Nanolumens®

Digital Signage Total Cost of Ownership: LED vs. LCD

Exploring the relationship of price and performance with digital display industry professionals.

Contents

Fast Facts

Launch date: 11/7/18
Close date: 2/8/19
Questions: 24
Respondents: 454
Hosting: Surveyhero
Participation rate: 18%
Completion rate: 96%
Avg competion time: 6:27

Total Cost of Ownership Report: LED vs LCD

Executive Summary

Hoping to explore the relationship between price and performance in the minds of digital display industry professionals, Nanolumens conducted an industry-wide survey centered on total cost of ownership. Explicitly, the survey aimed to discover what industry actors believed about LCD and LED display technologies, what their experiences with each technology were, and what they believed the future might hold. Implicitly however, the survey was designed to see if industry members could put together a puzzle for which they'd long held the pieces.

As we had hoped, this survey provided a diverse glimpse at the experiences of industry experts as well as how these experiences influenced their priorities, judgements, and expectations. One key finding revealed a discrepancy in the way industry experts perceive their values versus the values of their customers. The data seems to indicate that while the most experienced people in the industry believe performance trumps price, these same people presume that customers actually believe the opposite. Why might that be? What can be done to address this perceptual conflict? Who is actually right? This report endeavors to answer these questions and many more with analysis of survey data, industry trends, and technological realities. The puzzle pieces are on the table; this report helps readers assemble them.

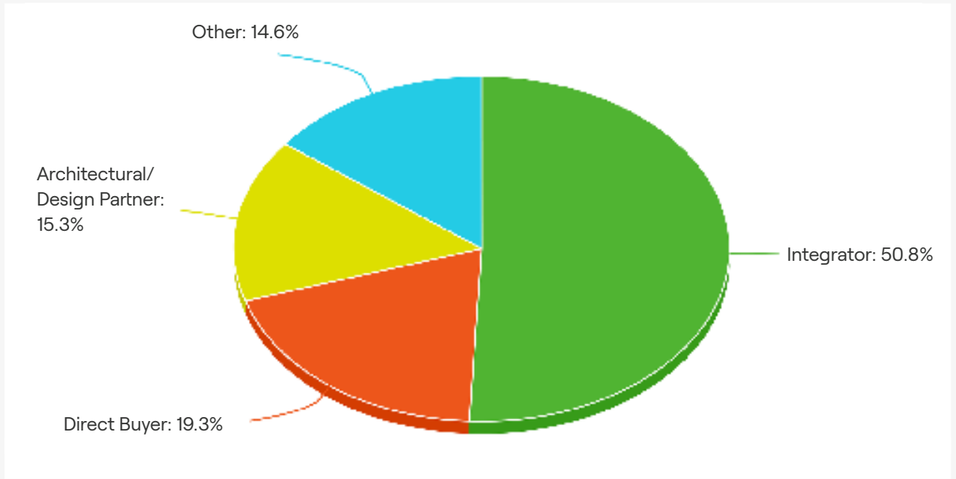
Inquiring minds can find detailed background information on the nature of the survey and why we conducted it starting on the 19th page of this report. What follows immediately are the results and conclusions of the study.

Results

INTEGRATORS COMPRISE MAJORITY OF RESPONDENTS:

Integrators account for 50.8% of the sample, with direct buyers, architectural and design partners, and "other" accounting for the remainder.

In regards to videowall technology, are you a direct buyer, integrator, or architectural/design partner?



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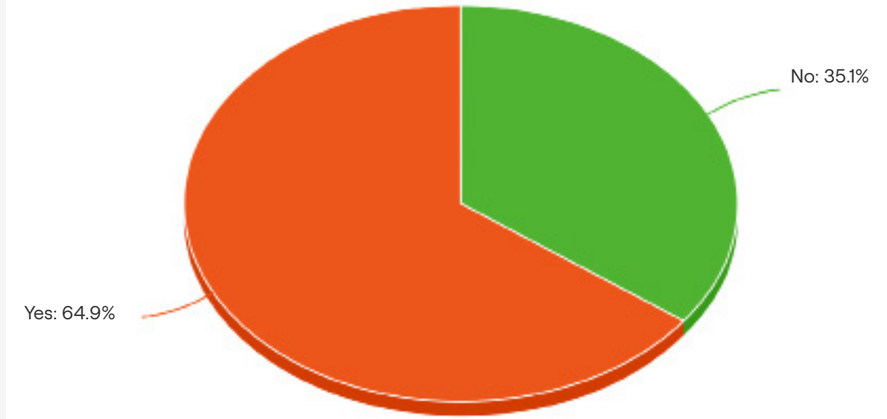
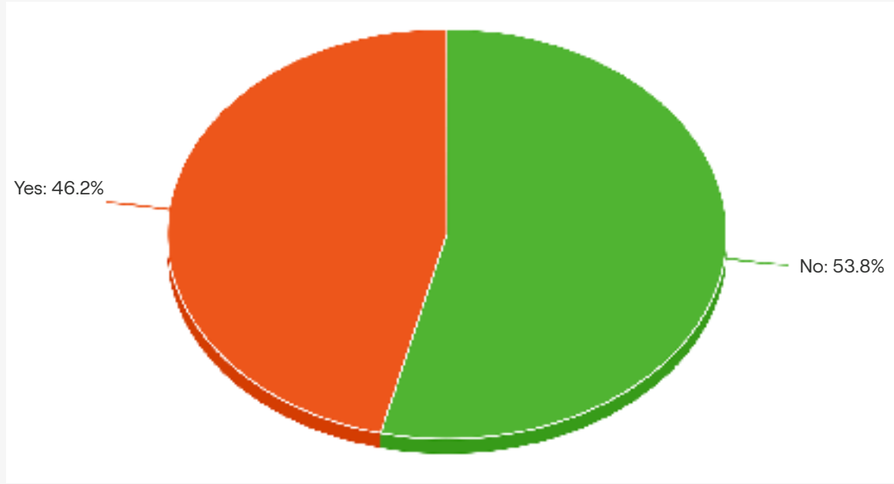
LCD EXPERIENCE IS MORE COMMON

Experience with LCD displays is more common, an expected result since LCD displays themselves are more common.

Have you ever purchased and/or specified an LCD videowall?



Have you ever purchased and/or specified an LED videowall?



