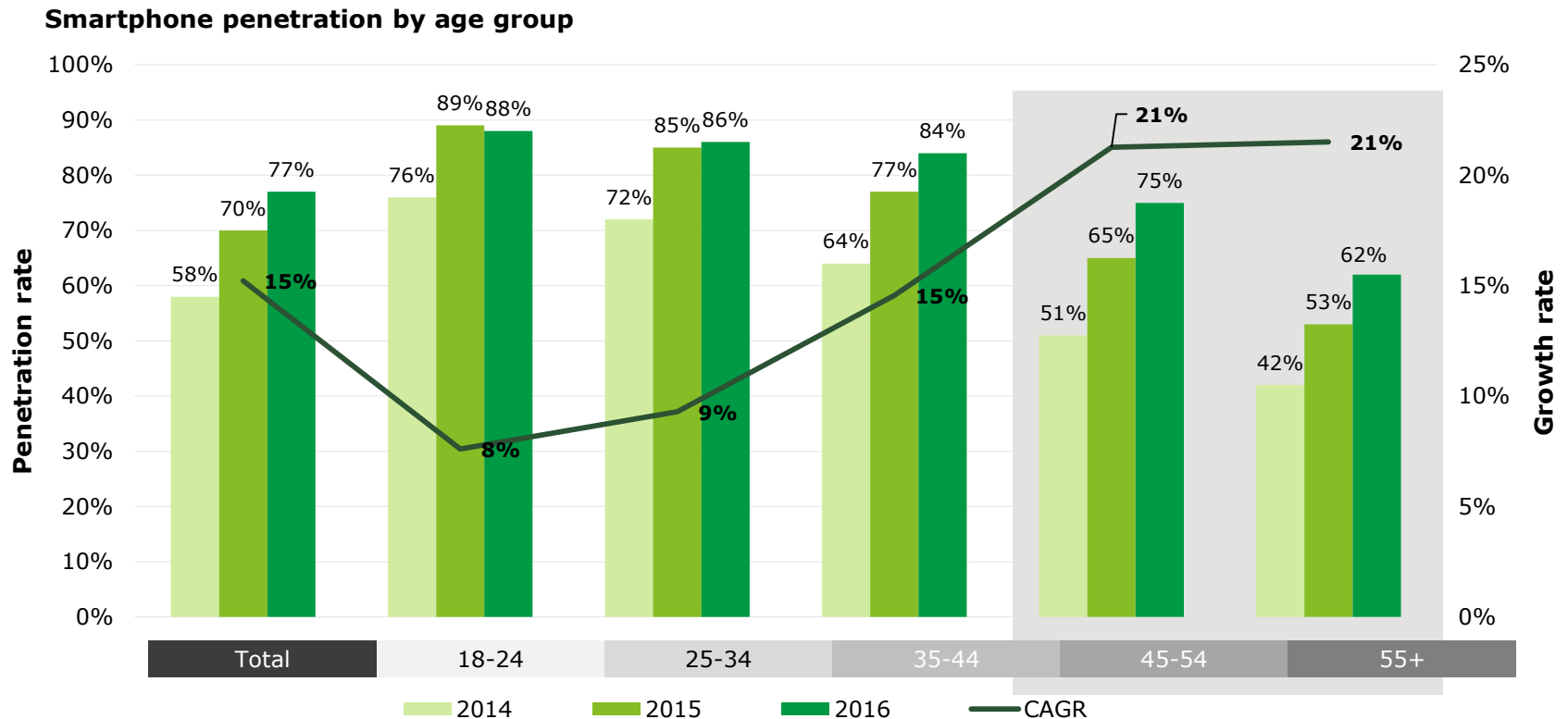
Source: UK edition, Deloitte Global Mobile Consumer Survey, May - Jun 2016

Base: All smartphone owners 1530

Penetration in the smartphone market continues to increase, particularly for the older age group demographics



Which, if any, of the following devices do you own or have ready access to?



