



**2020**

KIOSK MARKETPLACE

# **CENSUS REPORT**

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**KIOSK**  
marketplace

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# EXECUTIVE SUMMARY

## Executive Summary

The good news continues. Self-serve kiosk sales posted their third consecutive year of double-digit growth in 2019, riding the expanding consumer acceptance of self-service technology and continuous technology improvements.

Self-serve kiosk sales rose 17.9% in 2019, closely matching the growth rates of the previous two years since the Kiosk Marketplace Census launched in 2017. The sales of interactive kiosks – not counting ATMs and refreshment and amusement vending machines – totaled an estimated \$11.9 billion in 2019. The estimated total is based on research provided by BCC Research in combination with input from Kiosk Marketplace readers.

The growth in 2019 was driven by most of the same factors as the prior two years – rising mobile commerce and improved Internet of Things technology – as well as historically low unemployment, a factor also cited in last year's report.

## The survey's mission

The Kiosk Marketplace Census provides statistics on the self-service kiosk industry's size, operating metrics and outlook. Kiosk Marketplace organized the census in 2017 to meet requests from readers looking for reliable data on the industry's size and growth. The inaugural census report was published in 2018.

The census holds the distinction of offering statistical information provided by both user organizations and suppliers of self-serve kiosks. Where other kiosk market studies are based mostly on supplier provided information, much of the information in the Kiosk Marketplace Census is user provided.

Most of the statistics contained in this report are based on online questionnaires filled out by Kiosk Marketplace readers in November and December of 2019. Readers were asked to provide information about their number of installations, plans for future deployments, revenue, business mix, investment in research and development, operating costs, kiosk content strategy, return on investment, sales methodology, outlook on technology, level of optimism and perceived challenges.

The charts and much of the commentary are based on more than 150 completed questionnaires. Some of the commentary is also based on more than 30 phone interviews with Kiosk Marketplace readers.



**Elliot Maras,**  
*editor,*  
*KioskMarketplace.com*

## What the report measures

The report measures the growth of free-standing self-service devices and does not include ATMs or refreshment and amusement vending machines.

While interactive kiosks use some of the same components and technologies as ATMs and vending machines, the latter two equipment types are operated by companies using business models specific to those two industries. Kiosk Marketplace considers the ATM, refreshment vending and amusement vending industries as distinct from the interactive kiosk industry.

The report is divided into five reader segments: user organizations that host kiosks (retailers, consumer brands, government, restaurant, gaming and travel), kiosk hardware manufacturers, kiosk software manufacturers, value added resellers and hardware component manufacturers.

## Market growth factors


Economic conditions in 2019 encouraged businesses to invest in technology at the same aggressive pace as the prior two years.

1. **Economic growth.** One factor was a vibrant U.S. economy. Real gross domestic product grew 2.3% in 2019 over the prior year, according the Bureau of Economic Analysis. While this was less than 2018's 2.9% increase, it was nonetheless a growth year.
2. **Strong consumer confidence.** Positive consumer confidence also played a role in 2019, encouraging companies to make long-term investments. U.S. consumer confidence remained high in the fourth quarter of 2019, according to the U.S. Conference Board. The board's index of consumer confidence hit an 18-year high of 137.9 in October 2018 and it has remained close to that mark since then.
3. **Strong retail sales.** Strong retail sales encouraged retailers, the largest kiosk user sector, to invest in technology. Retail sales grew 5.8% in 2019, surpassing the average annual growth rate of the past three decades, according to Market Watch.
4. **Low unemployment.** The historically low U.S. unemployment – unemployment gradually dipped from 4% in January of 2019 to 3.5% in November and December, according to the Bureau of Labor Statistics – supports the need for self-service, as low unemployment drives up labor costs and makes self-service a more economical option to human labor.

## Areas of uncertainty

Kiosk Marketplace readers did experience some uncertainties about the business environment in 2019.

Trade tariffs emerged in 2019, threatening to undermine the economy and boost manufacturing costs, but the tariffs did not cause significant concern among kiosk decision makers. Tariffs



did raise the cost of steel imported from China, but competition among kiosk manufacturers prevented significant price increases.

Some industry observers also felt the 2020 presidential election created some uncertainty about the economy and delayed some investment decisions.

### **Cash acceptance becomes an issue**

While consumers continue to pay for more purchases without cash, kiosk manufacturers fielded more requests for cash payment equipment in 2019 caused by a backlash from consumers who don't have credit cards, debit cards or mobile payment accounts. The backlash is causing retailers nationwide to rethink their business models.

State and local governments, including New Jersey, New York City, Philadelphia and San Francisco, passed laws prohibiting stores and restaurants from not accepting cash.

Adding cash acceptance makes ROI significantly more challenging for payment equipment, kiosk manufacturers point out. At the same time, offering both cash and cashless payment has been demonstrated to optimize sales for self-service devices.

One study published in 2019 by USA Technologies, a cashless technology provider, in partnership with Michigan State University, demonstrated the benefits of offering cashless in combination with cash acceptance in vending machines.

The study measured performance in 250,000 machines over an 18-month period following cashless deployment in machines that previously only accepted cash and found total transactions increased by 26%. One of the most significant findings was that the cashless sales did not cannibalize the cash sales; cash sales increased by 13%.


### **Retail technology drives growth**

The most significant factor impacting the self-serve kiosk industry's growth in 2019 was the role new technology is playing at retail. Retailers comprise the majority of self-service kiosk user organizations, as indicated in chart 2. In the past few years, retailers have invested in technology to give customers more ways to shop, both online and offline. Interactive kiosks have emerged as important touchpoints retailers are using to make shopping easier and more engaging.

Retailers have recognized kiosks as an efficient and effective self-service opportunity, one that not only boosts customer convenience, but customer loyalty.

### **Self-checkout and BOPIS on the rise**

In 2019, self-checkout and buy-online-pick-up-in-store (BOPIS) technologies became more prominent at retail industry trade shows, building on the previous two years. As mobile commerce



expands, so does the need for shopping and order fulfillment options such as endless aisle kiosks and BOPIS lockers.

Self-checkout technology is not new, but artificial intelligence, in tandem with the consumer's embrace of mobile order and pay, has enabled new self-checkout business models.

Amazon, the e-commerce giant, pioneered AI-powered self-checkout technology with its Amazon Go convenience stores in 2016. Since then, a slew of competitors have developed other self-checkout business models, some of which use payment kiosks.

Citi Field, for example, the home of the New York Mets, introduced an AI-powered self-checkout concessions kiosk called the Walk Thru Bru that allows customers to place their purchases on a kiosk that scans multiple items simultaneously and charges the customer's credit card.

### **E-commerce drives change**

Retailers have recognized they need both an e-commerce and physical presence to meet the needs of today's consumers. While e-commerce sales have grown at the expense of traditional retail (eMarketer pegged global e-commerce sales rose 20.1% in 2019 versus 4.5% for total retail sales), e-commerce sales are higher for retailers that also have a physical presence, according to Forrester Research.

Interactive kiosks can provide an “endless aisle,” allowing customers to browse a store's inventory beyond what is available just in that store. A BOPIS pickup locker, meanwhile, allows the customer to retrieve an order placed online at their convenience.

### **Retailers invest in self-service**

While many retailers have reduced their physical footprints in recent years in response to rising e-commerce, many have invested in technologies such as artificial intelligence, virtual reality, augmented reality, mixed reality, facial recognition and voice recognition – using interactive kiosks – to improve customer shopping experiences.

The beauty industry in particular has embraced several of these new technologies to personalize the customer buying experience.

Sally Beauty, for example, has installed its ColorView kiosk powered by Perfect Corp.'s AI and augmented reality technology which allows customers to experiment with hair color and makeup via virtual try-ons in 500 store locations. The technology aggregates hair color and makeup product recommendations across a variety of Sally Beauty's extensive brand offerings.

In response to these opportunities, kiosk manufacturers are incorporating customer experience technologies like AI, IoT, voice recognition and facial recognition.





## Artificial intelligence gains

AI, which gives companies access to more data and allows them to utilize it for many tasks and to better understand customers, gained some ground among kiosk user organizations in 2019. Last year's report noted that AI – which experts believe will allow organizations to make use of the increasing amounts of data that the Internet has made available – had not taken hold.

In 2019, kiosk user organizations ranked AI as the seventh most promising technology in 2019 (chart 13), compared to 14th most promising technology the prior year.

Kiosk hardware and software manufacturers ranked AI higher than user groups did in both years.

## Facial and voice recognition

AI is also driving the development of customer experience technologies used in self-serve kiosks such as facial and voice recognition.

Facial recognition cameras on kiosks powered by AI can identify more human features, assess more consumer needs and access a greater variety of products to recommend.

The development of 3D cameras is also expected to drive facial recognition technology adoption, particularly in the payments, transportation and healthcare sectors. 3D facial recognition cameras can identify customers automatically, according to Mordor Intelligence.

On the voice technology front, Mastercard teamed with Zivelo LLC (now owned by Verifone) in 2019 to enhance the drive-through ordering experience for QSRs using a voice ordering assistant. Sonic Drive In piloted the technology at select locations.

Sonic Drive In customers order from an AI-powered voice-ordering assistant which integrates with a menu display. The display can be customized for a specific customer or for external factors such as weather, time of day, seasonality or location.

## Connectivity advances

As self-serve kiosks expand and include more personalization technologies such as virtual reality, augmented reality, video streaming and social media, reliable connectivity has become a critical tool for brands and retailers. Connectivity management platforms have emerged to manage SIM activations and information transfer.

Cellular carriers, meanwhile, have introduced Fourth Generation Long Term Evolution, better known as 4G LTE, which can download larger amounts of data in seconds.

5G, meanwhile, promises even faster speeds. One of 5G's most important distinctions is that it enables other technologies, such as IoT, video streaming, augmented reality and immersive gaming — areas that can improve the retail customer experience.



Mobile carriers began introducing 5G compatible phones in the U.S. in 2019.

### **Payment technology improves**

For transactional kiosks, hardware manufacturers now provide up-to-date EMV compatible payment equipment which reduces fraudulent transactions and improves consumer confidence.

In late 2019, the major credit card payment networks introduced the EMV Secure Remote Commerce protocol to simplify online checkout and secure the user's personal information. The technology allows the consumer to check out on a payment device by clicking a button designated by an SRC icon when paying with a credit card.

Bass Pro Shops, Cinemark Theatres, Jo-Ann Fabric and Craft, Movember, Papa John's, Rakuten, Saks Fifth Avenue, SHOP.com and Tickets.com introduced the SRC buttons in 2019, with more planned in 2020.

### **Digital signage improves**

Digital signage technology is also improving, enabling personalized content, where the content of an ad is matched to the active audience, condition or mindset. Thanks to the explosion of data sources, plus advancements in the software and hardware systems for processing data, marketers are now better equipped to deliver the right message, to the right audience at the right moment via the best channels.

### **Verticals on the move**

Following is a summary of some of the kiosk user verticals that gained prominence in 2019.

#### ***Restaurants***

Limited service restaurants have taken a leading role in popularizing self-service as several national chains have introduced order-and-pay kiosks, including McDonald's, Taco Bell, Panera Bread, Subway, Wendy's and Johnny Rockets.

According to a 2019 consumer survey sponsored by Tillster, a restaurant kiosk provider, more than 65% of customers said they would be more willing to visit a restaurant if self-service kiosks were offered. The survey also found that if the cashier line reaches four people, customers prefer to order from kiosks instead. In addition, even if line lengths are equal, 30% of customers will opt for the kiosk.

Kiosks also automatically upsell by allowing brands to better showcase order options and cross-sell opportunities. Kiosks were seen to increase check size by up to 30%.





Customers who would prefer to order from a self-service kiosk rather than a cashier, if line lengths were equal:

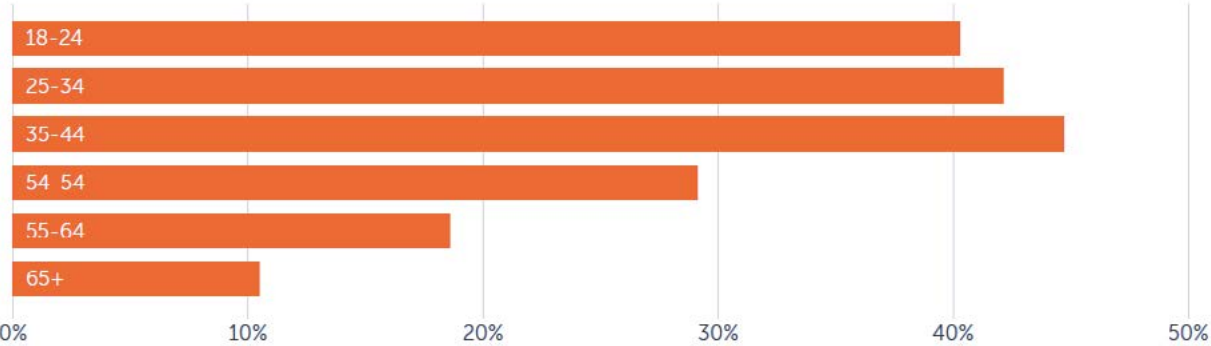


Chart courtesy of Tillster

**Transportation**

Airports, which have played a major role in educating the public about self-serve kiosks, are pioneering facial recognition and fingerprint scanning to identify passengers.

The U.S. Transportation Security Administration in the U.S. has used a four-finger scan as part of the database check that enables unattended verification of enrolled and approved travelers.

Clear, a technology company the U.S. government authorized to provide biometric identity screening at airports, allows travelers to verify their identities by pressing a touch pad or looking into an iris scanner at a kiosk. Clear members skip the regular identity screening line and go directly to the baggage screening and metal detectors for their TSA physical check.

Urban transit authorities, meanwhile, are deploying touchscreen kiosks to provide routes and directions for bus and rail passengers.

Some transit kiosks allow passengers to interact with a mapping database and explore first and last mile choices. Users can plan their itineraries right on the touchscreens and email it to themselves.

**Health care**

The digitization of health care facilities has driven investment of health care kiosks designed to streamline the customer interaction process, including check-in, payment, wayfinding, prescription ordering and remote check-ups.

Check-in kiosks can integrate with a provider’s back-end office and electronic medical record management systems, allowing patients to securely update personal information and access their medical records.



Photo courtesy of Clear

Health care kiosks have expanded to hospital and clinic waiting rooms, laboratories and pharmacies.

### **Utilities**

Utilities continue to roll out bill payment kiosks to make it easier for customers to keep current on their bills. Cash acceptance is important for many of these kiosks as the population using them uses a lot of cash.

The kiosks also provide customers 24/7 availability.

### **Smart cities**

The “smart cities” movement continues to expand in the U.S., with wayfinding kiosks popping up in big cities offering free Wi-Fi, directories, public service announcements, advertising and wayfinding.



*Picture courtesy of CityBase*

The “smart city” kiosks are only one element of broader smart city initiatives, which are designed to gain intelligence on their population needs that, in turn, allow for better planning.

The movement commonly refers to a set of initiatives to connect objects — such as kiosks, vehicles and buildings— to share data to coordinate traffic management, reduce congestion, optimize energy use and provide access to real-time information.

The term “smart city” often refers to the technologies that support infrastructure, information access, mobility, governance, energy, building, health care and citizenry.



*Image courtesy of iStock*

### ***Cannabis dispensaries***

As more states have legalized cannabis, either for medical or recreational use, the industry has expanded at a fast pace, and is projected to expand at a combined annual growth rate of 23.9% by 2025, according to Grandview Research.

Kiosks and digital signage are uniquely positioned to keep customers informed of the latest products and recipes, while also providing entertaining content at the point of sale.

Self-service kiosks can streamline transaction times, track inventory and payments, collect sales data and sell products from a climate-controlled, automated storage and dispensing system.

Enlighten, for example, a digital content provider, integrates custom-made, weekly-updated entertainment and educational content with location-curated marketing to engage customers and reduce wait time.



*Image courtesy of iStock*

### ***Photo printing***

The expansion of smartphone cameras and social media has rejuvenated the self-serve photo printing industry. Photo transfer technology now allows smartphone users to text their photos to a POS printer. Once the photos transfer to the printer, users can swipe their credit cards and pick up their prints.

The printers now have a smaller footprint since they rely on Wi-Fi and not cables.

Zebra Instant, a provider of smartphone photo printing and monetization technology, allows operators to set prices and track sales in real time through an administrative portal. Operators can also build opt-in SMS marketing lists and place their logos and messages on prints and merchandise.



*Photo courtesy of Zebra Instant*

### ***Gaming***

As more states legalize gaming, the demand for ticket-in/ticket-out dispensers, bill changers and promotional kiosks follows suit.





Sports betting in particular has expanded following the Supreme Court decision to overturn the Professional and Amateur Sports Protection Act in May 2018, allowing states other than a selected few to regulate sports betting.

