16 Global Retail Tech Trends for 2016

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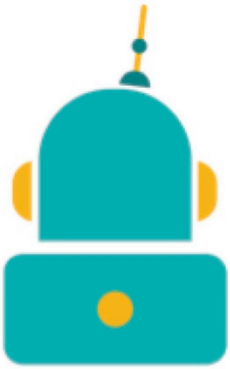

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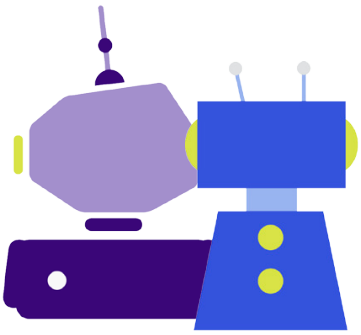
16 GLOBAL Retail Tech Trends FOR 2016



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GLOBAL RETAIL TECH TRENDS FOR 2016

Virtual reality, robots, mobile payments, 3D printing and 12 other tech trends will influence the retail industry and play a larger role in everyday life in 2016. In this report, our analysts identify and outline the most important tech trends for 2016 and share their thinking on what to watch for and why.

VIRTUAL REALITY: RETAIL REALITY

Virtual reality (VR) technologies will move further into the mainstream, boosted by the first consumer shipments of the Oculus Rift in March. VR will be used selectively to enhance the in-store experience and help shoppers choose among customization options for bigger-ticket purchases.

What It Is

The concept of being transported to another reality has been around for decades, but the technology has only recently caught up with the idea. Today, increasingly affordable technology allows viewers to "enter" 3D simulations and experience and interact with an environment via VR. Movies that use VR are entering the mainstream, too, and YouTube is planning to support VR movies in its service.

Digitally focused luxury brands and higher-end retailers are likely to be among the retail leaders in VR in 2016.

Philco developed one of the first VR headsets in the 1960s, and security and military initiatives were behind much of the funding of early VR development. In the past few years, however, as the technology has become more widely available and affordable, the entertainment, marketing, media and retail sectors have begun to adopt VR. For example, *The New York Times* distributed Google Cardboard VR headsets free of charge to its Sunday subscribers in an effort to broaden VR's acceptance. Retailers have begun experimenting with in-store use of VR, and consumer interest in it has been growing. The initial production run of the Oculus Rift VR headset sold out in less than a day, despite the device's $599 price tag.

Research firm Statista conducted a survey of 1,013 US individuals aged 19–49 in June 2015, and found that 44% of respondents said they are "very interested" in VR, while another 26% said they are "quite interested." Those polled said they were most interested in VR because it allows them to feel as if they are jumping into another world; they cited that sensation more frequently than factors such as interest in the technology itself and interest in an intense gaming experience.

According to Digi-Capital, an M&A advisory firm, combined revenue for VR and augmented reality (AR) is expected to total approximately $4 billion in 2016 and grow at a CAGR of more than 200%, to reach $148 billion by 2020.

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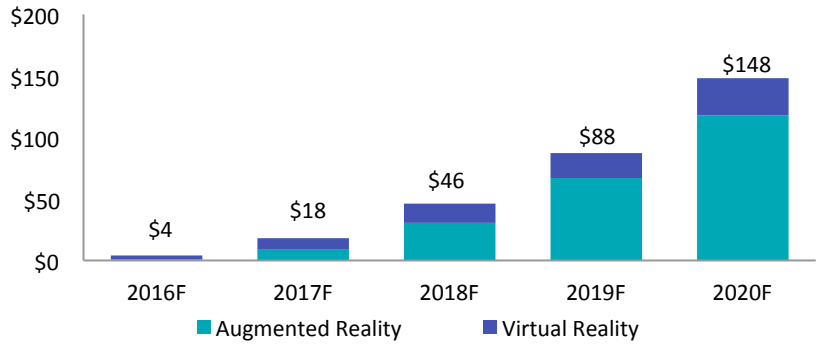
Figure 1. AR/VR Revenue Forecast (USD Bil.)



Source: Digi-Capital

Why It Is a Trend

VR entered mainstream retail in 2015. British mass-market travel agent Thomas Cook, for example, launched a VR trial using an Oculus Rift headset in a London store. The headset allowed customers to "try before they buy" by taking a virtual tour of the company's SENTIDO resorts and Thomas Cook Airlines planes. Bookings increased by 190% when customers used VR, according to Visualise, the VR production firm that worked on the project.

Automaker Audi uses VR for marketing and retail**.** A marketing program allows customers to "drive" the famous Silverstone circuit, home of the British Grand Prix, and take virtual tours of Singapore as it looked in 1965. In retail sales, Audi uses VR to allow customers to experience personally configured cars—they choose a model, color and interior. The service launched in selected dealerships in late 2015, and Audi expects to eventually use VR outside the showroom, allowing salespeople to use a "dealership in a briefcase" to present to prospective customers.

Hologram technology, which overlays images or data onto the physical world via a viewer's headset, is related to VR. Volvo is experimenting with holograms using Microsoft's HoloLens technology. Volvo states that the program "will allow people to experience the technology in our cars in a more tangible way.…HoloLens could also one day enable people to configure a car and see changes of color, trim or wheel design in the most realistic way possible."

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What to Expect

We expect to see continued, but slow, adoption of VR technology in several sectors this year. Retailers and brands that sell goods and services with high average sale prices (such as cars and holiday packages) will lead the charge in VR adoption. For these categories, options for adapting the purchase abound, and firsthand virtual experiences can help drive up conversion rates by giving shoppers greater confidence in their customization choices. In apparel, early adopters such as Tommy Hilfiger have led the way; the company used VR headsets to allow visitors to view its 2015 catwalk show in selected stores. And for companies focused on experiences, such as hotels, VR could offer a natural progression from the 360-degree virtual tours offered by Google Street View and other platforms.

2 PARTNERSHIPS: LINKS ACROSS THE IOT

As the Internet of Things (IoT) expands, partnerships between brands and tech firms will grow and businesses will search for the right devices to meet customers' digital demands.

What It Is

Cisco Systems predicts that 50 billion devices will be connected to the Internet of Things by 2020.

Not since "B2B" and "cloud computing" became part of the business vernacular have so many companies been as excited about a tech meme as they are about the IoT. The term encompasses everything from fitness-tracking wristbands to supply chain logistics to sensor technology. According to Cisco Systems, 50 billion devices will be connected to the IoT by 2020. Digitization and the expansion of the IoT are catalysts for growth, driving new economic models and new growth opportunities across a wide range of industries. As firms raced to digitize their offerings and compete in the IoT industry in 2015, unprecedented numbers of partnerships were established.

Why It Is a Trend

Many partnerships were announced at the CES 2016 trade show in January:

- Samsung said its current partners include the Samsung SDI division; Corning, the maker of Gorilla Glass, which is found in most of the world's smartphones; Microsoft, which provides the operating system for Samsung's new tablet; Goldman Sachs, which is partnering with Samsung on security software; and BMW, which Samsung is collaborating with on smart cars.
- Intel announced it would partner with New Balance to work on an Android Wear fitness watch that is due out by next holiday season.
- IBM is partnering with sports apparel company Under Armour on a project for Under Armour's Connected Fitness platform. IBM's Watson cognitive-computing software will process user data from Connected Fitness in order to provide real-time health and fitness coaching.
- Panasonic announced that it was partnering with energy provider Xcel Energy, the City of Denver (on smart city initiatives), Facebook (on optical data archiving), SunTrust Stadium (on digital signage), and

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various authorities and developers on the upcoming Olympic Games in Rio de Janeiro.

