Digital signage is a viable and effective communications tool, but companies taking the first step in signage deployment will be much more successful on the playing field if they understand the basics of what digital media is and how it operates. Learn the basics of digital signage and how to make it most effective.

By Richard Slawsky | Contributing writer, Digital Signage Today
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INTRODUCTION

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Signage 101

Digital signage continues to prove itself as one of the most effective and eye-catching communications mediums on the market. Spend time with any marketing professional and it’s easy to feel the excitement generated around digital technology. The enthusiasm is electric. Convinced by the vibrant colors and sharp resolution that a digital display provides, CEOs are ready to deploy dozens of displays under their company’s banners.

But before signing on the dotted line and rolling out the cash, it’s important to understand exactly what digital signage is and how it works. What kind of display will best meet the deployment needs? How will digital technology change in the next five, 10 or 20 years? What about terminology — what is the language of digital technology?

Digital signage is a big business for companies in a variety of sectors, and is only expected to get bigger. According to research firm Markets and Markets, the total digital signage market is expected to reach $23.76 billion by 2020 from $14.63 billion today, increasing at a compound annual growth rate of 8.18 percent between 2015 and 2020.

Helping to drive that growth is increasing investment by companies for the development of digital signage solutions and growing acceptance from government, combined with the reduction of waste and shipping costs from the elimination of printed static signage and the saving of energy from increasingly efficient signage.

But far too many users of digital signage launch a huge project without having a firm grasp on the basics. More often than not, these misguided efforts wind up costing them lots in terms of sunk cost. Others overlook the power and flexibility of digital technology, using it as merely an electronic poster board and failing to make use of its interactive capability.

In this guide, we take a look at some of the basics of digital signage as well as the up-and-coming trends, wrapping up with a look at what’s on the horizon.

We’d like to thank LG Electronics Inc., whose kind sponsorship of this guide enables us to bring it to you at no cost.
The basics

Digital displays designed for commercial use don’t look any different than those made for the average consumers. Looks, however, can be deceiving.

When it comes to the different types of monitors used for digital signage projects within a business, deploying the right type of screen can oftentimes be the difference between success and failure. There are considerable differences between commercial- and consumer-grade displays.

First and foremost is the price tag. While consumer products can run a few hundred bucks, depending on the screen size and manufacturer, commercial-grade items can cost thousands. But with it comes higher grade materials, stronger components and overall better build quality. The durability that comes with a commercial-grade product means less downtime for the digital signage, increasing the impact of the messaging. While commercial-grade products might mean more upfront cost to the end user, the ROI is usually greater.

Screen makeup
A flatscreen enclosure is comprised of a bezel which goes around the viewable area of the screen and a casing that covers the back. Commercial screens’ enclosures have been toughened to withstand the “elements” involved in deployments. For example, digital menu boards in restaurants have to withstand high heat and even grease, while screens in rail stations have to be resistant to dust and corrosion.

Commercial displays are designed for more rugged use and over longer, continuous periods of time. They’re also outfitted with increased software capabilities, including the ability to recognize all PC resolutions, including wide formats and different refresh rates in addition to TV/video resolutions.

Commercial-grade screens provide extra inputs that consumer-grade screens do not. To accommodate the numerous types of network connections and media playing devices that may be used, commercial-grade screens have HDMI and PC inputs, serial ports, Legacy and VGA inputs.
as well as the traditional RCA and cable inputs. Some commercial-grade screens are also equipped with RS-232 inputs, which allow two-way communications between the screen and the sending device, enabling features such as remote diagnostics and troubleshooting.

They also are equipped with internal thermal characteristics and additional fans for proper heat dissipation in both portrait and landscape modes during prolonged run times.

In addition, commercial screens are designed to be used in either portrait or landscape modes while consumer products only allow for landscape. The flexibility allows for users to mount displays in different ways and in a manner that enables operators to make easier connections. The screens also are more versatile with various types of mounting mechanisms and can include locking systems to protect against potential theft or vandalism. Consumer displays typically need special mounting brackets and sometimes cannot use third-party mounts.

Warranties
Commercial- and consumer-grade displays carry different types of warranties. For instance, many policies covering consumer monitors are voided if a buyer uses them for commercial purposes. That's because commercial screens are asked to do more than standard consumer products, such as run for longer periods, potentially function in extreme environments and stand up to more wear and tear.

Heavy-duty hardware means longer lifespans. Commercial-grade flatscreens are built with heavy-duty parts and components designed with durability in mind. Along with an increased resistance to deterioration, these high-quality parts also extend the lifespan of commercial screens far beyond that of consumer models, something that is critically important when one considers the difference in operating hours between the two.

Sectors for opportunity
Almost any non-residential setting is ripe to benefit from digital signage. Besides some of those mentioned above — school campuses, hotels and businesses — below are other venues where digital signage can be implemented and some of the ways in which they can be used.

Shopping malls: Merchandising specials, advertising/branding, visual paging system, emergency alerts, directions/wayfinding/local weather, IP video surveillance monitoring screen for security areas, entertainment, kiosks, point-of-sale advertising.

Retail stores (independent and franchise): Merchandising specials, advertising/branding, product demonstrations, training on sales floor, communications, visual paging systems, emergency alerts, kiosks, point-of-sale advertising.