Total industrywide revenue from sports betting, a form of entertainment in which people bet on the outcome of video games, grew to \$430.2 million in 2018, up from \$261.3 million in 2017, according to the American Gaming Association.



*Photo courtesy of Dave & Buster's*

Cash payment and acceptance continues to be a factor in the sports betting market.

The gaming sector pioneers much of the technology that will have application in non-gaming kiosk verticals. For example, casinos are spearheading the use of facial recognition to identify their guests faster.

### ***EV charging stations***

Electric vehicle charging stations are increasing as more consumers choose EVs for their environmental benefits, lower operating costs and requiring less maintenance than gasoline powered cars.

EV sales are projected to reach 34 million in 2025, 121.2 million in 2030, and 636.7 million by 2040 in the U.S., Europe, China and Japan, according to a November 2019 Frost & Sullivan study.

EV charging stations are projected to expand at a 14.3% combined annual growth rate from 2019 to 2025, according to MarketersMedia.



*Image courtesy of iStock*

EV manufacturers are working to educate the public about technological improvements that allow EVs to travel farther on a single charge. While the earliest models of EVs might travel 80 miles on a single charge, the newer long-range models can go for nearly 400 miles before the next charge, according to SemaConnect, a provider of EV charging stations.

Governments and electric utilities, meanwhile, are investing in the EV charging infrastructure.

### ***Micro markets***

Micro markets — which Technomic, a foodservice research firm, defines as “unattended retail stores located in a secure building or workplace that offer fresh foods, snacks and beverages for purchase via a self-checkout kiosk”— continue to expand, driven mainly by traditional vending operators.



Vending operators have been replacing traditional vending machine banks with micro markets due to improved customer satisfaction and improved operating efficiencies and profitability. The micro market allows the customer to physically hold and examine a product before making a purchase decision. The micro market also offers more product variety without the package size restrictions imposed by vending machines.



*Photo courtesy of Bernick's*

According to a recent consumer survey by Shekel Brainweigh Ltd., a retail technology provider, less than 15% of survey respondents have visited a fully autonomous micro market; but those that have visited one cited convenience, speed, selection variety and pricing as the main benefits of these locations.

The National Automatic Merchandising Association estimated 31,250 micro market kiosks were operated by the industry in 2018, the last available estimate, compared to 19,000 in 2016, according to Bachtelle and Associates, a foodservice consultancy.

### **Food trucks**

Food trucks, one of the fastest growing foodservice channels, are an evolving industry that is just beginning to explore self-order kiosks. While only a small number of food trucks have actually deployed self-order kiosks, the number is expected to increase as food trucks explore new ways to become more productive and efficient.

Many of the quick-serve and fast casual restaurant operators who have added food trucks to promote their brand are also installing self-order kiosks in their restaurants. Hence, companies that recognize the benefits self-order kiosks bring to restaurants are likely to see the same benefit applies to food trucks.



*Photo courtesy of Luv Pizzas*

The kiosk's benefit to a food truck would actually be greater given the shorter order time available compared to a restaurant.

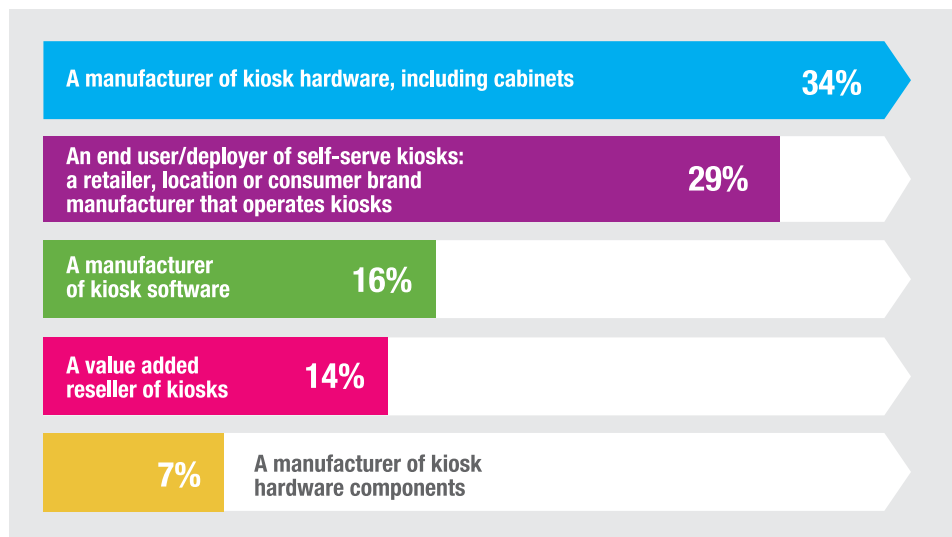
In 2019, ADUSA Inc., a kiosk software provider, introduced a self-order kiosk application to allow food trucks to realize the same benefits as restaurants, including increased order accuracy, increased sales, optimized labor and improved guest satisfaction.

There were 23,872 food truck businesses in 2019, with an annual growth rate of 6.8% for the past five years, according to IBISWorld.

# SURVEY RESULTS

Note: Not all data will equal 100% due to rounding

## 1. How do you describe your company?



## Retailers, locations and consumer brands that have kiosks

### USER ORGANIZATIONS

Retailers once again were the dominant user group represented in the survey sample base, but their dominance was less than in the previous two years as more user groups participated. This year, travel, hotel and gaming organizations participated, as shown in chart 2, along with retailers, restaurants, government organizations and consumer brand manufacturers.


Restaurants and government organizations were the second largest user organizations represented in this year's survey, following retailers, signifying those sectors' expansions into self-serve kiosks.

The increase of government organizations likely accounted for the growth of wayfinding, Wi-Fi, parking, tourist information and vehicle registration kiosks reported this year.

Many government organizations have invested in "smart city" initiatives which often support wayfinding kiosks that offer free Wi-Fi along with directories of local businesses and attractions.

Wayfinding kiosks, which were among the least common applications cited in the prior year's report, were the single most common application in 2019, as indicated in chart 3.





Restaurant order-and-pay remained the third most common application this year, along with retail order-and-pay, behind wayfinding and printing.

Photo processing, parking, phone charging, pharmacy self-serve, gift dispensing, locker pickup, tourist information and vehicle registration all made gains in 2019.

### **Deployment and maintenance costs increase**

Kiosk deployment and maintenance costs increased this year over the last two years.

Nearly one third of the respondents spent between \$5,000 and \$10,000 on deployment in 2019 (chart 4). In the previous year, more than a third (37%) spent less than \$5,000. Nearly a quarter in 2019 (22%) spent \$10,000 to \$15,000, compared to 11% the prior year.

More than a third (34%) of respondents paid more than \$5,000 annually for maintenance in 2019, compared to 15% who did the previous two years.

### **ROI takes longer**

The time required for return on investment on a kiosk grew in 2019, with only 20% saying they recovered their investment in less than one year, (chart 6), compared to 26% who did so in the prior year. Only 35% recovered their investment in one to two years, compared to nearly half (48%) who said they did so in the prior year.


### **More use third party service providers**

The use of third parties for service and maintenance took a jump in 2019, with nearly a quarter (21.9%) of respondents choosing this option compared to only 7% who chose it in the prior year (chart 7). More companies (31.71%) still chose to handle maintenance internally than using the kiosk manufacturer (26.83%) or a combination of the above (19.51%).

Cost continues to be the top reason customers choose not to install kiosks (chart 11), as was the case in both of the previous surveys. In 2019, however, more than a fifth (20.69%) cited “kiosks reduce customer interaction” as the reason against deployment, compared to only 7% who cited this the previous year.

### **Better customer service seen as top kiosk benefit**

Improving customer service was the top kiosk benefit cited in 2019 (chart 12), which marks a significant change from the prior year, when improving customer perception of the company was cited as the top benefit. This indicates user organizations are becoming more convinced of the full benefits kiosks provide.



Improving customer perception of the company was cited as the fourth most important benefit in 2019 behind improving customer service, improving customer satisfaction and allowing staff to be more productive.

Touchscreens once again was cited as the most promising technology in 2019, followed once again by remote management, integration with mobile order and data analytics (chart 13), in the same order as the prior year.

A significant change over the prior year, however, was the improved ranking of artificial intelligence, a technology that experts claim has the greatest promise to improve nearly all industries. Technology experts believe AI will allow organizations to make use of the increasing amounts of data that the Internet has made available.

Survey participants in 2019 cited AI as the ninth most promising technology, indicating a greater understanding of its potential than the prior year, when they cited it as the 16th most promising technology. Increasing AI kiosk use cases – such as those noted earlier in this report – are building awareness of the technology's potential.

### **Cash/coin acceptor failure**

Participants cited cash/coin acceptor failure as the leading cause of kiosk failure (chart 14) for the second time in the last three years, underscoring one of the main challenges facing payment kiosks. While cash has become a less frequently used form of payment in recent years, it remains the preferred method for many small value transactions.

Internet failure, the second most cited cause of kiosk failure in 2019, reflects the expansion of kiosks to less densely populated communities with less reliable connectivity.

Vandalism, the second most cited cause of Internet failure in the previous year, was the least cited cause in 2019, along with power failure.

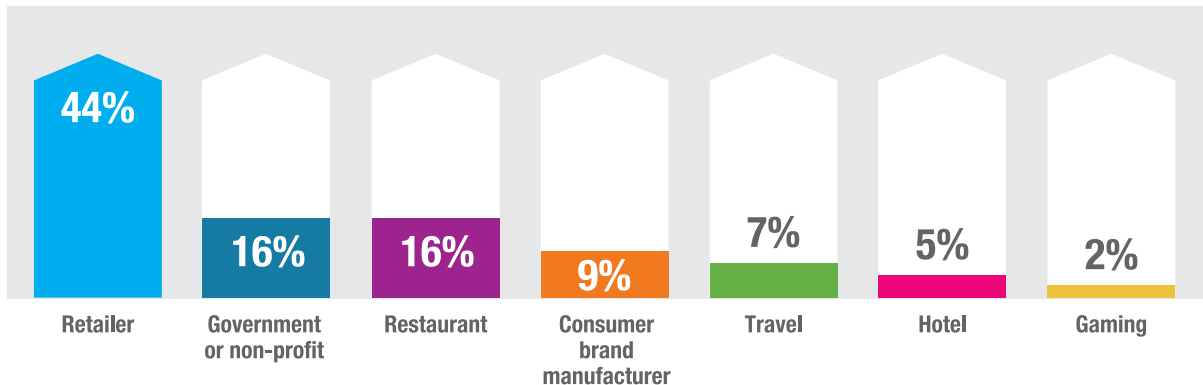
Consistent with previous years' surveys, and with the fact that most user organizations are retailers, the majority of the survey participants in 2019 used kiosks to generate revenue (chart 15). Increasing product sales was cited as the most important opportunity for kiosks, followed by attracting new customers, reducing wait times and upselling (chart 16).



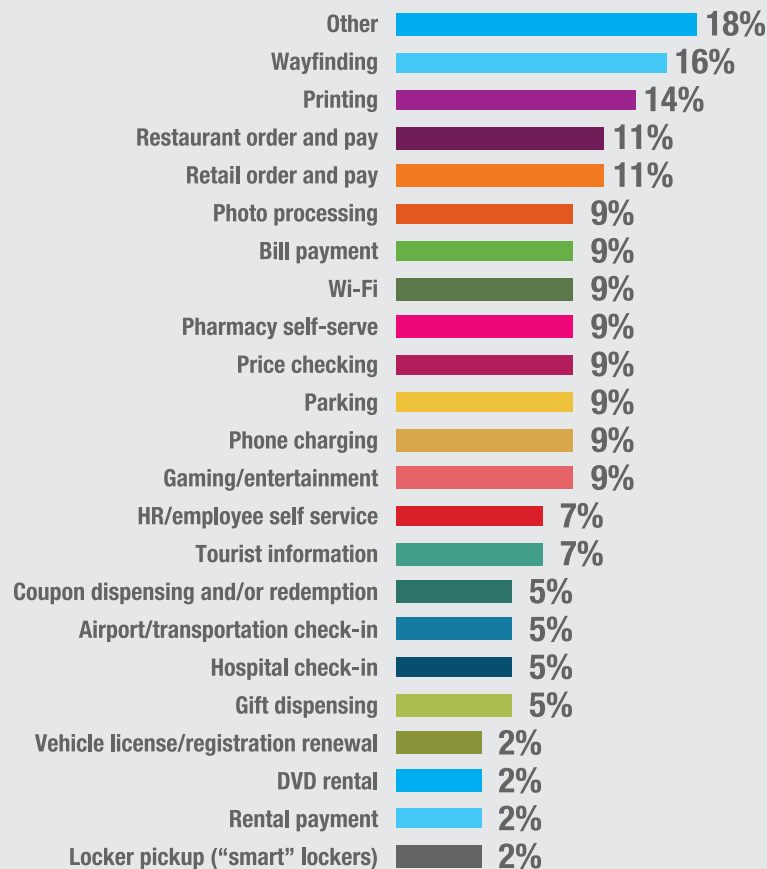
## Retailers, locations and consumer brands that have kiosks

### 2. Which best describes your organization type?

Note: Not all data will equal 100% due to rounding



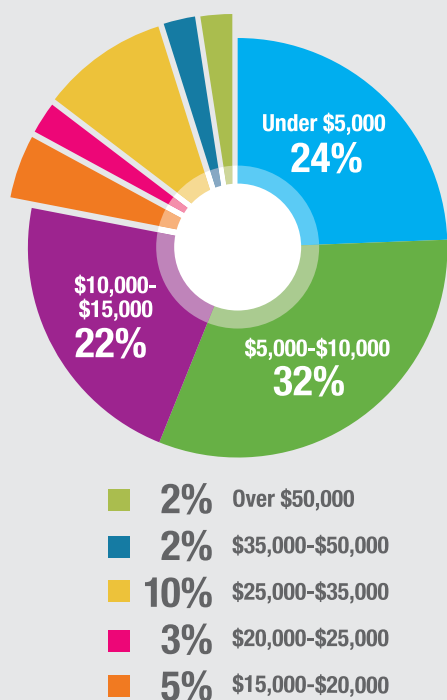
### 3. From the list below, which type of kiosks do you operate?



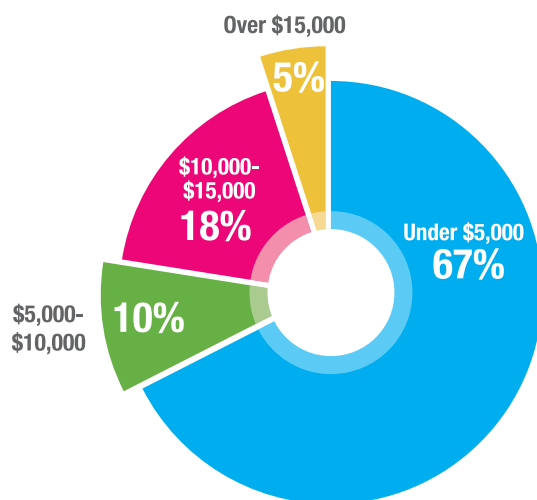
(Other includes interactive teller machines and financial services, appointment check-in, tanning beds, advertising, copy and scan for college students, parcel shipping and water dispensing.)