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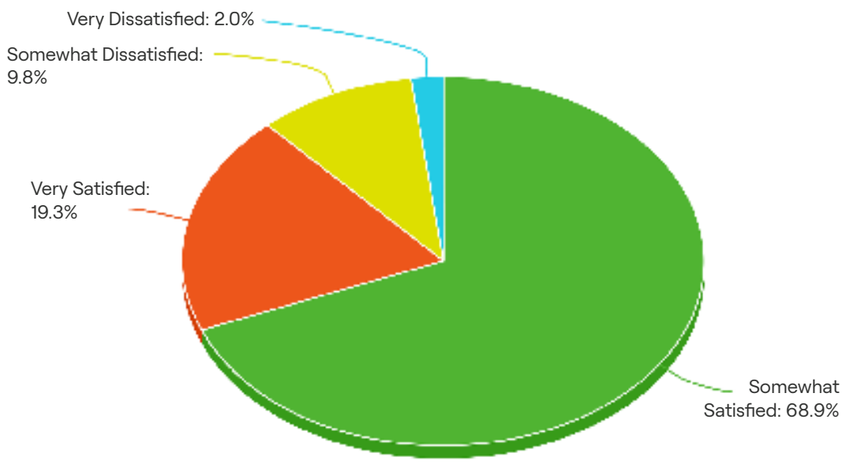
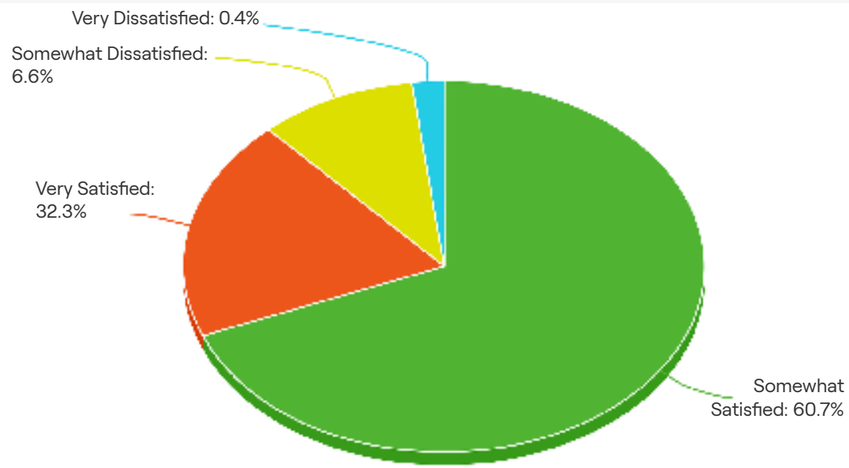
SATISFACTION WITH BOTH TECHNOLOGIES IS SIMILAR

Though fewer people have experience working with LED displays, those that do claim to have had a slightly better experience, on average.

How satisfied are you with current commercial LCD display technology in the market?



How satisfied are you with current commercial LED display technology in the market?



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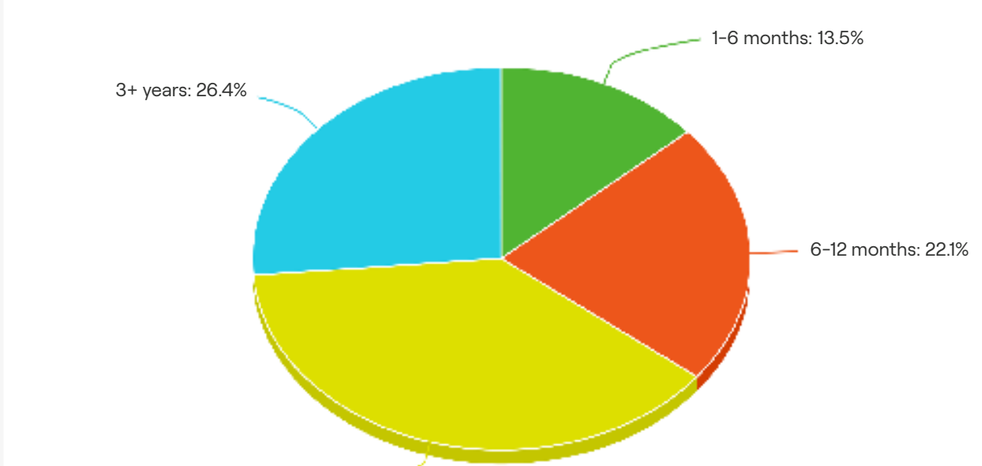
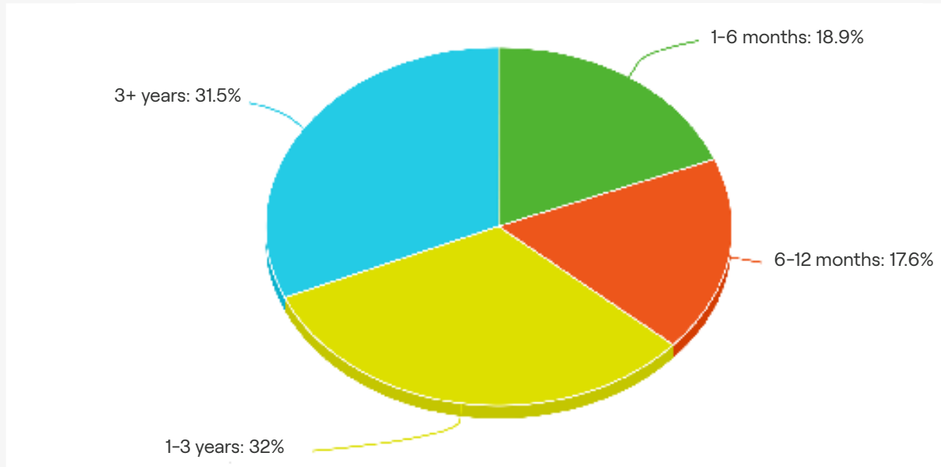
SERVICE ESTIMATIONS ARE SIMILAR UNTIL THE TECHNOLOGIES ARE COMPARED DIRECTLY

Among those who had worked with LCD and LED technologies, experienced rates of service were fairly equal. Experts also roughly experienced similar times until first failure.

In your experience, how long did the LCD videowall(s) last before a failure or complication occurred?



In your experience, how long did the direct view LED videowall(s) last before a failure or complication occurred?