Hospitals and clinics: Visual paging systems, emergency alerts, corporate communications to all employees, directions/wayfinding, IP video surveillance monitoring screen.

Gyms and spas: Merchandising specials, advertising/branding, upcoming classes, visual paging system, emergency alerts, local weather/entertainment/news.

Restaurants: Merchandising specials, advertising/branding, menu boards.

Churches and houses of worship: Information on sermons and hymns, visuals paging system/emergency alerts, education.

Retail banks and credit unions: Merchandising specials on low interest rates on loans or CDs, visual paging system, news and weather.
Consumer screens in people’s homes are turned on anywhere from one to eight hours a day, and serious TV watchers or gamers may even have them on for 12 hours or more. But many commercial users demand 12-to-15 hour days out of their screens, and locations such as airports may never turn the screens off.

Commercial warranties account for use under tougher conditions. Coverage tends to be longer — generally a few years — and protects a wider range of components and labor. And many repairs are performed on-site.

Picture quality contributes heavily to the success of a digital signage campaign. Because companies use an array of hardware systems to project content, commercial-grade screens produce hundreds of different levels of brightness and color to present the richest hues possible for particular computers.
Most experts agree technology is not nearly as important as content. Once a company decides to move forward with a digital signage deployment, it needs to determine what visuals and information to show. Content, in most cases, will be dictated by the campaign’s intent.

End users also will put considerable stock in ways they perceive they can enhance the customers’ experience. Because of the familiar industry adage that content is king, many will incorporate flashy graphics and large screens for immediate pull.

While those can go a long way in attracting viewers, companies should lay out their digital signage strategy to determine what to offer beneath the surface.

Content development can be time-consuming and can be created by in-house developers or through firms that specialize in reaching viewers. The latter will work closely with businesses, learning their targets, markets and products to help devise effective displays that satisfy the client’s strategy.

Content packages can be pre-loaded into signage units, pulled from libraries via the Web and installed through USB-connected portable hard drives. As social media grows in prevalence and relevance, sites such as Facebook, Twitter and other social media channels might be added to the mix as well.

Networks are optional but highly recommended, especially for large-scale signage deployments that cover a wide area that might include multiple cities, states or even continents. A network is an effective empowerment tool that enables users to manage their digital displays without leaving the office.

Signage content can be replaced, deleted or updated at the click of a mouse. In addition, content can be triggered to play upon certain conditions being met. For a fast-casual restaurant, signage might be programmed to display ads for hot soup should the temperature drop below 40 degrees. Or, a spike in temperatures could result in the promotion of swimwear or other sum-
mer apparel in a retail environment. And because businesses constantly are looking for a return on their investment, software can be equipped with features that detect specific information, such as what consumers view, how long they view it and whether the products or information displayed translate into a sale. That software can even help determine some basic information about the viewer, such as gender and approximate age.

Content, if done right, will put the greatest pinch on a company’s digital signage budget and pose the greatest complexity. The reason: People are needed to develop creatives that meet a specific intent. That can entail shelling out tens of thousands of dollars a year for graphic artists and writers, depending on the market.

Instead of hiring a full-time, in-house staff, businesses can generate content throughout outsourcing or software the enables content development and modification. Doing so still comes at a cost.

Some experts see digital signage as a valuable extension of a company. And in the end, what displays on a screen defines the effectiveness of the digital signage package.

“Our average retail professional has no experience with digital media,” said Bill Collins, principal of Cincinnati-based DecisionPoint Media Insights, a research consultancy that designs and produces custom consumer research on digital media networks and digital signage. “As the various venues recognize the value of it and get a positive response, they’ll assign more talented people to it and gradually get better at it.”
Working in harsh environments

Digital signage has quickly taken over the indoor environment, performing functions ranging from advertising and wayfinding to serving as information displays in transportation hubs and displaying the menu in QSR and fast-casual restaurants.

Increasingly, though digital signage is moving outdoors. Outdoor LCD displays are delivering information in the drive-thru lane and at the bus stop, while large-format LED displays are dotting the roadside, heralding a shift from static billboards to full-motion displays bigger than a movie theater screen.

But moving screens outdoors introduces a host of issues not present with indoor boards.

“Indoor displays are designed for indoor ambient light conditions, indoor humidity levels and indoor temperature levels,” said Peter Kaszycki, CEO and President for Alpharetta, Georgia-based LG-MRI, a company that creates both outdoor and semi-outdoor digital signage displays. “When you go outside, everything changes.”

Outdoor LCD displays

The first major technical issue that must be addressed in selecting an effective outdoor digital display is how viewable the content is when exposed to direct sunlight.

Anyone who has ever tried to use a laptop or smart phone outdoors knows that the brightness of the screen impacts visibility, whether the screen is in direct sunlight or even in the shade. A screen with inadequate brightness and poor anti-reflective treatment makes the image difficult to see. If the image cannot be adequately seen, then a business’ capital investment in an outdoor digital display solution is wasted.

Outdoor displays need to be significantly brighter than their indoor counterparts. An average indoor digital display will feature a brightness measurement of 350 to 600 nits. LG-MRI’s Kaszycki
said outdoor digital displays should have, at the bare minimum, a brightness measurement of 2,000 nits.