## Retailers, locations and consumer brands that have kiosks

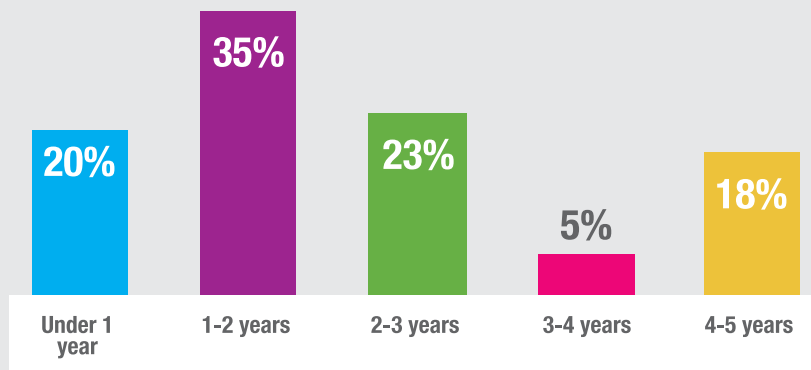
4. Average cost for deploying one of these kiosks:



5. Average yearly cost for maintaining one of these kiosks (including labor):

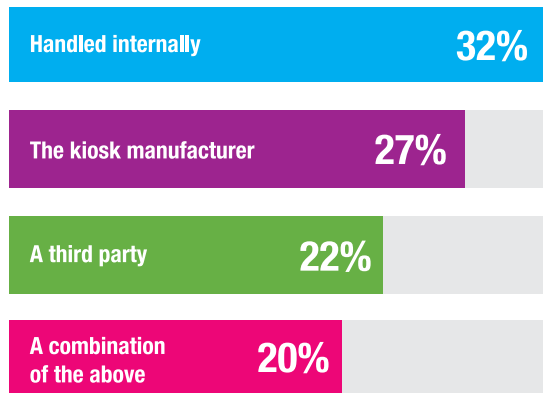


6. Average number of years for recovering the investment for one of these kiosks:

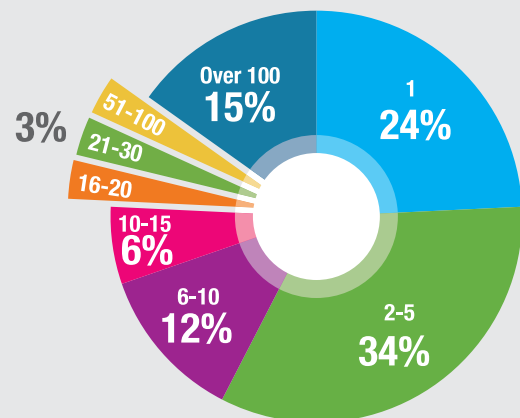


## Retailers, locations and consumer brands that have kiosks

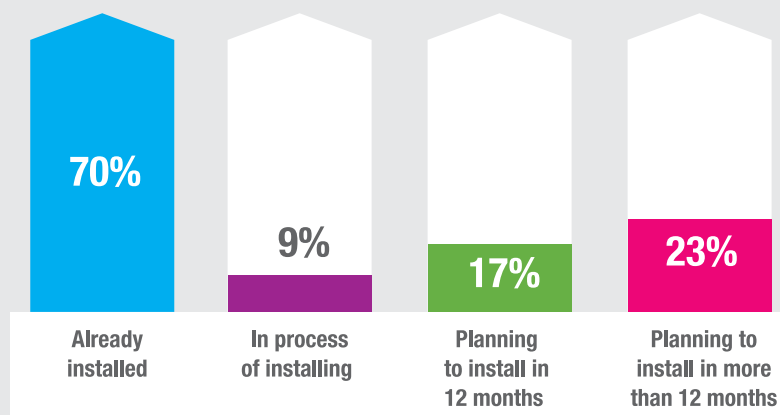
### 7. Who services and maintains the kiosks you operate?



### 8. How many of your locations operate kiosks?

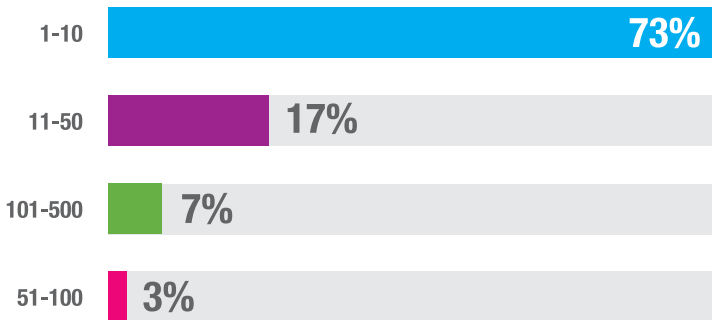


### 9. What is the status of your kiosk deployments?



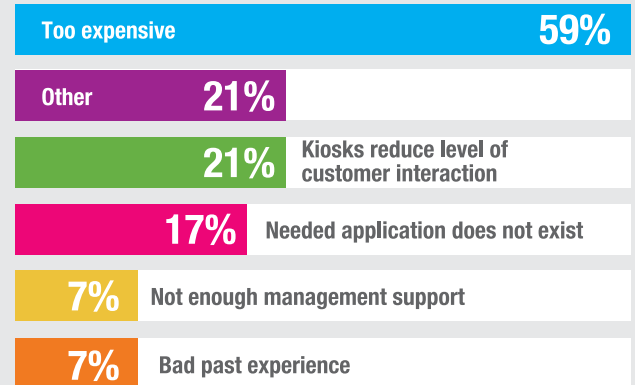
## Retailers, locations and consumer brands that have kiosks

### 10. How many kiosks will be deployed in the next 12 months?



### 11. Reasons against deployment:

*Other includes: Inventory restrictions, market saturation and need more locations.*



### 12. Top benefits from kiosks

*Participants selected on a scale from 1 (not important) to 4 (extremely important)*

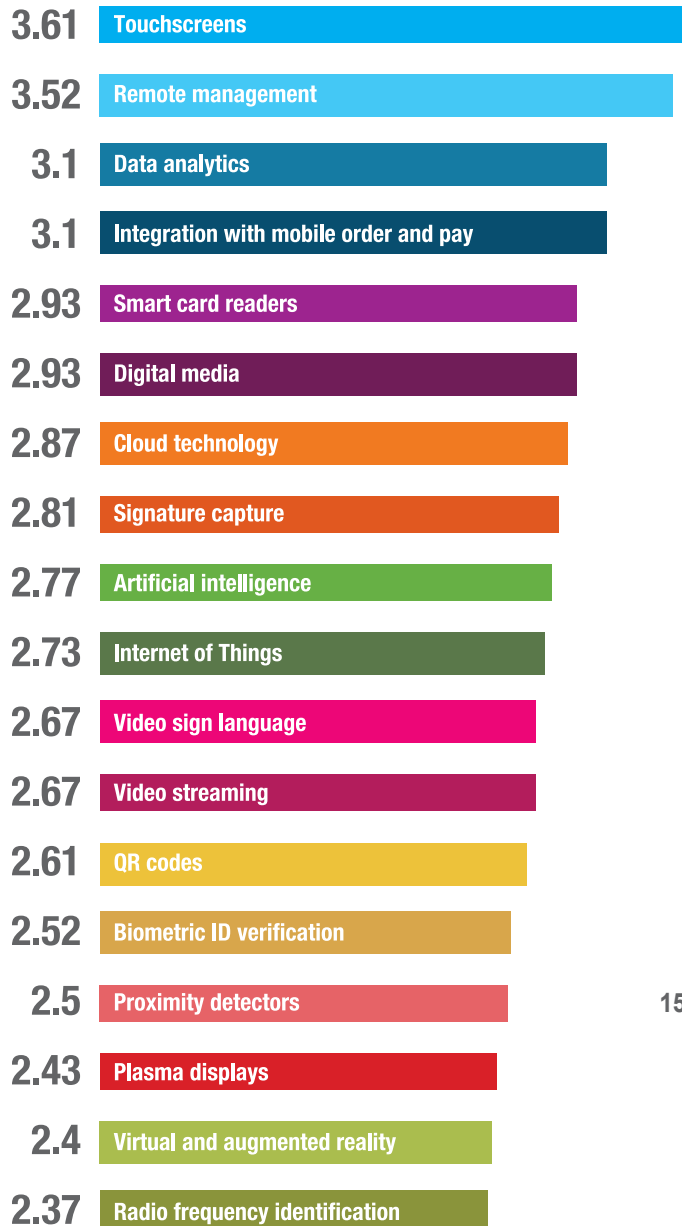




## Retailers, locations and consumer brands that have kiosks

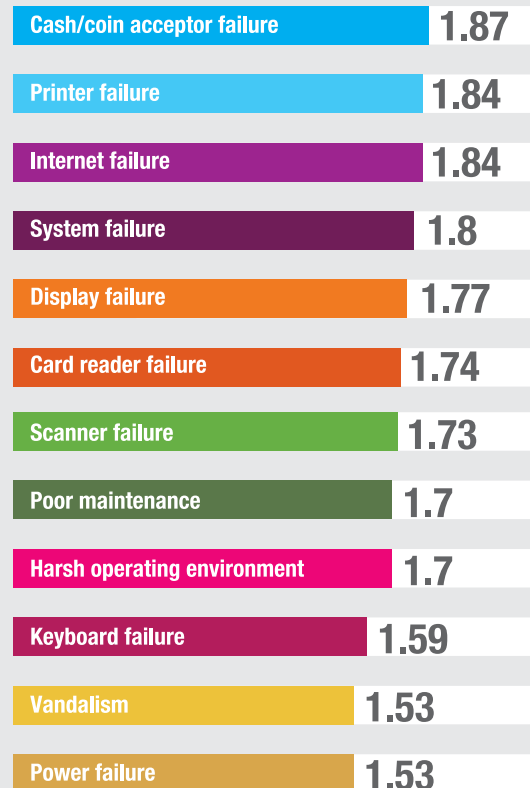
### 13. Most promising new kiosk technology:

Participants selected on a scale from 1 (not promising) to 4 (promising)



### 14. What are the main causes of kiosk failure?

Participants selected on a scale from 1 (not important) to 4 (extremely important)



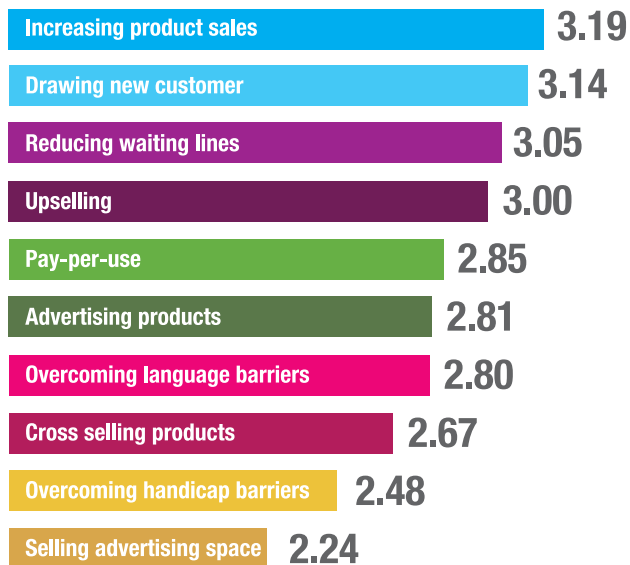
### 15. Does your company use kiosks to generate revenue?



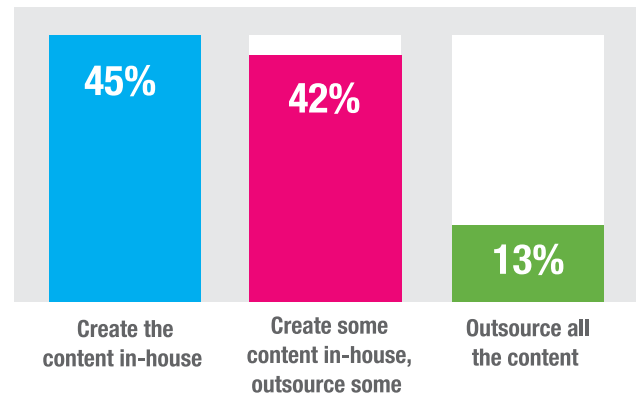
## Retailers, locations and consumer brands that have kiosks

### 16. If yes, how important are the following opportunities for your kiosks?

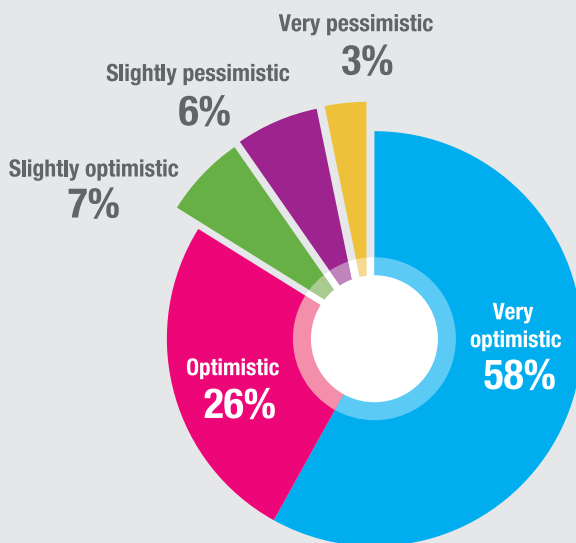
Participants selected on a scale from 1 (not important) to 4 (extremely important)



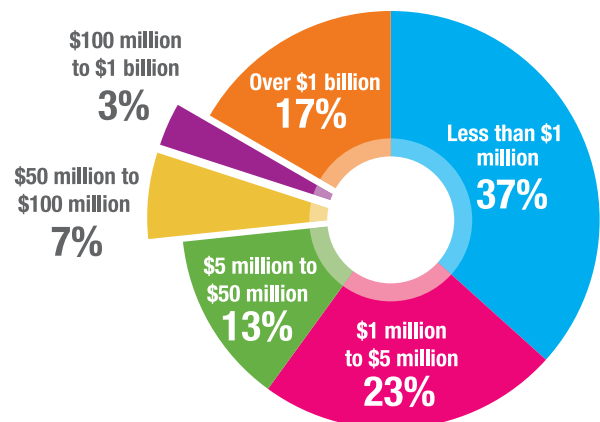
### 17. Describe your kiosk content strategy:



### 18. How optimistic are you about your company's future?



### 19. How large is your company by annual revenue?





## Kiosk hardware manufacturers

### KIOSK HARDWARE MANUFACTURERS

Wayfinding and airport/transportation applications led new installations for kiosk hardware manufacturers in 2019, followed closely by hospital check-in and phone charging (chart 20). This differed markedly from 2018 when restaurant order-and-pay led new installations.

Restaurant order-and-pay was the fourth most frequently cited new installation, followed closely by retail order-and-pay.

Auto license/registration renewal was the sixth most often cited new installation, followed by gaming/entertainment, tourism and restaurant drive-thru.

U.S. and Asia based companies were dominant among kiosk hardware manufacturer participants in this year's survey (chart 20), which impacted which regions they considered most promising for future growth (chart 21).

The direct relationship between a company's geographic base and where they see their best growth prospects (chart 22) indicates most companies do most of their business close to home. The relationship was evident in the prior year's survey when companies based in Europe and Latin America were better represented.

Hardware manufacturers continued to rely mostly on direct sales for finding customers (chart 23). In 2019, however, participants made greater use of exhibiting at trade shows, social media and media advertising than in the prior year.

The increasing use of trade show exhibition was consistent with Kiosk Marketplace's observation of a near doubling of kiosk exhibits at the National Restaurant Show and the National Retail Federation's Big Show in the past year.

For the third straight year, hardware manufacturers cited touchscreens as the most promising technology, with remote management and integration with mobile order-and-pay among the top four most promising technologies (chart 24).

This year, cloud technology made it into the top four, tying with remote management for the number two spot. Last year, hardware manufacturers ranked cloud technology seventh.

Data analytics also gained importance for hardware manufacturers in 2019, grabbing the number four spot. During the prior year, the technology shared the number six ranking with smart card readers and customer relationship management, indicating that manufacturers are starting to recognize the benefits data analytics can provide.

Data analytics allows kiosk operators to track information about users and what content and/or product information users access. The data also allows operators to measure ROI and other metrics.



## Kiosk hardware manufacturers

Artificial intelligence ranked number six in 2019, one spot behind the prior year's ranking.

Expectations for investing in research and development were slightly less aggressive in 2019, with fewer hardware manufacturers planning to invest more than \$25,000 (chart 25) compared to the prior year. More participants also planned to invest less than \$5,000 in 2019.

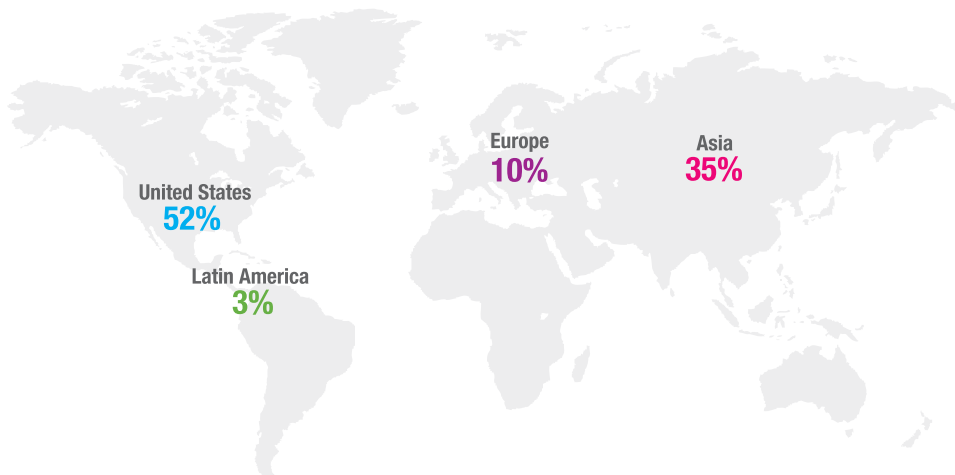
Nevertheless, hardware manufacturers expressed greater optimism about business this year compared to the prior year. An outstanding 80% said they were either optimistic or very optimistic, with the balance being slightly optimistic (chart 26). By contrast, 12% expressed some level of pessimism the previous year.