- Qualcomm said that Audi had selected its chip, which combines intelligence, wireless connectivity and machine learning, for its infotainment and advanced-driver-assistance platform.
- Monster said that it has partnered with AllHipHop.com, luxury automobile maker Bentley, and professional athletes Shaquille O'Neal and Cristiano Ronaldo on new products.
- Ford announced a partnership with Amazon that will integrate Echo, Amazon's smart-home device, into cars. The collaboration would allow a person sitting in his living room to ask Amazon's Alexa, Echo's personal assistant, to start his car in the garage.
- Volvo is partnering with Microsoft to enhance its connected-car strategies and technologies. A Volvo owner can now press and hold the action button on the Microsoft Band in order to issue commands such as "Volvo, start the heater of my car."

What to Expect

The expansion of the IoT has catalyzed growth across industries, and we expect this trend to continue. More companies will form partnerships in order to advance their IoT initiatives as they look to develop the right platform for their technology. Furthermore, almost all of today's modern marketing techniques are built on the new gold currency of our era: data. Merging customer data with prospecting data, so that brands and retailers can reach people with more personal marketing, will result in a significant wave of new partne rships.

3 ROBOTS: HELPERS AND COLLEAGUES

As retail and other industries face increasing pressure to boost efficiency and reduce costs, robots will be used in more warehouses and factories, on more sales floors and in more homes—and humans and robots will increasingly work side by side.

What It Is

A new breed of robots understands and responds to human language commands.

Robots were once the stuff of science fiction movies, but they have been in actual use in manufacturing since the 1960s. We normally picture them in automated car factories—where huge robotic arms dart around and sparks fly as the robots weld an automobile chassis—but they are increasingly used in many other kinds of workplaces. The International Federation of Robotics estimates that the global market for industrial robots will total nearly $12 billion this year, and grow at an 8.3% CAGR, to $24 billion, by 2025. Among retailers, Target and Lowe's are furthest ahead in robot use. Target is working on using robots to improve the customer experience and Lowe's is testing robots that can locate and retrieve items within a store.

The advantages of using robots are well documented: they can work 24/7, they do not take holidays or vacation days, and they can offer throughput, quality and repeatability at rates that surpass those of human workers. The drawbacks of using robots are also well known: they have a high initial cost,

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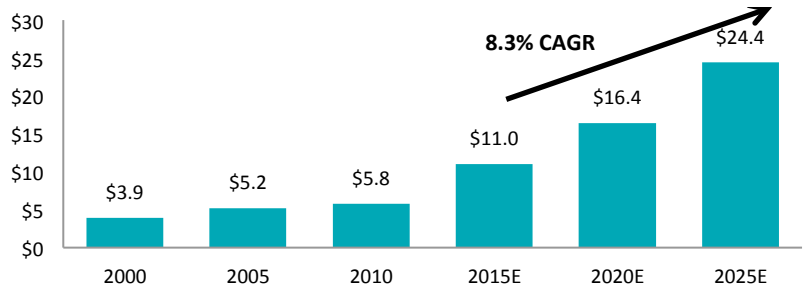
they seem hard to set up, they require difficult and costly maintenance, and they have the potential to cause human injury or death if they have a massive failure.

Figure 2. Worldwide Spending on Industrial Robotics (USD Bil.)



Source: International Federation of Robotics/Japan Robot Association/Ministry of Economy, Trade and Industry/euRobotics/company reports/Boston Consulting Group

Why It Is a Trend

Robotics has benefited from the same trends that boosted the electronics industry: the cost of computing has decreased, owing to Moore's Law, and increased computing power has, in turn, increased the power of software**.** Simultaneous advances in image processing and artificial intelligence (AI) have also accelerated the use of low-cost robots. Robots are now used for warehouse tasks, for cleaning homes, for entertaining consumers (in the form of drones), and as greeters and customer service agents in department stores. For example, iRobot offers the Roomba robot, which automatically creates a floorplan and vacuums floors, and the company offers other robots for floor mopping and gutter and window cleaning.

Still, there are many more robots on the horizon, as evidenced by healthy levels of venture capital investment. Funding of robotics startups grew by an average of 13.8% from 2011 through 2013 and jumped 36%, to $341 million, in 2014, according to Hizook.com and TechCrunch.com. Excluding investments in drone makers, the financing of robotics companies increased by 24% in 2014. The robotics landscape also includes several global technology conglomerates, which are developing a variety of automated systems, including autonomous guided vehicles, robot arms, storage systems, and conveyor belts and other industrial systems

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What to Expect

We expect an explosion in the deployment of robots in the workplace, where they will work side by side with humans. Amazon expects to achieve savings of $400–$900 million by using Kiva Systems robots, which work in combination with humans in fulfillment centers, rather than replacing human workers. Amazon's success has encouraged several startups to develop robots and automation systems for use in warehouses, particularly in e-commerce fulfillment houses.

Specialty gift catalogs have long featured robots that serve cocktails, and Japanese department stores and banks have been using robot greeters. A new breed of robots, however, understands and responds to human language commands. At CES 2016, IBM demonstrated how its Watson supercomputer could be used with Pepper, a robot developed by SoftBank of Japan. Pepper is able to respond to spoken commands as well as produce human-like emotional responses and physical gestures. IBM is offering its Watson technology to enterprises seeking to deploy robots in retail and customer service environments.

To allay fears that robots might run amok and injure or kill humans (as they often do in science fiction movies), robot makers are working feverishly to prevent accidents. For example, German technology company Bosch has developed sensors that detect contact with human skin; these can be employed to stop a robot's motion or trigger a shutdown.

One of the biggest fears workers face in the age of robotics is, of course, the loss of their jobs. Technological advances are leading to more and more workers being replaced by automated machines, and jobs that require a low level of social interaction, creativity, or mobility and dexterity are likely to be the first to be replaced. Although many people know that a shift is coming and that certain types of jobs will be under immense threat in the coming years, most companies are currently underprepared to face the inevitable changes.

4. WEARABLES: ALL ABOUT WELLNESS

Fitbits, smartwatches and other wearables are leading the way in the wellness market, and sales of these products are projected to grow from $20 billion in 2015 to almost $70 billion in 2025.

What It Is

Most wearables will focus on wellness, helping wearers track and improve their fitness, nutrition and sleep.

Wearables encompass a wide range of products, including fitness bands, smartwatches, heart rate monitors, clothing with sensors, eyewear, headgear, footwear and even skin patches. Broadly speaking, they are electronic gadgets that are worn on the body and that communicate information to an outside network. Advances in the miniaturization of electronics and wireless communication technology have enabled these devices to monitor a wearer's health and fitness, and to predict catastrophic health problems. Market research firm IDTechEx estimates that the wearables market will grow from $20 billion in 2015 to almost $70 billion in 2025, at a 13.3% CAGR.

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Why It Is a Trend

Wearables have shown strong but uneven growth across categories. For example, fitness-tracker wristbands have become hugely popular, but technology limitations regarding the size of sensors have slowed the development and adoption of smart clothing. Early versions of smart clothing, such as Ralph Lauren's sports shirts, have been widely adopted only by serious athletes. These types of wearable garments will continue to lag in terms of popularity until manufacturers can place sensors in them that do not cause discomfort for the wearer.