The screens that LG-MRI provides feature a brightness measurement of 2,500 nits.

While brightness is important, increasing it beyond a certain level may actually wash out the image. If the image is too bright, it becomes difficult for a viewer to tell what is on the screen, which makes the advertisement no longer appealing.

“Just because something’s bright does not mean you can see it well,” Kaszycki said. “It’s a combination of the brightness level, contrast ratio and the AR treatment on the cover and safety glass that provides for the best image.”

**Staying bright**

Merely installing a bright screen with a high contrast ratio does not guarantee that the display will be able to overcome the external environment. While the brightness of the sun can affect the viewability of the display, so can weather conditions and the length of time the display is operating.

In adverse conditions like extreme heat or cold, the display brightness can fall by as much as 20 percent. Since most environments are not perfectly temperate for the entire year, temperature will be an issue with most outdoor digital deployments. In addition, normal backlighting systems will naturally lose about 10 percent brightness every year of operation.

LG-MRI has solved this problem with its BrightVu technology. By utilizing LED backlight technology, its outdoor displays can function in temperatures ranging from -30° Celsius to 50° Celsius without any loss of brightness.

Another issue affecting brightness is time. A typical LCD display loses 10 percent to 12 percent of its brightness from year to year because the half-life of the backlights are typically rated at 50,000 hours.

This means that the brightness will be cut in half after five years and the picture will get progressively dimmer as the years go by.

Kaszycki likens this to buying a car that gets 33 miles per gallon when purchased, but gets only 16.5 miles per gallon after five years of moderate driving. Such a decrease in brightness represents a significant loss for the company, and lowers the return on investment. LG-MRI’s BrightVu feature allows for 2,500 nit brightness for 40,000 hours, which equates to 10 years based on operating 24 hours a day with 6-8 hours a day running at full brightness.

**Keeping it cool**

Enhancing brightness in outdoor digital signage also creates a cooling problem. Outdoor signage needs additional backlights to reach the ideal measurement of 2,000 to 2,500 nits,
but these extra lights create additional heat, which adds to the existing heat created by the sealing and ambient sunlight.

LG-MRI’s Kaszycki said conventional air conditioning is not the best way to solve this problem. While a standard air-conditioning unit can indeed work in keeping a display cool, it will use a lot of power, cost more to operate and does not address the real potential of condensation. Conventional A/C systems also drip and require added maintenance. Remember that if the cooling system fails, the display fails too. Consider alternative cooling methods to prolong the life and reliability of the display.

LG-MRI uses a closed-loop cooling system, CoolVu, to direct air flow and cooling based on ambient temperature conditions and the impact of the direct sunlight on the screen. This alternate system has key benefits that traditional air-conditioning units cannot offer. It consumes 60 percent less power, saving money and reducing the impact on the environment, it is closed-loop (does not bring in external air), it is 90 percent lighter, and lastly, and perhaps most importantly, it provides a greater thermal capability, which protects the display in temperatures of up to 50 degrees Celsius.

The closed-loop cooling system also eliminates the need for outside air to be circulated through the display, eliminating the possibility of bringing elements such as dirt, excess moisture and humidity into the display, all of which can damage the unit.

**Conforming to protect**

And to help provide an additional layer of protection against environmental issues that can affect display performance, such as salty air near the ocean or dusty air in desert climates, many screen manufacturers are making use of conformal coatings. Conformal coating is a thin polymeric film which ‘conforms’ to the contours of a circuit board to protect the board’s components against moisture, dust, chemicals and temperature extremes.

Still, even the best-designed, top-of-the-line systems will require service from time to time. In fact, because the technology has become so intricate, the possibility for individual parts to malfunction has increased.

Maintenance of outdoor digital signage presents unique challenges. The display is often so big and the electronics so intricate that fixing a display on-site can be close to impossible, but when a sign is offline, the message does not reach customers, decreasing return on investment. It is imperative that digital displays be fixed quickly and efficiently.

The most common procedure when a digital sign goes down in the field, Kaszycki said, is to dispatch a service tech to the site. Then, the display is taken down and sent back to another location to be repaired.
The tech may have a replacement sign to put up, but the process is time-consuming and costly.

Fixing a display costs more than just the advertising time that is lost when the display is not functioning. Removing a large digital display requires many people, lifts, and time, all of which add up to a considerable expense. For certain outdoor applications, the cost of a service call can exceed $10,000 once the costs of union labor, cranes, safety personnel and logistics are factored into the equation. Even though the purchase price of an individual display may be lower than that of another brand, if the lower-cost display cannot be serviced in the field, then the operating expenses will be significantly higher, negating the savings on the initial capital investment.

LG-MRI’s Service Access Module allows technicians to troubleshoot and repair the most common component failures via slide-out service modules containing digital controllers, power supplies and interface boards. This technology drastically reduces the cost of servicing the display and gets the display back up and running within minutes.
Digital signage screens and displays are getting bigger and bigger. Just a few years ago a 42-inch display was a luxury. Today, 98-inch or larger screens are becoming commonplace.