# Kiosk hardware manufacturers

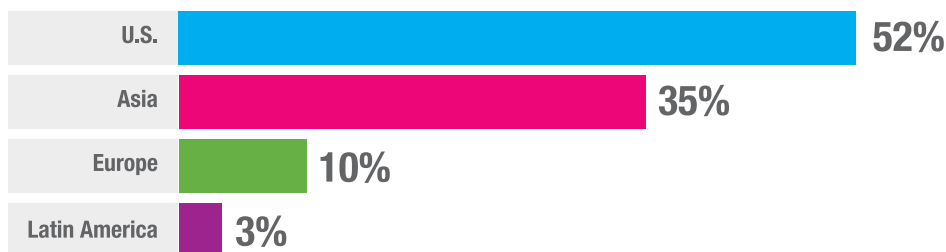
## 20. Top new kiosk installations in 2019



## 21. Where is your company based?

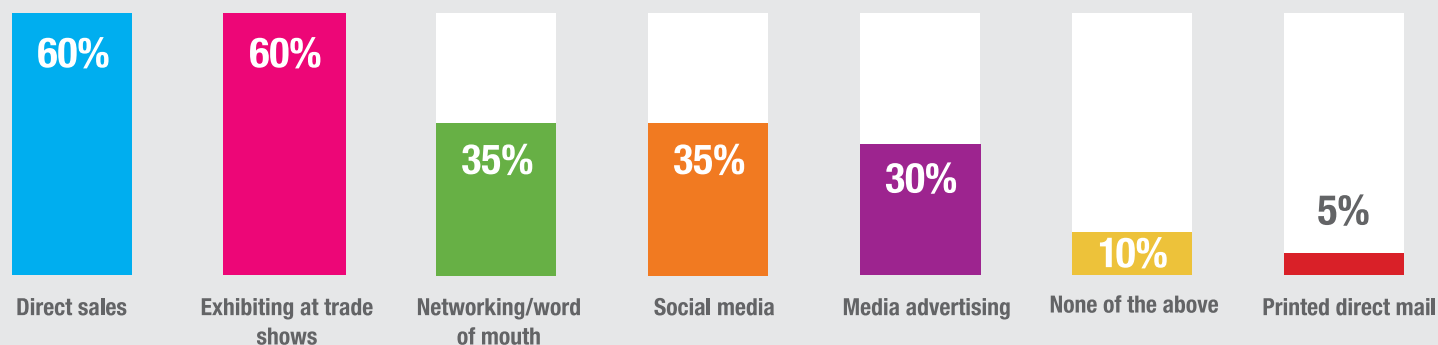


## 22. Which geographic region has the best growth prospects for kiosks in the next 5 years?



## 23. How do you find customers for your kiosks?

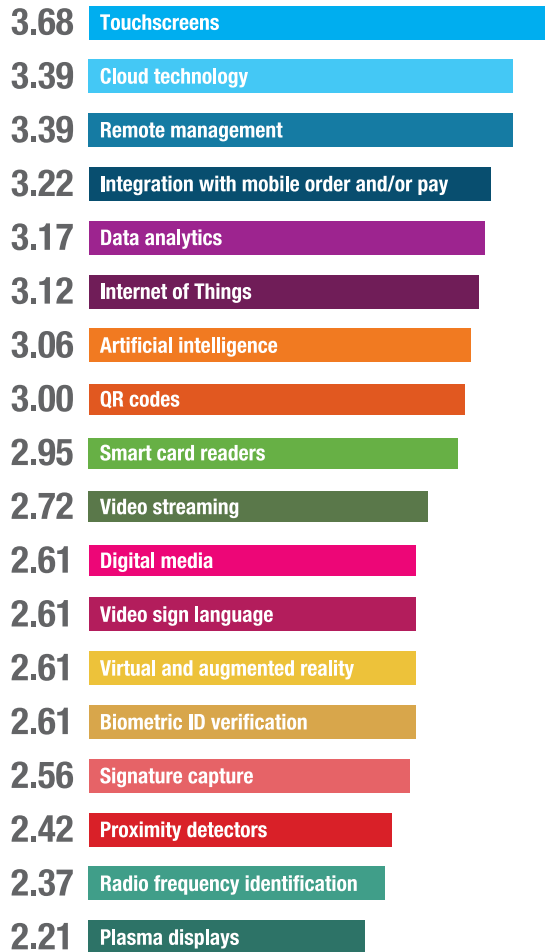
Participants selected all that applied



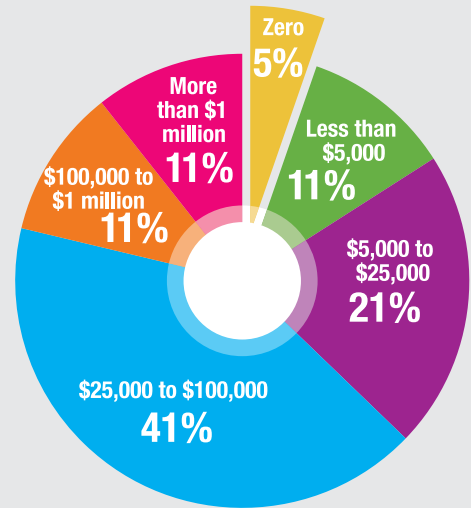
## Kiosk hardware manufacturers

### 24. Most promising new technology:

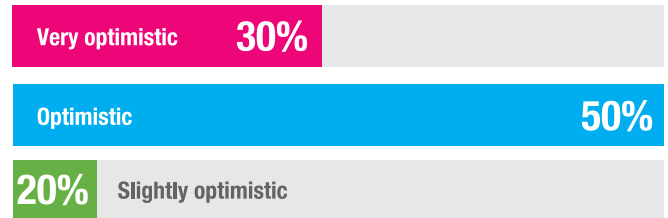
Participants selected on a scale from 1 (not important) to 4 (extremely important)



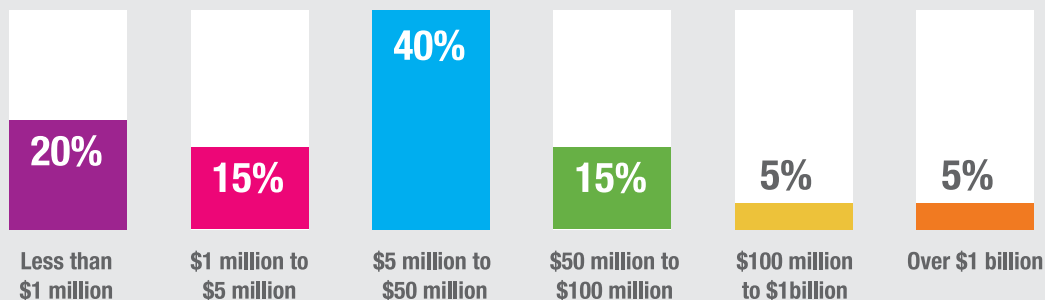
### 25. How much will your company spend on research and development in the next year?



### 26. How optimistic are you about your company's future?



### 27. How large is your company by annual revenue?







## Kiosk software manufacturers

### KIOSK SOFTWARE MANUFACTURERS

Most of the kiosk software is now being provided by technology companies that provide other types of software in addition to kiosk software (chart 28).

Dedicated kiosk software providers accounted for less than 7% of the kiosk software respondents. Their number has declined as these companies have expanded into kiosk hardware in response to kiosk hardware companies' foray into kiosk software, as noted in the prior year's report.

Bill payment upgrades were the leading software upgrades kiosk software providers made in 2019 (chart 29), likely driven by the EMV chip compatible devices to prevent fraud introduced to payment kiosks in the last year. Bill payment upgrades were the second most common upgrade in the previous year.

Pickup locker ("smart") locker upgrades, far and away the leading upgrade in the previous year, were not a significant number in 2019, despite an increase in pickup locker introductions. An explanation being that more pickup locker hardware manufacturers provided their own software in 2019.

Photo processing accounted for the second most common upgrade in 2019, along with restaurant order-and-pay.

As noted in the discussion on retail kiosk trends, the expansion of smartphone cameras and social media have rejuvenated the self-serve photo printing industry. Photo transfer technology now allows smartphone users to text their photos to a POS printer. Users can then swipe their credit cards and pick up their prints.

Restaurant order-and-pay continues to expand as limited service restaurants install self-order kiosks to serve customers faster and improve order accuracy.

Wayfinding, parking and EV charging stations were the third most common upgrades in 2019. Smart cities initiatives are driving wayfinding and parking kiosk installations, while the growing popularity of EV vehicles is creating demand for EV charging stations.

Kiosk software providers cited touchscreens and remote management as the top most promising technologies in 2019, followed by data analytics and cloud technology (chart 30), similar to the previous year's findings. Internet of Things and integration with mobile order-and-pay were also once again highly rated.

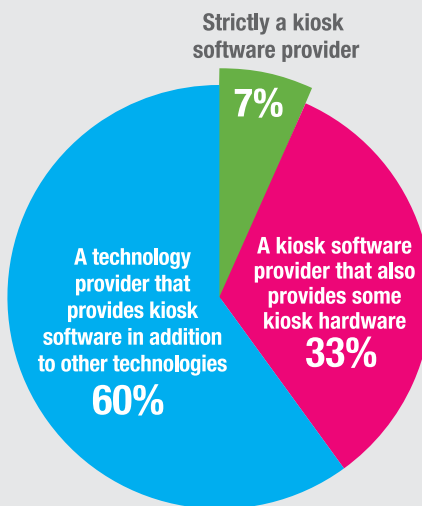
## Kiosk software manufacturers

Artificial intelligence came in fifth, one spot higher than in the previous year.

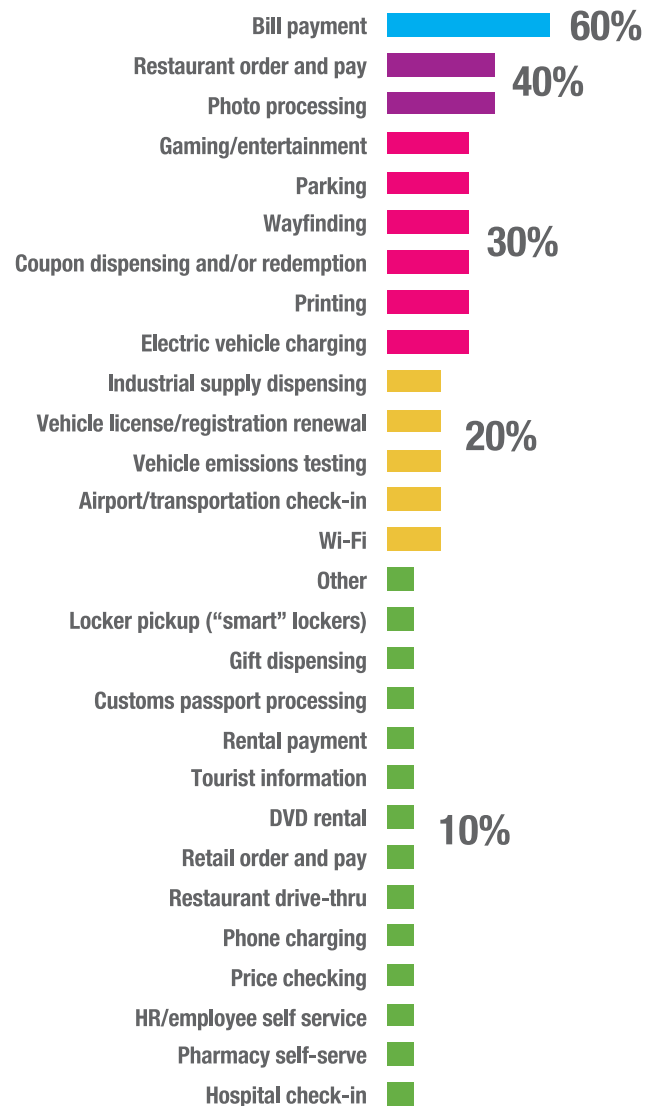
Most kiosk software manufacturers plan to spend more than \$25,000 on research and development this year (31), a comparable level as last year.

Most were either very optimistic or optimistic about the future; none were pessimistic (34).

28. What best describes your company:



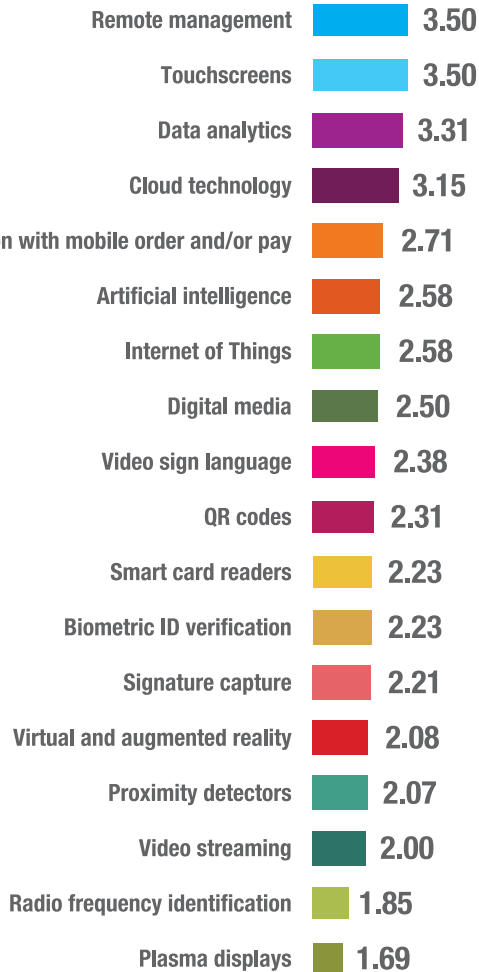
29. The kiosk verticals with the most software upgrades introduced in the last year:



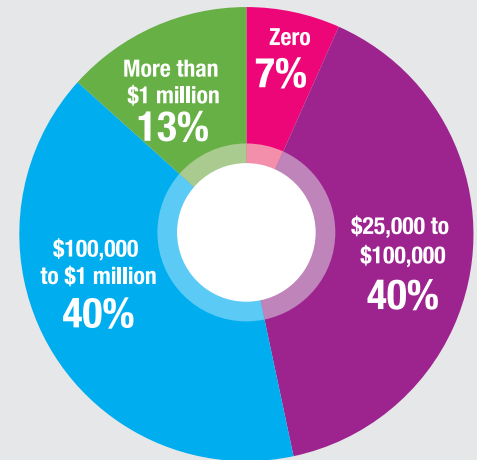
## Kiosk software manufacturers

### 30. Most promising new technology:

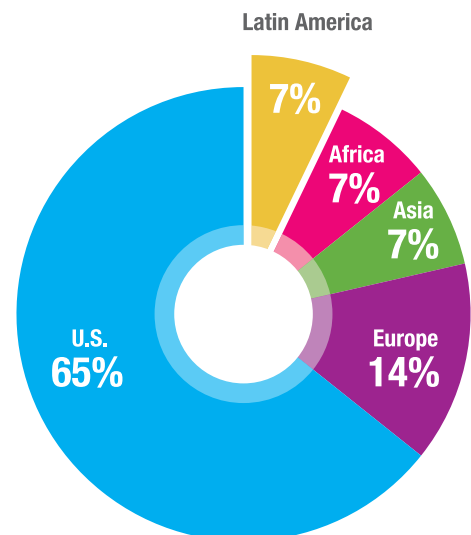
Participants selected on a scale from 1 (not important) to 4 (extremely important)



### 31. How much will your company spend on research and development in the next year?

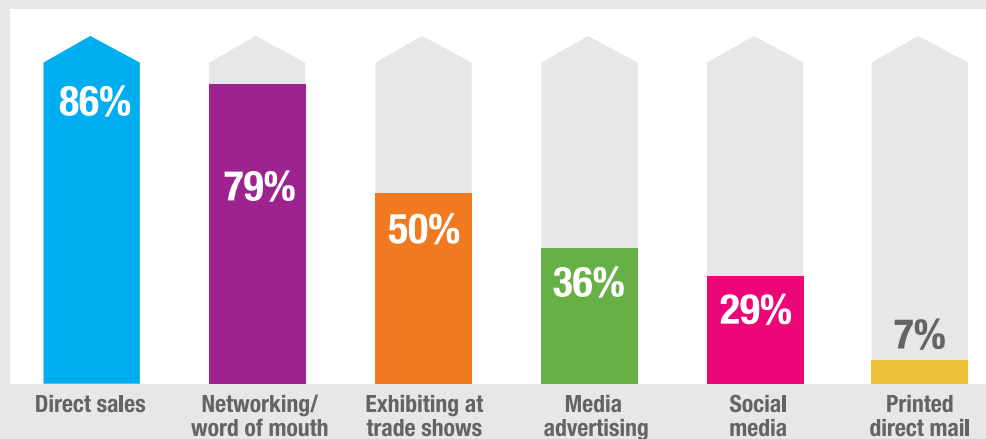


### 32. Which geographic region has the best growth prospects for kiosks in the next 5 years?

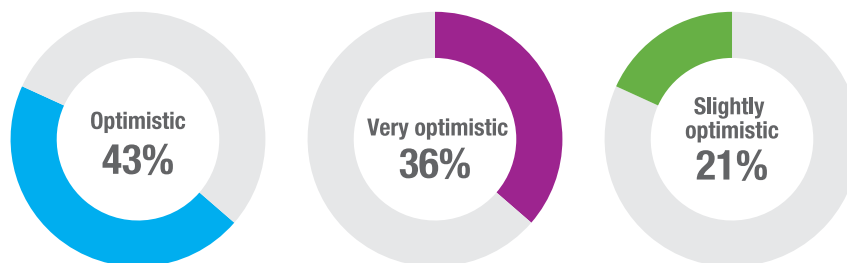


## Kiosk software manufacturers

33. How do you find customers for your software?



34. How optimistic are you about your company's future?





## Kiosk value added resellers

### KIOSK VALUE ADDED RESELLERS

Hardware reselling became the leading service for kiosk value added resellers in 2019, reflecting the increased customer demand for kiosks (chart 35). Close to 90% of the respondents cited it as a service provided, compared to 71% in the prior year.

