



CES 2018



Tech Trends

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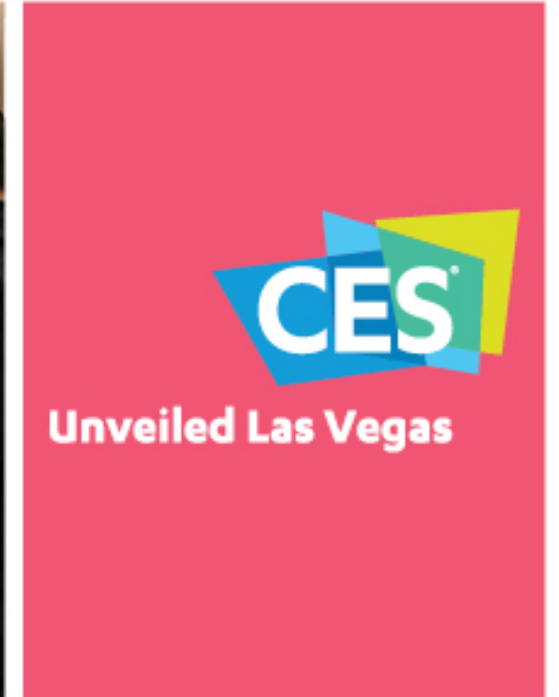


CES 2018



Tech Trends

Direct access to CES Unveiled Las Vegas



Seaside Ballroom

Slides and press release available at:

[CTA.tech/salesandforecasts](https://cta.tech/salesandforecasts)

Steve Koenig



Lesley Rohrbaugh





CES 2018



Tech Trends

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CES 2018 Technology Trends In Three Parts

Ingredient Technologies

5G

A.I.

Robotics

In The Market

Native Interfaces and
Digital Senses

Realism Redefined

Emerging Tech

Smart Cities

Sports Innovation

Digital Therapeutics

5G Connectivity: Coming Soon

- **Higher speed** - **Greater Capacity** - **Lower Latency**
- Big stories for CES 2018: 5G New Radio (NR) and 5G roll-out



Wireless VR



Smart Cities



Self-Driving Cars

Solutions Enabled by 5G



Telecommunications Residential and Enhanced Mobile Broadband



Industrial

Robust and secure network.



Automotive

Extremely high data rate and very low latency



Health Care

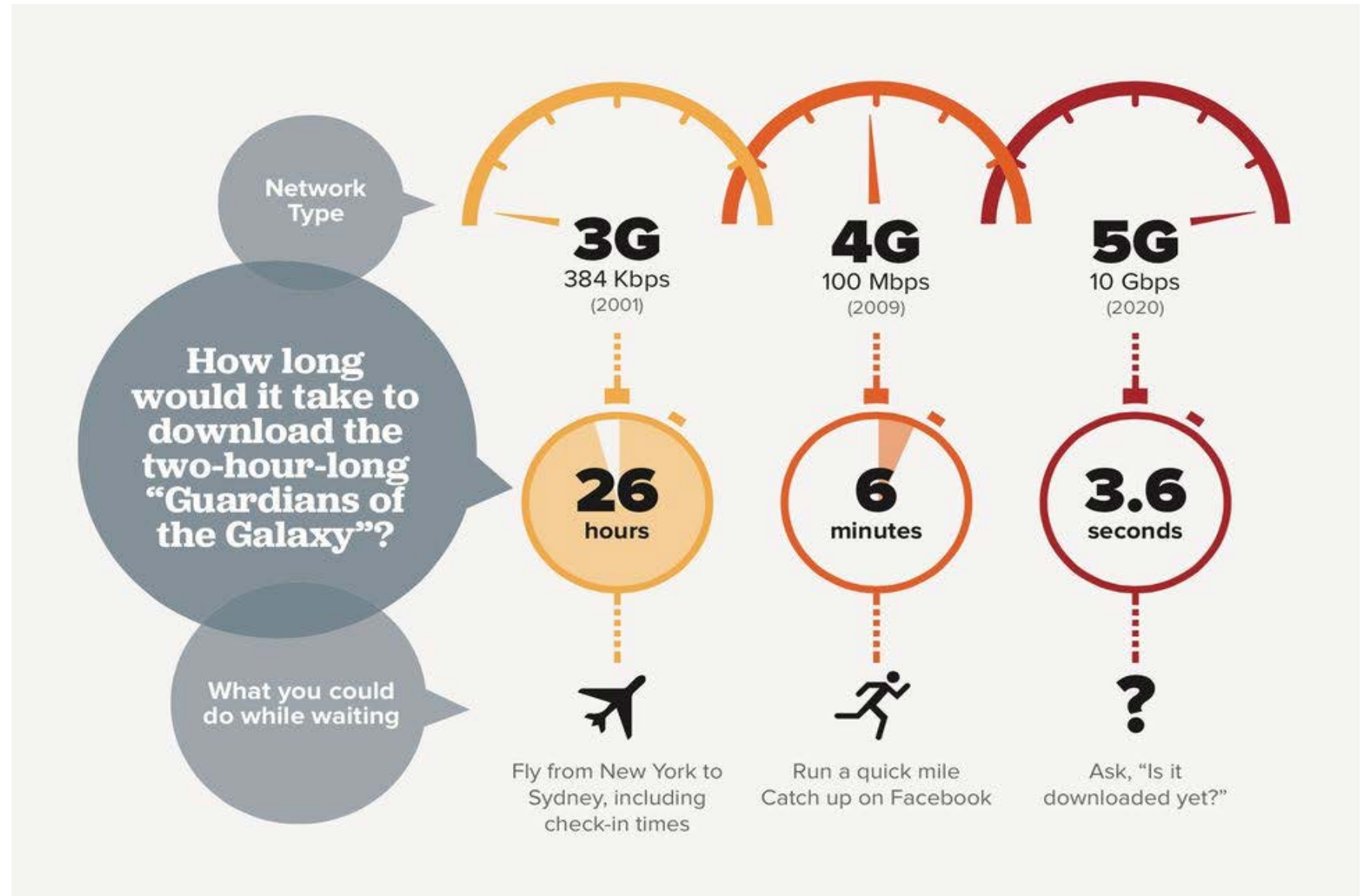
Real-time networks; streaming 8K video



AR/VR

High data rates revolutionize customer experience

5G: How fast is it?



5G Industry Roadmap

2016

2018

2020

Short-term development

Longer-term development

Technology Initiatives

Carriers deploy LTE-Advanced/Pro
Small /pico and metro cells

5G / 4G LTE networks
5G stand-alone networks

Standardization Initiatives

Field trials

Release 16 by 2020

Market Initiatives

5G New Radio (NR) development

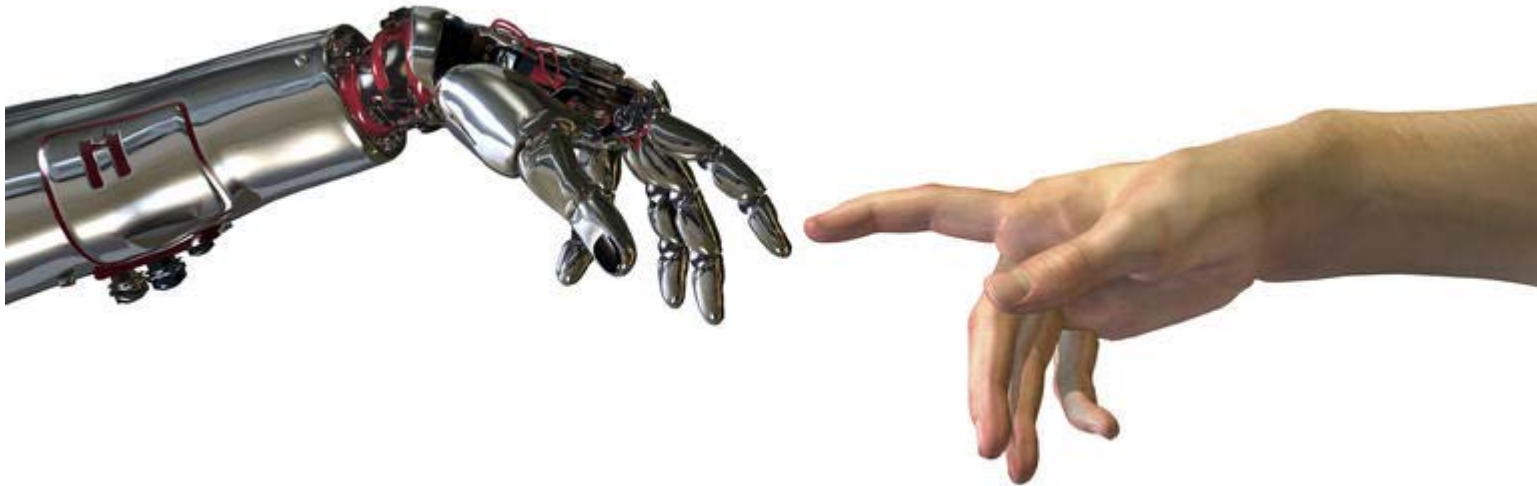
Enhanced Mobile Broadband
New business models

Regulatory Initiatives

Finding spectrum

mmWave spectrum

Artificial Intelligence



Artificial Intelligence

Systems that learn to do things we can't program them to do

- Deep / Machine Learning
 - Software learns from data (i.e., experience)
- Neural Networks
 - Processing devices from algorithms to hardware
- Narrow vs. General AIs

Use Cases: *Doing Things We ...*

Don't Care to Do

Can't Do

Need all the help we can get

Greater A.I. integration will generate societal impacts



Hi. I'm Cortana.