So what was once the domain of the matrix-arrayed digital signage video wall is now opening up to the use of those large-format displays that eliminate the tile effect caused by the bezels in video walls.

Along with larger screen sizes the improved brightness, durability and temperature controls of LCD displays mean they are increasingly being used for outdoor applications.

LG-MRI, for example, worked with Astral Media Outdoor in Canada to produce digital displays for double-sided, free-standing advertising totems throughout high traffic areas in Montreal. One side features a 72-inch 2000-nit high-bright display on the side that faces oncoming traffic and a traditional backlit static poster on the opposite side. The displays are built to withstand direct sunlight and are fully sealed to protect against the elements.

The units have been in operation for over two years and have been exposed to temperatures ranging from over 100 degrees Fahrenheit to -14 degrees Fahrenheit.

“Astral has been very pleased with the operation of the LG-MRI 72-inch displays and they continue to perform above expectations,” said Kevin Martens, director of construction and new products for Astral Media.

The main drawbacks of large-format LCD displays are their price and sheer size. A new 98-inch digital display can cost upwards of $40,000, not to mention the care and expense needed to transport the display to its intended location. A 98-inch panel won’t fit in the average elevator or in areas with tight corners.
So ultimately, except for specialized applications, video walls tend to be the preferred choice.

“A single large-format display is easier to deploy and can show great UHD content without a bezel break, but there may be locations that simply can’t accept a single panel this large,” Andy Clipsham, senior product manager of global market solutions for digital signage display provider Christie, told Digital Signage Today.

“It really depends on the environment, the use and the need for design flexibility,” Clipsham said. “If the viewers of the content will be located close to the panel, then a UHD LCD display will probably be the best option. A larger LCD-based video wall is an option with a lower price, but the bezel will show.”

Key considerations when selecting the best technology for a given installation, Clipsham said, include design flexibility, physical footprint, ease of installation, image quality, ambient light tolerance, reliability, ease of maintenance and cost.

**Older technology offers new opportunities**

We all remember the LED displays mounted on the side of the local bank, displaying the time and temperature. Those displays typically have featured a very low resolution, but because the conveyed a limited amount of information the resolution wasn’t as critical.

As technology has improved, though, the distance between individual LEDs – known as pixel pitch – has become smaller, resulting in significantly greater resolution and opening up opportunities for large-format deployments.

“As LCDs get larger and larger, with 84-inch screens becoming popular and 98-inch screens being available and 105-inch screens hitting the market, LCDs are encroaching on some of the LED opportunities,” said David Kaszycki, marketing coordinator with LG-MRI. “And as LEDs go from 1.9 mm pixel pitch to 1.5 mm and 1.2 mm, they are starting to encroach on some of the outdoor street-level and indoor opportunities.”

In addition, the way LCD screens are manufactured today, those screens are constrained to a 16x9 aspect ratio. LED displays, on the other hand, can be manufactured in any shape desired, greatly expanding the creative opportunities.

The image on an LED displays looks uniform even when viewed off-axis, making them ideal for applications where viewings might be looking at the screen from a variety of angles. Increased contrast ratio means the content displayed looks vibrant even in a high ambient lighting scenario such as a window display or sports stadium.

The lower power consumption and reliability of LED displays generally means that the operating costs of an LED display are generally lower than their LCD counterparts.
“In addition, the price of fine-pitch LED displays has fallen dramatically,” said Kurt Tsai, LED display product director with Taiwan-based Macroblock, a provider of fine-pitch LED display drivers and other products for digital signage displays. “As a result, they have become much more affordable for use in indoor applications to replace LCD video walls.”

On the other hand, LCD displays still have an edge when it comes to displaying a sharp picture.

“LED displays are lower resolution, which means they are fine for viewing from a distance but not so good for closer up,” said James Henry, CEO of Morgan Hill, California-based digital signage solution provider Digital View. “LCD can be very high resolution so they are great for close-up viewing. Still, LED resolution is increasing.”

So to answer the question of which type of display is the better choice, the general answer is “it all depends.” The best advice is to find an experienced digital signage partner who can help a potential user make the right decision.

“We are approaching the point where eventually LEDs are going to be approaching LCDs in price, performance and pixel pitch,” Kaszycki said. “They are both good technologies, but they both have different uses.”
Although most early digital signage deployments relied on Ethernet cables to deliver content to the screen, today some sort of WiFi connectivity is virtually a requirement.

Not only does WiFi connectivity offer a cleaner, cable-free installation, it allows for deployments in situations where laying additional network cabling may not be an option, such as a leased property or a historic building. In addition, wireless connectivity allows for the easy re-arrangement of a deployment.

For many deployments, that connectivity is being accomplished via the 3G/4G networks operated by most cellular carriers. Cellular connectivity allow end users to place digital screens in far-flung locations where it may not be feasible to deploy a hard-wired network or the type of WiFi connectivity most of us have in our homes and offices.

The widespread availability of 3G/4G networks has made cellular connectivity a viable option for virtually any type of digital signage deployment. As access has increased, prices have come down, making this network choice an affordable one.

And in cases where credit card or other sensitive information may be transported over the main network, cellular connectivity offers the capability for remote management of the deployment without raising the PCI concerns of sharing networks.