Despite mixed consumer reviews, total shipments of wearable fitness trackers reached 21 million in the third quarter of 2015, according to IDC, a market intelligence firm. The Fitbit topped the list, with 4.4 million units shipped, followed by the Apple Watch's 3.6 million units. North America was the leading wearables market in 2015 in terms of shipments and innovation, followed by China and Europe.

What to Expect

In 2016, most wearables will focus on wellness, in areas such as fitness, nutrition and sleep. The more popular products will provide a one-stop, integrated solution for monitoring many aspects of personal health, not just the wearer's activity level. In the future, we may see further integration of wearables, and the data they collect, with personal health insurance plans. If fitness devices help customers meet health goals, their insurance premiums may be reduced. A few companies already use data collected from a device to make recommendations and predictions for the wearer. Under Armour's HealthBox includes a sports band, a heart rate monitor and a connected scale for a retail price of $400. iFit has developed a series of products that include fitness trackers, equipment modules and workout SD cards.

At CES 2016, a number of products that track sleep patterns and promote healthy sleep were on display, including monitors and smart mattresses. This subcategory should see continued growth and innovation. Sleep Number introduced its smart mattress, called the "it" bed, at CES. The mattress adjusts to a person's preferred firmness levels based on data gathered through the SleepIQ app.

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Finally, as more advanced technologies are integrated into consumer wearables, we expect to see more product development partnerships between traditional technology companies and retail fashion companies: IBM, for example, has already developed voice-controlled fitness sunglasses in partnership with fashion eyewear company Luxottica.

5 DRONES: FROM TOYS TO TOOLS

No longer just curiosities and playthings, drones will be put to even more practical commercial and industrial uses.

What It Is

Drones are especially well suited for reaching people and sites in remote locations.

Once purely a tool of the military, drones generated a good deal of attention at CES 2010 and reappeared in headlines in December 2013, when Amazon boasted that it was testing them for residential package delivery. Since then, drones have become a popular consumer electronics product and at the same time a nuisance to airports and sensitive facilities. They come in all shapes and sizes, with varying numbers of propellers, and with or without cameras. The consumer drone market is expected to hit $953 million (and 2.9 million units) this year, up from about $450 million in 2015, growing at a rate of 115%, according to the Consumer Technology Association.

Why It Is a Trend

Drones have undergone the full hype cycle during the last five years, first as innovative products and then steadily growing into a blockbuster consumer product category. Estimates of drone sales during the 2015 holiday season reached 1 million units, and revenues for leading drone maker DJI were expected to hit $1 billion in 2015.

Alongside their meteoric rise in popularity, drones have been the center of controversy in a number of incidents. They have been used to snoop on movie locations and flown into airspace designated for airports and other security installations. One hapless operator even inadvertently landed his drone on the White House lawn. Drones' ability to encroach on others' airspace led the FAA to draft rules in December 2015 requiring that drones fly below 400 feet and that owners register them.

Drone technology continues to improve, including in terms of battery life and intelligence. At CES 2015, drones were able to avoid basic obstacles; at CES 2016, they showed improved functionality, including cameras that enabled them to follow their owner. To comply with growing regulation, drone maker DJI said that it was adding geolocation capabilities to its drones to keep them out of airports and other sensitive areas.

Drones have also been put to practical use, such as for delivering medicine in regions of rugged terrain or military conflict, but there are potential commercial uses in developed areas as well. In San Francisco, QuiQui is planning to offer aerial delivery of pharmacy items in the Mission District of the city. A drone demonstrated at CES 2016 is even capable of transporting a human, i.e., functioning as a remote-controlled helicopter.

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What to Expect

Drones are gradually evolving from being just technical curiosities and toys into being commercially useful. Amazon recently released a video showing home package delivery by drone, although many technical and operational challenges remain. Given that they are by nature aerial vehicles, drones are especially well suited for reaching people and sites in remote locations. The best uses of drones in the near term are likely commercial and industrial, and include surveying real estate, electrical lines and oil pipelines.

Major drone makers are likely to add geolocation functionality to their products to keep them out of trouble and mitigate regulators' fears somewhat, although there are still many new ways drones (like any other technology) could be used for ill. Still, drone technology is in its infancy and will likely evolve as companies find new applications for it.

6 CONNECTED HOMES: THE COMPETITION HEATS UP

More retail and technology companies will join the race to help homeowners control everything from alarm systems to heating systems with just a tap on a smartphone.

What It Is

In a connected home, or smart home, key electrical appliances and systems are interconnected and may be remotely accessed, controlled and monitored via a network manipulated by a smartphone, tablet or computer. A home automation hub or platform allows users to control devices such as heaters, air conditioners and lights through a single device that communicates with their smartphone. Examples of smart devices include Philips Hue lights and the Nest Learning Thermostat. Revenue from smart home products is expected to hit $1.2 billion (and 8.9 million units) this year, up 18% from about $1 billion last year, according to the Consumer Technology Association. Two key factors have slowed the adoption of smart home technology: the inability of these devices to communicate with each other seamlessly (consumers often need different apps to control them) and their high cost.

Nearly every home appliance now comes with smart capabilities or could be made "smart" with the use of a smart switch.

Why It Is a Trend

The connected home market has been teeming with smart devices for some time. Nearly every home appliance now comes with smart capabilities or could be made "smart" with the use of a smart switch.

Home security is the most sought-after functionality among smart home adopters. Connected-home security devices and systems allow users to not only make their homes safer, but to keep track of elderly occupants, children and pets through remote monitoring.

At CES 2016, Panasonic demonstrated its Ôra home-control system, which features a single software platform that lets owners control home devices remotely, allowing them to open locks, operate appliances, monitor pets and turn on music even when they are not at home.

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What to Expect

Three fundamental trends could take shape this year. First, the market for hubs and platforms may get more competitive as the most popular hubs, such as Google's Nest and Apple's HomeKit, allow a wider set of devices to work together. This will make smart home adoption more pocket-friendly, because consumers will not have to buy different hubs for devices from different brands. Second, the home security segment will boost the connected-home market. Finally, connected homes and connected cars will converge, with cars functioning as an extension of the smart devices in the user's home.

Several companies that unveiled devices at CES this year noted those products' compatibility with particular platforms. This will be an important marketing point, as consumers are looking for such compatibility. LG, for example, announced it was partnering with Google to develop smart devices, and many of Google's smart products are already marketed with the "Works with Nest" tagline.

In the smart security segment, two broad developments will boost the connected-home market. First, more big companies will join the smart home security race this year, following the many startups and smaller companies that have come out with innovative and popular products. The big guns, such as Samsung and Google's Nest, already offer successful smart security cameras, locks and other products, and LG recently upped its game by unveiling its own smart security solution.

Second, the bigger security services companies that enter the race will introduce more integrated products or refine their existing security solutions in order to work better with other home systems. LG's new solution has integrated a large-field-of-view security camera, a hub, an environmental monitor and a siren into one device that can work seamlessly with a smart home's other devices.

7 STREAMING: TIME TO CUT THE CORD

Widespread use of devices such as Apple TV and services such as Netflix suggest that this will be "the year of streaming." Viewers are expected to finally abandon cable television subscriptions in droves.

What It Is

Faced with decreasing numbers of cable TV subscribers, distributors and TV networks will look for ways to rebalance their revenue streams.