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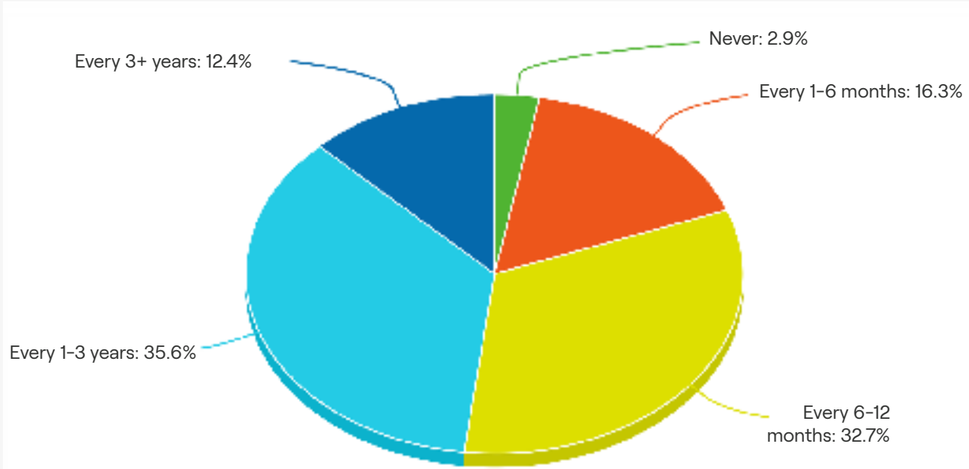
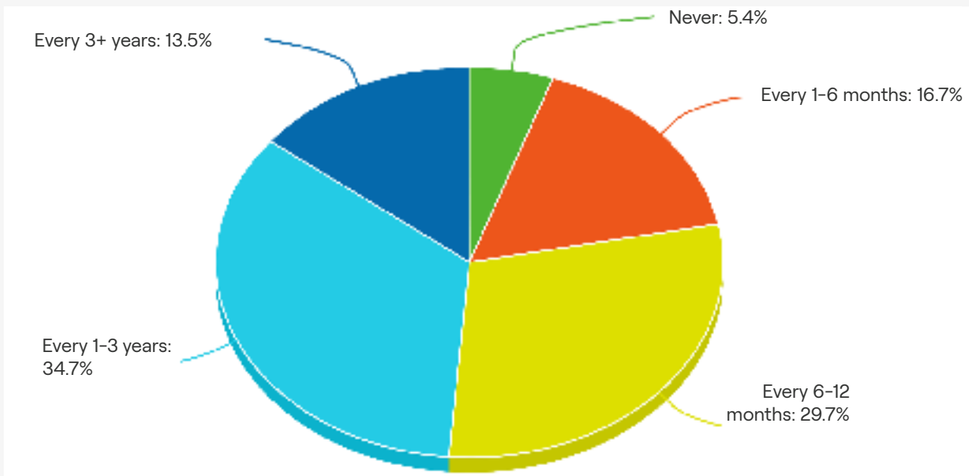
SERVICE ESTIMATIONS ARE SIMILAR UNTIL THE TECHNOLOGIES ARE COMPARED DIRECTLY (2)

In your experience, how often do LCD videowalls require service?



In your experience, how often do direct view LED videowalls require service?



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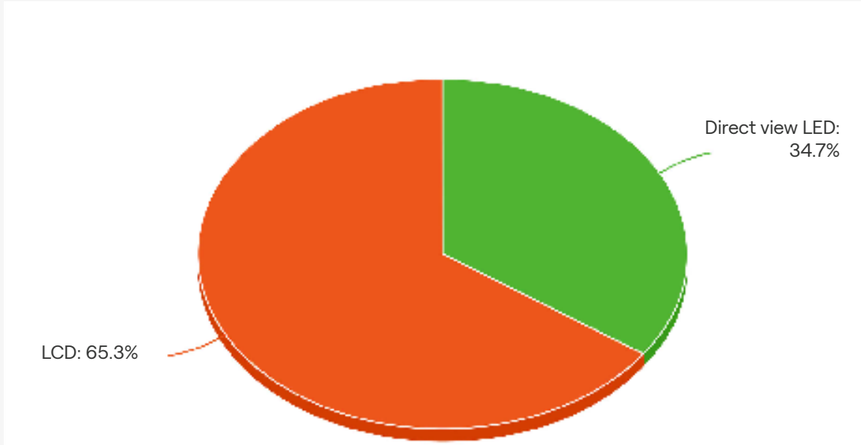
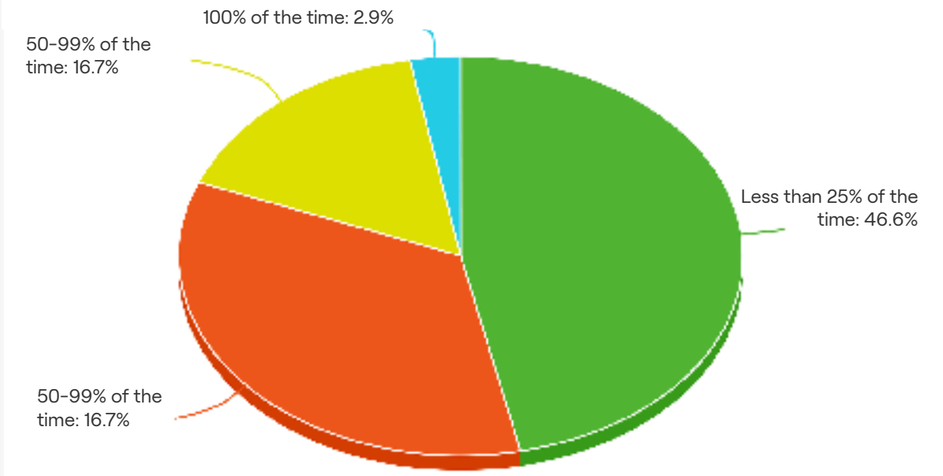
SERVICING RATES ARE SIMILAR, BUT ISSUE SEVERITY IS NOT

When asked to make an explicit choice between the two, experts chose LCDs as the more troublesome product by a two-to-one margin.

In your estimation, which videowall technology requires more maintenance?



In your experience, how often does an LCD videowall malfunction result in product replacement (instead of repair or spare components)?