In one innovative combination of digital signage and cellular connectivity, drivers in Sydney, Australia, can now rely on unique electronic paper signs deployed by the Australian Road and Mari-
time Services. The signage developed by the European company Visionect, uses electronic ink, a technology best known from e-book readers and smart watches.

The signs communicate over the cellular network to display information about road conditions.

“The hardware components are managed by server software programmed to ‘wake up’ the sign for certain pre-scheduled windows of time when the content on the sign will be changed using 3G technology,” Rok Zalar, Visionect’s head of product development, said in the announcement. “Outside of the ‘waking’ time, the traffic signs use no power.”

**Is the media player a vanishing breed?**

When digital signage first hit the scene, content was controlled by dedicated computers not much different than the standard desktop PC. Eventually, specialized media players became popular, incorporating specialized graphics chips that ensured none of the player’s computing power went to waste.

Over time, the size of those players shrunk until eventually, they could be mounted on the back of the screen itself.

Another change is brewing in the market that has the potential to make the media player obsolete. System-on-Chip (SoC) devices are grabbing an increasing amount of market share, with SoC displays now taking 8 percent of the digital signage marketplace.

The concept behind a SoC display is simple. The media player is built into the screen itself, providing digital signage functionality without the need for an external media player.

SoC displays offer a number of advantages over their media player-driven counterparts, with the main advantage being cost. Although a SoC display may be slightly more expensive than one without the technology, the difference is more than offset by eliminating the requirement to purchase an external player.

In addition, SoC displays offer a much cleaner installation, requiring mainly WiFi access and power.

On the other hand, there are some limitations on the type of content that can be driven by SoC devices. While they may be more than capable of displaying many types of multizone content, some things such as simultaneous multiple video playback, interactivity and 4K content may be beyond their capability.

“My opinion right now is that as the SoC display technology continues to gain traction, the likes of Samsung and LG are going to have a significant impact on the sales of digital signage media players … and subsequently other commercial display manufacturers that do not offer SoC displays,” Drew Harding, head of sales & marketing at UK-based Eclipse Digital Media, said in a blog posted
on Digital Signage Today. “As the SoC technology matures and even more functionality and features are brought to market, I expect more and more businesses will realize the benefits of digital signage and choose to implement a SoC based network, especially as the majority of signage projects are for small projects, up to 49 displays.”

The software
There are nearly as many different types of software as there are digital signage providers, with more than 1,000 different products on the market. Still, there are some common elements as well as some key differences.

Software options range from free to expensive, with most packages offering content creation tools as well as the ability to integrate social media and RSS feeds. Some companies specialize in certain verticals, such as video walls, billboards or ad-based networks, while others offer packages that can be tailored to meet nearly any need.

In general, software comes in two breeds: on-premises or Software-as-a-Service. Many companies offer both options for their packages.

On-premises software is just what it sounds like: the end user buys the software and it resides on their system. Advantages include a single outlay of cash for the package, with the user then free to adapt it to his or her needs.

Software-as-a-Service, on the other hand, generally operates under a subscription-based model, where the software resides on the provider’s servers, communicating with the network via the Internet. Although there is typically a monthly charge associated with SaaS, users typically can access a much more powerful set of tools at a lower cost than they would by purchasing the software outright.

Other advantages include access to the latest version of the software without having to worry about installing updates or software patches. In addition, the cost of adding additional locations is lower, allowing companies to expand their networks while preserving capital.

On the downside, if network access is down the deployment is likely to go down as well.

WebOS
In an effort to capture the best of all worlds when it comes to digital signage software, LG is offering WebOS, a package that promises intuitive user experiences, simple customization, easy connection and convenient management.

With LG WebOS, end-users eliminate the need for external media players, simplifying installation and maintenance. The plug-and-play solution requires only a network and a code and then end-users are ready to display their content.

End-users have the choice to either run the system as rental subscription (SaaS) or as a self-owned installation on a server, needing only an Internet connection.

Among the key benefits to content providers and app developers are the flexibility and ease-of-use of WebOS for Signage, meaning faster development and more seamless integration, said Clark Brown, digital signage vice president for LG Electronics USA.
“But even more importantly, the WebOS platform is a high-performance system-on-a-chip approach with powerful capabilities that can actually reduce the total cost of ownership,” Brown said. “Beyond providing customized and functional solutions for business owners and system integrators, LG’s WebOS for Signage enables a variety of Web-based applications across multiple platforms, including Linux, Android, iOS and Windows, as well as the ability to write applications using HTML 5.”
Up-and-coming trends

Probably the biggest trend to emerge with digital displays in the last few years is in the area of resolution. While 1080p is currently the most common resolution, 4K, or ultra-high definition, is one of the most talked-about developments taking hold, with 8K already making inroads.

“Global shipments in 2014 of UHD panels aimed specifically for digital signage purposes will reach an estimated 145,000 units, up a colossal 590 percent or nearly sevenfold from just 21,000 units last year,” said analysts at Englewood, Colorado-based research firm IHS. “The tremendous surge of the market is the first real growth for digital signage displays featuring UHD — also known as 4K because the panels feature four times the resolution of full high-definition 1080p panels.”

Although a 4K display shows the same image as a 1080p display, it crams in much more information, resulting in a sharper image on a larger screen.