The Internet has democratized access to TV and video content. Cable no longer has a monopoly on first-run premium content—Netflix, Amazon Prime and others have emerged as strong competitors. Devices such as the Apple TV, Amazon Fire TV, Roku and smart TVs now offer a multifunctional wireless alternative to the TV set-up box. As a result, consumers increasingly expect to pay for only the content they want, delivered when they want. In other words, the Internet is bringing down the old cable TV bundle model.

Advances in mobile and Internet technology have also made the Internet a more stable vehicle for accessing high-quality video—and viewing devices have become cheaper. In addition, Netflix announced at CES 2016 that its service is now available in over 130 countries worldwide. Thus, this year is set to be a big one in terms of consumers cutting the cable cord and abandoning their cable subscriptions. PwC estimates that the streaming

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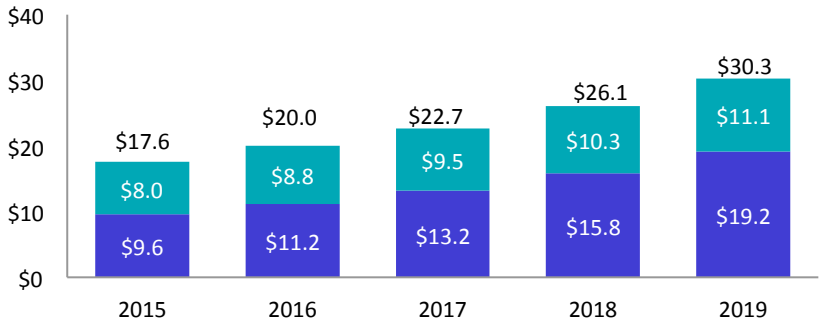
video market will be worth $11.2 billion this year and will grow at a 20% CAGR, to $19.2 billion. In addition, we calculate that the subscription music services market will total more than $400 million this year, and grow to $1.5 billion by 2019, based on estimates from music industry association New Music Seminar.

Figure 3. Estimated Global Electronic Home Video Market (USD Bil.)



Source: PwC

Why It Is a Trend

Pay TV distributors in the US, such as AT&T, Dish Network, Time Warner Cable and Verizon, are looking for ways to rebalance their revenue streams. One way for them to do that is to focus more on their broadband business, which remains essential to consumers who still need to access the Internet. Another way is to venture into over-the-top (online-only) TV services.

- Dish announced Sling TV at last year's CES. Sling TV is a cheaper, live TV online bundle package that includes several sports channels. It was estimated to have about 400,000 subscribers as of November 2015 and was expected to contribute around $100 million to Dish's revenues last year. Even though Sling TV subscriptions have grown "according to expectations," there are doubts about the service's ability to attract and retain new subscribers.
- Time Warner Cable launched a Roku trial for its TWC TV app in New York City in November 2015. However, the service still requires customers to subscribe to the company's traditional cable TV service in addition to its broadband service.

TV networks have also moved to leverage the Internet in order to directly access viewers and counter the growth of Netflix, Amazon Prime and Hulu.

- HBO launched its over-the-top online streaming service, HBO Now, in 2015. Showtime, CBS and Lifetime also all announced or launched over-the-top video services.
- NBCUniversal launched a digital comedy channel, Seeso, early this year. It offers a mix of original series, NBC late-night shows and archived content.

At the same time, the big aggregators—Netflix and Amazon Prime—have made even bigger bets on original content. Netflix plans to double its

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original programming in 2016. Based on an estimated 74 million subscribers, we calculate that Netflix streamed approximately 40 exabytes (40×10^{18} bytes) of data (assuming 45 Gb of consumption per month) in the fourth quarter of 2015, as compared to 31 exabytes in the year-ago quarter.

Lastly, the big online video companies for user-generated media—YouTube and Vimeo—are moving to play a greater role in the new landscape. YouTube is adding support for VR and 360-degree video, anticipating that user-generated content will move in that direction. Snapchat and Facebook are also putting video at the forefront of their strategies, betting that it will be the way users engage with the Internet going forward. At CES 2016, Chinese consumer electronics maker TCL announced a line of 4K UHD TVs with integrated streaming functions from Roku.

What to Expect

The traditional broadcast TV model is increasingly being replaced by the cloud. There is no reason to think that viewers will stick with cable, especially when cable fees continue to climb. The major providers, AT&T, Comcast, Dish and Time Warner Cable, are all planning to increase prices in 2016. With subscription fees a fraction of the cost of cable TV service in the US, streaming services are a more attractive offering for many consumers. Faced with decreasing numbers of cable TV subscribers, distributors and TV networks will continue to roll out streaming services. But they might find they are too late, given that Netflix and Amazon are already excelling in the space. The proliferation of streaming options will make the market a lot more confusing for consumers, but the increased competition will bring about more flexibility at lower prices.

8 CYBERSECURITY: KEEPING THE BAD GUYS OUT

The cybersecurity market will continue to grow as the number of ways criminals can invade digital systems increases alongside increased use of mobile devices and mobile payments.

What It Is

Cybersecurity refers to the tools and techniques used to keep information thieves, trespassers and vandals out of IT systems, which consist of hardware and software and the data that reside on them. Systems need to

be protected against unauthorized access, the unauthorized retrieval of data, and the insertion of foreign data and computer code. We calculate that the cybersecurity market will grow at a CAGR of nearly 18% over the next four years, based on research firm Gartner's estimates that the market was worth $75 billion last year and will grow to $170 billion by 2020.

Examples of cybersecurity breaches include spam (unwanted, unsolicited email), malware (malicious software) and phishing (fraudulent email that attempts to trick the victim into opening an attachment that launches malware or links to a fake website that steals personal information). Once a computer is under the control of malware, it can be controlled remotely to send spam, spread malware or for other purposes. If unable to gain entry through one of these ways, miscreants can just flood a server with erroneous data requests in a DoS (denial of service) attack.

Why It Is a Trend

Hackers have obtained internal, customer and/or credit card data in many well-publicized data incursions. Target was hacked in 2013, as were JPMorgan Chase, Home Depot, Staples and Sony Pictures in 2014. In 2015, criminals used Social Security numbers, birth dates, addresses and other personal information to obtain tax returns and other filings, which were then used to file fraudulent returns with the US Internal Revenue Service; the agency sent nearly $50 million in refunds before detecting the breach.

At the same time, greater consumer use of mobile payments and greater use of mobile devices for commerce have only increased the number of opportunities for cybercriminals. Many of the publicized hackings have demonstrated that the weakest link in the system is often the home server or accounting system where customer information is saved, rather than the point-of-sale terminal or payment system.

Although we typically think of cybersecurity in terms of corporate and financial information, nearly all devices with a processor and communication capabilities need safeguards. In a demonstration last year, a General Motors vehicle was hacked through its diagnostic port and forced to drive off the road, highlighting the vulnerability of Internet-connected car systems.

Cybersecurity has been elevated to one of the key concerns shared by enterprises, retailers, network operators, electronic device manufacturers, communications-protocol designers and consumers.

Given the huge growth in digital and mobile commerce, devices, and technologies, cybersecurity is now a key concern for enterprises, retailers, network operators, electronic device manufacturers, communications-protocol designers and consumers.

What to Expect

With the increasing digitalization of our lives and greater reliance on e-commerce and mobile commerce, the number of platforms and entry points through which criminals can invade our IT systems is poised to increase exponentially. Moreover, the increasing adoption of mobile payment systems, which fuse mobile computing technology with credit cards and other traditional payment systems, offers an attractive target for criminals.