Just as many resellers (82%) were involved in application development in 2019 as the in the prior year. The need for application development has increased due to the need to integrate more software capabilities to existing software as technologies advance.

Just as many resellers (76%) also provided service support for deployments in 2019 as in the prior year. Nearly a 60% majority also provided project management services in 2019, a continuation of prior year trends.

Less than half (47%) provided networking services in 2019, marking a slight decline from the prior year. A plausible reason being that companies specializing in networking services have provided more options for companies hosting kiosks in recent years.

Software integration issues remained the top challenge (chart 36) for value added resellers for the third straight year, although in 2019, for the first time, finding the right application emerged as equally challenging.

The rising difficulty of finding the right application reflects the increasing need for customized solutions for kiosk deployments. Kiosk hardware and software manufacturers interviewed in recent years have recognized the need for customized solutions and have allocated resources accordingly.

Once again, value added resellers cited growing consumer acceptance of kiosks as the top factor driving business growth (chart 37), followed by technological advancements. More than half the respondents also cited new and robust applications as a driving factor, while half cited growing demand from end user businesses.

Retail order-and-pay reclaimed its position as the vertical with the top growth opportunity in 2019 (chart 38), a position it had lost in the prior year to restaurant order-and-pay, bill payment and airport/transportation check-in.

The finding indicates that kiosk value added resellers witnessed the investment retailers made in 2019 in kiosks as part of their expansion in omnichannel marketing. Retailers have recognized the role kiosks play as touchpoints in the omnichannel ecosystem.

While secondary to retail-order-and-pay in 2019, restaurant order-and-pay was cited as the best growth opportunity by half the value-added resellers, which is close to the 53% that cited it as such the prior year.

## Kiosk value added resellers

Half the respondents also cited pickup lockers as the best growth opportunity in 2019, significantly more than the 29% that cited it as such the prior year.

Close to a third of the respondents (31.25%) cited electric vehicle charging stations as the top growth opportunity, a marked increase over the 6% citing it as such the prior year.

Coupon dispensing and/or redemption also posted a significant gain in 2019, as more than twice as many (31.25%) than last year (12%) saw it as the top growth opportunity.

### 35. Services provided:



### 36. What are the top challenges in deploying kiosks?

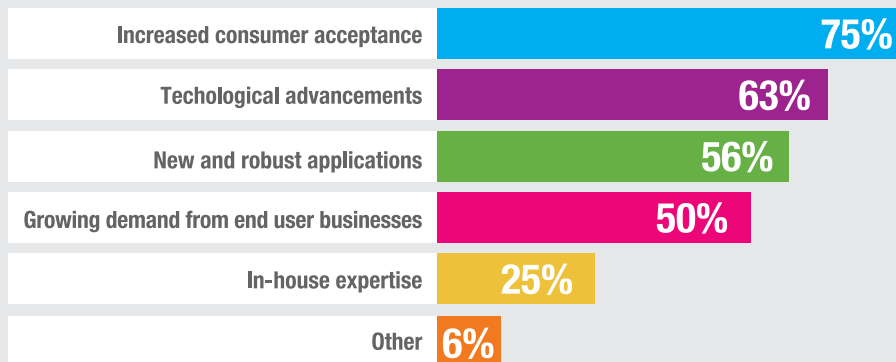
Participants selected on a scale from 1 (not important) to 4 (extremely important)



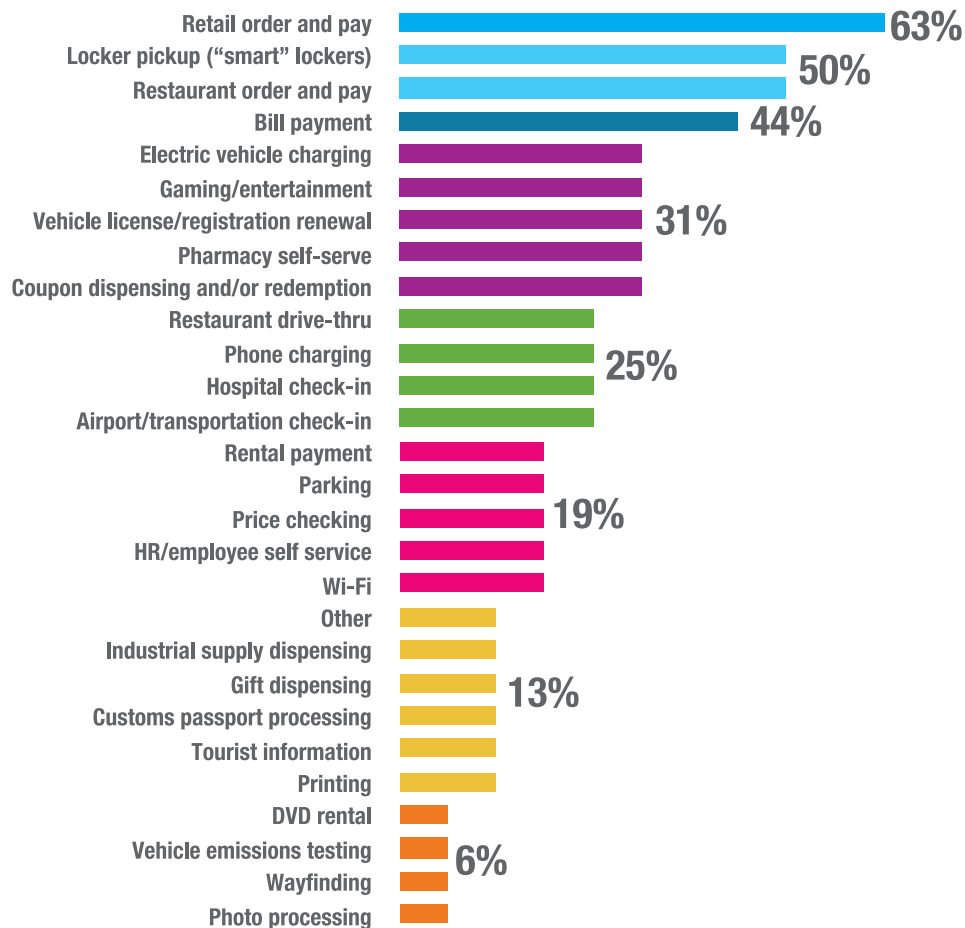


## Kiosk value added resellers

37. What factors are fueling the growth in kiosks for your business? *Participants selected all that applied*

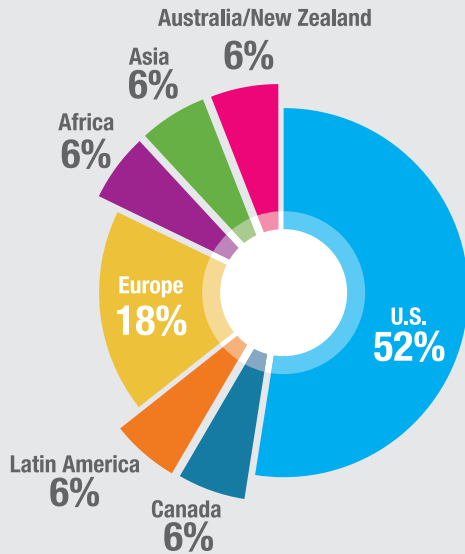


38. Verticals with the best growth opportunities: *Participants selected all that applied*

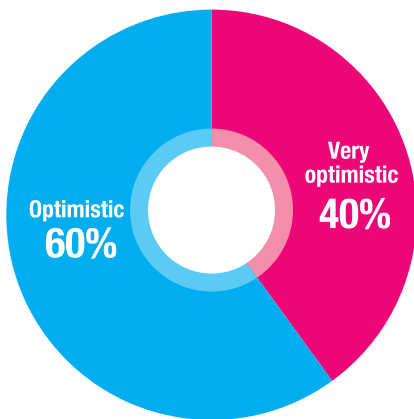


## Kiosk value added resellers

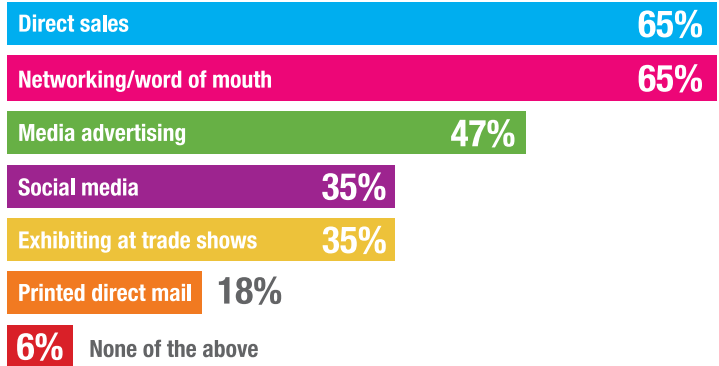
39. Which geographic region has the best growth prospects for kiosks in the next 5 years?



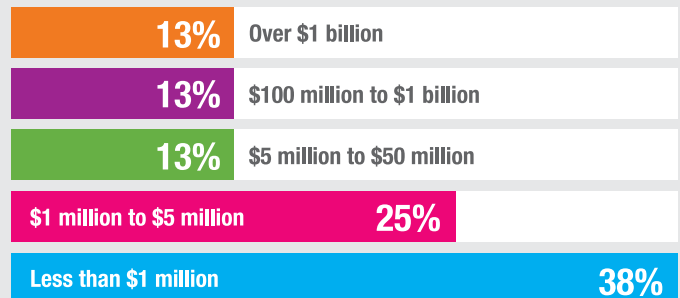
41. How optimistic are you about your company's future?



40. How do you find customers?



42. How large is your company by annual revenue?



## Kiosk component manufacturers

### KIOSK COMPONENT MANUFACTURERS

Touchscreens and printers were once again the most common components that kiosk component providers offered, although in 2019, just as many manufacturers also cited card readers (chart 43).

RFID/NFC readers, cameras and heaters also gained importance in 2019 compared to the prior year.

The growth in RFID/NFC readers can be attributed to a growing interest in mobile payment acceptance for kiosks that accept payment.

Restaurant order-and-pay was cited as the top growth opportunity among kiosk component manufacturers (chart 44), marking a gain over the prior year when gaming/entertainment was cited as the top opportunity, followed by parking.

Restaurant drive-thru was cited second top growth opportunity in 2019, marking a significant gain over the number that cited it as such the prior year.

Locker pickup, gaming/entertainment, hospital check-in, pharmacy self-serve, HR/employee self-service and pickup all were cited as top opportunities by a third of the respondents.

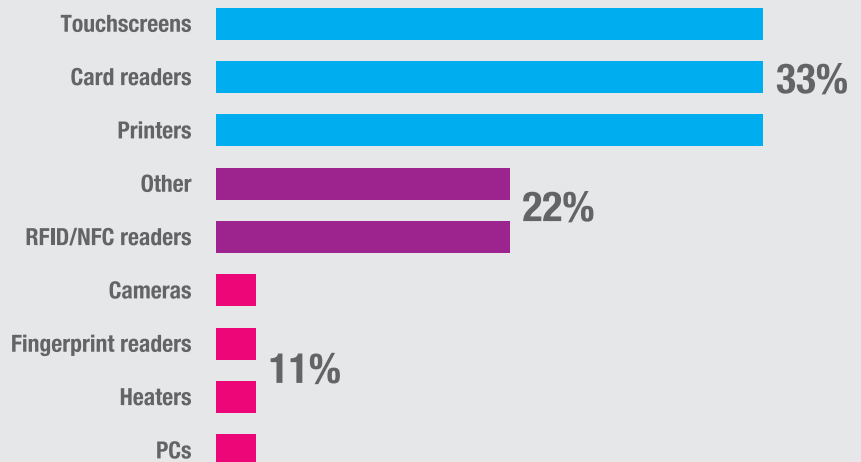
Remote management was cited as the most promising technology among kiosk component manufacturers (chart 47), displacing touchscreens in the prior year. In 2019, integration with mobile order-and-pay, data analytics and cloud technology all tied with touchscreens as the second most promising technologies.

Biometric ID verification rose as the third most promising technology from sixth place in the prior year, when it held that position along with smart card readers.

Proximity detectors also rose in importance, rising to fourth place along with Internet of Things, from 11th place the prior year.

#### 43. Components provided: *Participants selected all that applied*

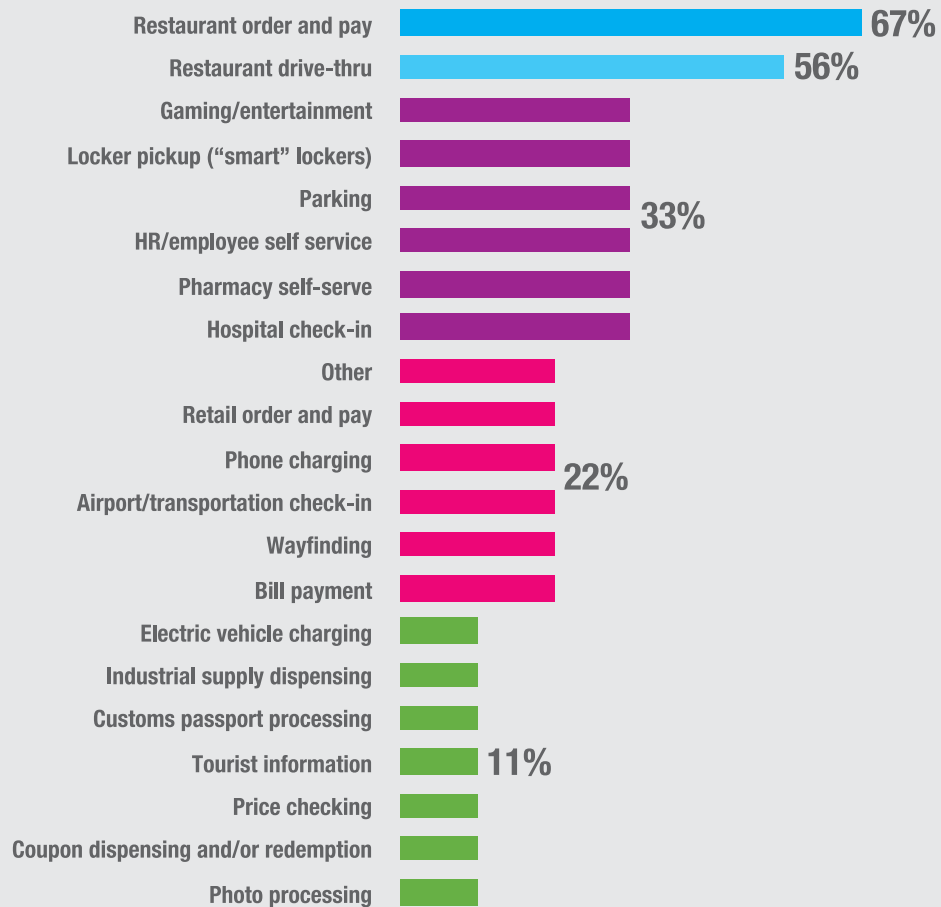
*Other includes: Thermal kiosk paper, debit/credit card dispensers, air conditioners*