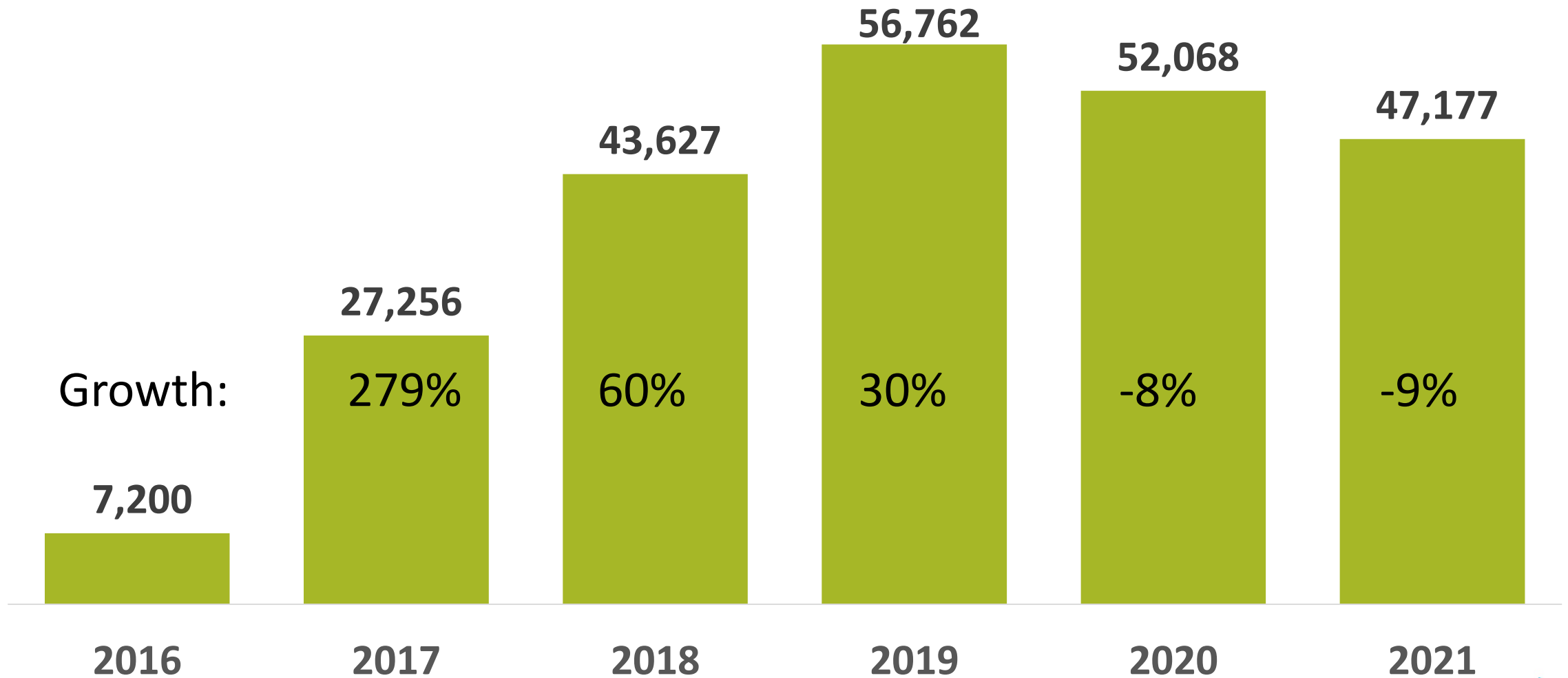
LG IoT

Control LG Smart Products hands-free



U.S. Smart Speaker Shipments

Units in 000s



Source: CTA

AI Applications in Auto:

Sensory Perception | Data Processing | Action

NVIDIA DRIVE PX2



FORD | ALEXA

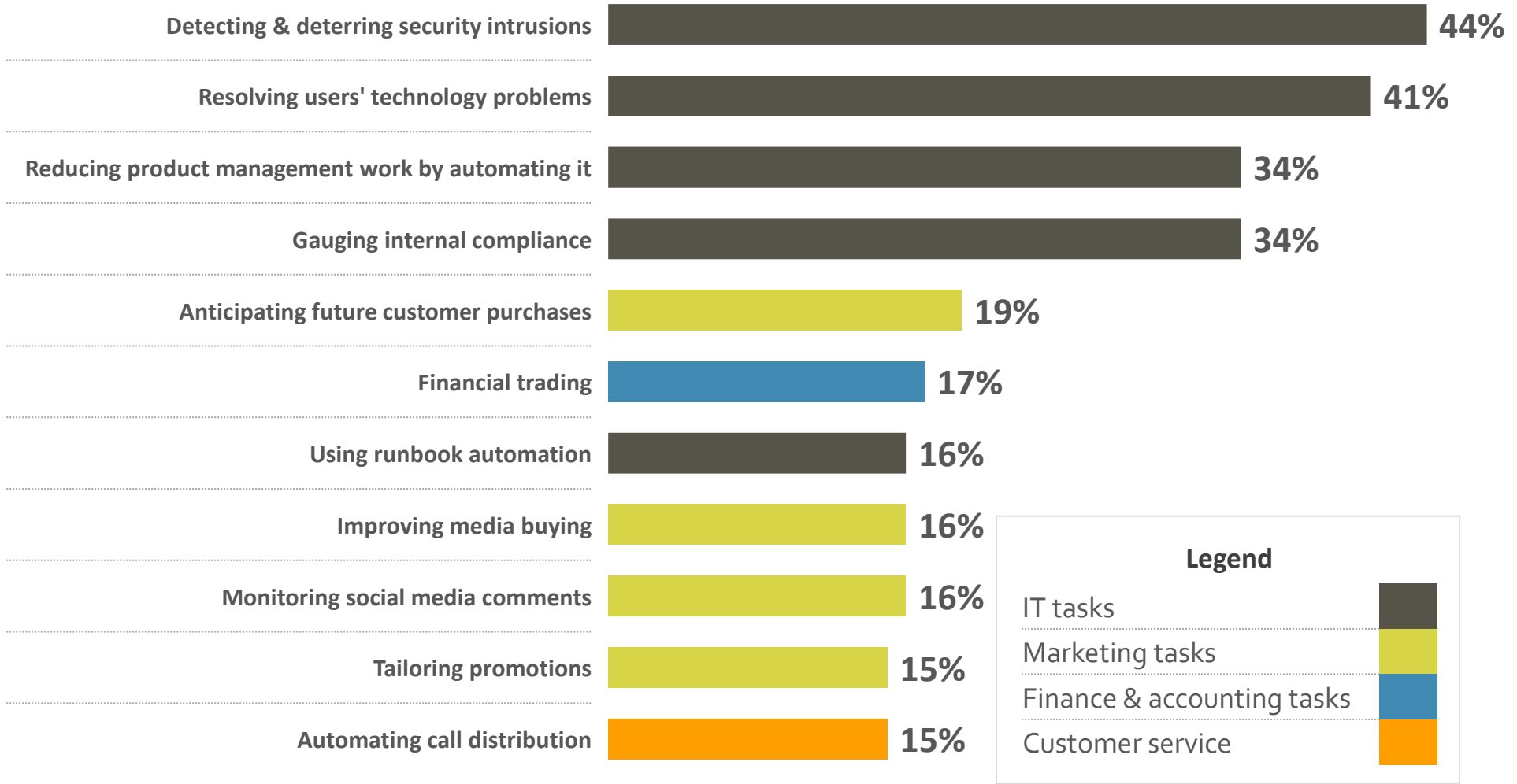


NVIDIA PILOTNET

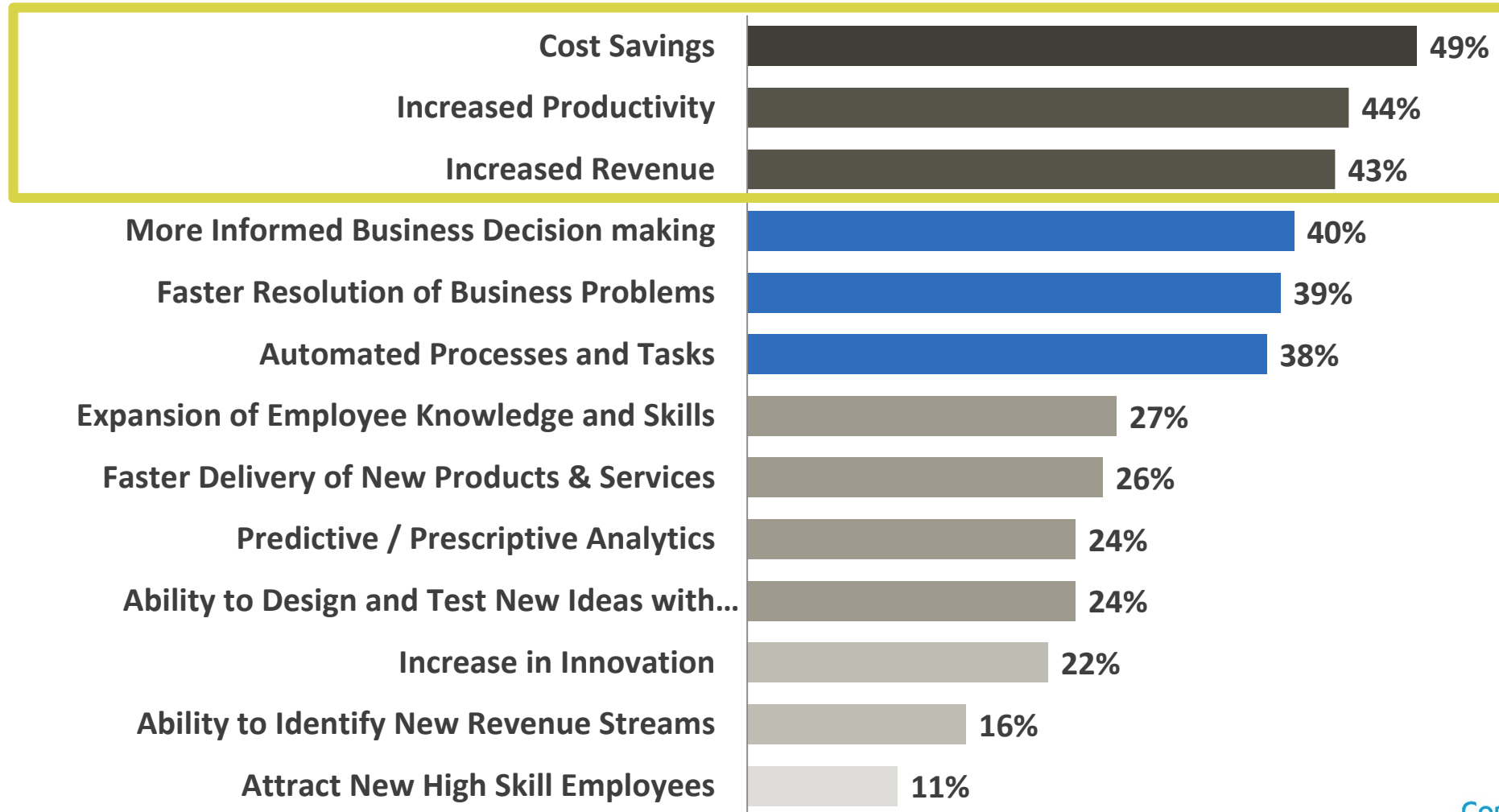


AI: Not Just For IT-Related Tasks

Top Areas Where Companies Are Using Artificial Intelligence



Retailers Experience The Tangible Benefits of AI

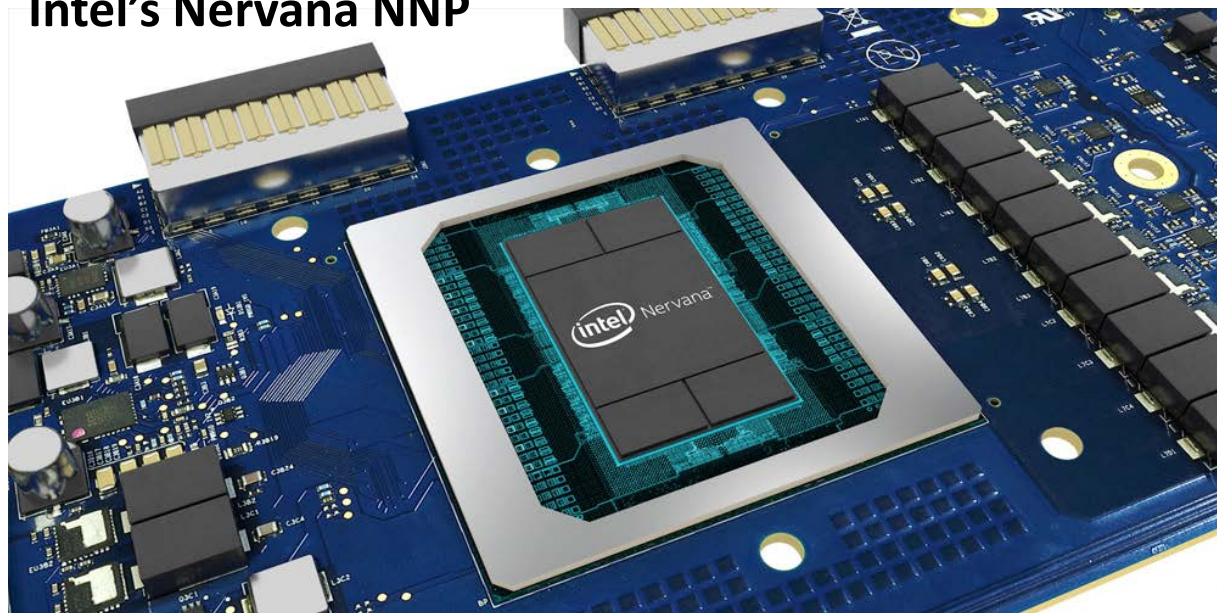


Inside A.I. at CES 2018

NVIDIA Titan V GPU



Intel's Nervana NNP



Snapdragon 845 Mobile Platform

New Architectures for AI and Immersion



What's Next for A.I.?

Conversation With Context



“One of the major groundbreakers is going to be our ability to **truly converse** with artificial intelligence embedded in the fabric around us—this will be **far bigger** than people realize right now.”

Arvind Krishna, Senior Vice President of Hybrid Cloud and Director of IBM Research

Source: IBM

What's Next for A.I.?

Building Trust and Reducing Bias



“We will get to a point, likely within the next five years, when an AI system can better **explain why** it's telling you to do what it's recommending.”

Rachel Bellamy, IBM Research Manager for human-agent collaboration.
Source: IBM

From Conversations to Relationships?

From Amazon's Alexa ...

"Alexa turn on Movie Night"

"Alexa, turn on Kids' Bedtime ."



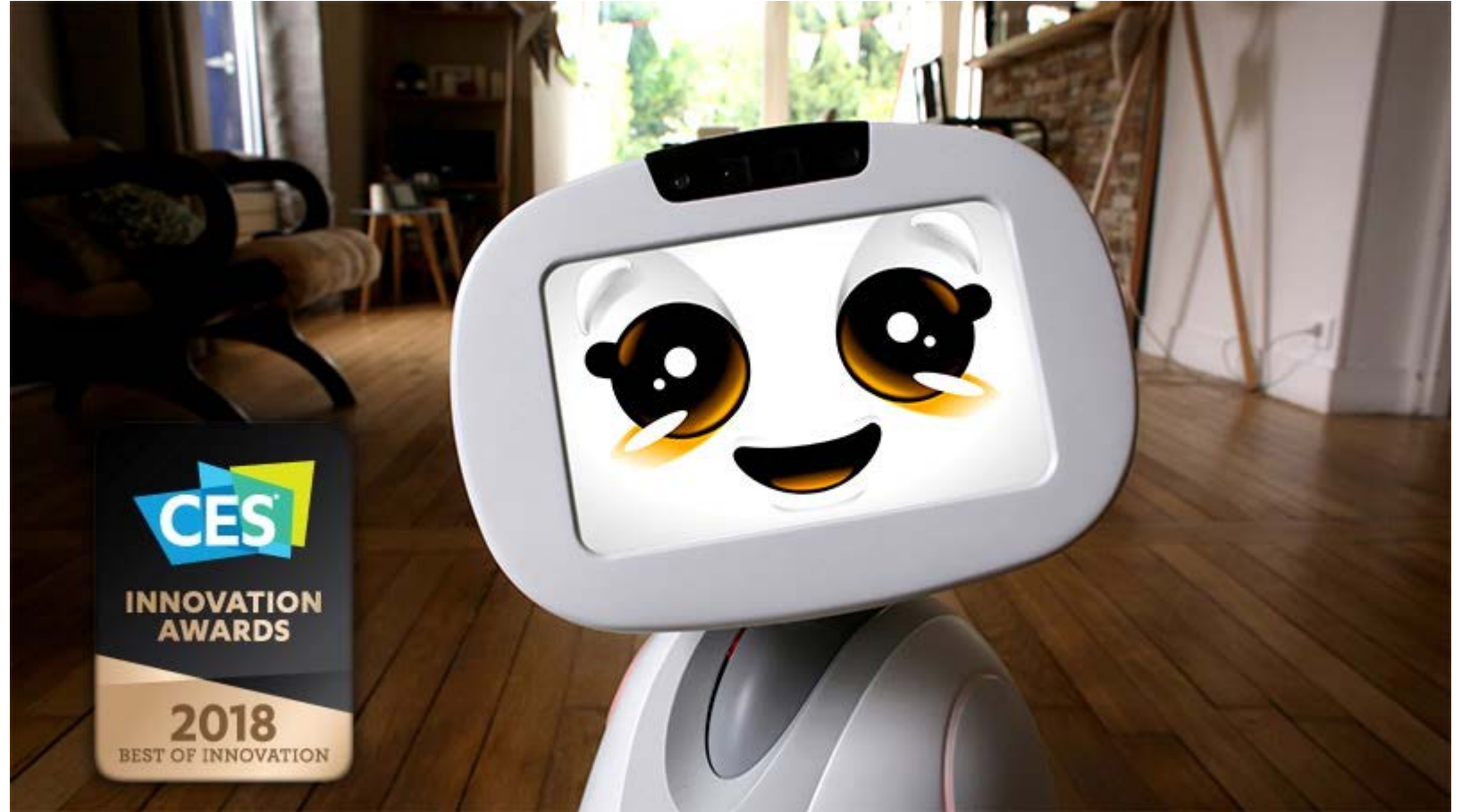
"Alexa, turn on My Morning Motivation Routine."