Source: Deloitte Global Mobile Consumer Survey, USA edition, Aug 2014, August 2015, August 2016

Base: All respondents USA, 2014: 2001, 2015: 2069, 2016: 2000

Biometrics

Prints charming:

Biometric security reaches the billions

Deloitte Global predicts that the active base of fingerprint reader-equipped devices will top

1 billion
for the first time
in early 2017

90% of devices will be:
smartphones and tablets

Each active sensor will be
used an average of

30 times
a day

over **10** trillion
times a year

Catalyst for the deployment
of biometric sensors in other
environments and across
multiple industries including:



retail



financial
institutions



government



schools

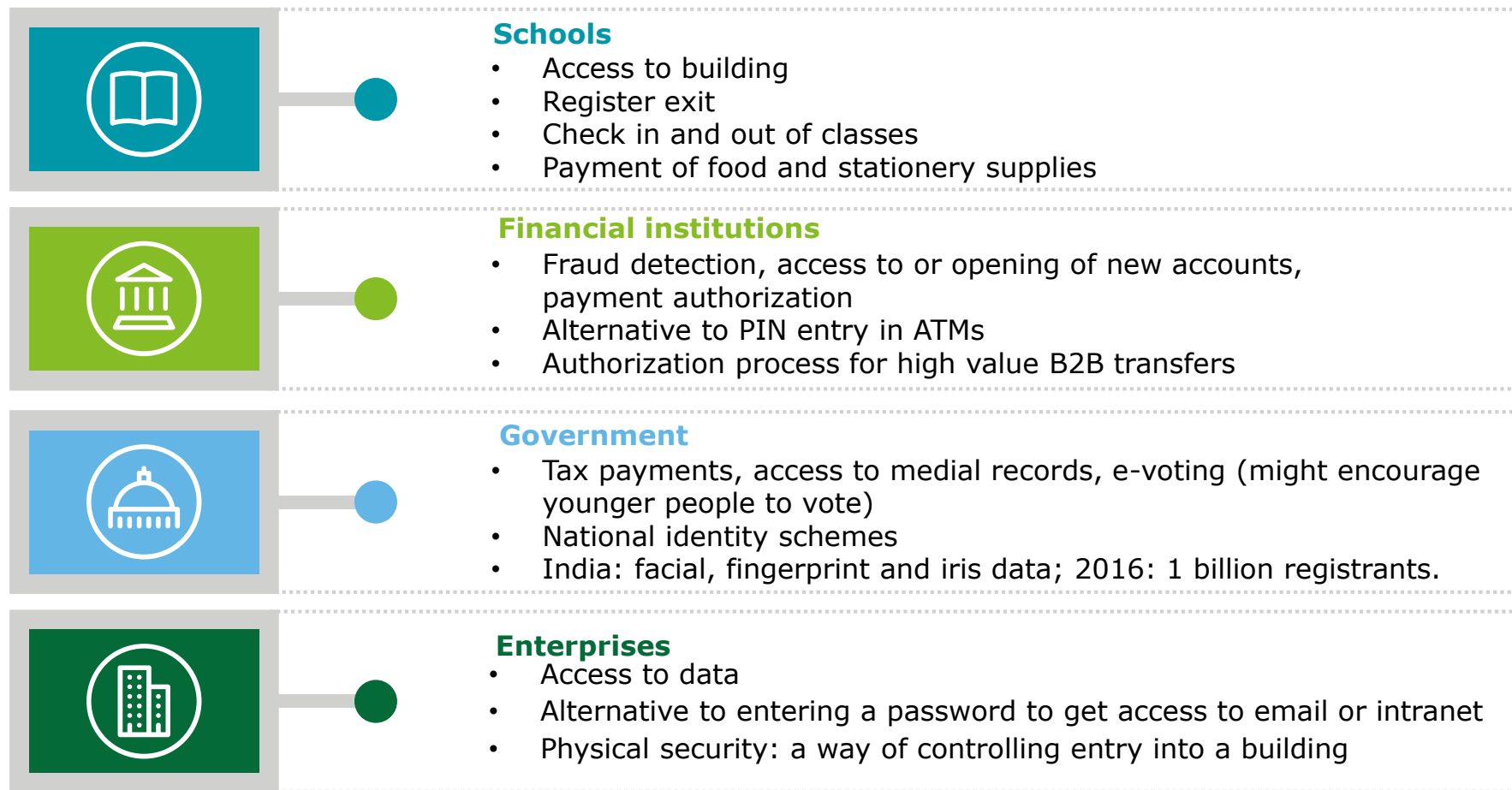


media
companies

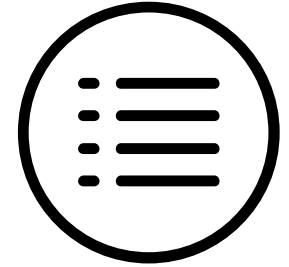


many more

Mainstream adoption of smartphone biometrics will act as a catalyst for the deployment of biometric sensors in other environments