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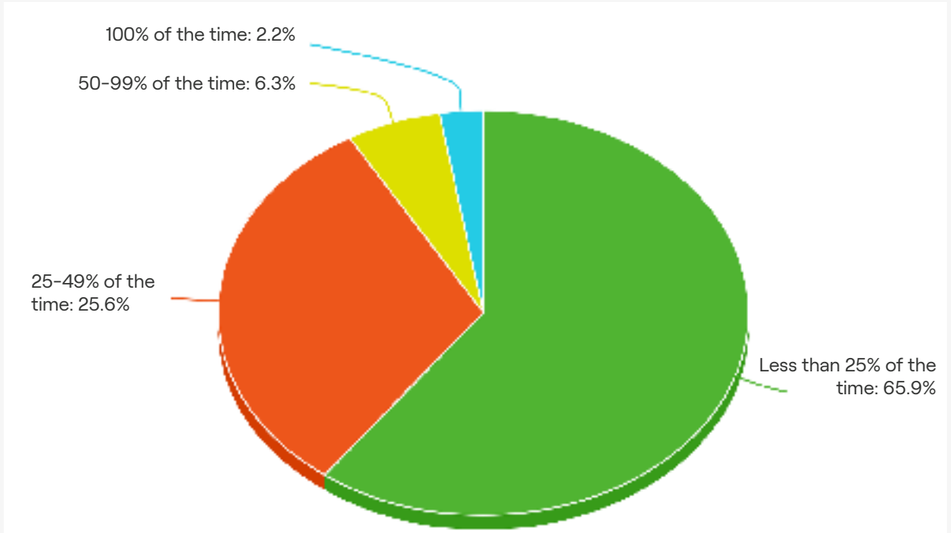
SERVICING RATES ARE SIMILAR, BUT ISSUE SEVERITY IS NOT (2)

In your experience, how often does a direct view LED videowall malfunction result in product replacement (instead of repair or spare components)?



Noteworthy Numbers

- 46.6% believed LCD malfunctions result in replacement less than 25% of the time.
- 65.9% believed LED malfunctions result in replacement less than 25% of the time.
- 19.0% believed LCD malfunctions resulted in replacement at least 50% of the time.
- 8.5% believed LED malfunctions resulted in replacement at least 50% of the time.

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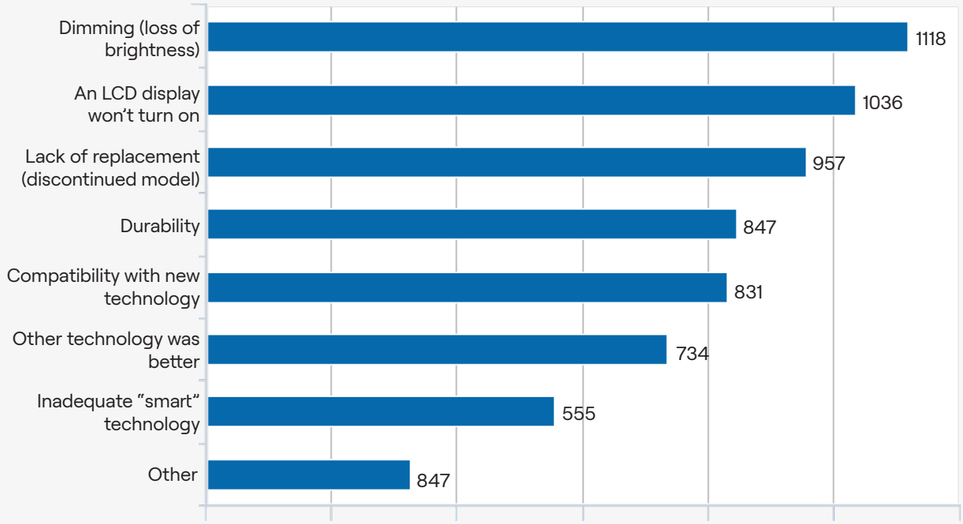
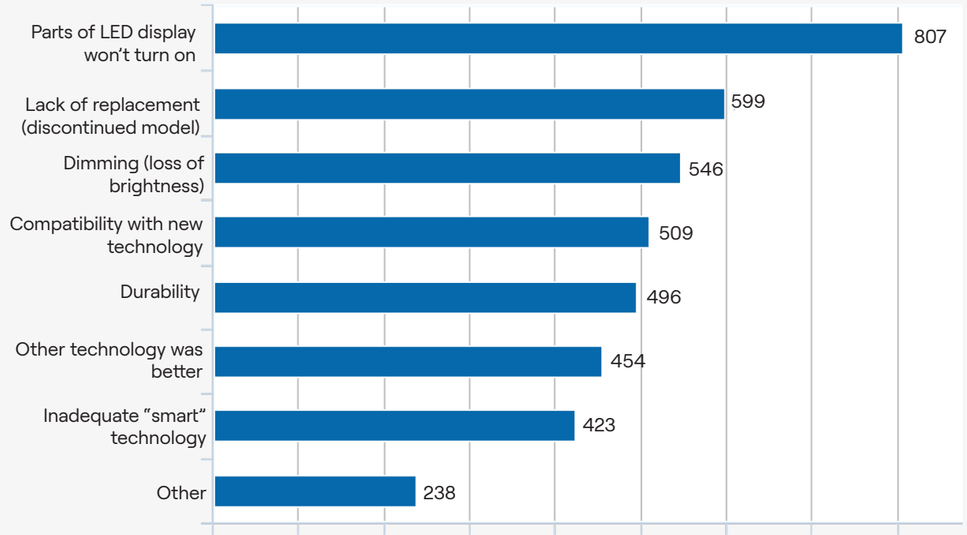
DIMMING IS DAMNING, BUT OTHER FAILURES ARE FIXABLE

By a slim margin, respondents judged dimming to be the most common reason an LCD display required replacement but were more united in ranking failure to turn on as the root of LED display replacement.

Based on your experience, rank the most common reasons LCD videowalls get replaced:



Based on your experience, rank the most common reasons direct view LED videowalls get replaced:



The "score" associated with each choice is where each choice was ranked, and how often. Following the Borda count method, an individual's top choice receives the most points, their second choice a slightly lower amount, and each subsequent choice lower and lower amounts still. This method is consensus-based rather than majoritarian, for a choice ranked #1 by half the group and last by the other half may find itself with a lower point total than a choice ranked #2 by the entire group