"I'm outta here. Alexa, turn on the Leave Home Routine."

To Toshiba's Aiko...



Robotics



Blue Frog Robotics' BUDDY

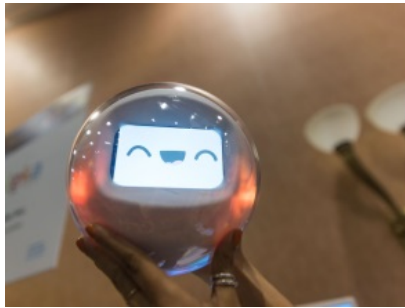
Robotics in the Consumer Market

Mayfield Robotics

Kuri



Leka



LG Robots at CES

Hub Robot



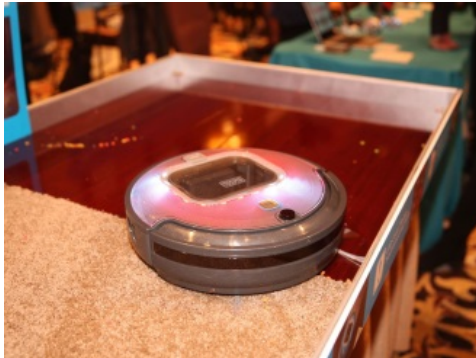
Lawn Mowing Robot



Ubtech Lynx



**Black and Decker
Smartech Robot Vac**



Airbot



Life with Kuri ...

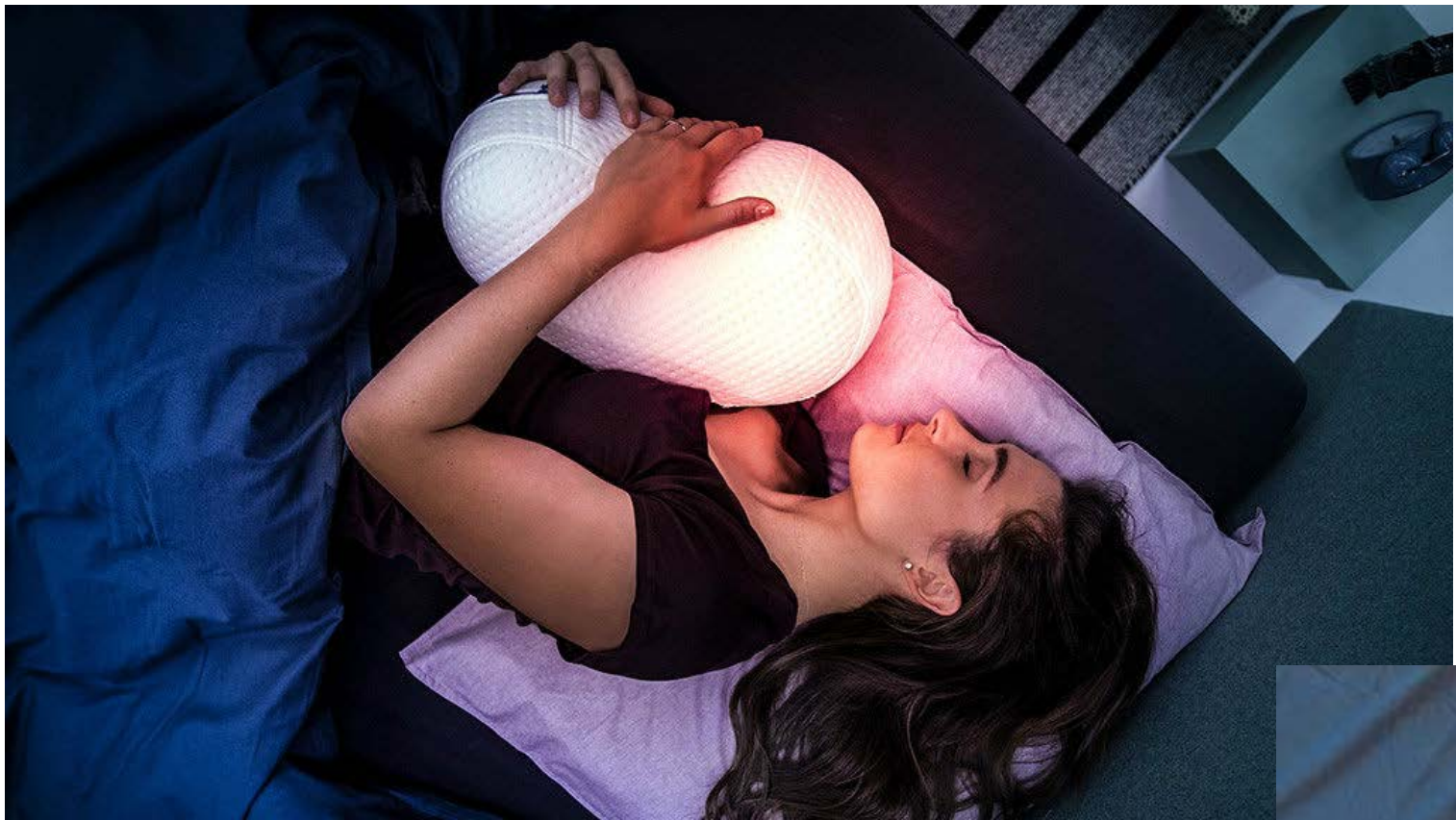
Family friend

Capturing life's moments
automatically using face
recognition

Life of the party

Home video connection





Somnox sleep robot



Honda Robots – *way beyond Asimo*

Interaction

Mobility



3E Philosophy: *Empower, Experience, Empathy*

Digital Senses and Native Interfaces

Addressing the need for better authentication and greater security

Voice becomes the preferred UI

New business opportunities and implications for marketers



Voice: The Fourth Sales Channel



voice shopping

**The smart way to stock
your home this holiday**

Learn more ▶

"Alexa, order..."



This advertisement features a light blue background with several white snowflake icons. On the right side, there is a collection of household items: a bottle of Seventh Generation Natural Dish Liquid, a container of Clorox Disinfecting Wipes with Micro-Scrubbers, a standard incandescent light bulb, and a white Sengled smart plug. The text on the left promotes voice shopping as a smart way to stock a home for the holidays, with a 'Learn more' link and a quote 'Alexa, order...'. The Amazon logo is integrated into the 'voice shopping' text.