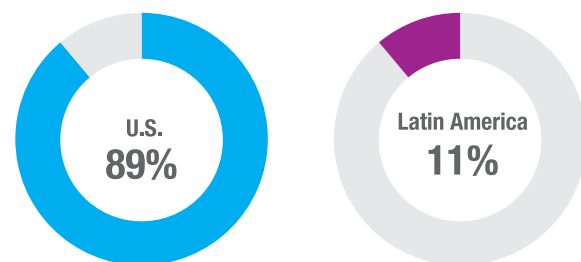
## Kiosk component manufacturers

### 44. Verticals with the best growth opportunities:

*Other includes: banking, financial institutions*

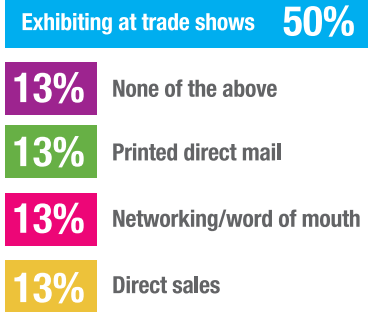


### 45. Which geographic region has the best growth prospects for kiosks in the next 5 years?

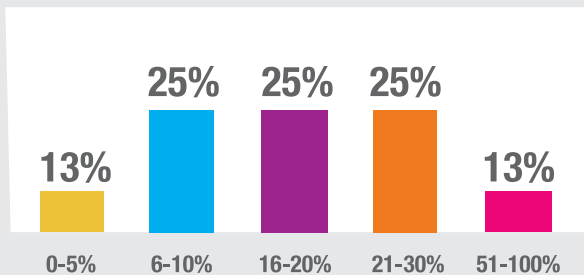


## Kiosk component manufacturers

### 46. How do you find customers?

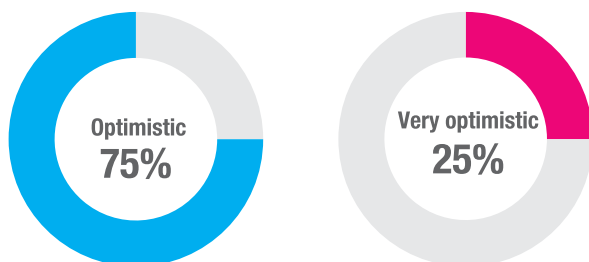


### 48. How much has your business increased in the last year?



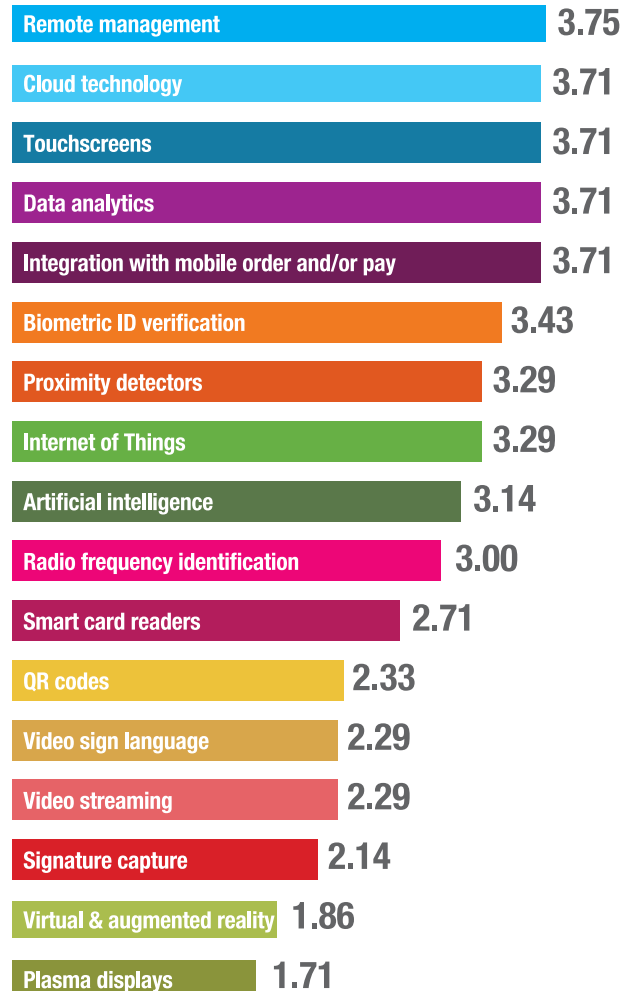
### 49. How optimistic are you about your company's future:

Participants selected all that applied



### 47. What do you see as most promising new kiosk technology?

Participants selected on a scale from 1 (not important) to 4 (extremely important)



### 50. How large is your company by annual revenue?



# INDUSTRY INSIGHTS

## Kiosk market 2020: an ocean of opportunities

As a revolution continues in the kiosk market, the kiosk market has more and more challenges to overcome. There are good short-term opportunities and a potential medium term “slump” if companies do not choose to adapt to future trends.

In relation to the world market, retail, hospitality, financial services, healthcare, media, communication, entertainment and government are leading the largest investments in this technology.

The adoption of interactive kiosks is growing modestly worldwide and is being led by Asia where market segments are increasingly independent of foreign investment as they have the world's largest suppliers of these products, low costs and the ever-increasing profile of local users demanding interactive kiosks for all industry segments.

### Fast food picks up pace

In the U.S., major players in fast food chains began experimenting with kiosks in 2006, but greater adoption in the restaurant space (not just fast foods) has been slow to gain momentum; it is happening faster at airports, supermarkets and casinos.

However, in recent years large fast food chains have started to invest more in self-service kiosks. We are talking about tens of thousands of units being purchased in the next years in this segment.

This will certainly drive industry growth for 2020 through 2022, but we are talking about an investment that is expected to occur again in five to 10 years, when we specifically talk about hardware.



Marcos Fugulin is business development director at Apek International.



Image courtesy of iStock



## Retail picks up pace

Retail is starting to discover how to use the digital kiosks and the real relevance to the business through the information they are able to provide to the people (B2C) as well as the demographic and analytical data they are able to collect. Also, the suppliers are developing more and more tools that will justify the investments.

The proof of this is when we see some of these companies buying technology companies to have their own customized solutions (especially in the software area) and to have better and faster customer interactivity as well as generate valuable data from immediate consumption that supports marketing and production/decision making. Here artificial intelligence is one of great targets for the next steps, as well as IoT.

In health care, for example, the most common technology use cases involve connecting people – consumers, doctors, and caregivers. These IoT services allow a person to purchase products in digital kiosks and receive information from a signal on his watch or cell phone.

## EVs on the horizon

Another opportunity for kiosks is the global market for electric vehicle chargers which is expected to expand into thousands of units in the coming years.

An electric vehicle charging station will require a fixed cost of installing the hardware needed to charge, potentially outdoors. When an interactive kiosk is provided with the charging station, it can reduce the cost of this investment as bundled services may be offered as advertising.

A big appeal is that it helps to reduce environmental pollution. The number of interactive kiosks available for charging globally is still very small, but I believe the number will increase after 2021 to double digits, considering all ecosystems involved.

Like everything new, it will go through a period of market adoption and face major barriers from industry and consumers, but I think they are here to stay, and the interactive kiosk market has to adapt to this model right now. This will happen faster in this market segment than before. European countries are already planning for electric cars beginning in 2021.

All of this will depend on some global factors such as the U.S.-China trade relationship, employment impacts due to these automations, government incentives and consumer usage.

The software segment, meanwhile, will be much less severely impacted by these factors in the short term.

Software, unlike hardware, can be developed anywhere, with fast productivity. Hence, software development should grow exponentially in the coming years.

Now is the time for kiosk companies to look for innovations, partnerships and new markets.



# Out of home: A critical complement to digital marketing

Over the past 20 to 30 years, we have seen a technological revolution. Computers that used to take up entire rooms now fit in our pockets and televisions that used to only have a few channel choices now offer thousands of programming options. In the world of advertising it has become increasingly difficult to reach a consumer bombarded with anywhere from 5,000 to 10,000 messages a day through digital media. It's for that reason that we believe that out of home media is a critical complement to digital marketing and the most impactful way to reach consumers.

We are currently witnessing blending of mobile technology and OOH, where the content provider holds the consumer's attention for a limited but critical time period.

Retail environments that enable this marketing opportunity are poised for growth, which is where kiosks and digital signage come in. Digital technology can create a more engaging experience than traditional advertising channels, and digital content can be more contextually relevant by displaying the right message at the right moment in the right location.

Location based marketing — yet another rising retail technology — brings the ability to push individual messages to consumers based on demographics and where they are physically at a specific point in time. The technology makes it possible for marketers to engage with consumers at a point in time when they have their smartphone available to make a purchase, and boosts the consumer's likelihood of making a purchase.

OOH media is defined as any media consumed and displayed outside the home in the physical world. OOH touches areas such as billboards, transit, cinema, malls, gas stations, elevators, sports, restaurants, hotels, airports, gyms and much more. And yet, OOH has historically been relegated by



Mark Boidman is a New York investment banker who advises technology and media companies and the author of “Times Square Everywhere; the Next Wave in the Fast Changing Media Landscape.”



Ethan Volk is an analyst at P.J. Solomon, a financial advisory firm in New York City.




*Image courtesy of iStock*

marketers to the lower end of the marketing mix. Given that people are spending 70% or more of their waking hours outside of their homes, all other media channels are more effective in conjunction with an OOH campaign.

According to a 2017 report by PageFair, 30% of people blocked online and mobile ads to avoid viruses and 29% blocked ads to avoid interruptions and distractions. Since the inception of the Internet, there have been issues with viruses and malware, many times caused by clicking on the wrong “advertisement.” The number of people globally who have used online and mobile ad blocking software has increased in the last few years, from 39 million in 2012 to nearly 220 million in 2016. This trend will only continue and the result is that dollars spent on digital advertising will go wasted as consumers increasingly block out advertisements.

Online ads are generally unwanted ads that disrupt the user experience. On the other hand, OOH may enhance consumer experiences by sharing the right ad in the right location at the right time to the right audience.

For example, if a person were to go to Yankee Stadium and see a Coca-Cola billboard on the left field wall, they would not necessarily feel that the ad was taking away from their experience. They expect to see ads in a baseball stadium. It is part of the experience. It would be a different story if he or she went to the Yankees website and was interrupted by a pop-up ad or other marketing that distracted from the online experience.



Privacy concerns are yet another reason why we are so bullish on the outlook for OOH. Whether it's through cookies or other measures, online and mobile advertisers track where you are spending your time to send you relevant advertising. While some consumers may like this kind of targeted advertising, many do not and are becoming increasingly wary of how their data is being used.

New location-based technologies can indicate when consumers are near OOH advertisements. If you can measure how many people that were exposed to the ad then visited a store to make a purchase, you have closed the loop for marketers and demonstrated the value of OOH as part of the marketing mix. While this technology is very new, it has the potential to revolutionize OOH media.

With all of this in mind, it must be said that digital media and advertising are still incredibly effective, both in isolation and especially in conjunction with OOH media.

Technology has been a friend to OOH, much more so than to newspapers, magazines, radio and other classic media channels. This competitive advantage is going to allow the OOH advertising industry to defend and take share of total advertising spend. Across numerous cities, we are seeing integration of mobile into OOH. It's just a matter of time before we feel the excitement and energy in the physical world as if it is Times Square everywhere.

# INDUSTRY INSIGHTS

## Artificial intelligence leads a wave of change in the self-service kiosk industry

The times they are a changin.'

As noted composer Bob Dylan stated over 50 years ago, at a time with major disruptive social change occurring, change may come with a force that shakes the walls and windows. The times, they are indeed changing. In the world of self-service kiosks, that change is being driven by a number of disruptive technologies.



Jeff LeBlanc is the director of user experience at Advanced Kiosks.

The very concept of “self-service” is that a person wants to complete a task, such as buying an item or ordering a meal, without needing to interact with another person. While humans are social creatures, there are plenty of times when we just want to accomplish our goals and move on. This could mean avoiding that long line at the cashier during the holiday season, or paying for a meal without having to wait for your server to finish up at other tables and deliver the bill.

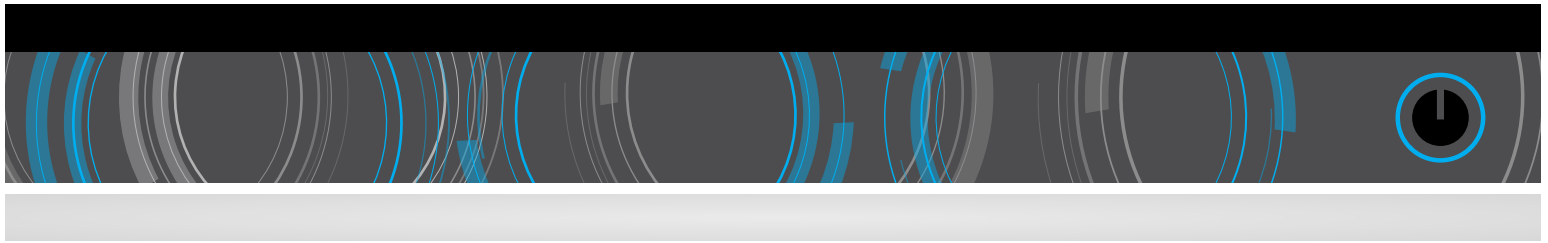
As 2020 arrives, it's interesting to look at some of the trends we've been seeing in the self-service kiosk industry. Like many sectors of business, disruptive technologies have been making a huge impact on what services computer kiosks can provide. Retailers, restaurant owners, digital marketers and others can provide a customer experience unlike any their customers have seen before just by adding interactive kiosks.

By far, the biggest blanket term in new technologies has to be “artificial intelligence.” It's a term that has many meanings, ranging from simple virtual assistants to visions of SkyNet. With the vast computing power provided by cloud computing and 4G or 5G connectivity, self-service kiosks can do amazing things.

### Facing the future

Computer vision has always been considered an area of research that falls under the umbrella of artificial intelligence. In the last few years, we've seen vision techniques used commercially to perform facial recognition and facial detection on a number of self-service kiosk platforms.





*Picture courtesy of Network World Media Group*

Several airports have begun pilot programs using facial recognition to speed check in and expedite boarding of flights. Delta has had success using this technology at their home hub of Atlanta. The Transportation Security Administration has likewise begun testing a program at Las Vegas' McCarran International Airport to allow passengers who opt in to verify their identities using facial recognition.

On the retail front, California-based burger chain CaliBurger has been using facial recognition kiosks for a few years now. Instead of paying for food with cash or card swipes, customers who opt in to the program can use their face. By linking payment options to their account, customers can order food with a wink and a nod.

### **Thinking ahead**

Other QSRs have been embracing AI as a way to enhance your visit. McDonald's has been using kiosks for order placement, and now is looking to add predictive AI to suggest menu items based on order history and the environment, such as suggesting a hot beverage on a cold winter day. Their self-service kiosks have already proven to be a huge business win for the company, as they have reported an increase in the average check size in franchises that have invested in kiosks.

McDonald's restaurants in Canada have been using similar smart menu boards and have seen sales increases of 3% to 3.5%. These kiosks can prioritize menu items based on what is selling well in the local region.



## Smart streets of the city

Globally, governments are laying the groundwork for smart cities, bringing IoT solutions together with new architecture to provide convenience, communication and infrastructure. Digital kiosks are poised to play a major role in these initiatives.

Transit locations, such as train stations and bus stops, have begun to employ kiosks to offer a number of services to travelers. Free Wi-Fi service, cell phone charging, local information, and even a prediction as to the arrival time of the next bus, can all be made available through smart kiosks.

## Getting real

Augmented reality, and its close cousin virtual reality, have long been considered technologies in search of a problem to solve, but that perception is changing. The Pokemon Go game made a huge splash a few years ago, bringing the concept of AR into the public consciousness. Since then, retailers have begun to adopt the concept of merging the physical with the digital to produce some truly innovative customer experiences.

Sally Beauty Holdings, Inc. has released its ColorView virtual hair color try-on experience to let customers experiment with different hair colors and makeup options, so they don't have to turn their hair blue before deciding that green might have been a better choice. Powered by AI and AR technology from Perfect Corp, the ColorView kiosk pulls together product recommendations from across the Sally Beauty brand to offer a unique try-before-you-buy experience.

Another popular use of AR is the virtual dressing room. By using computer vision techniques like the ones in video games that use a Kinect controller, clothing can be superimposed on shoppers to give them an idea of what particular outfit they would like to wear. Retailers like Timberland and Topshop have successfully used these virtual fitting rooms in public spaces to drive increased foot traffic, which of course leads to increased sales.

## Riding the cycle

These, and many similar new technologies, are poised to make a great impact on the self-service industry in the coming years. Just looking at the Gartner Hype Cycle for AI for 2019 shows many technologies, such as Edge AI and automated machine learning that will likely make their way into self-service kiosks in the next two to five years.

As a result of these and other emerging technologies, computer kiosks will likely become more prevalent and useful to customers as we move into the new decade.

# Smart security solutions for IoT-connected kiosks

Kiosks are getting smarter. Thanks to cloud computing and Internet of Things technologies, kiosks are being used for increasingly sophisticated applications, from industrial vending to secure package retrieval.