Polling Question #3



How important would a faster wireless network (such as 5G) be to you?

- Very Important — Today's 4G speeds simply aren't fast enough
- Fairly Important — 4G is okay, but I could use faster speeds
- Not Very Important — 4G speeds are sufficient most of the time
- Not At All Important — Today's network meets all of my needs
- Don't know/Don't understand

Future of connectivity

In 2017, we expect to see continued progress toward 5G rollout through completing market trials and beginning initial full-scale market rollouts

What 5G Offers

Higher capacity: LTE-A Pro offers 10 times the capacity of the first 4G standard.

- Smaller cells – Allows for base stations to be placed in stores in shopping malls, lamp posts
- Carrier aggregation
- MIMO
- Greater capacity edges and hot-spots
- Higher frequency bands/higher speeds

Lower latency:

- LTE-A Pro – 600 microseconds
- LTE – 8,000 microseconds

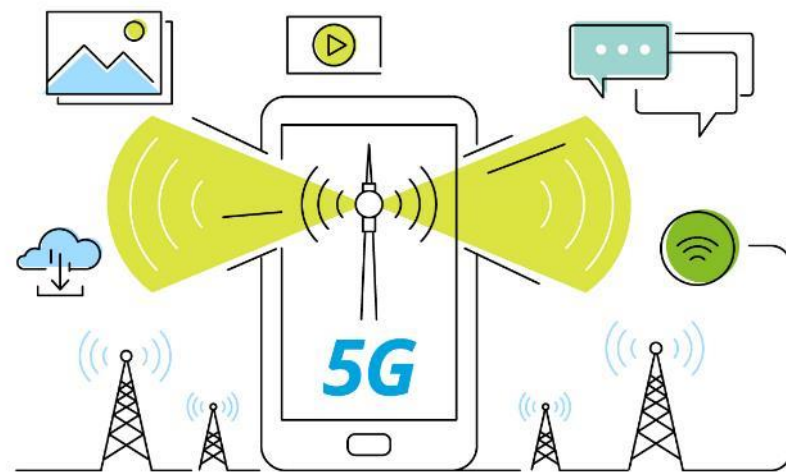
Dedicated support for IoT: Low-Power Wide Area Network – low bandwidth connections to a large number of smaller, connected devices

- low-power transmission
- low-frequency transmission (for basements and inside buildings)

Deloitte Global predicts that over

200 mobile networks

will include elements of 5G network architecture in 2017

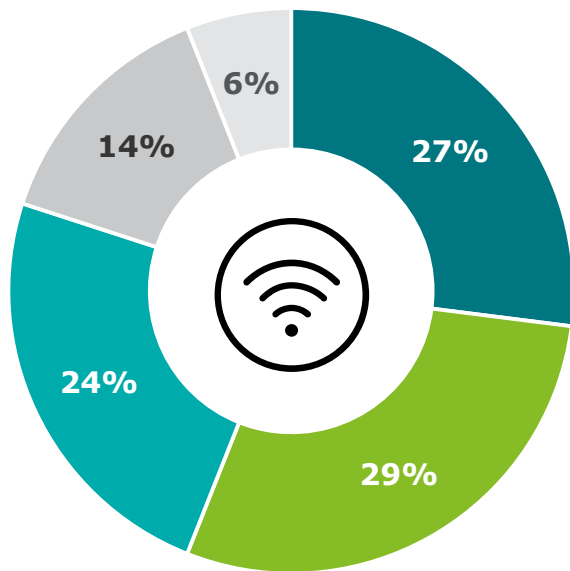


These will be found among upgraded **4G (LTE-A and LTE-A Pro) networks**, which will provide a steady progression to the full launch of 5G in 2020

Based on Deloitte's 2016 Global Mobile Consumer Survey, more than half of consumers believe 5G to be important. Specific demographics have even greater levels of interest in 5G.