In addition, the IoT is a windfall for the bad guys, with 50 billion devices expected to be connected shortly, offering an additional 50 billion (or more)

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access points for hackers. Many of these devices will be storing and transmitting a great deal of personal information, including health and medical data, in addition to traditional payment information. At the same time, the number of technologies and devices used to access the Internet—including smartphones, wi-fi devices, smart TVs and Bluetooth devices—is exploding. The coverage of cybersecurity will have to be expanded to secure the rapidly growing number of connected devices and interfaces.

9 AUTONOMOUS VEHICLES: THE JETSONS ARE FINALLY COMING

The driverless car market will become more crowded as companies work to perfect driverless cars that can conserve energy, reduce accidents, and transport the disabled and elderly.

What It Is

Science fiction movies have long presented a future where robotic drivers operate cars. Today, a host of companies—including the major auto manufacturers and many major US and foreign technology companies—are hard at work making this vision a reality. Autonomous vehicles could save resources and energy, free commuters from the need to concentrate on their driving, reduce automobile accidents and fatalities, and offer new transportation options for the elderly and disabled. The global light-vehicle market is estimated to total about 95 million vehicles this year, according to KPMG. Insideevs.com estimates that 116,548 electric vehicles were shipped in 2015; if we multiply that number by an assumed price of $100,000 per vehicle, then the market for autonomous vehicles could exceed $11.5 billion.

Why It Is a Trend

Consumer electronics, software and chipmaker companies must all find partners with experience manufacturing reliable vehicles.

A few companies have already demonstrated driverless cars. At last year's CES, for example, Audi demonstrated a driverless vehicle that had driven to Las Vegas from Silicon Valley. However, these vehicles are still at least a couple of years away from general availability. Tesla appears to be leading the field. Recent software updates enable its vehicles to offer driver-assisted services such as automated lane changing, highway driving and self-parking. Other companies, including Audi and Bosch, have announced capabilities for piloted driving and automated parking.

Google also appears to have a substantial technology lead over competitors. It road tested its second generation of driverless cars in the streets surrounding its Silicon Valley headquarters last year, and posted the results

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on a blog. After being mum on the topic of driverless cars at CES 2015, Ford announced this year that its vehicles had moved from the research phase to the advanced-engineering phase. There are also reports that Apple has a team of 1,000 engineers working on its own autonomous car project.

This year's CES featured many interesting demonstrations of connections between the smart home and the smart car. Ford said it is partnering with Amazon to enable drivers to turn on the lights or open the garage door using Amazon's Echo device and Alexa personal assistant. The connection will also allow Ford owners to use Echo to instruct their car to start or to turn on its heater.

What to Expect

The driverless car market will become even more crowded: it is already huge and attractive, comprising approximately 94 million units and $2 trillion dollars, according to IHS and Marketline estimates. Companies involved in the market include US carmakers Ford, GM and Tesla; foreign carmakers, including the German, Japanese and South Korean manufacturers; technology giants such as Apple, Google, Qualcomm and Nvidia; and Chinese technology companies, including Internet leader Baidu and a secretive startup called Faraday Future, which is backed by a Chinese billionaire. Samsung has also said that it is establishing a team to research driverless cars.

A brutal shakeout is likely, due to the tough technological hurdles that must be overcome in order to produce a driverless car. Such a car must provide reliable transportation, and its image-processing system must respond correctly (and safely) to a wide variety of driving conditions, including weather, unforeseen obstacles and objects in the road. Safety is the paramount concern, particularly for legal reasons, as lawsuits arising from accidents could quickly bankrupt a carmaker. Clearly, consumer electronics and software companies, as well as chipmakers, must find partners with exp erience manufacturing reliable vehicles. The strengths of the traditional carmakers have not historically focused on image processing and AI software, so a significant degree of consolidation or partnership is essential.

10 MOBILE PAYMENTS: CASH IS DEAD

North American consumers will increase their use of mobile payment systems like Apple Pay, following the path already taken by shoppers in Europe and A sia.

What It Is

Mobile payments are transactions performed from or through a mobile device. Instead of paying with cash, check or credit card, consumers can now use a mobile phone to pay for a wide range of goods and services. According to a recent Accenture survey, 52% of North Americans are "extremely aware" of mobile payments, but only 18% make them on a regular basis. Unsurprisingly, millennials and higher-income households lead the pack, with 23% and 38% of these groups, respectively, using contactless payment services at least once a week.

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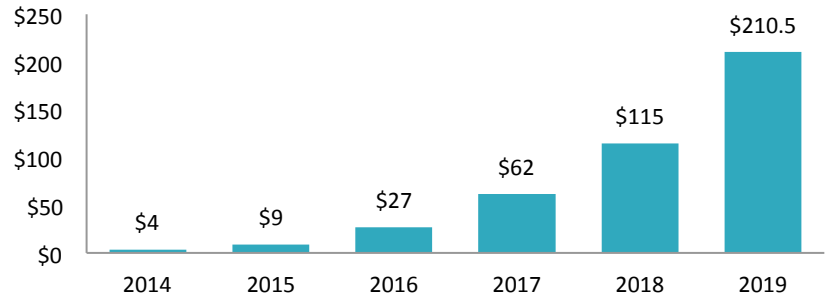
Mobile wallets have struggled to find favor in the US, where consumers have been slower to adopt the technology than consumers in Europe and Asia have been. China is the leading mobile payments market, and many Chinese companies offer some degree of mobile commerce support.

China is the leading mobile payments market.

Figure 4. Estimated US Proximity Mobile Payment Transaction Value (USD Bil.)



Source: eMarketer

Why It Is a Trend

The use of mobile payments in the US is expected to ramp up aggressively, according to eMarketer. Total transaction value will triple in 2016 due to a growing user base, broader merchant acceptance and consumers using their phones more frequently to make point-of-sale payments for medium- and high-priced products. eMarketer further estimates that the total value of US mobile payment transactions more than doubled in 2015 from the year before, reaching $8.7 billion. The firm also anticipates that 2016 will be a watershed year for mobile payments in the US, with transaction value tripling, to $27.1 billion and growing at a rate in excess of 80% through 2019.

Mobile payment programs include:

- **Samsung Pay:** Samsung plans to expand its mobile payment service in the US this year, allowing users to shop online and with more models of smartphones that will support its electronic wallet. Lower-priced Samsung phones will likely offer the mobile wallet in 2016, according to company statements. Samsung Pay already leads its major rivals, Apple and Android, having launched its US service in September 2015 with technology that is widely used at most stores.
- **Apple Pay:** Apple announced in December 2015 that it would launch its new Apple Pay electronic payment service in China in early February 2016. The company has struck deals recently with China's four big state-run banks that will allow Apple Pay users to link the service with their local bank accounts. Apple Pay could still face regulatory hurdles in China, where banking and e-commerce are overseen by a number of government agencies. Apple Pay is currently live in the US, the UK, Canada and Australia, but Apple plans to bring it to Hong Kong, Spain and Singapore in 2016. Apple Pay will undoubtedly face stiff competition from the more established mobile payment services in China, including Tencent's WeChat and Alibaba's Alipay.