Fingerprint Technology



Benjilock
Thumbprint Padlock



NXT-ID
Smart Wallet



Synaptics Natural ID
Capacitive Sensor

Facial Recognition on the Go

Continental AG



iPhone X Face ID



Samsung Galaxy S8 Iris Scanning

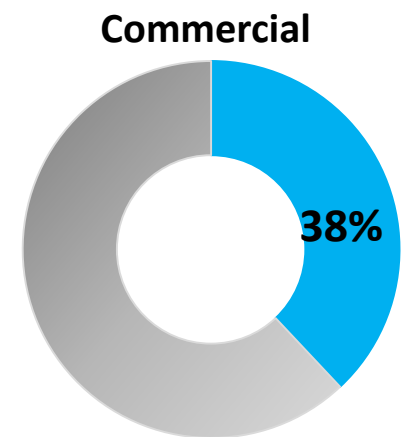
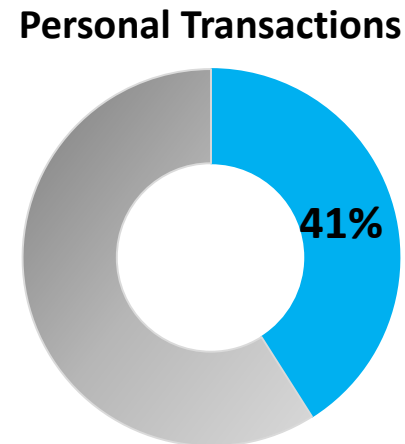
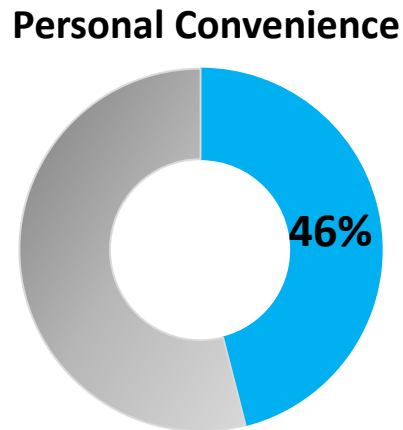
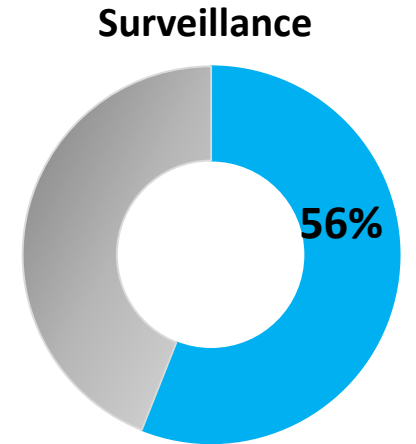
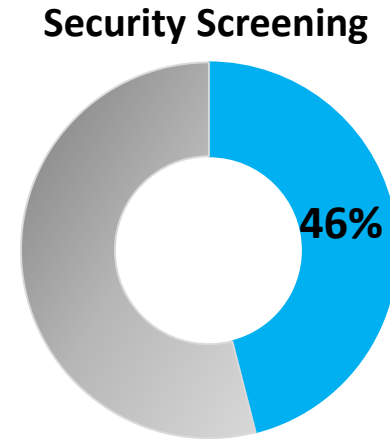
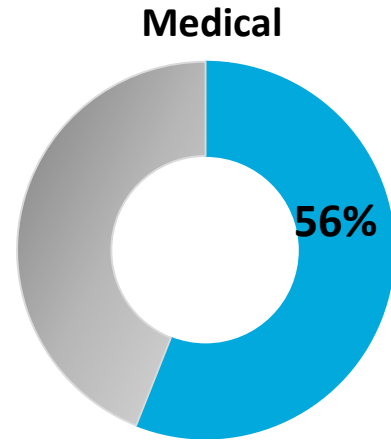


Comfort with Native Interfaces

U.S. Consumers

Use Cases: Net Comfort Levels with Biometric Technology

Net Comfort Level =
Very Comfortable +
Comfortable



Realism Redefined



“**Presence**. Where if you create the right type of experience, you can make someone forget where their real body is for a moment, a minute or two, and make them **truly feel** like you've taken them somewhere else.”

Hollywood Executive

VR's Market Journey



AR's Market Journey



B2B



B2C

VR Ecosystem Expanding



HTC Audio Strap



**Audeze and JBL Headphone Solutions
Specifically Developed for VR**



Content Subscription Plans



**Insta360 Pro 8K 360-
Degree VR Camera**



Taclim VR Boots



Nyko VR charging docks



HTC Vive tracker



**Dynamic
Tactile Wave**



**Intel's
Project Alloy**

Lenovo Mirage Solo



Oculus Experiences



Top Selling

PACK 1

PACK 3

PACK 2

Top Free

Disney PIXAR
COCO

TRANSITION

Google Earth VR
now with Street View

Have You Got Friends in VR Spaces?

facebook Spaces

VR is better with friends



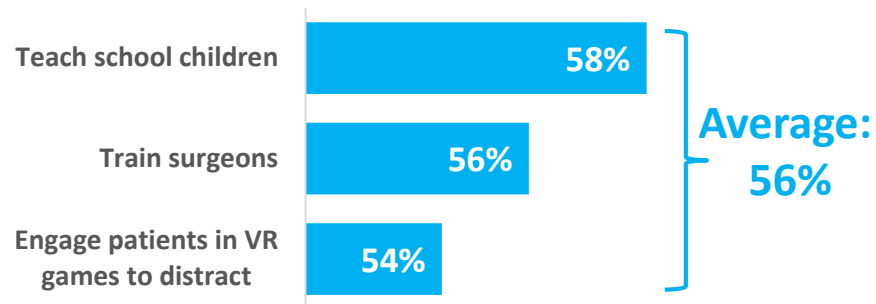
VR Use Cases: Favorability

U.S. online adults aware of VR

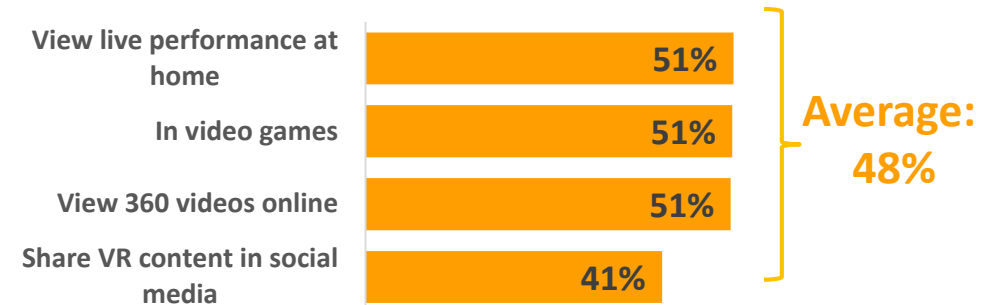
Level of favorability

(Very favorable + favorable)

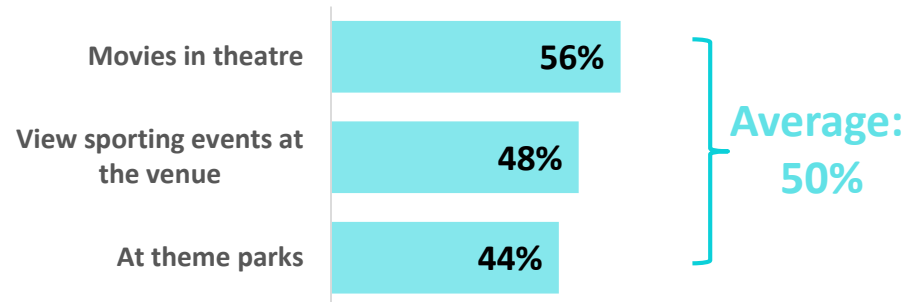
Training and Medical Support



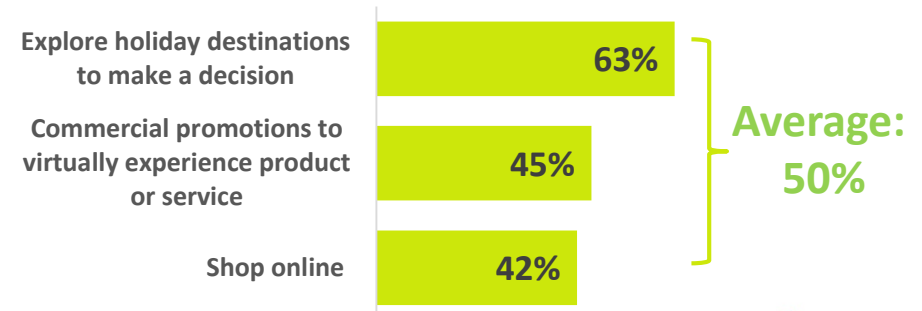
Indoor Entertainment



Outdoor Entertainment



Commercial



AR Gets Real

GLASS

2 Hours
of Doctor time
saved per day



15% Gain
in operational
efficiency



25% Reduction
in manufacturing time



Source: Google X

AR All Around CES

Lenovo Mirage AR Headset



Vuzix Alexa-enabled
AR Glasses



AR/VR and Sports

Next VR Camera



CES Sports Zone



AR for All





Smart Cities



The Case for Smart Cities

- Urban centers increasingly difficult to monitor/manage
 - Better, more-timely information = better choices
 - Optimization of public safety and services
 - Reducing traffic congestion
 - Less pollution
 - Competitive economic advantages
 - Self-Driving Pizza Delivery >>>>>>>>>>
- 
- A photograph showing a person wearing a blue t-shirt and black pants, standing next to a white delivery vehicle. The person is holding a pizza box and appears to be loading or unloading it from the back of the vehicle. The vehicle has a red stripe along its side. In the background, there is a building with a blue roof and some greenery under a clear sky.