If your carrier offered next generation wireless data speeds (e.g. 5G) how important would this be for you?



- Very important
- Fairly important
- Not very important
- Not at all important
- Don't know

Source: US edition, Deloitte Global Mobile Consumer Survey

Base: All Adults, 18-75

Top interested demographics

Category	Value	% Diff from Next Highest Age Group
Age	25-34	19%
Region	Northeast	4%
Household	Couple with children	8%
Bought phone in...	2016	17%
Income	\$250K-\$299K	9%
IoT ownership	Connected car & wearables (tie)	9%

Small Cells: Big impact on seamless connectivity

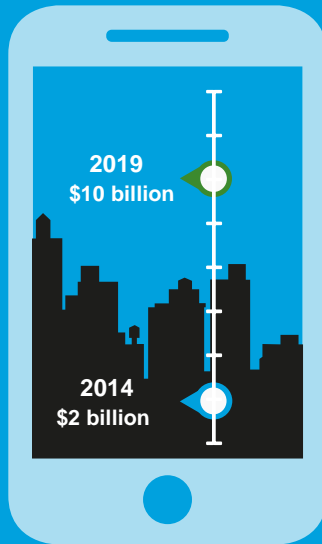
Why small cells now?

Achieving advances in capacity and network speed will require densification of networks consistent with a 5G strategy over both licensed and unlicensed spectrums—to patch coverage holes, to optimize signal strength, and to increase capacity to meet consumer demand.



Globally **10+million** Small Cells have been deployed so far.

The demand for network densification is only going to increase exponentially in the future. Small cell equipment market revenue was around \$2 billion in 2014 and is expected to approach \$10 billion by 2019.



Evolving organizational capabilities

The processes and tools for overseeing conventional network deployment and rollout might not work so effectively in the new era of small cells.

A diverse and potentially new set of capabilities will be needed, from such as process automation, mobile apps to support field workers, regulatory processes, and real-time performance monitoring and analytics, just to name a few.



Impact on network design

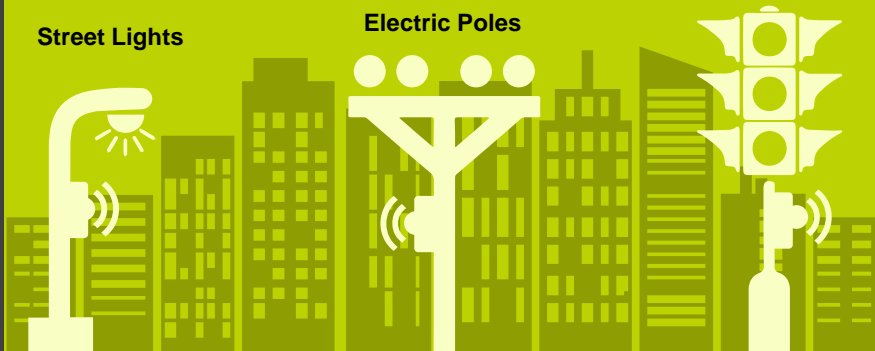
Shifting from a “macro tower only” mindset to a “connect everything” mindset will require looking beyond conventional ways of thinking about network design and engineering, site selection, and deployment.