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- **Alipay:** Created by the Chinese e-commerce juggernaut Alibaba and later spun off, Alipay is a digital wallet that shoppers (mostly in China) use to buy products online, on their phones and even in stores. Alipay is a phenomenon that is difficult to fathom outside China. In November, on China's version of Black Friday, Alipay handled a record $9.3 billion in transactions. It is so big that it has 350 million registered users—almost triple the number of its closest US rival, PayPal**.** Alipay controls around 80% of online payments in China.

- **WeChat Pay:** WeChat Pay is an app on Tencent's popular WeChat messaging service that can be used in a variety of shops in China for cashless transactions, much the same way as Apple Pay is used. WeChat Pay does not aim to compete with the existing online payment systems or to replace Tencent's other payment system, Tenpay. WeChat Pay is something a little different, a creation of the WeChat social network and another step in commercializing the WeChat platform. In mid-November, Tencent announced that it had made WeChat Pay available in more than 20 countries. According to Xinhua, 60% of WeChat users have activated the payment service, and since the service's launch less than two years ago, more than 200 million users have bound their credit cards to their accounts. In February 2015, WeChat added a function that lets users send a virtual red envelope (*hongbao*) or "lucky money," which is a customary gift for children and others in China, in time for the traditional Chinese New Year/Spring Festival.

What to Expect

Adoption rates of mobile payment systems such as Apple Pay will increase from their current, slow pace. Over time, consumers will likely see the added value these services provide (the loyalty benefits offered by Starbucks are one example of this). Mobile payment systems will likely be more popular than credit and debit cards as early as 2020.

Mobile wallets will become standard on newer smartphones, and more retailers will accept proximity payments from systems such as Apple Pay, Android Pay and Samsung Pay. There will also be significant consolidation among the hundreds of mobile wallet providers currently in the market; there may be some acquisition activity, but most services will just cease to exist as the industry matures.

11 SMART CITIES: AIDING URBAN GROWTH

As urban populations grow, more cities will look for technological solutions to improve services, update infrastructure and enhance quality of life.

What It Is

A smart city uses information and communication technologies to enhance the quality, performance and interactivity of urban services, to reduce costs and resource usage, and to improve contact between citizens and the government. Smart city technology has been developed for government

services, transport and traffic management, energy, healthcare, water, innovative urban agriculture and waste management.

The smart cities sector, which includes everything from revamping the energy grid to digitizing government systems, is estimated to become a $1.5 trillion market by 2020.

The growth in urban populations is driving the smart cities market. These populations are growing exponentially, and by 2030, 5 billion people will have surged into cities, according to a United Nations report. By 2050, 6.3 billion of the world's population will live in cities, and nearly 90% of this increase in urban population will occur in Africa and Asia. These global trends highlight the need to modernize cities' infrastructures and develop smart city technologies.

The smart cities sector, which includes everything from revamping the energy grid to digitizing government processes, is estimated to become a $1.5 trillion market by 2020, according to consulting firm Frost & Sullivan.

Why It Is a Trend

In 2016, more cities will be smart cities—either having been built so from scratch, like Songdo in South Korea, or as a result of upgraded infrastructure, like Amsterdam.

- Singapore has wholeheartedly embraced smart city technology. To bring its vision to fruition, the government created a virtual 3D copy of Singapore and wired up a single precinct—the Jurong Lake District—to use as a test bed for a range of urban digital experiments, deploying over 1,000 sensors to monitor everything from traffic to street lights. New data hubs, known as Above Ground Boxes, provide high-speed fiber connectivity and power at the street level, and accommodate all the sensors. An automated sanitation system, built by Temasek Polytechnic and ZWEEC Analytics, is being tested to determine the cleanliness of public areas; it relies on advanced video analytics and smart bins. A driverless buggy built by the National University of Singapore and the Singapore-MIT Alliance for Research and Technology Centre is already ferrying passengers.
- AT&T has launched a series of alliances with other technology companies aimed at providing IoT solutions to cities, with Atlanta, Chicago and Dallas the first to benefit. Cisco Systems, Deloitte, Ericsson, GE, IBM and Intel have partnered with AT&T to provide smart city technology across countries where AT&T has a presence–primarily the US and Mexico.
- Panasonic announced that it has teamed up with the city and county of Denver to transform Denver into a smart city to help save energy and better manage resources. The company said that its Panasonic City Now project will include gear such as Internet-connected security cameras and a smart solar grid.

- Bosch launched sensor-based products for monitoring and controlling traffic, street illumination, air quality and parking in cities. The new Bosch Retrofit eCall Plug is a smart device that uses acceleration sensors and intelligent, embedded algorithms to detect an accident and then send data to a smartphone app via Bluetooth. This data is sent to a back-end IT system that can determine actions, such as having a call center call the driver to provide assistance or, in extreme cases, making an emergency call. The company has also developed safety information systems that warn about conditions such as black ice and wrong-way drivers, and it is developing other products to help reduce the effect of human error in accidents. Bosch is also developing fully automated parking systems and working with TomTom on more accurate maps.

What to Expect

Growing awareness and adoption of smart city technologies will spur countries and cities to create policies that prioritize funding and document technical and business guidelines. At the same time, these will bring unique new challenges. As di gital interconnection evolves in smart cities, there will be a corresponding need to ensure the safety, stability and reliability of this technology. We expect a greater emphasis on security, with smart city authorities implementing digital security practices that protect information and prevent interruptions to service.

Information from social media, crowdsourcing and sharing economy companies will have a greater impact on smart city technology. The Waze traffic app is a great example of this: it provides crowdsourced traffic information for commuters. If integrated with systems in a city's transportation management center, such information could help operators update digital signs, adjust traffic signals and dispatch responders more quickly.

12 3D PRINTING: FOR INDUSTRY, CRAFTS AND…DINNER?

A third industrial revolution will take root as 3D technology allows small retailers and individual consumers to design and produce goods.

What It Is

Researchers are working on printing food using organic inputs, and on printing textiles, which could have huge implications for the apparel industry.

3D printing represents a major disruption in manufacturing: it enables small shops and individuals to design and produce their own objects, and essentially moves manufacturing away from factories, portending a third industrial revolution. The technology builds on the ink-jet printing of the 1970s, but it is not printing per se. Rather, 3D printing refers to the process machine that extrudes successive layers of material, typically a plastic resin. It is typically a three-step process: modeling (in which the item is designed), printing and finishing (if necessary). Apart from manufacturing, there are many applications of the technology for consumer use, including in medicine, education, art and design. The market for printer hardware, materials and services is expected to grow from $4.3 billion in 2015 to $17.7 billion in 2020, at a 33% CAGR, according to market research firm Context.

Why It Is a Trend

3D-printing technology has numerous applications in design and manufacturing, including product development, the visualization of three-dimensional data, rapid prototyping and manufacturing, especially for small quantities. Moreover, 3D printing can help companies accelerate product development, develop new manufacturing processes and locate new profit sources. There have been well-publicized examples of 3D printing being used in ways that benefit humanity, such as to create prosthetic limbs. Other applications include vehicle parts, construction (even of homes), and other types of medical and biomedical parts and devices. As with any new technology, this one can be used for good or ill, and plans for the 3D printing of plastic firearms are already available on the Internet, leaving law enforcement agencies scrambling to respond.

For consumers, 3D printing enables individuals to explore the limits of their creativity and imagination, and subcultures of "makers"—individuals who prefer to make their own objects—have formed. They assemble at maker fairs, where they share and discuss their creations. Consumers can also download or purchase designs on the Internet and manufacture items at home. Although many 3D printers have price tags above $1,000, there are also some that sell for several hundred dollars less, putting them solidly in the reach of most consumers. In the arts and crafts arena, there are several sub-$100, pen-based 3D printers. We estimate that, within 10 years, 60 million households could own a 3D printer, constituting a $39 billion market.