Of course, that increased resolution comes with an added cost, not only for the screen itself but for content development, increased storage needs and higher bandwidth requirements.

The types of applications that can benefit from 4K include wall-mounted or in-store displays where the viewer may be only a few feet away from the screen.

“How far away is your audience standing from the sign?” asked Doug Bannister, CEO of Concord, Ontario, Canada-based digital signage software provider Omnivex Corporation. “If you’re 20 feet away and looking at a 50-inch screen, a lower resolution is just fine. But if your viewers are up close, you may want to consider a 4K display. The key question is whether the added cost of going to 4K is worth it for that application.”

Walls of wonder
As the price of displays and software has come down, the popularity of video walls has increased. While a single screen can be impressive, a wall of multiple screens — as many as 25 in some projects — can take the experience over the top.
More intricately designed, the technique tiles together a number of monitors to create one large display. Video walls are comprised of two main components: content and hardware.

Organizations considering a video wall often believe that it’s necessary to have discrete control of each screen in the display. That’s not always the case, however. It’s possible to create an impressive video wall under the control of a single PC. But as the content displayed on the wall becomes increasingly more complex, so too can the array of PC or media appliances needed to control and deliver that complexity.

Media players connected via Ethernet cable in a master-slave configuration, with the master player synchronizing content among the individual screens, offers a host of opportunities to make content more engaging. Screens can even be divided up themselves to add zones. Items such as tickers, clocks or other images can complement the main video.

**The interactive experience**

With the increasing popularity of smartphones and tablet computers, consumers are beginning to expect that if a digital display is within reach that display will react to touch.

Several types of technologies deliver a touch experience, but in their most basic form interactive displays involve pressing an onscreen button to facilitate a response. Typical uses involve wayfinding or kiosk-based catalogs; such uses have proven to be popular with consumers and are likely to continue to grow.

Taking it one step further are multitouch displays that react in a manner similar to an iPad or other touch-enabled tablet. Still, at present there aren’t many uses accomplished by multitouch that can’t be accomplished by a single-touch screen.

In addition, the use of a multitouch screen is likely to require a certain amount of education for the user.

As a result, screens that incorporate multitouch generally are being used in niche environments such as hospitals where trained people are using specially designed applications. However, some retailers are experimenting with multitouch, and where it goes from here likely will be governed by consumer adoption.

Thanks to the Microsoft Kinect gaming technology, the next extension of touch-enabled displays involves gesture controls. One of the most interesting use cases of this technology is in a hospital operating room where a doctor may want to manipulate an image on a screen but already is scrubbed in for surgery. In other settings, at present, gesture control tends to be either a novelty or a solution in search of a problem.

Other types of interactive controls are technologies such as barcode scanning, where a consumer might scan a barcode on a particular product to prompt the digital sign to display more
information about it, or RFID, where a product has a radio frequency tag that elicits a response from the screen within a certain distance. Picking up a certain shoe from a shelf might prompt a screen to display additional information about that shoe.

Nearly everyone is familiar with barcode scanning and RFID from the grocery store, and uses for such technology are likely to grow.

**The interactive mirror**

One of the biggest opportunities for fashion retailers to create additional revenue is by targeting their existing customers via add-on sales. Although selling that expensive dress or pair of pants is a great way to add revenue, the profitability of that item is enhanced when combined with a pair of shoes, a belt, scarf or other high-margin item.

Retailers already employ a number of ways to suggest add-on items, but each method has its own weakness. Printed material can generally only be used to suggest the most generic items. Some shops are incorporating point-of-sale systems that suggest add-ons targeted to the items the customer is buying, but those solutions have the drawback of interrupting the checkout process.

Developments in digital technology are changing the way retailers suggest add-ons, offering the ability to target supplemental items specifically targeted to enhance the customer’s main purchase.

Imagine a scenario where a shopper in a clothing store tries on a particular outfit in the fitting room, and as they do they are automatically presented with suggestions for items specifically targeted to their main purchase.

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**Rolling video wall rolls into University of Nebraska Omaha library**

Christie and AVI Systems teamed up to create a movable four-unit-by-one-unit LCD interactive digital display wall at the University of Nebraska Omaha, according to an announcement from Christie.

Built on casters for easy mobility, the multitouch video wall is designed to give students the opportunity to experiment, play and create what was previously unavailable to them — and they are taking full advantage by designing gaming videos, working on school projects and “spray painting” the wall using Graffiti Wall software.

The display wall was built for the school’s Dr. C.C. and Mabel L. Criss Library, the school’s primary source for academic information, the announcement said. Library Director of Patron Services Joyce Neujahr said in the announcement she was searching for something “unique and different” that was not already on campus. Her interest was piqued when she read about the Christie installation at North Carolina State University and took in the Christie MicroTiles at Nebraska Omaha’s Barbara Weitz Community Engagement Center.

Neujahr said the video wall’s mobility was a big selling point for both the Dean and the Chancellor — who she said appreciate and love the wall and its technology, thinking it is money well spent. Using the Christie wall, the library has “Throwback Thursdays” where archival photos are shown and also shows videos on Tuesdays, which are quite popular, according to Neujahr.