Small Cell Deployed on

Street Lights

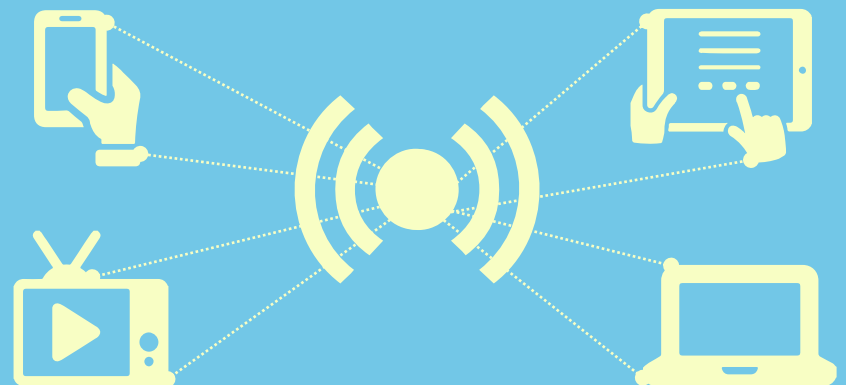
Electric Poles

Traffic Light Poles



How innovation helps

Small cells offer the potential of providing speeds that pave the way for wireline broadband substitution and enable the creation of a mesh network, offering direct connectivity to the rapidly growing number of Internet of Things (IoT) devices.



Technology Outlook

Paul Sallomi, US and Global Technology Industry
Leader
Deloitte Tax LLP

Tech outlook 2017

Exponential technologies, flexible consumption business models, cyber security and ecosystem partnerships offer a continued set of opportunities and transformational challenges for technology companies



Flexible Consumption Model offerings will have significant impact on tech companies and their customers and will drive tremendous business and operating model transformation

Cognitive Computing will enhance a wide array of enterprise and consumer applications



Digitization of the enterprise will open new markets and create new ecosystems

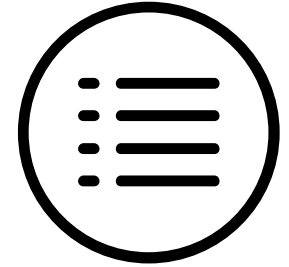
Cyber Security products and services are addressing the increasing threat of attacks



New partnerships and collaborations across tech and other industries are critical for driving topline growth

Mergers, Acquisitions, & Divestitures are on the rise as tech companies choose to focus on what they do best

Polling question #4



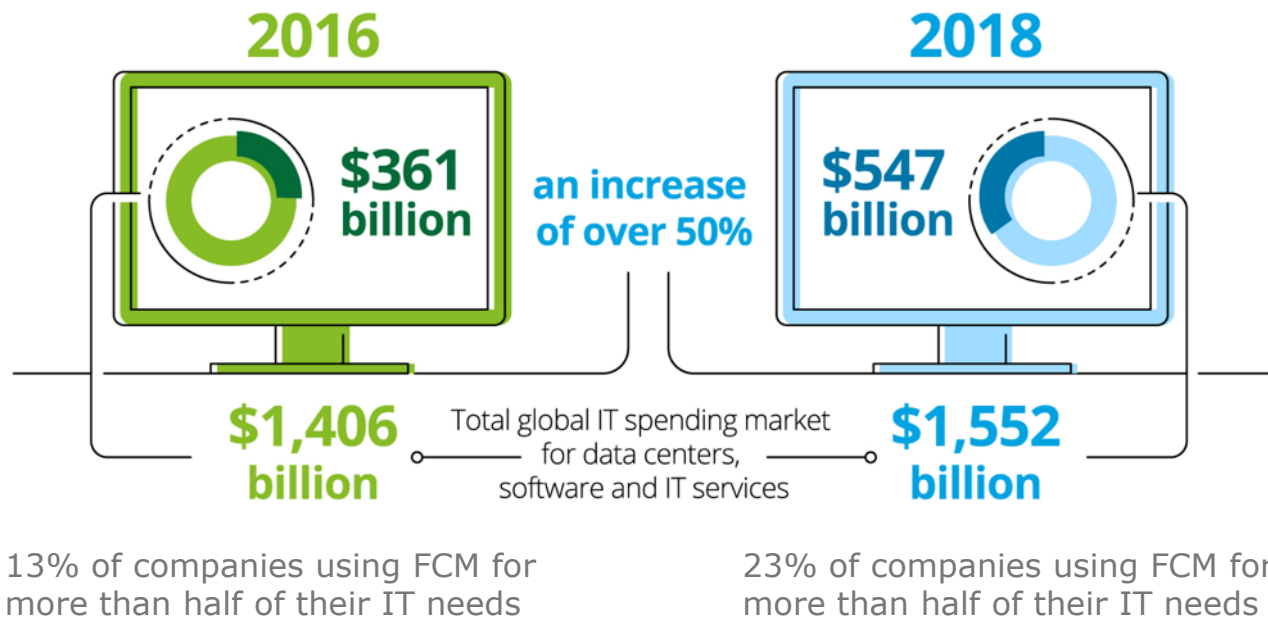
Which trend do you predict will drive the largest growth opportunity in the tech market?