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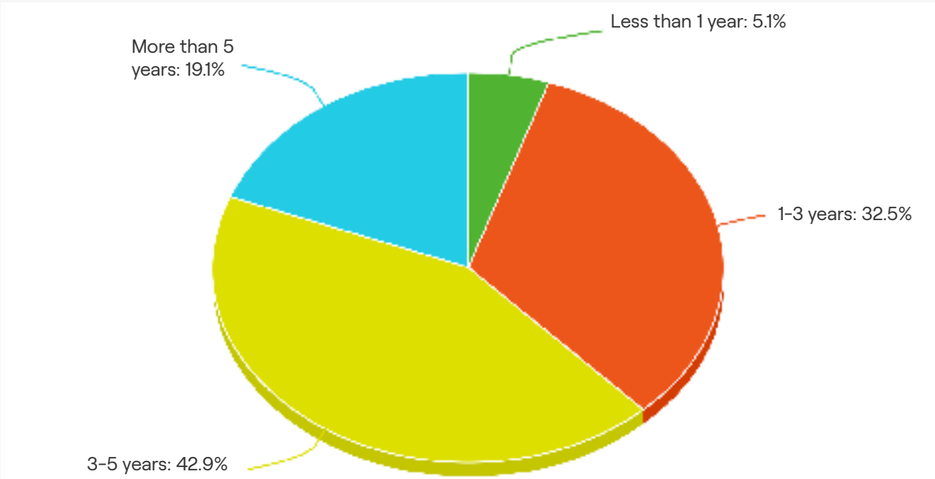
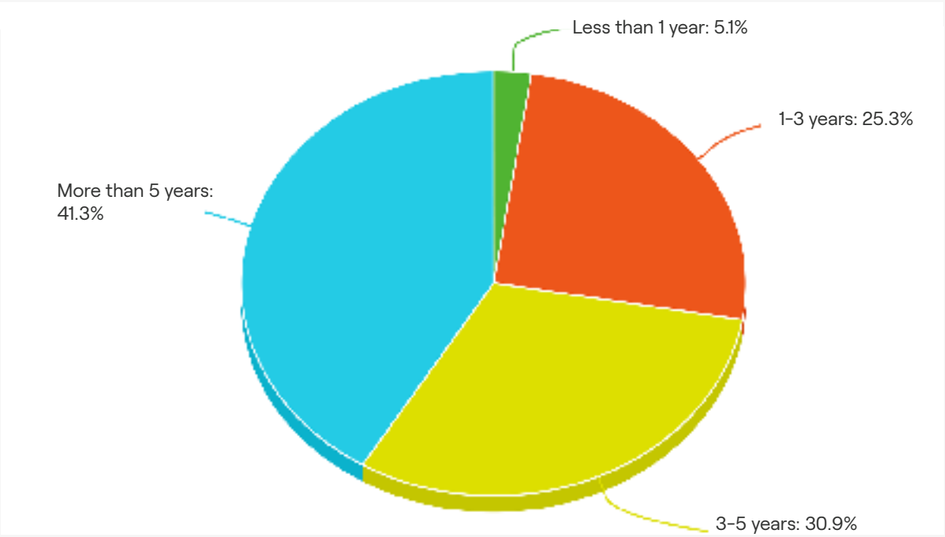
PRODUCT LIFESPAN IS A CLEAR ADVANTAGE FOR LED

A general expectation for LED's to exhibit longer lifespans is reinforced when respondents were directly asked which technology they thought would last longer.

How long do you expect an LCD videowall to last operating 24/7?



How long do you expect a direct view LED videowall to last operating 24/7?



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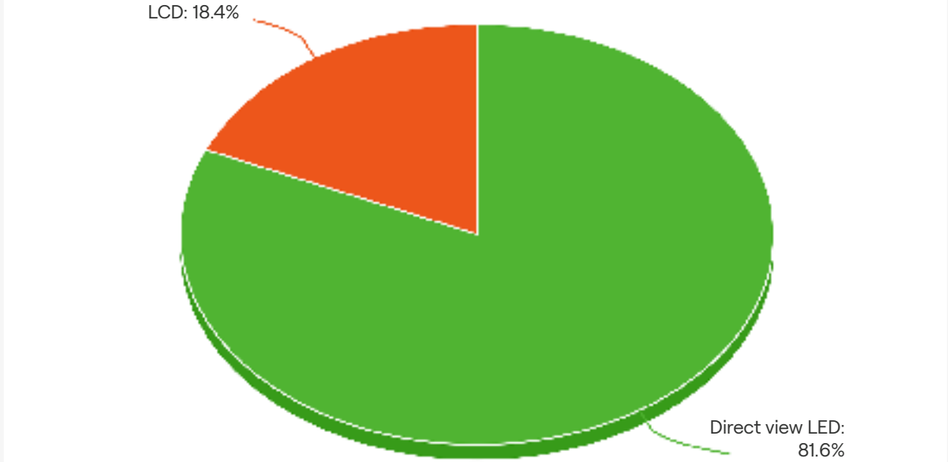
PRODUCT LIFESPAN IS A CLEAR ADVANTAGE FOR LED (2)

Which videowall technology would you expect to have a longer life cycle?



Noteworthy Numbers

- 19.1% expect an LCD display to last beyond five years operating 24/7.
- 41.3% expect an LED display to last beyond five years operating 24/7.
- 81.6% expect an LED display to have a longer life cycle than LCD.

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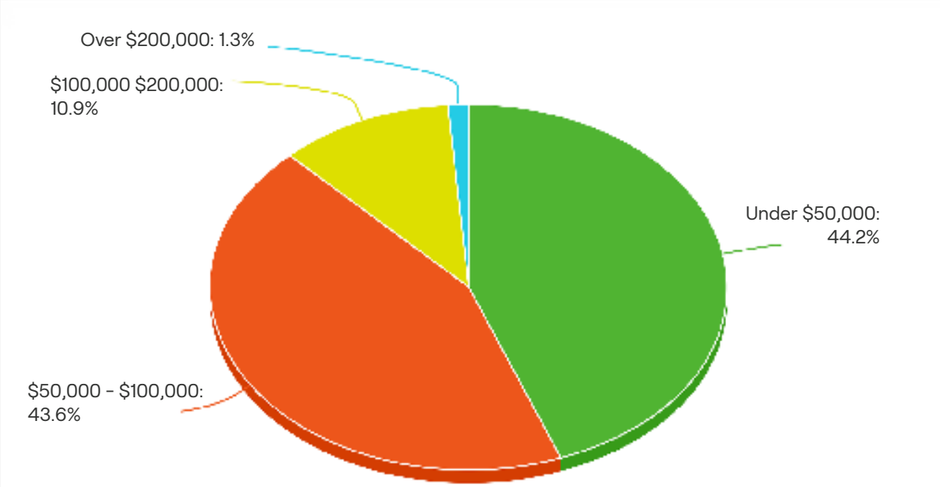
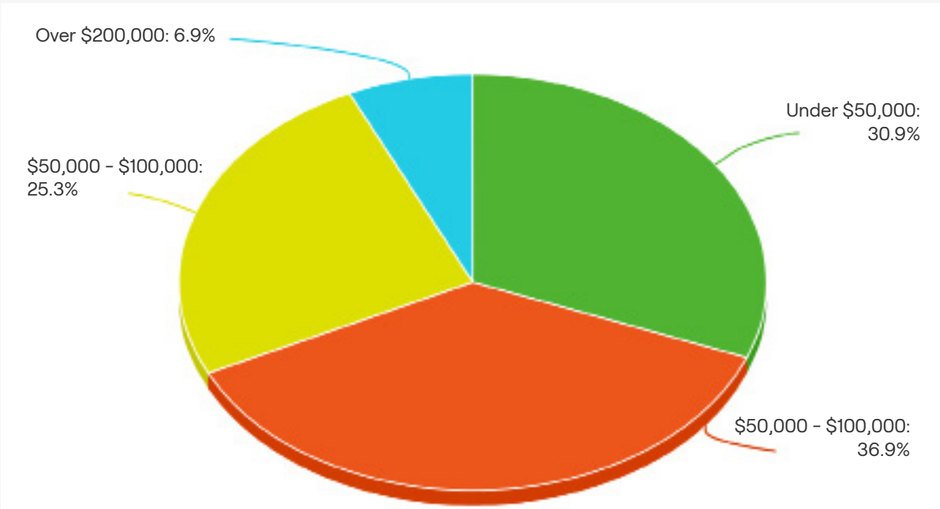
PRICING MAY NOT BE AS STANDARDIZED AS WE THOUGHT