Publicly traded makers of 3D printers include 3D Systems—which went public in 2013 and is expected to shed some products and technologies to narrow its focus and cut costs—and Stratasys, which went public in 1994.

What to Expect

3D printers are used mostly by makers and designers today, but some envision a future where much manufacturing moves from overseas to a corner maker center or to individuals' homes. Given consumers' appetite for ever-faster shipping, it is likely that some will realize they can get the speediest delivery by just licensing and downloading the plans for an item and manufacturing it themselves at home. Researchers are even working on printing food using organic inputs, and on printing textiles, which could have huge implications for the apparel industry.

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There is much excitement about HP's upcoming Fusion 3D printer, which could energize the consumer segment of the market. HP's low-cost ink-jet technology revolutionized printing for consumers, and it could also enable 3D printers at new, lower price points for consumers. According to the *Wohlers Report,* the consumer 3D-printer market is expected to grow from $5.5 billion in 2015 to $21.2 billion in 2018, at a 31% CAGR.

13 AI PERSONAL ASSISTANTS: "MAY I HELP YOU?"

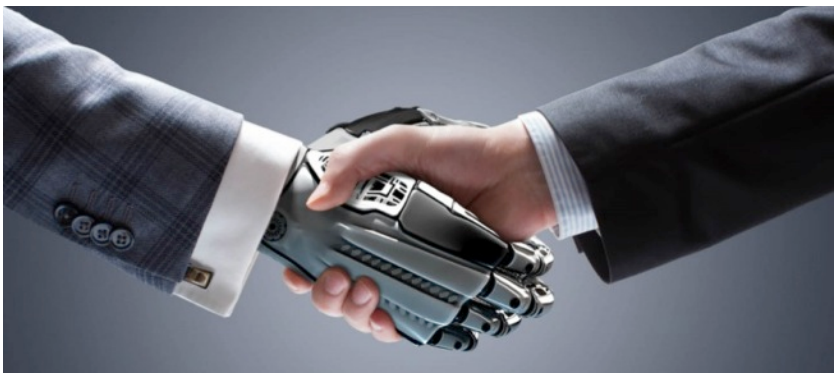
Breakthroughs in the abilities of digital personal assistants will begin to alter the way businesses interact with customers.

What It Is

AI personal assistants are basically software that has been developed to perform tasks for the user. Most of these assistants can now answer queries, schedule meetings and map travel routes. More advanced personal assistants can provide information more proactively and make suggestions. They can tell a user how much extra commuting time she might need due to inclement weather, for instance, or remind her what time her favorite TV show will air. The market for digital assistants is expected to grow at a CAGR of 30%, from $585 million in 2014 to $8.1 billion in 2024, according to Siemens.

AI personal assistants will move from being "nice to have" features on smartphones to being essential parts of every smart device.

These products are powered by two core AI technology components: language recognition software and predictive learning capability. Language recognition includes speech recognition and natural language processing, which enable the software to understand human languages and interact with a user. Predictive learning technology enables the software to proactively provide information to the user and make suggestions based on user input and data, such as frequent search queries, emails, past meetings and locations that the user commonly visits.



Why It Is a Trend

Tech giants have spent a fortune developing AI personal assistants. For example, Google paid $400 million to acquire DeepMind, a company that focuses on machine learning and systems neuroscience, while Apple spent over $50 million to acquire VocalIQ, a speech technology startup. And in 2014, investors funded AI startups to the tune of $309 million across more than 40 deals.

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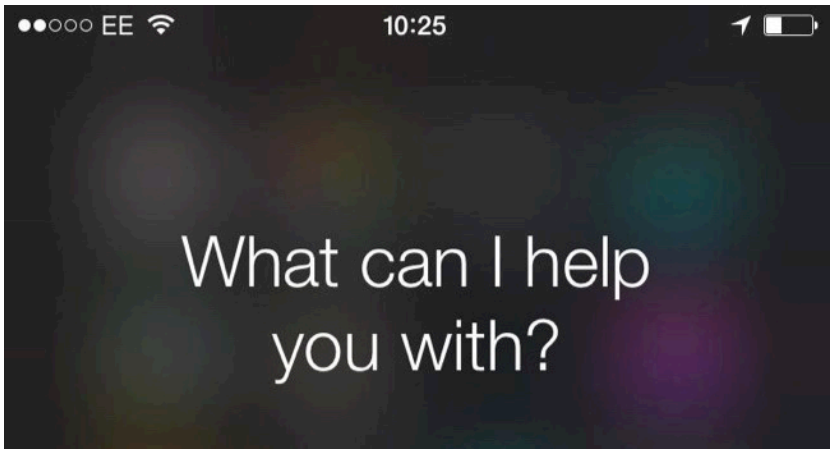
Google and Apple are not the only companies developing these products: Facebook, Microsoft and several startups have also designed AI personal assistants. Assistants already on the market or in development include:

- **Apple Siri**—Integrated into multiple devices, including the iPhone, iPad, iPod Touch, Apple Watch and Apple TV
- **Facebook M** (in trial)—Uses human intelligence to train and improve AI
- **Google Now**—Relies on predictive technology to anticipate the user's information needs
- **Hound by SoundHound** (in development)—Comprehends natural language; is capable of handling sophisticated commands
- **IBM Watson**—Uses natural language processing; integrated in the Pepper robot and in CogniToys
- **Microsoft Cortana**—Employs progressive intelligence; the system asks permission before accessing a user's information on a device, instead of automatically recording information
- **Mobvoi**—A Chinese AI personal assistant available on iOS, Android and its own smartwatch

What to Expect

Since Apple's Siri launched in 2011, the AI personal assistant market has developed rapidly and assistants' capabilities have expanded to include more advanced tasks, such as making recommendations based on predictive technology. AI personal assistants are becoming an integral part of the IoT, which offers exciting new capabilities to interconnect intelligent systems. Additional breakthroughs are likely in the next few years, and AI personal assistants will move from being "nice to have" features on smartphones to an essential part of every smart device. This would revolutionize not only how the devices are used, but also decision-making processes. It would have great implications for retail, and other sectors, too, and could ultimately change the way businesses operate, especially the way they reach and interact with customers.



14. FACIAL RECOGNITION: SECURITY AND MORE

Facial recognition technology will be used for applications that go well beyond security, including health, wellness and beauty.

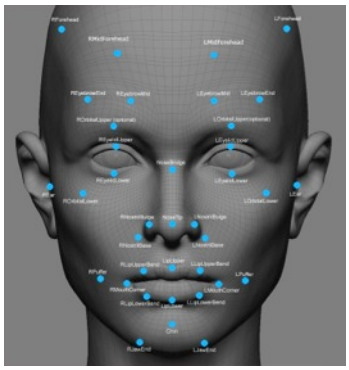
In the future, accurate and secure facial recognition technology will likely completely eliminate the need for physical keys, passwords and credit cards.

What It Is

Facial re cognition, a type of biometric identification, has many applications, including confirming an individual's identity. One branch of the technology, facial mapping, has particularly broad potential in the beauty industry. Advances in computing speed and image-processing hardware and software have made facial recognition technology more widely available for both commercial and consumer use.