- Cognitive computing
- Cyber security advancement
- Automatic Emergency Brakes/Automotive technologies
- It-as-a-Service/Flexible Consumption models
- Mergers, Acquisitions, & Divestitures
- Don't know/Not applicable

IT-as-a-Service: the half trillion dollar 'niche'

Deloitte Global predicts by the end of 2018, spending on IT-as-a-Service for data centers, software and services will be just under \$550 billion worldwide. IT-as-a-Service is the fastest growing example of Flexible Consumption Models

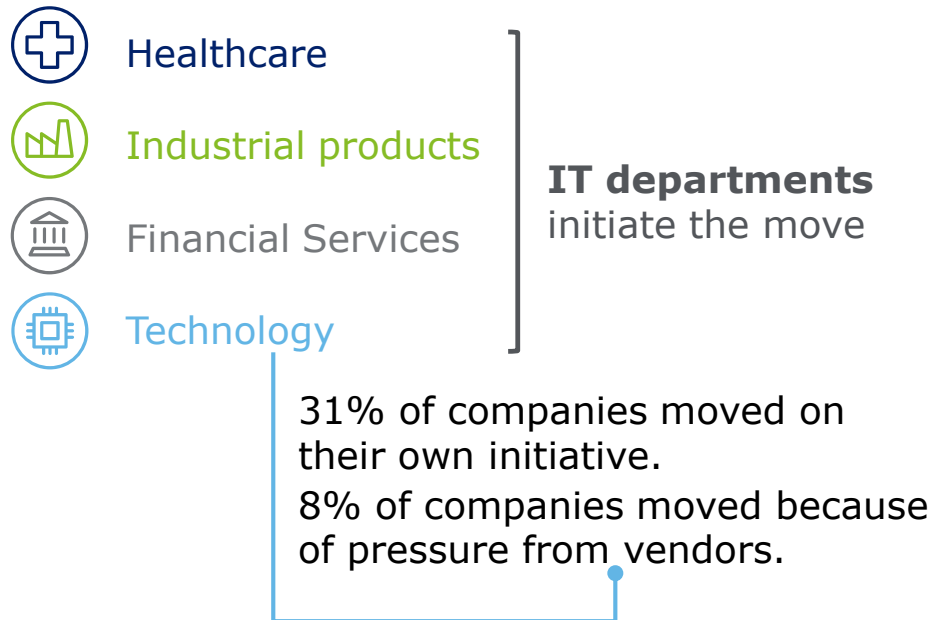
A subset of flexible consumption models, potentially able to procure every aspect of IT on a "you get what you pay for" basis.



IT-as-a-Service: the half trillion dollar 'niche'

Adoption varies in a number of ways

Who it is that makes the decision to move to the alternative model seems to depend on the industry:



In other industries the change is led by **the vendor**:

Media and entertainment

- 13% of companies moved on their own initiative.
- 33% of companies moved because of pressure from vendors.

Enterprise size also plays a role:

	\$1-5 billion revenue	+\$5 billion revenue
Public cloud	7%	7%
On premise	19%	32%

Brains at the edge: machine learning goes mobile

Deloitte Global predicts that over 300 million smartphones (more than a fifth of units sold in 2017) will have on-board neural network machine learning capabilities.