“One week we had eagles with their eggs hatching, and then the mother feeding them and another time we had newborn puppies - that sort of thing usually drives a lot of attention,” Neujahr said. “We also had a feed from the Hubble Space Telescope circling the Earth with live streaming video. I think that’s been a popular use of the wall — the live streaming event. The multitouch screens are also frequently used and is a feature which influenced our purchase.”
designed to complement that outfit. Those suggestions are displayed on the fitting room’s mirr- or, with the customer’s choices detected by RFID tags attached to the clothing.

A customer trying on a suit, for example, could be presented with suggestions from the store’s inventory for a matching pair of shoes along with a shirt and tie. Someone trying on a dress could be presented with suggestions for shoes designed to match that dress along with choices for a handbag or other accessory. In those cases, not only do the chances of the store making that sale increase dramatically, the chances of the customer making additional pur- chases increase as well.

Possibilities for the technology include opt-in programs where the retailer identifies the shopper by information they enter themselves or by detection of an app on that customer’s smartphone. The retailer then has the option of suggesting additional purchases based on the customer’s previous visits.

Luxury fashion brand Rebecca Minkoff, for example, offers a “Connected Glass” mirrored in- teractive display at its New York flagship store. Customers check in when they enter, and once they make their selections, they tap a button to have their products sent to a dressing room, each of which is also outfitted with the mirrored touchscreens. Once in the fitting room, a shop- per can still browse the online catalog, and request that additional items be brought to them.

The shopper also has a high level of control over the ambient lighting inside the fitting room.

“Every woman hates walking out of a dressing room half-naked in search of a sales associate for another size or style, which is why I’m so excited about the magic mirrors in our dressing rooms,” Minkoff said in a statement. “My customers will be able to virtually connect with their stylist through the mirror’s touchscreen technology for anything they need ... whether it’s another size or a glass of champagne.”
Up-and-coming trends

In the past few years, social communication has become part of the digital signage landscape. Interaction is all part of one of the newest strategies for making digital signage more relevant to users. In this age of around-the-clock news, rapid rewards and instant gratification, consumers also want constant connectivity. And they want it in every facet of their lives.

As users of digital signage look for new ways to make the technology more valuable — to themselves and to users — they see opportunity by using and mimicking the concepts of sites such as Facebook and Twitter. Social media and networking have become so pervasive in people's lives; software developers see its integration into the signage medium as a logical step forward.

Social-enabled screens can serve a multitude of functions. For instance, some bars are using screens to stage interactive games for visitors who can play against other patrons — whether they are at the same location or elsewhere in the country — by texting answers to the screen with their cell phones. They're also using signage to instantly feed in Twitter messages mentioning certain words or phrases — like the name of the pub or a specific beverage, for example — that would resonate with those inside the establishment. Customers can even send their own messages and photos to be shown on the screen.

All the material, of course, winds through filters that ensure only appropriate content is posted.

Bars and similar establishments where people congregate socially were seen initially as the most common spots to use the technology. However, signage software designers anticipate the strategy expanding to other sectors, some of which are beginning to inquire about integrating the approach into their venues.

Besides physicians' offices, sporting arenas are considering implementation where fans can post comments about a game or their team from inside the stadium, and government agencies are weighing how to get residents more ingrained in the functionality of their elected leaders.
But some analysts say they believe winning more widespread acceptance will simply take time, noting that the social media platform is still relatively new to the digital signage industry.

Also on the horizon are mobile connectivity solutions that leverage the computing power many people now carry in their pockets.

Examples include QR codes that take a user to a particular website when he or she snaps a photo of the code with a phone, or near-field communication applications that communicate with a viewer’s phone for applications such as mobile payments. One of the main roadblocks to QR codes, along with their not-so-attractive appearance, is the fact that consumers have to download an application to use the codes. Hampering NFC is the fact that a user has to actually touch their phone to a reader. While this would be fine in a digital payment checkout scenario, it is unfeasible in many digital signage installations such as airports, food courts, or anywhere screens are being viewed by people spread out over a large area.

A host of other mobile integration technologies are under development, with many leveraging Bluetooth or similar technology to deliver content to or accept payment from a user’s smartphone. Most of those will involve a significant investment on the part of the retailer, so the spread of those technologies is likely to depend on how retailers view the potential return on investment.
CONCLUSION

On the horizon

Although digital signage remains in its infancy, the technology continues to evolve quickly. Developers routinely find new ways to make screens more efficient, more vibrant and more cost-effective.

“New technology translates into one thing: new opportunities,” said Dan Smith, director, commercial products, LG Electronics USA. “New opportunities to serve your customers, new opportunities to break new ground and — last but not least — new opportunities to get a leg up on the competition. If end users can recognize these new technologies as they develop and harness their power and meld them to somehow meet consumer demand, they’ll be in a very enviable position as the future unfolds.”

New technologies generally do one of three things; replace the existing technology at higher performance, replace it at a lower cost or create a new product category. Any one of these three actions will cause a market and application shift expanding existing markets or creating new markets. With an eye on these trends, you can lead your customer to more impactful ways of doing business.

Interactivity and targeted advertising

If there’s one thing industry experts agree on, it’s that interactivity — the ability of the consumer to manipulate the digital display — is becoming an increasingly important feature on digital signage.