Respondents generally expect LED to be a bit pricier, though there is no consensus for either technology on a uniform price.

How much would you expect to invest for a 150 inch diagonal LCD videowall?



How much would you expect to invest for a 150 inch diagonal LED videowall?



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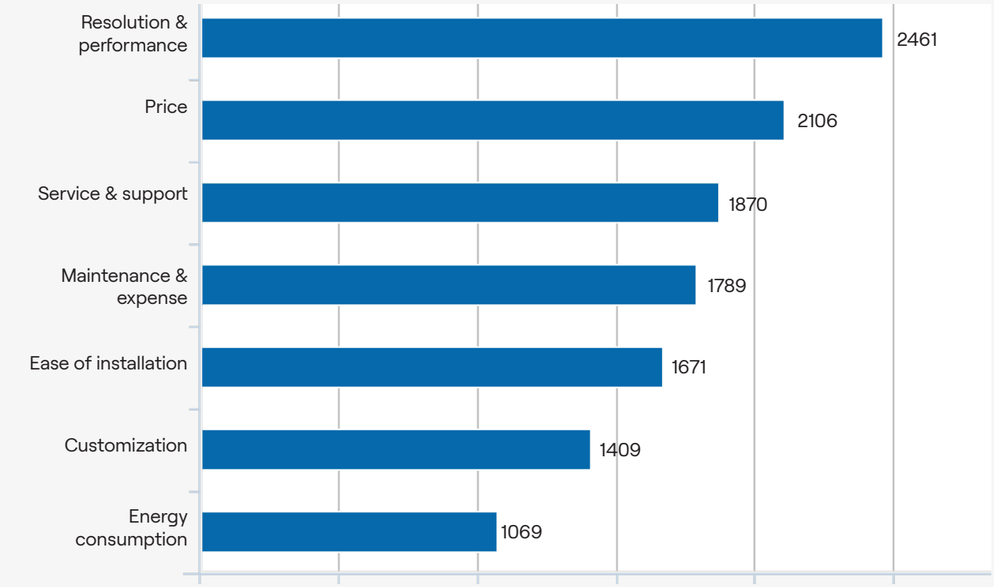
PRIORITIZATION OF PRICE VS. PERFORMANCE

While industry members ranked "resolution & visual performance" as by far the most important factor in their purchasing decisions, they subsequently ranked price as the most important factor in the increased future adoption of LED videowalls specifically. In other words, they prioritize performance, but forecast that the market prioritizes price.

Based on your experience, rank the most common reasons LCD videowalls get replaced:



The "score" associated with each choice is a function of where each choice was ranked, and how often. Following the Borda count method, an individual's top choice receives the most points, their second choice a slightly lower amount, and each subsequent choice lower and lower amounts still. This method is consensus-based rather than majoritarian, for a choice ranked #1 by half the group and last by the other half may find itself with a lower point total than a choice ranked #2 by the entire group.

Noteworthy Numbers

The second place answer was closer in score to the fourth place answer than it was to the first place answer. In other words, the top choice was ranked far ahead of the rest.

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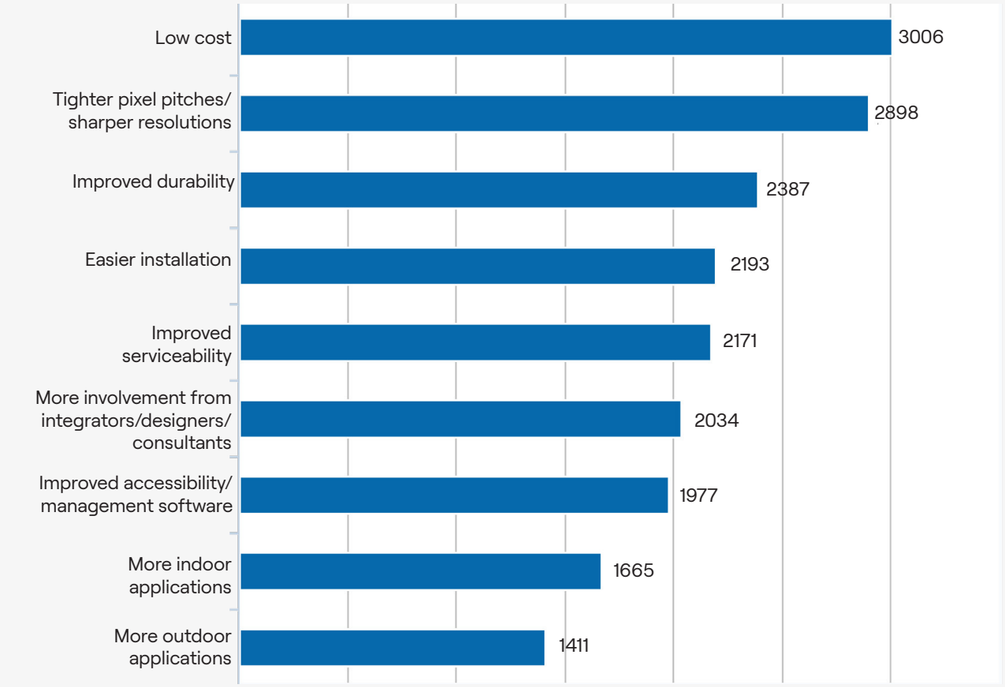
PRIORITIZATION OF PRICE VS. PERFORMANCE (2)

Please rank in order of importance which attributes would most contribute to the increased adoption of direct view LED display technology:



The "score" associated with each choice is a function of where each choice was ranked, and how often. Following the Borda count method, an individual's top choice receives the most points, their second choice a slightly lower amount, and each subsequent choice lower and lower amounts still. This method is consensus-based rather than majoritarian, for a choice ranked #1 by half the group and last by the other half may find itself with a lower point total than a choice ranked #2 by the entire group.