Computer models that mimic aspects of the human brain's structure and function



Allows smartphones to perform machine learning tasks



indoor navigation



speech recognition



image classification



language translation



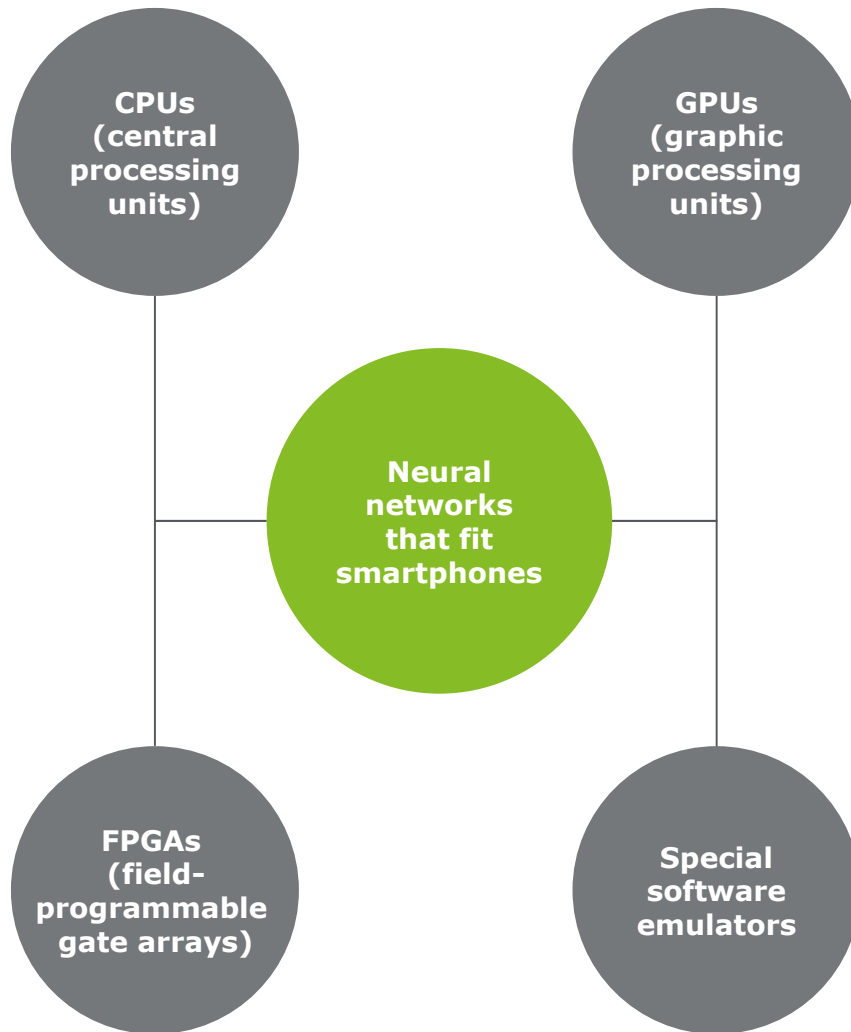
augmented reality



and many more currently unknown applications

Brains at the edge: machine learning goes mobile

The technology behind it



Machine learning on-the-go will not be limited to smartphones.



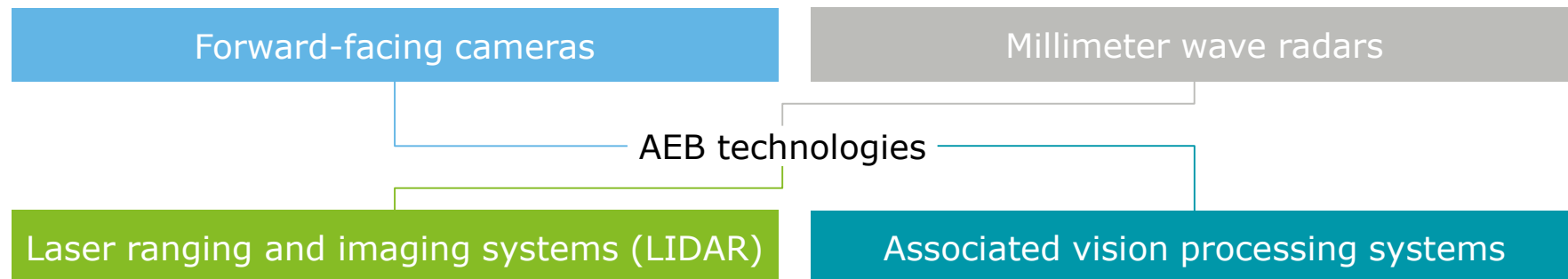
Mobile phones are becoming critical devices in our daily lives, and need to be able to perform machine learning tasks all the time.