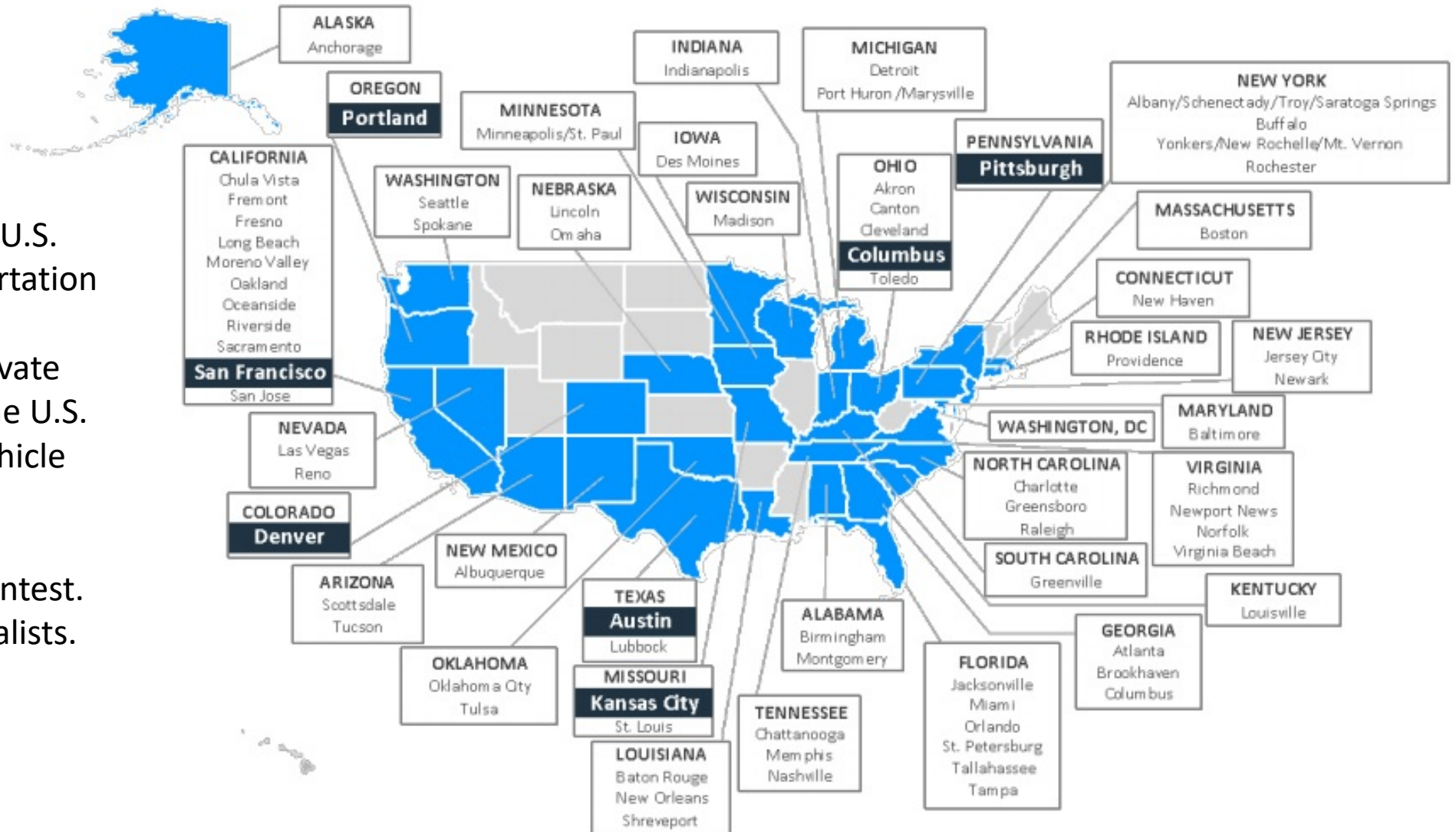
Big challenges exist: Market-based, Organizational, Political leadership

Visit Smart Cities at CES at Westgate

Smart Cities in the USA

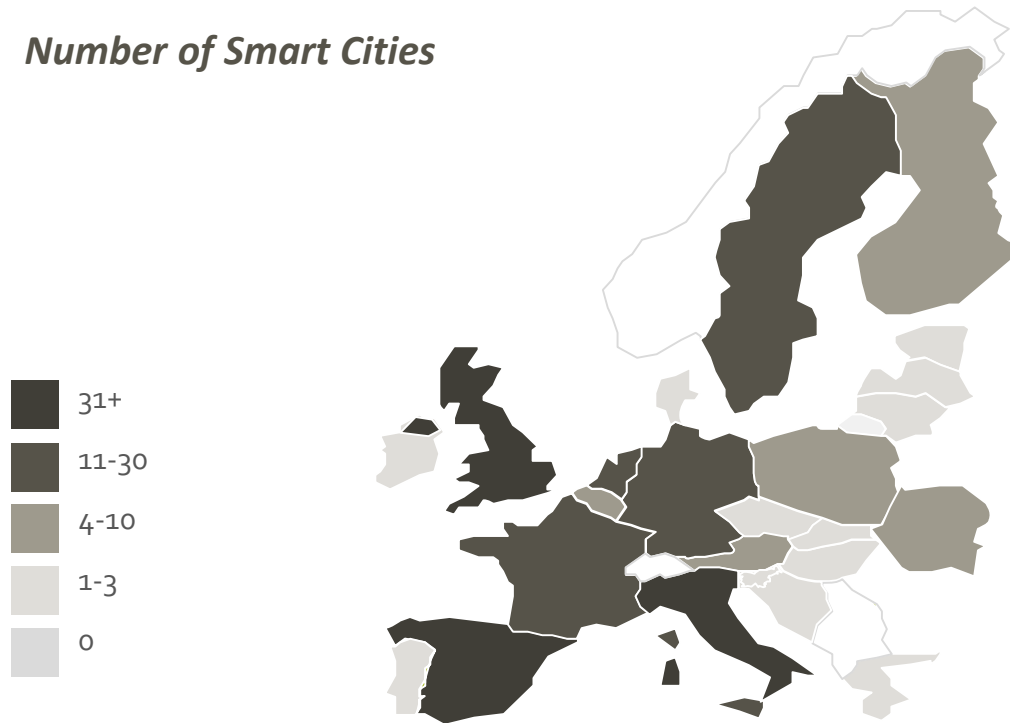
In December 2015, the U.S. Department of Transportation launched its Smart City Challenge—a public-private partnership between the U.S. DOT and investment vehicle Vulcan.

77 cities entered the contest.
Bold cities were the finalists.