Digital touchscreens and interactive kiosks are everywhere, ranging from the self-service airport check-in kiosks to touch-activated wayfinder displays in colleges and universities. But Tim Buchholz, senior vice president of corporate communications for Point of Purchase Advertising International, an international trade association based in Washington, D.C., says he expects those displays increasingly to target customers based on their interactive choices.

Where are you headed?
In fact, he says he believes the time may come when a display will be able to size up a prospective customer as soon as he or she walks into the room.

“I also think there will be interactive devices that will be able to understand the demographics of a particular individual who might be passing by a digital sign and be able to serve up information very targeted to the demographic of that individual,” Buchholz said. “Facial recognition and stuff like that, I think, will be quite advanced by that time, and they’ll be able to send out demographic information and basically have it served up on demand without that person’s interaction with it at all, except their being in proximity to the display.”

He says having this ability will be critical for marketers in the future because today’s consumer is becoming very adept at ignoring random advertising.

**Transparency**
Looking into the future, users of digital signage will find opportunities in see-through technology.

The technology itself isn’t particularly difficult; it typically involves removing the backlight from an LCD display and mounting the lighting in a frame along the side. The displays can transition from complete transparency to displaying graphics or animation, allowing the products to appear and disappear before customers’ eyes as the display changes from transparent to opaque.

The capability to combine digital signage with a glass wall expands options for end-users and architects. Both the content and the product behind the window are visible, allowing the digital display to augment the physical display and add messaging or information simultaneously.

The approach creates a new shopping experience by displaying graphics in ways that coordinate with the store interior or goods on display.

The displays are hailed as a creative way to advertise and promote products near the point of sale. Such systems generally consist of the transparent LCD, an LED lighting system and a video server. Transparent LCD panels use ambient light, which reduces the power required to operate the screens since there is no backlight.
Companies can run content almost anywhere they can fit a screen — on retail displays, on the doors of standup coolers and on glass museum cases. Screens already have made their way into some retailer settings and convenience stores.

One of the more popular applications of transparent displays is mounted in the door of a supermarket cooler. An ice cream case, for example, can attract consumers with full-motion video playing on the door while allowing viewers to look through the door and see the contents inside.

But while transparent screens work well in the movies, in reality the concept has a few drawbacks. A transparent display exposes what may be located behind the display, including cables, mounting solutions and power outlets. In addition, high levels of surrounding light can end up washing out the image on the display.

“Transparent screens can be good in terms of getting people’s attention and can be great for applications such as refrigerators, windows and display cases,” said Omnivex’ Bannister. “But are you using the technology to solve a problem, or are you simply using it for the sake of the technology?”

**OLED**

One of the hottest emerging trends in digital displays are OLED TVs, or organic light-emitting diode televisions. Unlike LED displays, which are actually LCD displays that use LEDs as a backlight, OLED displays use a thin film that can emit light when a current is passed through it.

In an OLED TV, red, green, and blue OLED materials are sandwiched together, creating a white light that is then passed through a color filter to create each pixel. Displays manufactured by LG also include a white film that when passed through a clear filter creates white light, adding additional brightness and increasing efficiency.

As a result, OLED TVs are thinner, lighter and more energy-efficient than LED backlit displays. Pixels can be shut off completely to create an absolute black, meaning an infinite contrast ratio. OLED TVs can be as thin as a quarter of an inch or less and weigh just a fraction of an LED backlit display. The viewing angle is much better than an LED backlit displays, appearing essentially the same even at extreme angles.

In November 2015, LG’s flat OLED 4K TV, model 65EF9500 was named “Best Television of the Year” by USA Today for the second year in a row as well as being named “Best 4K Television.” The designations were based on extensive lab-tested reviews and expert technical analysis.

And display manufacturers have begun to introduce transparent OLED displays that can show content on a nearly frameless display while allowing viewers to see through the display as well.
The technology offers countless opportunities for see-through window displays and interactive dressing room mirrors. And because OLEDs can be flexible and made in any shape, tabletops, walls or even the sides of a building could be made of such displays.

As with most new technologies, OLED TVs are more expensive than LED displays, but prices continue to fall. OLED is a legitimate contender as the dominant display technology of the future.

**The last word**

Deciding if digital signage is a good investment means answering a few simple questions: What are the company’s needs? What messages need to be communicated to prospective customers? How often do they need to be conveyed? How can the company best reach consumers where they are?

Once companies know what they want their messaging to achieve, they can decide if digital signage is the right medium. And knowing the basics of the technology will help ensure deployments are appropriate, impactful and cost-effective.

“I don’t want to put down traditional media like posters, print ads and banners, because I think that there will always be a place for such mediums,” said Dan Smith, director, commercial products, LG Electronics USA. “But the problem with print media is it quickly becomes outdated. That poster advertising the orchestral concert becomes worthless the moment the curtain is drawn. Then you have to spend additional dollars to create the next poster, and you have to send someone to take down the old one — and quickly, before people start to ignore that ad space.

“Compare that with digital signage, where content can be changed and updated at the click of mouse,” he said. “It’s all in realtime. That’s the greatest advantage.”