But as kiosks become more sophisticated and connected, they also introduce new security vulnerabilities. Radio-frequency ID and mobile technologies such as Bluetooth low energy and near-field communication can provide secure user identification and access control for kiosks — but only if they are implemented appropriately. Here's what kiosk manufacturers need to know about security.



Chris Randle, vice president of sales at ELATEC, is responsible industry solutions which include multiple vertical markets including kiosks.

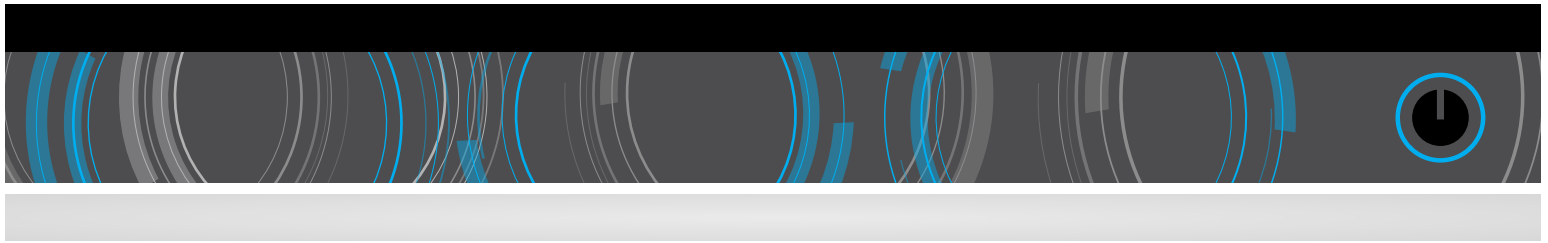
## The rise of the smart, connected kiosk

The use of self-service kiosks has exploded over the last decade, with kiosks providing a broad range of on-demand services in both consumer and industrial environments. IoT technologies enable kiosks to stay connected to each other and to centralized software systems for better management and tracking of users, inventory and accounts. For example:

- Industrial vending kiosks provide point-of-use access to job-related equipment and supplies (such as gloves, goggles or consumables) and enable centralized tracking of inventory levels and usage by individuals or departments.
- Kiosks at transit hubs allow riders to add money to the account tied to their transit card.
- Self-service kiosks for after hours prescription pickup can identify the user and vend the correct prescription.
- Smart lockers can be set to allow a specific resident or employee to pick up a package and then reset for a new account after the package has been retrieved.

To make these services work, the kiosk must be able to correctly identify the user who has approached and determine what they are authorized to do or access.





*Image courtesy of iStock*

## **The security risks of connected kiosks**

The same technologies that enable these high-tech applications can also introduce new security vulnerabilities. Kiosks represent an “IoT endpoint”—that is, the user-facing end of an IoT system. Security solutions are needed to ensure that only people with the right authorization can access the products or services the kiosk provides.


There are two essential elements to endpoint security.

- User authentication: the ability to accurately identify the user who has approached the kiosk and verify their level of authorization.
- Access control: ensuring that only users with appropriate authorization are able to get access to the products or services that the kiosk provides.

Kiosk security of course starts with the physical design of the kiosk itself, which must be built in a way to prevent or deter brute force physical access to contents or control systems. But authorized users must have a way to access the goods or services the kiosk provides. Each access control choice introduces its own set of security risks.

In unconnected applications, access control may be provided by a physical key. This ensures that only the key holder can open a locker or kiosk. But physical keys can be easily lost, stolen, shared or copied. They also do not allow any tracking of who has accessed the kiosk or locker contents.

For smart connected kiosks, different types of security solutions are needed to enable applications that rely on cloud and IoT technologies. At a minimum, these solutions must be able to identify a unique user so that the user can be connected to the right accounts and authorization levels. This can be done by



giving each user a password or PIN they must remember, providing them with a card or token (such as a key fob) that they must carry with them, or using biometric identification technologies. However, each of these options has potential downsides as well.

- Passwords and PINs are easy to hack and often forgotten, creating management headaches for IT.
- Biometric identification is too complex and expensive for many kiosk applications and puts companies in the position of having to manage and secure sensitive personal data. Fingerprint identification on shared devices also introduces public health concerns.

A card or token that people can carry with them is often the best solution, but not all card technologies are created equal. Magstripe cards, for example, are easy to copy. They also can be easily demagnetized or damaged by dust and other substances, especially in an industrial environment.

For many kiosk applications, RFID technologies offer the best combination of security, cost and ease of use.

### **RFID-based access control for kiosks**

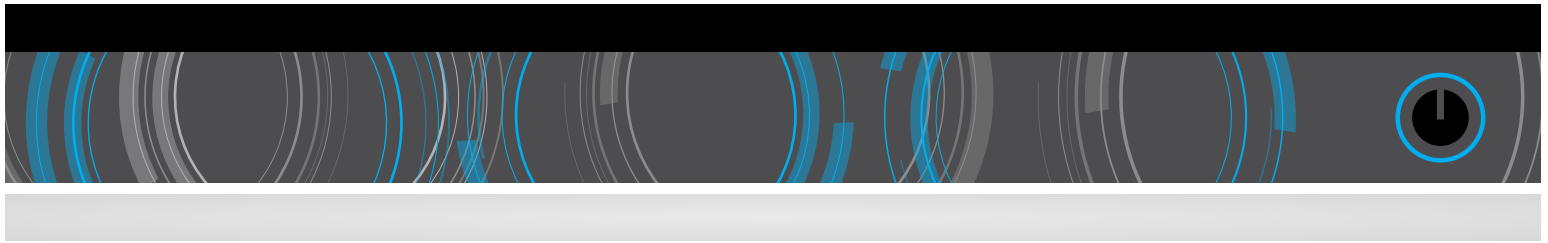
RFID provides many advantages for kiosk applications. RFID cards are easy and cost effective to issue and manage. In many environments, kiosks can leverage the cards or tokens users are already carrying for employee identification or building access. For applications with a more diverse or transient user base, it's easy to issue new cards or even temporary wristbands with RFID technology (great for access to ride kiosks and lockers at amusement parks, for example). Some RFID readers can also read BLE or NFC technologies for smartphone-based access control.

RFID technologies enable unique user identification, which is critical for most IoT-based kiosk applications. With a unique user ID and a connection to backend systems, the kiosk can track exactly who has accessed the kiosk, how often and at what times, and exactly what goods or services they accessed. This data can be sent to a centralized system for billing, inventory management and cost control. RFID technologies are also programmable to enable customized access levels, such as a temporary wristband that only works for the day it is issued or a locker that resets itself for a new user after a user has retrieved its contents.

Cards and tokens can be instantly shut down if lost or stolen; the unique identifier on the old card or token is simply disabled, and the user is issued a new card with a new identifier that is connected to their existing accounts. This is an important security consideration. End users usually realize they have lost their card or token quickly, while it may not be immediately obvious if someone's password or pin has been compromised.

### **Secure RFID solutions for kiosks**

RFID technologies have varying levels of security. Some RFID cards use an unencrypted numerical sequence as a unique identifier for the user. Without encryption, these cards can be easily compromised.



A secure RFID solution for kiosks must ensure that:

- Cards and tokens cannot be easily cloned or tampered with.
- Data cannot be intercepted between the card and the reader.
- The RFID reader itself cannot be physically tampered with.

Encryption prevents cards from being easily cloned and prevents data from being read as it passes between the card and the reader. With encryption, the unique identifier and other information stored on the card can only be read using a secret key. Advanced encryption technologies store part of the key in the reader and part within the card itself. Both parts of the key are needed to decode the data.

For highly secure environments, such as prescription vending or access to valuable materials, kiosk manufacturers may want to enable multi-factor identification. In multi-factor identification, users must have another form of ID in addition to the card or token. This may be something they know (such as a password or PIN) or something they are (biometrics). This provides an added layer of security if a card is lost, stolen or compromised. RFID cards can store encrypted biometric data on the card itself rather than in a central database for a highly effective multi-factor solution that does not require centralized storage of sensitive personal information.

### Selecting the right RFID reader for smart kiosks

Kiosk manufacturers should look for a reader technology that fully supports their intended use. Some considerations include:

- Technologies supported: Look for a “universal” reader that supports multiple technologies. A reader that supports all or most of the 60-plus card technologies in use today, along with emerging smartphone-based technologies, will provide maximum flexibility. This is especially important in multi-tenant environments where multiple card technologies may be in place for different user groups.
- Remote programmability: Kiosks are widely distributed assets; make sure you can easily reconfigure the reader for new technologies or applications without visiting each one.
- Storage capacity and working memory: Make sure the reader is able to support the level of encryption you need and can be programmed for any custom functionality required.

Over the next several years, we expect to see even more sophisticated “smart kiosk” solutions find their way into the market. Kiosk manufacturers must ensure that they have the right security solutions in place to protect both people and property.

# 5 ways kiosks will change the restaurant industry in 2020

In the last 18 months, we've seen astronomical growth in the use of kiosks in restaurants and storefronts around the U.S., and the continued success of kiosks in other regions around the world. Tillster data shows that in 2019, customer usage of kiosks grew 20%, and we anticipate an additional 25% growth in adoption in 2020.



Hope Nieman is chief marketing officer at Tillster, which provides restaurant kiosks.

The technology is poised to reshape the restaurant industry in 2020, for several reasons:

## **Growing personalization capabilities**

With kiosks, we're starting to personalize menus across a variety of factors, from dynamic experiences shaped by the known preferences of the person standing at the counter, to those guided by time of day and geography, or coupons intelligently driven by loyalty program data. Kiosks enable a greater discovery process and in the coming year, customers will experience a more personalized experience than they are getting today, which means in 2020, kiosks will become more dynamic and likely deliver better metrics to brands.

## **Artificial intelligence will make things dynamic**

Look for AI to be deployed in kiosks to drive better guest experiences. The technology helps kiosks understand and track sophisticated decision-trees that get changed on the fly. Even though a kiosk may not know who you are as a guest, it will soon be able to intelligently decide what menu items to show you next, based on how you are going through the menu behaviorally or any number of other identifiable qualities. AI can automatically help restaurants create dynamic flows tied to weather or any number of other real-time decision-making influences.

## **Growth in off-premise kiosks**

Restaurant kiosks aren't just for the restaurant environment. In 2020, you just might encounter one in the lobby of a hotel or office building. Imagine returning to your hotel lobby with tired kids and finding a kiosk standing by with local restaurants and pizza joints preselected, and ready to deliver to the hotel or make pick-up easier at the touch of a button. For the customer, kiosks are an invitation when encountered off-premises, creating a billboard and a storefront at once. For the restaurant they make pick-up easier, create a social ordering experience, and eliminate lines.



*Image courtesy of Tillster*

## **Kiosk as multichannel**

In 2020, expect kiosks to integrate into the existing marketing channels more seamlessly. As loyalty enrollment grows through delivery and online ordering, so too should those rewards points (and data collection opportunities) extend seamlessly at the kiosk. Kiosks can be used, in addition to ordering, to select a table or to place an add-on order. As kiosks become smarter and more connected to broader data sets, they will give guests a more seamless experience and offer restaurants a more cumulative view of guests.

## **Better data utilization**

At the heart of any advancements in kiosk capabilities are smarter uses of data. Better connections to existent operations. More predictive software programs. Smarter loyalty interactions. With better data utilization, we can make more intelligent offers to guests and make them in a timelier manner, or A/B test offers in specific markets or at certain times. We can create a feedback loop connecting guests, apps, in-store experiences and delivery, driving and enabling higher average unit volumes, and more loyalty among guests.

Kiosks have flourished in a tight labor market, thanks to their ability to offload tasks better suited to self-service. They allow restaurants to boost throughput, increase average check size, and provide a better guest experience.

As our society becomes more dependent on digital tools to drive real-world choices and experiences, kiosks are becoming an increasingly important intermediary between the in-store and digital experience. They connect data dots in the omnichannel mix and provide value in sometimes unexpected ways, to restaurants and guest alike. With all that said, restaurants still need to remember to create warm guest experiences outside of ordering to keep their guests coming back.



# Cash acceptance and self-service kiosks in QSR and fast casual environments

Following a major quick service restaurant's industry-changing launch of self-service kiosks, rumblings began soon after about those same kiosks' inability to accept cash.

The 2019 Diary of Consumer Payment Choice reports consumers used cash in 26% of transactions, with that figure increasing to 49% in transactions less than \$10. Does the latest criticism, coupled with data showing a noteworthy portion of the population continues to pay in cash, reveal an issue that QSR and fast casual restaurants weren't prepared for?



David Anzia is the senior vice president of sales at Frank Mayer and Associates, Inc., provider of branded point-of-purchase displays and interactive kiosks.

## The argument for cash acceptance

Currently, many self-service kiosks in the field are not set up to accept cash. And while the 2019 Diary reveals the continued popularity of using cash, especially in situations of inexpensive transactions, the argument for cash acceptance hardware on kiosks goes beyond strictly convenience.

According to a recent Bloomberg report, approximately 6.5% of U.S. households don't have a bank account or a credit/debit card. That's 8.4 million households that represent the underbanked community. With a notable portion of the nation relying on cash as their only means of payment, QSRs and fast casuals without cash accepting kiosks may not be delivering quality service to a significant segment of their target customers.

A popular rebuttal to the cash acceptance case is that most self-service kiosks still technically allow cash payments, but customers must finish the transaction with an employee at the counter.

But without cash recyclers, defined as machines that accept cash and give change, are self-service kiosks really offering the advantages of self-ordering to the fullest potential? Some of the biggest benefits of self-service are cutting back on wait times as well as redeploying labor, both of which cannot be done if people must wait in line at a register to pay with cash anyway.

## A cash acceptance strategy

Luckily, as QSRs and fast casuals recognize the importance of including cash acceptance in their self-service kiosk payment options, they can implement these practices before rolling out programs to locations.

As restaurants organize their kiosk strategies, they'll want to plan with client payment needs top-of-mind. While sleek designs look nice and allow for less space requirements, smaller units could prove difficult to engineer with larger cash recycling hardware. It's smart to take into account that offering cash acceptance could potentially result in a larger footprint per self-ordering kiosk.

In addition, QSRs and fast casuals will need to be cognizant of certain challenges that come with dispensing money.

Before deciding on what version of a cash acceptor or recycler is needed, companies will need to decide on solutions to running low on cash, what bill denominations to dispense, and the limit on how many bills can be returned. Knowing their target audience will help determine the type of dispenser a QSR or fast casual requires, and a full-service kiosk manufacturer will be able to guide a brand through this process to ensure the dispensing option is the right fit for their environment.

What happens if a QSR or fast casual restaurant already has kiosks in the field that don't accept cash?



*Image courtesy of iStock*

Retrofitting can be an expensive undertaking, which is why implementing cash acceptance off the bat is the better bet. After kiosks are placed in the field, going back to add large cash acceptance hardware can pose problems for infrastructure, customer flow and space allocations.

However, there are some options available for those who recognize the need to invest.

Because the kiosks are already built, inserting hardware inside the unit would be next to impossible. But thankfully, side car cash acceptor towers can be a possibility if space allows.

Another option includes a shared “station” where customers go to pay for their transaction. In a case like this, multiple kiosks might feed into a few cash recyclers where patrons go to finish their order. The thought is that because a portion of customers will pay with a credit card, having a limited number of cash acceptance options would be sufficient to contain the flow of those paying with cash.

At the end of the day, cash acceptance and kiosks is proving to be a more important talking point than many originally assumed. And with data indicating the continued use of cash by a sizeable portion of the public, it's no surprise. Investing in cash acceptance at the onset of a kiosk campaign will help QSRs and fast casual restaurants avoid a later headache if they were to choose a kiosk strategy without the option.



# The case for self-order kiosks in cannabis dispensaries

Self-order kiosks represent perhaps the most rapidly growing form of guest digital engagement in the quick service and fast casual restaurant spaces. Well-known companies like McDonalds, Panera, Wendy's and Yum Brands are rushing to deploy kiosks in a growing number of restaurants. Indeed, it appears that in no time all of the restaurants in these large chains will feature this digital channel.



Juan Perez is president of ADUSA Inc.

The benefits being reported by these companies are impressive. We regularly see reports of increased sales, shortened wait times, enhanced customer satisfaction and more efficient labor utilization; moreover, the self-service kiosk, in general, has essentially become mainstream since it is now practically everywhere from airports to hotels to supermarkets to restaurants.

## What about cannabis dispensaries?


Many dispensaries are experiencing long lines and wait times, leading to frustration for dispensary guests and employees, alike. If these issues are not dealt with appropriately, these frustrations can, and usually will, lead to a drag on the overall success of the business. One way to deal with these problems is to add additional labor, but this of course can be quite costly.