Why It Is a Trend

Casinos pioneered the development and use of facial recognition technology in order to identify criminals and trespassers, as well as to monitor ongoing table games and help identify card counters. The same technology has been available to retailers for identifying shoplifters and/or significant customers. Consumers, however, are not especially comfortable with the technology's use in retail.



- In 2015, Walmart tested a facial recognition system developed by FaceFirst to identify shoplifters, but the company has not deployed the technology further due to privacy concerns.
- According to a study by software firm CSC, 74% of stores use some type of technology to track customers and 30% of retailers use facial recognition technology to track customers in stores.
- The global facial recognition technology market will grow from $2.8 billion in 2015 to $6.2 billion in 2022, at a 17.4% CAGR, according to MarketsandMarkets, a market research firm. Based on these figures, the market should be worth about $3.3 billion this year.

In the consumer sphere, Intel introduced its RealSense 3D camera module at CES 2015. The module enables the recognition of faces and hand gestures, and allows for background removal, depth sensing, 3D scanning and other functions. At the show, Intel's CEO participated in a live demo in which the camera recognized a face, which allowed a door to be unlocked. The camera was also demonstrated in consumer PCs in a module that authenticates the user and eliminates the user's need to remember passwords.

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Facial recognition technology is also being used to identify human emotions. Researchers and companies such as Affectiva have developed software that can detect a person's reactions to various stimuli. Such data can be used to determine consumers' reactions to products and audiences' reactions to entertainment and other events.

What to Expect

Facial recognition technology has moved beyond the commercial sphere into the consumer arena, and we expect its uses to multiply. In the future, accurate and secure facial recognition technology will likely completely eliminate the need for physical keys, passwords and credit cards.

In addition, the technology has a large number of potential applications in health, wellness and beauty, from helping to diagnose certain ailments to determining the optimal shade, thickness and application of makeup. A presentation at CES 2016 noted that facial recognition might even be used to help patients with Alzheimer's disease identify relatives and visitors.

15 VOICE RECOGNITION: MOVE OVER, SIRI

The success of Apple's Siri and the growing accuracy of voice recognition software will pave the way for wider consumer and commercial use of the technology.

What It Is

Voice and speech recognition technology will eventually be used for everything from simple dictation to the automatic transcription of conference calls to complete voice control of all household appliances.

The idea of voice recognition technology existed even before talking computers were featured regularly in science fiction movies. Although speech recognition (dictation) software has been around for more than a decade, it never reached the mainstream, likely because it is not very accurate. With recent improvements in translation software and the advent of Apple's Siri and other voice-controlled digital assistants, however, a universal translator is moving from the realm of science fiction to reality. As computers' ability to recognize human speech has improved, using a person's unique voiceprint as a form of biometric identification is now a distinct possibility.

Why It Is a Trend

Apple's launch of its Siri digital assistant spurred other technology companies to offer their own voice-controlled digital assistants; these include Google Now, Microsoft Cortana, Facebook M, Hound by SoundHound and the Chinese personal assistant Mobvoi.

There were several demonstrations of voice recognition technology at CES 2016. Luxottica's Oakley division debuted sport sunglasses that respond to voice commands and use AI to act as a virtual coach, encouraging athletes to meet their targets. The Pepper robot, produced by SoftBank of Japan, uses natural language processing and IBM's Watson AI platform to respond to voice commands and show emotion. The robot responds to Japanese language commands and has been used to sell coffee machines at Nestlé shops in Japan. At CES 2016, Pepper also responded to English commands.

Ford said at CES 2016 that its partnership with Amazon allows Ford owners to tell their cars to send a message to their Amazon Echo device, ordering it to turn on the lights in the house or unlock the front door. Similarly, consumers can tell their Amazon devices to instruct their cars to start or to turn on the heat.

Lexifone, an Israeli startup, offers a platform for the translation of regular calls, video conference calls and call center calls using best-in-class voice recognition and translation software on each end.

IBM stated at CES that the leading voice recognition technology had a 5% error rate. Google had recently stated this figure as 8%, down from 23% in 2013. Despite such substantial progress, the recognition levels still trail the 4% error rate for humans. According to market intelligence firm Tractica, the speech and voice recognition market is expected to grow from $249 million in 2015 to $5.1 billion in 2024, at a 40% CAGR.

What to Expect

Voice and speech recognition technology will eventually be used for everything from simple dictation to the automatic transcription of conference calls to complete voice control of all household appliances. The technology could be used in multiple ways that benefit society; for example, it could enable the disabled and elderly to perform household tasks and operate appliances and devices.

Translation software is an area that still needs improvement. The difficulty of understanding the nuances present in every language makes developing superior translation software extremely challenging. Still, technologies such as natural language processing offer the potential for huge improvement.

16 O2O IN CHINA: SINGLES' DAY CHANGES THE GAME

Buoyed by China's Singles' Day 2015 sales, which surpassed the *combined* sales for Black Friday and Cyber Monday in the US, domestic and international brands will expand within or enter the Chinese market via online platforms such as Alibaba's Tmall and Tencent's WeChat.

What It Is

More than 6,000 brands are now selling in China through Tmall, without having set up operations in the country.

Singles' Day, China's version of Black Friday, falls on November 11 and has become one of the leading days for retail sales in the world. The name derives from the 1s in the month and day, representing singles. It was launched by Alibaba in 2009, when the company began offering special "11/11" deals through a heavy marketing push to young, single people. Despite the slowdown in China's economic growth, Singles' Day sales in

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2015 soared, to $14.3 billion, breaking the record of $9.3 billion set in 2014. The 2015 sales figure even exceeded the combined Black Friday and Cyber Monday sales in the US in 2015.

Why It Is a Trend

These record-breaking sales figures for Singles' Day 2015 suggest a new trend for e-commerce in China: while many established firms and startups are exploring the online-to-offline model, other brands are working the offline-to-online angle, using Alibaba's marketplace. More than 30,000 brands are now available on Alibaba's marketplace, including 16,000 international brands. About 5,500 international brands offered promotions during the Singles' Day shopping event, and about 33% of shoppers made a purchase from one of those brands, helping to drive up the total sales figure.

Apart from the brands that have had a presence in China for some time, such as Nike, many new brands are selling through Tmall Global, Alibaba's cross-border e-commerce marketplace. More than 6,000 brands are now selling in China through Tmall, without having set up operations in the country.

What to Expect

The success of Singles' Day has made many brands more confident in adopting the offline-to-online model, and both domestic and international brands will take further advantage of online platforms such as Alibaba's Tmall and Tencent's WeChat in 2016. That does not mean brands will completely change how they operate—they will maintain their physical stores in major cities—but they will build on the success of these online platforms in order to capture sales. Selling via the online malls could also help some retailers expand their catchment area to lower-tier cities, where consumers' purchasing power is increasing but sales volumes are not yet strong enough to support a retail outlet.

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About Global Retail & Technology, Fung Business Intelligence Centre

We are Fung Business Intelligence Centre's (FBIC) New York-based Global Retail & Technology Team. Since its establishment in 2000, FBIC has served as the knowledge bank and think tank for the Fung Group. We identify and follow emerging global retail and technology trends. Our specialty is to provide comprehensive insights and analysis by observing and studying these trends as they intersect at the retail interface worldwide. Our goal is to stay at the forefront of the retail revolution brought upon by the newest technology and be the leader in the collaborative knowledge communities.

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