Safety first: the road to self-driving starts with a stop

Deloitte Global estimates that, by 2022, a sixth of the US cars and light trucks will be equipped with automatic emergency braking (AEB).

AEB will contribute to a reduction of annual US motor vehicle fatalities by 6,000.



Safety first: the road to self-driving starts with a stop

The bottom line



- AEB is a critical first step towards the fully autonomous vehicle
- Technology sector stands to benefit with wider deployment
 - Automotive semiconductor market growing faster than rest of chip market at 6% annually until 2019
- AEB will not require rewriting laws, regulations and liability
 - It could be a successful transition technology
- Telecom implications: cars in 2020 may be connected to the network or to other cars generating 0.6 exabytes per month in the US or 9% of all wireless traffic

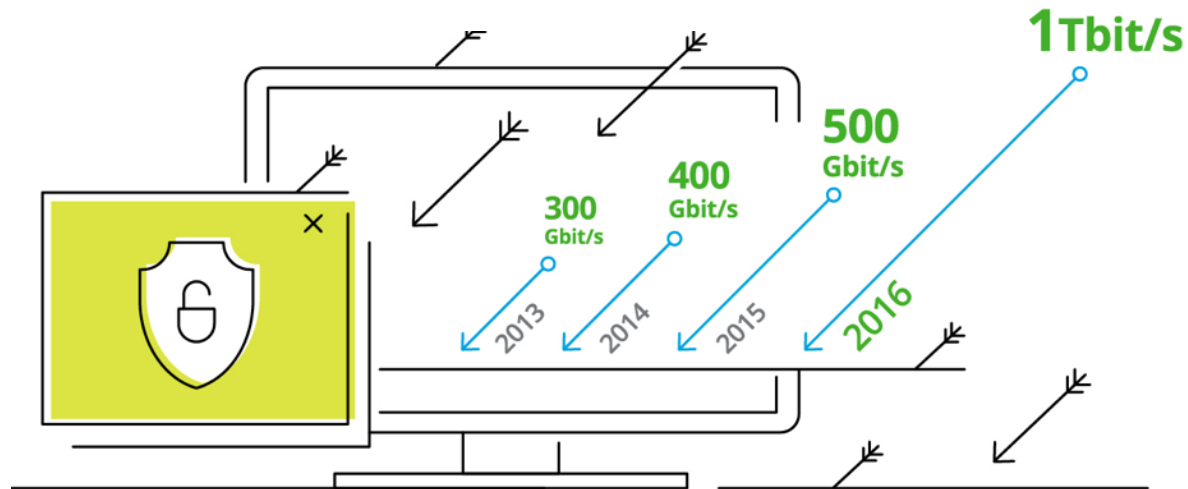
DDoS attacks enter the terabit era

Deloitte Global predicts that in 2017 Distributed Denial-of-Service (DDoS) attacks will become larger in scale, harder to mitigate and more frequent.

1 Tbit/s attacks per month

+10 million attacks in total

Average attack size of 1.25 – 1.5 Gbit/s
(enough to take many organizations offline)



DDoS attacks enter the terabit era

The bottom line



Organizations increasing its dependence on the Internet should be aware of a potential spike in the impact of DDoS attacks

They should consider a range of options to mitigate the impact:

- Decentralizing
- Bandwidth oversubscription
- Testing
- Dynamic defense
- Fallbacks
- Protecting
- Detecting
- Repelling

DDoS attacks are likely to increase in intensity in 2017 and beyond

Partnerships, M&A and Divestiture Activity

The new growth strategy

Efforts to advance new technology fields and build end-to-end customer solutions are driving:

- Unprecedented wave of partnerships between technology companies and other industries
- New forms of consortiums and collaborations
- Partnerships between traditional competitors in emerging fields
- Increased M&A and divestiture activity

Companies that are open and adept at this type of teaming or restructuring will be able to find a broader network of growth opportunities for their products and services



Question and answer

Join us April 26 at 1 p.m. ET as our
Technology, Media & Telecommunications
series presents:

**Media consumption trends:
Multigenerational perspectives
and implications**

Eligible viewers may now download CPE certificates.

Click the CPE icon in the dock at the bottom of your screen.



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