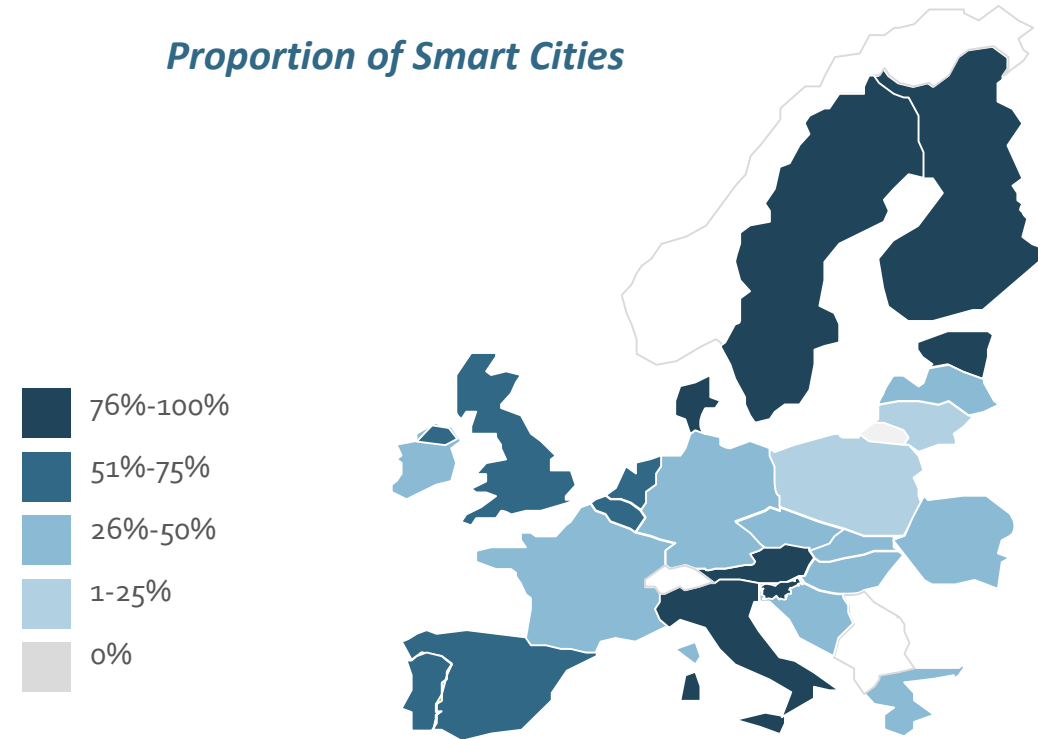


Smart Cities Across the EU

Number of Smart Cities



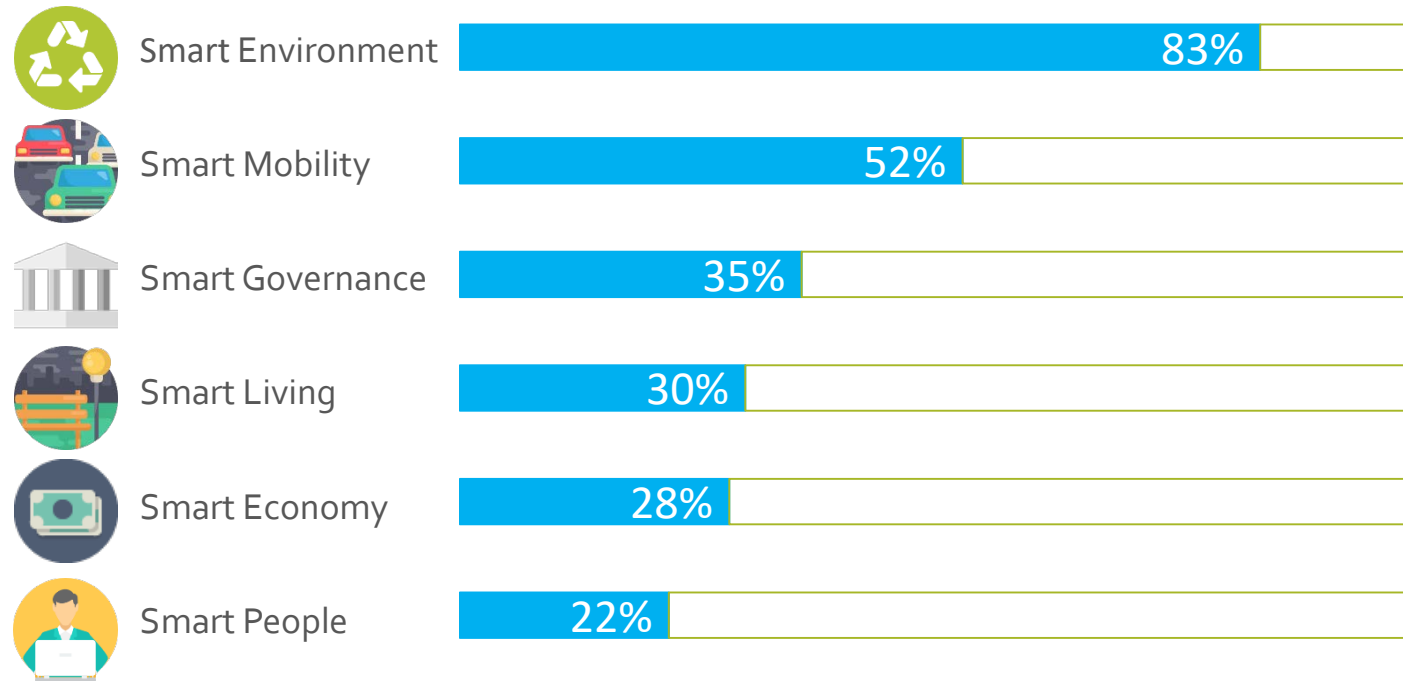
Proportion of Smart Cities



Source: 2014 EU research project

EU Smart Cities Focus On Environment & Energy Usage

Among the 264 EU Smart Cities in 2014, how many present these characteristics?



Source: 2014 EU research project

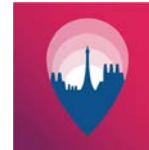
Smarter Transportation With Mobile Apps

The future for smart city app development may be these data collection apps like these:

Paris



SoundCity by Inria measures users' personal exposure to noise pollution and allows app creators to build a map of noise pollution for Paris.



DansMaRue by Paris Numirique allows users to identify and report damaged infrastructure or cleanliness issues so that service teams can be easily deployed

London



Appyparking allows users to easily locate available parking spots in real-time and on-the-go.



FixMyStreet is a platform connecting citizens with their council to report damaged or dirty streets.

Amsterdam



Tranzer allows users to pay for public transport on the go, making their trips more convenient.

Helsinki



MAAS Global identifies the optimal path for its users across a combination of public (trains, busses, bike shares) and private (taxis) transport options.

Sports Innovation



Quantified Athlete

From next-generation activity tracking sensors to personalized nutrition, tech is shaping the way we eat, sleep, and exercise.



Smart Venues

Smart city technology will be pressure-tested in crowded stadiums hardening IoT systems and software.



Next-Gen Sponsorship

Tech companies create new sponsorship categories and increase demands on measurement tools. Experience valuations will dominate impression counts.



Immersive Media

Streaming platforms shake up media business models and increase fan choice. Personalized augmented and virtual reality viewing experiences are here.



Esports

Competitive video gaming provides a laboratory for experimentation on the future of sport content creation and consumption.

Digital Therapeutics



Digital Therapeutics

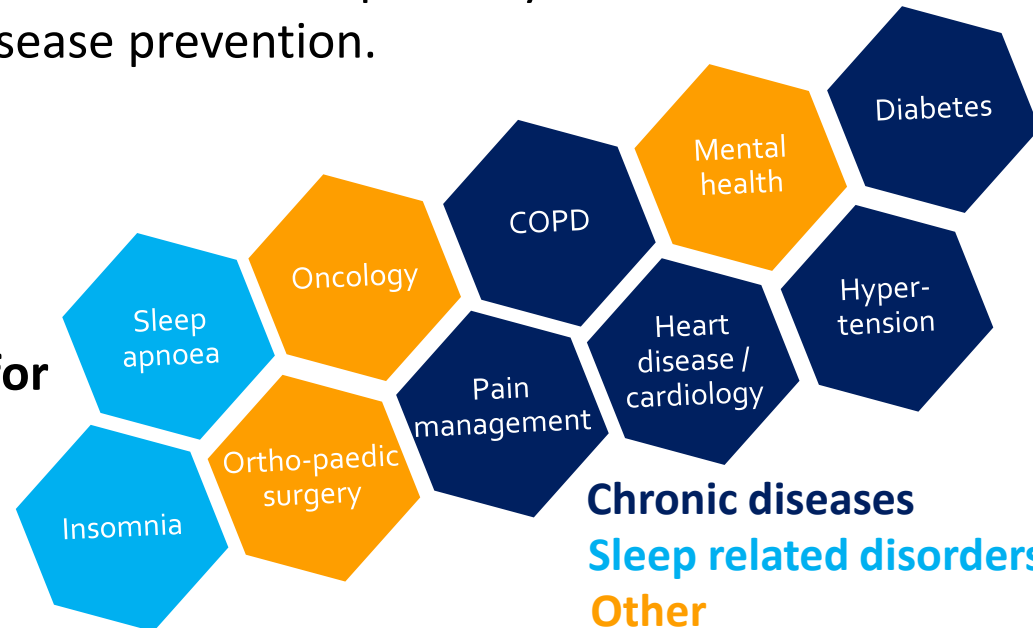
Digital therapeutics harness the power of technology to impact health by:

- **Enhancing traditional medical practices**
- **Encouraging behavior change**, and in some instances,
- Serving as a **direct stand-alone therapy** for a health condition.

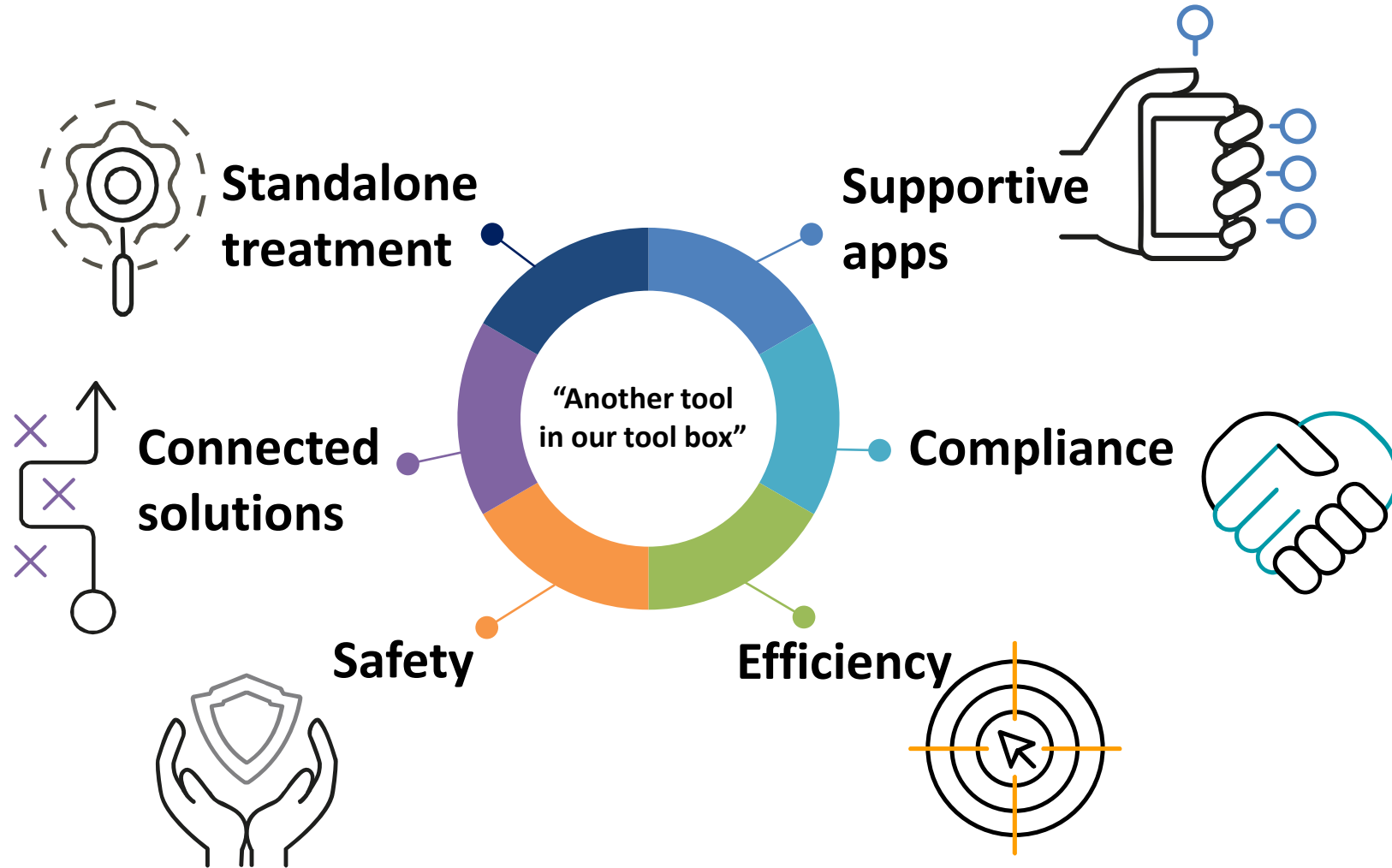
Digital therapeutics are **validated by clinical evidence** to demonstrate an effect on **health outcomes** for specific treatment pathways as well as primary and secondary disease prevention.