Noteworthy Numbers

The third place answer was closer in score to the seventh place answer than it was to the second place and first place answers. In other words, the top two choices were ranked far ahead of the rest.

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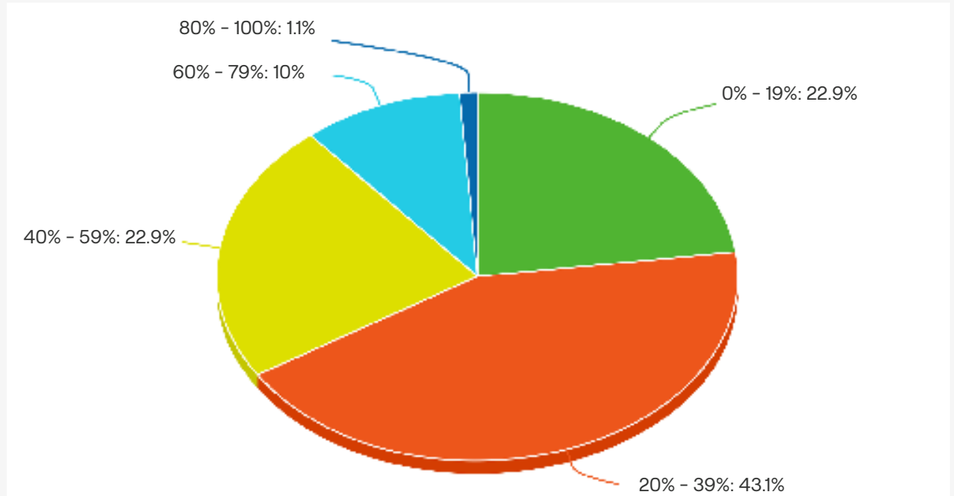
DIVERGENT EXPERTS UNITE TO EXPECT LED LEAP

Experts diverge in their assessment of how the market currently breaks down, but they unite in their expectation of what direction it's headed.

Estimate the current market share of direct view LED display tech vs. LCD:



Noteworthy Numbers

A large majority of respondents believe LED currently holds less market share than LCD.

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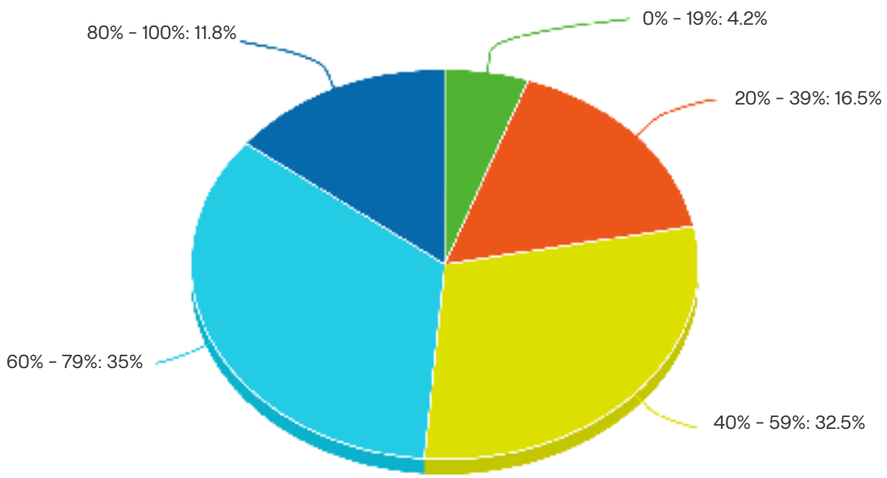
DIVERGENT EXPERTS UNITE TO EXPECT LED LEAP (2)

Estimate the market share of direct view LED display tech vs. LCD in five years:



Noteworthy Numbers

Though a large majority of respondents estimated LED currently holds less market share than LCD, this consensus flips when respondents were asked to forecast the display market landscape five years in the future.

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Conclusions

When determining where our industry stands, we are in essence determining how our industry assigns value. What do people care about? The results of this survey indicate that display industry experts assign value to longevity, durability, adaptability, and performance. The results also indicated that while these experts prioritized performance traits over a low price tag, they anticipated that customers would think the opposite. Though perhaps counterintuitive, that is at least a fair assumption. After all, the display technology that is most prevalent right now with regard to the number of our respondents who have used it is the solution they pegged as less expensive.

It's well known that LCD displays are the more common solution right now, in part because of their cheaper reputation. Their lower initial purchase prices are often cited as the reason LCD displays make a better fit for application areas like retail locations, classrooms, and conference rooms. But are they actually a better deal when it comes to total cost of ownership? Do they return customers more value? We aren't so sure and based on their answers to survey questions, we don't think industry experts are either. Naturally, exploring total cost of ownership requires asking questions about each of the elements that contribute to those total costs. One of the most fundamental contributors to total cost is, of course, service.

The Seriousness of Service

Survey data shows that while industry experts might not be sure whether the two display technologies require service at the same frequency, they do seem to recognize that LED displays are built in a way that avoids full replacement while LCD displays are built in a way that may exacerbate it. While LED displays –like those built by NanoLumens– are composed of interchangeable and interlocking subcomponent boards, LCD displays are not. This means repairs for LED products are much more likely to be quick fixes focused on the specific problem area rather than the wholesale replacements often necessitated with LCD malfunctions.

Availability of Replacement Parts

Already more expensive than the spare part swaps LED display owners can execute, LCD monitor replacement is complicated further by LCD manufacturers' tendency to sunset old model lines. Sunsetting is the act of discontinuing the manufacture of a product. While LCD manufacturers often enact sunsetting policies to keep their plants rolling out only the newest product lines, LED manufacturers tend not to for a few reasons, one of which being the longer viability of LED products. Full product replacement is not desirable but in the event that it is needed, having a like-for-like replacement is obviously ideal. Because LCD manufacturers sunset their old models, LCD customers aren't able to get that like-for-like swap, forcing them to integrate a screen of a separate model than the others around it. A video wall of mismatched displays will still get the job done, but if audiences are sharp enough to spot an off-colored pixel, they'll spot an off-colored display.