So, what about self-order kiosks for cannabis dispensaries? Certainly, there is significant opportunity in this emerging market for self-order kiosks to shine and deliver the same, and perhaps additional, benefits to those being realized in other retail segments.

I believe that self-order kiosks will ultimately be a big success in cannabis dispensaries, but there are clearly some challenges to overcome. These challenges can also be exacerbated by a rush to deploy the technology without really understanding the business and the culture of a dispensary.

## Challenges

As far as implementing self-order kiosks in dispensaries, the first challenge I see, in talking with dispensary operators, is the uncertainty around payment processing. This uncertainty makes it difficult



to introduce an unattended payment device, like a kiosk, that works hand-in-hand with the existing point of sale system so that the guest can complete a full self-order transaction all the way from browsing the catalog to paying for their purchase with their credit or debit card.

The kiosk can be fitted with cash processing/recycling hardware, but this makes the kiosk hardware significantly more expensive, and it requires a higher degree of operational maintenance.

Another challenge that quickly comes to light are the regulatory constraints placed on dispensaries. Guest identification and sometimes prescription statuses and limits need to be checked and validated. The hardware required to perform that validation, especially if paired with cash processing/recycling hardware can have a negative effect on the ROI the kiosk should deliver.

Additionally, since legalization has only reached the state level, and only in some states, these regulatory requirements can vary significantly, making a standardized approach difficult if not impossible. Another issue to consider with respect to guest ID validation is that the federal Real ID enforcement deadline is Oct. 1, 2020. This will undoubtedly also have an impact on ID checking/scanning/validating hardware and methods on a national basis.

The third area of challenges has to do with the software solution providers themselves not necessarily being in sync or having enough experience with the business model and processes in a typical dispensary.

There are two types of solution providers that are presently trying to address the need for self-order kiosks in dispensaries: One group consists of the companies that currently provide self-order software for restaurants. The other consists of the POS providers that have come to the forefront in the cannabis industry's retail space. The problem here is that the former may not fully understand the dispensary business model and will try to shoehorn their restaurant software instead of designing a dedicated system with the dispensary's requirements in mind, while the latter likely doesn't have the experience to fully understand the intricacies of self-ordering as a process, in general.

## Solutions

First and foremost, because of the uncertainty in payment processing and other financial limitations currently existing in the cannabis industry, the ideal solution at this point in time for the dispensary would be one that introduces an industry-unique pre-ordering (i.e. browse catalog with industry-specific filtering capabilities and order items on the kiosk, but separately provide credentials and payment directly to the budtender to complete the transaction) model in order to normalize customer flow, reduce wait times and improve customer satisfaction.

This same solution, however, should have an explicit roadmap for, and be open to, adopting payment options (i.e. credit/debit, mobile payments, etc.) as they become viable and more widely used in the cannabis industry.

Secondly, the same approach should be taken with ID and guest validation challenges. That is to say that for now the initial version of the deployed self-order kiosk system should leave those tasks to



the eventual direct interaction between the guest and the budtender. However, here again there should also be a plan in place for how to transition those validation tasks to the kiosk as the dispensary model evolves and standardized methods for guest identification and validation emerge.

Lastly, the current restaurant industry software companies now vying to provide self-order kiosk software solutions to the cannabis industry have to accept that they can't just tweak their restaurant software to come up with a "dispensary version"; they have to go through the standard software development processes of analysis and requirements gathering to design and develop an industry-specific solution. After all, the dispensary self-order kiosk requirements are unique and different enough that it would be a disservice to the industry as a whole to saddle it with a tweaked system meant for another industry.

Similarly, POS vendors that have flourished specifically with a system purpose-built for dealing with the complex regulatory requirements in the cannabis industry, should not assume that they know the intricacies and nuances of self-ordering well enough to develop a self-ordering kiosk module to tag on to their POS. Instead, they should consider hiring a capable business analyst to lead this development, or strike up a partnership with a best-in-class software vendor that understands the self-ordering kiosk requirements well.

I truly believe that the cannabis dispensary business is going to continue to grow exponentially in the U.S., and that big brands, perhaps even on the scale of a Starbucks, will eventually establish themselves in this space. That being said, I also strongly believe that a cohesive multi-channel self-ordering approach that is unique to the dispensary model and its specific requirements will evolve alongside.

Self-order kiosks, mobile self-ordering, credentials validation and payment, and other digital engagement technologies, will become mainstream in cannabis dispensaries, and they will be as common as they are today in quick service and fast casual restaurants.

# EV charging kiosks as an advertising tool

If you spend any amount of time on the roads, at some point you've likely driven alongside an electric or hybrid vehicle. You've probably also seen electric vehicle (EV) charging kiosks in some of the public places you frequently visit — grocery stores, shopping malls, and downtown parking lots, just to name a few.

While electric and hybrid vehicles are still in the minority when it comes to the vehicles on the roads today, they have been around for longer than you might think.

Introduced in the 1890s, the first electric vehicle was capable of holding up to six passengers and reached top speeds of 14 miles per hour. However, despite their initial popularity, once the gas-powered Ford Model-T hit the market in 1908 with a significantly lower price tag, and the ability to drive further and faster, electric vehicles practically disappeared from the roads.

Nearly 100 years after the introduction of the first electric vehicle and following the passage of the 1990 Clean Air Act Amendment, manufacturers began to rethink electric vehicles. The concept, however, didn't truly take off until the turn of the 21st century.

Designed to be far technologically superior to their predecessors, modern hybrid and electric vehicles are now able to drive at comparable speeds and distances to their gas-powered counterparts. As their capabilities have grown, so has their popularity. In fact, electric and hybrid vehicles accounted for five percent of all new cars sold in the U.S. in 2018.

As the presence and popularity of electric and hybrid vehicles has continued to grow, so has the presence of electric charging station kiosks. After all, even though the batteries in modern day electric and hybrid vehicles are designed to last upwards of 300 miles, it's still necessary for drivers to re-charge.

While EV charging station kiosks are still designed to do what their name indicates — charge electric and hybrid vehicles — their overall appearance and capabilities have also evolved and expanded since first being introduced. Flexible in design, many of the EV charging stations on the market today



**Melissa Harward is marketing coordinator for Meridian, an integrated manufacturer of indoor and outdoor kiosks, interactive digital signage and self-service software.**

are able to be customized to house large-format digital signage within the enclosure. As such, they are proving to be a highly effective advertising platform for businesses of all kinds.

Here's why:

### **Highly targeted**

For most companies, the first step to implementing an effective marketing or advertising campaign is to define their target audience and identify the platforms most effective for reaching that audience. By advertising on an EV charging kiosk, companies are able to easily message to a unique captive audience.

While there is no way to guarantee exactly which people passing by will view and receive the advertisements displayed on an EV charging kiosk, companies can rest assured that their advertisements will, for the most part, be reaching drivers of electric and hybrid vehicles — which, at this point, is a relatively niche group of middle aged, wealthier, more educated individuals.



*Image courtesy of iStock*

### **Prominently placed**

For the most part, EV charging stations are often placed in high traffic locations, like grocery stores, shopping malls, universities, large parks, downtown areas, and popular city parking lots and parking garages. Due to their unique appearance and their ability to be placed in such prominent outdoor locations, digital advertisements displayed on EV charging stations are able to effectively capture the attention of those using the charging station, as well as those simply passing by.

### **Interactive**

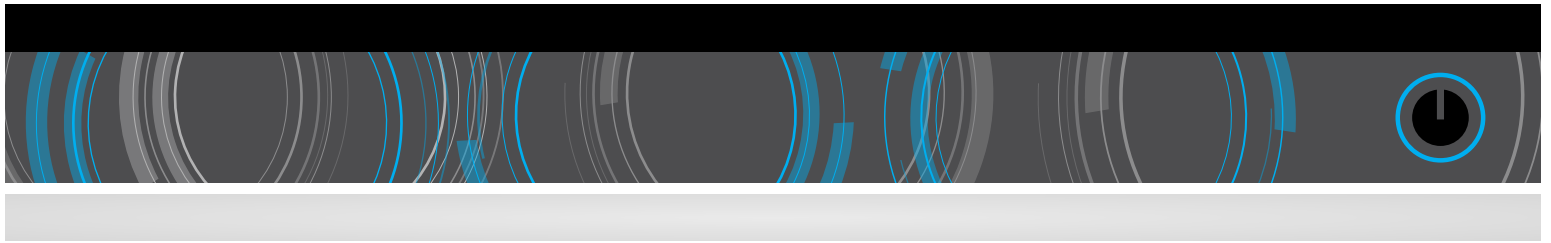
In addition to capturing the attention of and enabling their target audience to view advertisements, EV charging station kiosks can also utilize touch technology to allow users to interact with them as well. From video content to internet connectivity, and more, drivers can utilize EV charging station kiosks to obtain more information about products and services that pique their interest.

### **Actionable**

Depending on where they're placed, EV charging kiosks can be used to drive users to visit or purchase a specific product from a retailer, restaurant, or attraction right in front of them. Unlike more traditional forms of outdoor signage and advertising, which are typically placed along major highways or in storefronts, EV charging kiosks enable advertisers to target customers at specific charging kiosks that are in close proximity to their location and drive them to act on the advertisements they see.

### **Durable**

Designed for outdoor use, EV charging kiosks are housed within a rugged enclosure which enables drivers to use and interact with them in any weather or climate. Unlike other forms of advertising,



which can fail to hold up against harsh climates or conditions, EV charging kiosks are designed to thrive in any environment.

Despite the fact that electric and hybrid vehicles still only make up a small percentage of the vehicles on the road, that number — and the number of EV charging kiosks available for public use — has continued to grow significantly over the past decade. In fact, the number of public EV charging kiosks in the United States, which was less than 3,500 in 2011, was more than 61,000 in 2018 — and is expected to exceed the 100,000 mark by 2021, according to the Alternative Fuels Data Center.

As the number of electric and hybrid vehicles on the road continues to grow, so does the demand — and opportunity — for EV charging kiosks and those looking to utilize the platform to advertise their business.



# The state of kiosk accessibility in 2020

Accessibility is not a new topic in the world of customer service, technology and regulation, but from a kiosk industry perspective, accessibility is still in its nascency. When asked directly about accessibility standards, kiosk manufacturers and deployers typically reference the ADA and other related – but peripheral – regulations such as the Air Carrier Access Act and the European EN standards.



**Laura Boniello Miller** is corporate business development manager at Vispero, an assistive technology solutions provider.

As outlined in the ADA, hardware specifications include specific additional accessibility requirements, but the long and short of it is that:

1. When kiosk manufacturers recommend accessible designs or project alterations to improve accessibility, kiosk deployers do not always adjust accordingly.
2. Not all kiosk manufacturers understand accessible design standards.
3. Even minimum legal requirements typically do not make kiosks usable by people with disabilities.
4. The law of the land is still not 100% defined or agreed upon when it comes to kiosk accessibility.

## Accessibility versus usability

An accessible kiosk may not be “usable” from a practical standpoint. Take, for example, a kiosk that allows customers to purchase movie tickets. Let’s pretend that this kiosk follows ADA guidelines and includes screen reader technology and an accessible keypad. These adjustments will make the touchscreen technology accessible to a user who is blind or has low vision in the eyes of the law, but even with screen reader software and physical hardware accommodations, the kiosk is not necessarily “usable.”

What does that mean? In this example, a typical kiosk user may take three minutes to complete a purchase. Even with hardware accommodations, a user who is blind or has low vision may take 15



minutes to complete the purchase due to the design and layout of the application if the application is not built with accessibility in mind.

The best way to determine if a product is “usable” rather than just technically accessible is to compare the experience to that of someone without a disability. Even if the kiosk adheres to legal accessibility requirements, if it takes 15 minutes to complete a purchase, does that kiosk count as usable? Does a user who is blind or who has low vision walk away having completed a task without frustration, and with a reasonable amount of effort? Ask yourself: would that experience be acceptable for a sighted user?

### **Kiosk manufacturers provide accessible options**

Some of the top kiosk manufacturers are leading the way with accessible kiosk design and components. Furthermore, they are working to educate kiosk deployers on the options that should be available to make a kiosk accessible to users with disabilities.

That said, kiosk manufacturers are predominantly responsible for the hardware portion of a kiosk experience. The software (kiosk application) is typically a separate but integrated part of the kiosk project. Even with the most accessible kiosk hardware, accessibility devices, and screen reader technologies, the kiosk is not accessible or usable if the kiosk application is not built with accessibility in mind. Both the hardware and the software must be accessible in order for the kiosk to be usable by people with disabilities.

Kiosk application developers are only just beginning to understand the complexities and considerations for developing an application that works well with screen reader software and building applications that are not only accessible but are, in fact, usable.


Screen reader software works to turn application text into speech and makes it possible for people who are blind or who have low vision to hear and interact with an application. For the most part, website accessibility gets the lion’s share of the attention when it comes to digital accessibility standards.

While Web Content Accessibility Guidelines should apply, they aren’t always considered a requirement for kiosk application development.

With little clarity from the regulatory bodies of the U.S. government, the kiosk industry itself is taking the lead on accessibility efforts through the Kiosk Manufacturer’s Association and their efforts to work with the U.S. Access Board via an accessibility committee.



*Image courtesy of iStock*



Deployers are slowly becoming aware of the need for accessibility in their kiosk deployments. Some of this is driven by fear. Court cases tend to drive the trend, as the threat of litigation is enough to persuade larger organizations to deploy accessible kiosks in an attempt to avoid being the subject of a costly lawsuit.

Larger organizations tend to have accessibility departments or in-house experts who are responsible for accessible design. Those organizations continue to work with manufacturers and application developers to draw attention to the accessible user experience. However, smaller organizations have less incentive to do so and seem to be less educated on the repercussions of being inaccessible.

### **Future trends and current events**

Books such as the “Algorithms of Oppression” highlight the need for technology to be designed both by and for a diverse audience. The most recent examples of how technology is built with implicit bias are places like Google search results, facial recognition software and automated resume filtering software. Technology biases are also found in kiosk applications and kiosk deployments.

Kiosk technology that is designed without consideration of and input from users with varying disabilities will not serve a substantial subset of the population. Ignoring this group will not only leave customers dissatisfied with their experience, but it will also negatively impact profitability, as the 40 million Americans with disabilities may be excluded from utilizing any self-service kiosk that is not built to be accessible or usable for those with disabilities.

### **Lawyers weigh in**

In 2018, a federal lawsuit was filed against Walmart challenging that the retailer’s self-checkout kiosks were not accessible or usable by customers who are blind. This is only one example of many in which kiosk accessibility (or lack thereof) has found its way to a courtroom.

Experts in accessibility law have made the point that digital accessibility does not stop with websites; it must address kiosks as well. Accessibility lawyer Lainey Feingold has written extensively on the topic and believes (according to a post in January 2018) that “the revised Section 508 guidelines specifically identify kiosks as covered information and communication technology (ICT)” and that “the ADA’s non-discrimination and effective communication provisions are broad enough to embrace kiosk accessibility.” The efficacy of this statement will be determined by judges in the courtroom, as the Walmart case and others find their way to a decision.

### **Industries already impacted by kiosk accessibility cases**

The list of industries already impacted by kiosk accessibility cases includes healthcare, government, retail, higher education, restaurants, financial, movie rentals and transportation. While many kiosk deployers are waiting to see how many of these cases turn out, the smart way to avoid being on the wrong side of an accessibility case is to create and deploy kiosks with an eye toward accessibility and usability.



## **“Nothing about us without us”**

The accessibility community uses a phrase that the kiosk industry may find useful in deploying accessible kiosks: “Nothing about us without us.” This sentiment drives home the fact that kiosks should not be built and deployed without checking in with disabled users to determine if the kiosks are usable and accessible.

Usability tests should be conducted with users who have a variety of abilities. Usability tests should not be limited to those with visible disabilities. Tests should be conducted with users who have cognitive disabilities, people with physical disabilities, and those users who have no disabilities.

Take, for example, the 8% of men who are color blind. If a kiosk communicates information only via color, one in 12 men may find it difficult to navigate the application and complete their task. “Press the green button” does not mean anything to someone who can not differentiate color.

By making the kiosk experience accessible and usable, using multiple visual, audible and navigational cues, kiosk deployers are improving the experience for more than the users who are blind or deaf, but also users who are color blind, dyslexic, or are temporarily unable to use their hand because they have on a cast.

A clear upside of usability testing is that improvements for accessibility often improve the experience for all users. Clarifying language, leveraging multiple methods to communicate the same information, and identifying issues with content or physical reach can greatly improve the user experience for all. So even if the courts or regulations don’t require kiosks to be accessible, there are fundamental reasons to create an accessible and usable kiosk experience. Broader appeal means more transactions, and happier customers. At the end of the day, deploying accessible kiosks makes financial, moral, and legal sense.