Chronic diseases are believed to present the greatest opportunities for Digital Therapeutics adoption

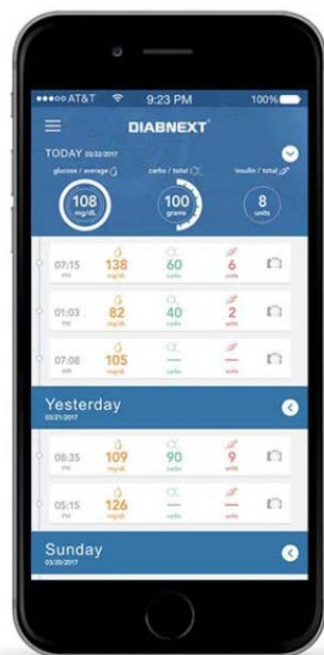


Digital Therapeutics Will Be Defined Using Both Clinical and Non-Clinical Components:





OMRON® Kardia Mobile EKG



DIABNEXT® CLIPSULIN®

It makes your insulin pen smart



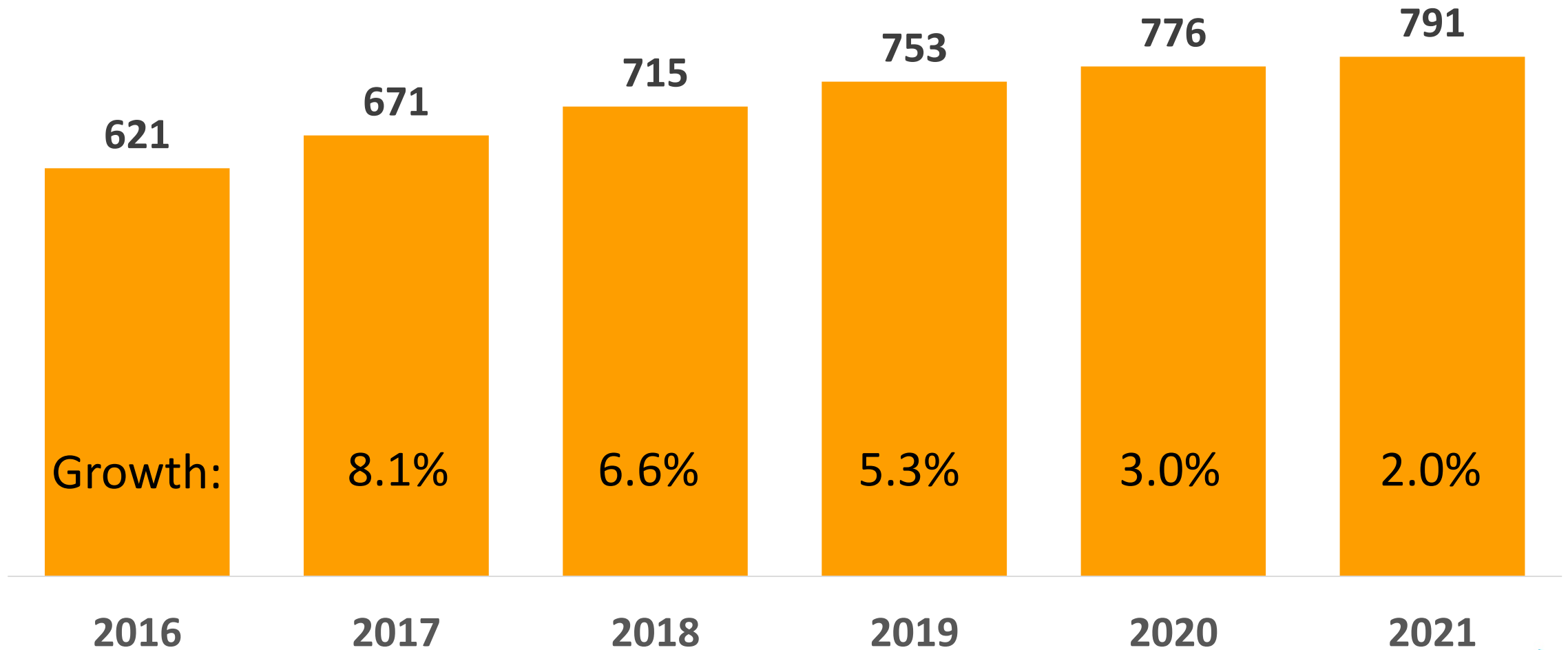
VR Treating Trauma



*Project Bravemind
VR Therapy
Developed by
Researchers at USC*

U.S. Consumer Tech Connected Devices

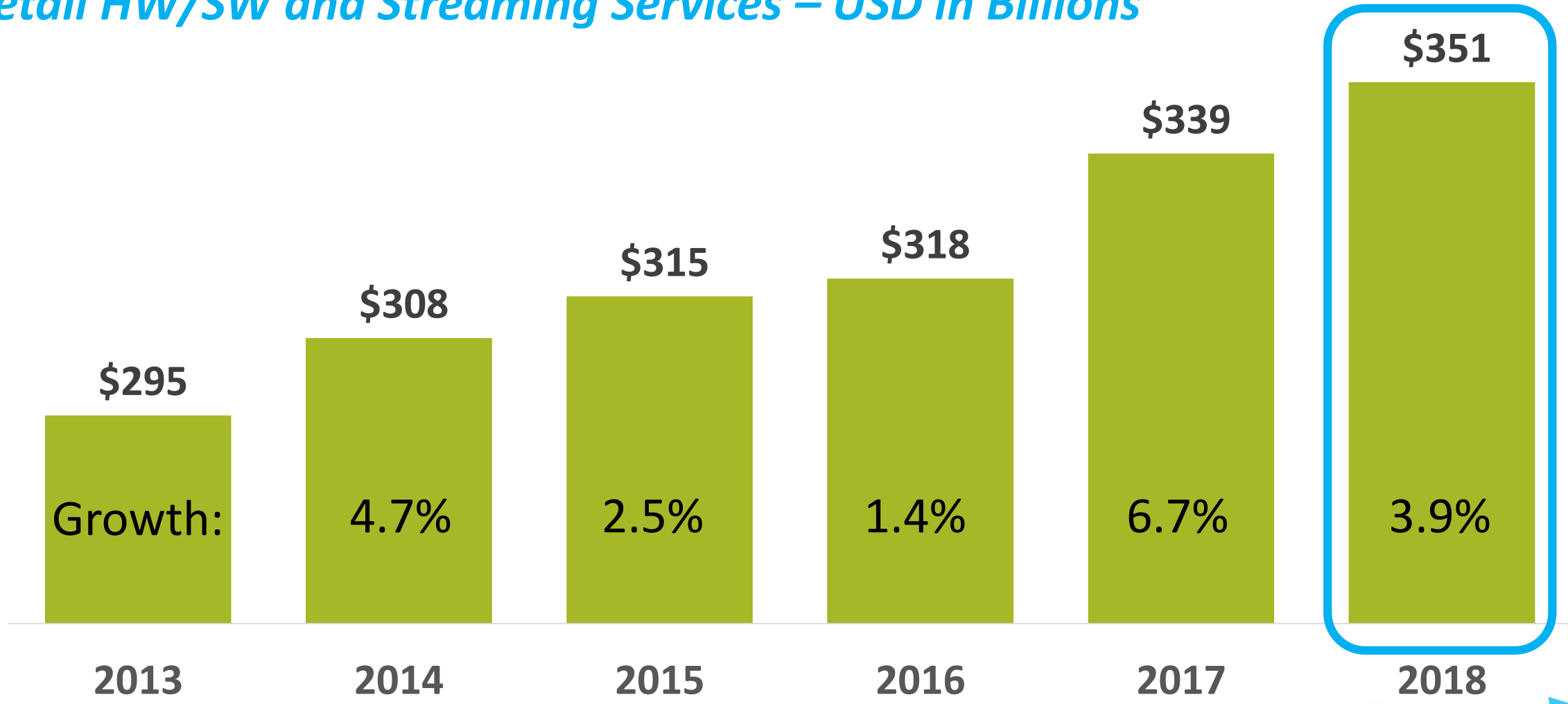
Retail Sales – Volumes in Millions



Source: CTA

U.S. Consumer Tech Revenues

Retail HW/SW and Streaming Services – USD in Billions



Source: CTA



Get the Slides!

[CTA.tech/salesandforecasts](https://cta.tech/salesandforecasts)

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