Exacerbation of Existing Problems

As detailed in the results section, the highest ranked cause of LCD replacement is a loss of brightness. This is damning for LCD displays because LCD technology is already far dimmer than LED technology to begin with. When a product starts out with a clear disadvantage in one noticeable area and then experts later cite worsening of that issue as their chief reason for replacement, perhaps the disadvantage is more than just a weakness. In fact, in certain applications, it's a disqualifier. To wit, nearly every outdoor display is of the LED variety. Indoor areas with challenging ambient light conditions have begun the transition to LED as well. These venues know that a dim display blends in with its surroundings, and if a display can't demand attention from distracted audiences, what purpose is it serving?

Respondents listed failure to turn on as the second most common cause for LCD product replacement. While this was listed as the first most common cause for LED display replacement, the subsequent actions required from display owners in replacement situations differ wildly depending on the technology, as has been discussed. Respondents agreed that LED displays were likely to last longer than LCD displays, but that LED displays are also more adaptable (as a result of their manufacture and their manufacturers) only further future-proofs them against the risks of obsolescence.

Experience Informing Priorities

Industry insiders report they prioritize performance when purchasing a videowall but they seem to be forecasting that buyers prioritize price. Why? Digital display industry consultant Alan Brawn recently remarked, "[n]owhere have I seen it more true that you get what you pay for [than] in the total cost of ownership and service of a direct view LED supplier." The sentiment of this quote supports the idea that paying for quality is worth it, but it only be something you realize once you've experienced working with the technology yourself. Survey respondents, 80% of whom claim to be industry professionals, knew to trust quality over cost for their own purchases but perhaps assuming future customers would lack the experience that leads to this knowledge, predicted onto them the opposite priorities.

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What's Next

Experts seem to predict that the LED share of the market is going to grow dramatically in the coming years, and that price drops will lead the way, despite they themselves not valuing price most highly. A declining price point will obviously boost sales of LED's, but that isn't the point. The point is that based on their own responses, LED's may already have a better total cost of ownership when every element of the arrangement is looked at. Experts acknowledge that LED's require service less frequently, last longer, they perform better, brighter, and bigger, and their service is less frequently a major problem.

The value dynamic illustrated by LED and LCD displays brings to mind an oft-used metaphor that details the footwear purchases of a rich man and a poor man. While the rich man can afford an expensive pair of boots that will last him many years, the poor man has to repeatedly buy and replace less expensive boots, over time forcing him to spend more money for a lesser solution. Though commonly deployed to demonstrate other concepts, when viewed through the lens of the digital display industry, this metaphor perfectly captures the importance of considering a product's total cost of ownership. Just like the shoddier boots, a less expensive display technology may seem like the right option at first glance, but as this survey indicates, AV professionals and savvy customers know what Ben Franklin noted, "The bitterness of poor quality is remembered long after the sweetness of low price has faded from memory."

RECOMMENDATIONS

For Customers

- Consider rate of service, seriousness of service, and availability of replacement materials when calculating total cost of ownership. Investigate the policies and manufacturing methods of suppliers and track down where hidden costs might arise. Add these to the initial price tags you're shown.
- Take note of the pros and cons of each technology option and determine whether each is likely to improve, remain steady, or worsen.
- Do your homework! Self-education (like reading survey reports!) can give you the knowledge you'll need to find the best display solution for your needs.

For Industry Professionals

- Provide customers with as many educational resources as possible. Informed customers are more likely to adopt the experienced priorities of industry professionals and thus see things your way.
- Focus marketing efforts on customer education rather than persuasion.
- Take more surveys! The more our industry learns about itself, the more intelligently it will grow.

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Background

Why'd we Survey?

Capturing the moment the display industry finds itself in right now is a tall task. It demands a recognition of what today's technologies actually bring to the table, a consideration of tomorrow's overt and discrete evolutions already in progress, and of course, input from a broad swath of industry members. As a leader in the commercial LED visualization field, NanoLumens understandsthe technological limitations and possibilities of each solution on the market. NanoLumens also understands the trends guiding the industry and is a leading pioneer in several of them. What we don't know is what everyone else thinks.

Who'd we Survey?

Though the survey was open to the general public, NanoLumens intentionally targeted members of the Pro AV community who had experience interacting with commercial digital display technology. This target group included display integrators, architects, designers, artists, engineers, manufacturers, and direct buyers, among others. The reason we wanted to specifically target the most experienced respondents is because their opinions are best informed.

How'd we Survey?

During its time active, the survey was distributed through every customer-facing channel we employ. We recruited past customers and partners to the survey with persuasive email pushes and we used each of our social media channels to loop in unassociated audiences by offering survey respondents the chance at a pair of $500 Amazon gift cards. Links to the survey were embedded into the email signatures of each company employee to spread access passively, and we partnered with several industry publications to disperse the survey more actively to their readerships.

We chose to host the survey online because online surveys allow respondents to participate anonymously, remotely, and immediately. Accessible anywhere from a mobile phone or laptop, online surveys grant researchers a much larger reach than any traditional, more physical methods would. A digital survey also makes more sense for the audience we are targeting; experts who work in digital technology. If any group can appreciate the merits of an online survey, surely it is this one.

About Nanolumens

Nanolumens is a US-Based LED design and manufacturer headquartered in Atlanta, Georgia. Nanolumens offers world-class displays across multiple market segments adding wonder to physical spaces. Nanolumens is a pioneer of the true curve technology and are committed to being better. With a bold and visionary team of experts Nanolumens will take your project, in all shapes and sizes, from concept to reality. Nanolumens brings your creative visions to life, leaving a first and lasting impression. We are LED! For more information, visit www.nanolumens.com

What makes us different

Connectivity

We use gold instead of copper to connect die to the LED package which provides better connectivity and protection from corrosion.

LED Package

Our LEDs are made of only virgin plastic, instead of recycled plastic makes our product more humidity resistant.

LED Die

Larger die used for greater efficacy, which translates to less heat.

Warranty

Most LED display warranties are 12 - 36 months, with at least half a percent of allowable pixel outage. Our warranty for most of our products is 72 months to 100% of all pixels.

LED Lens

Our products have epoxy in-stead of silicon lenses, which is more reliable and long-lasting.

Longevity

Our LEDs are rated for 100,000 hours (11.4 years).