GREEN SIGNAGE

How **ECO-DESIGN, CIRCULAR ECONOMY** and **SUSTAINABLE OPERATIONS** shape the future of the industry

invidis CONSULTING

YEARBOOK DIGITAL SIGNAGE & DOOH **2021**

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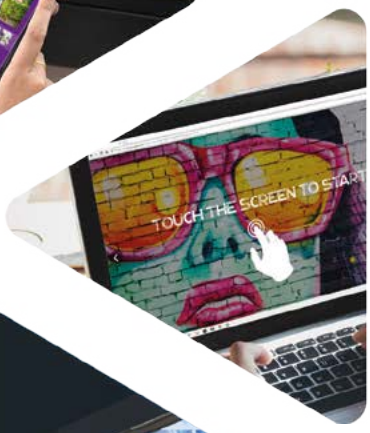

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Dear Readers,

The pandemic has changed the world we live in and the digital signage industry we work in more than anyone expected at ISE 2020 – the last time the industry came together in-person. More than a year later, the pandemic is still ongoing, but demand for digital signage and retail tech, as well as DooH and Smart City, has rebounded. Many market players report record orderbooks, but unfortunately major supply chain issues hinder an even better rebound of business.

Photo: invidis

Florian Rotberg (left) and Stefan Schieker

A much bigger and longer impact on digital signage and DooH is the climate crisis. Global citizens are changing their behavior, forcing businesses to also shift to more sustainable actions. New major challenges for digital signage providers and users. invidis decided to dedicate this year's issue of the invidis yearbook to Green Signage. Developing, operating, and maintaining more sustainable digital signage and DooH networks will become essential for the industry in Europe and soon after worldwide. invidis travelled across Europe to inspect digital experiences and talk with movers and shakers of Green Signage.

As you will see throughout the feature, Green Signage touches a lot of different aspects: from hardware design to energy consumption. Because of this and the importance of the subject, we decided not only to compile a special, but also to focus on green topics in the DooH section.

We also want to invite you to learn more about Digital Signage and DooH throughout the year on invidis.de, with our fast-growing collection of invidisXworld videos on Youtube, and hopefully in-person soon again. Please follow us on Youtube, Linkedin and Twitter.

Last but not least we want to thank our advertisers enabling invidis to research and publish insights for and about the industry.

Yours

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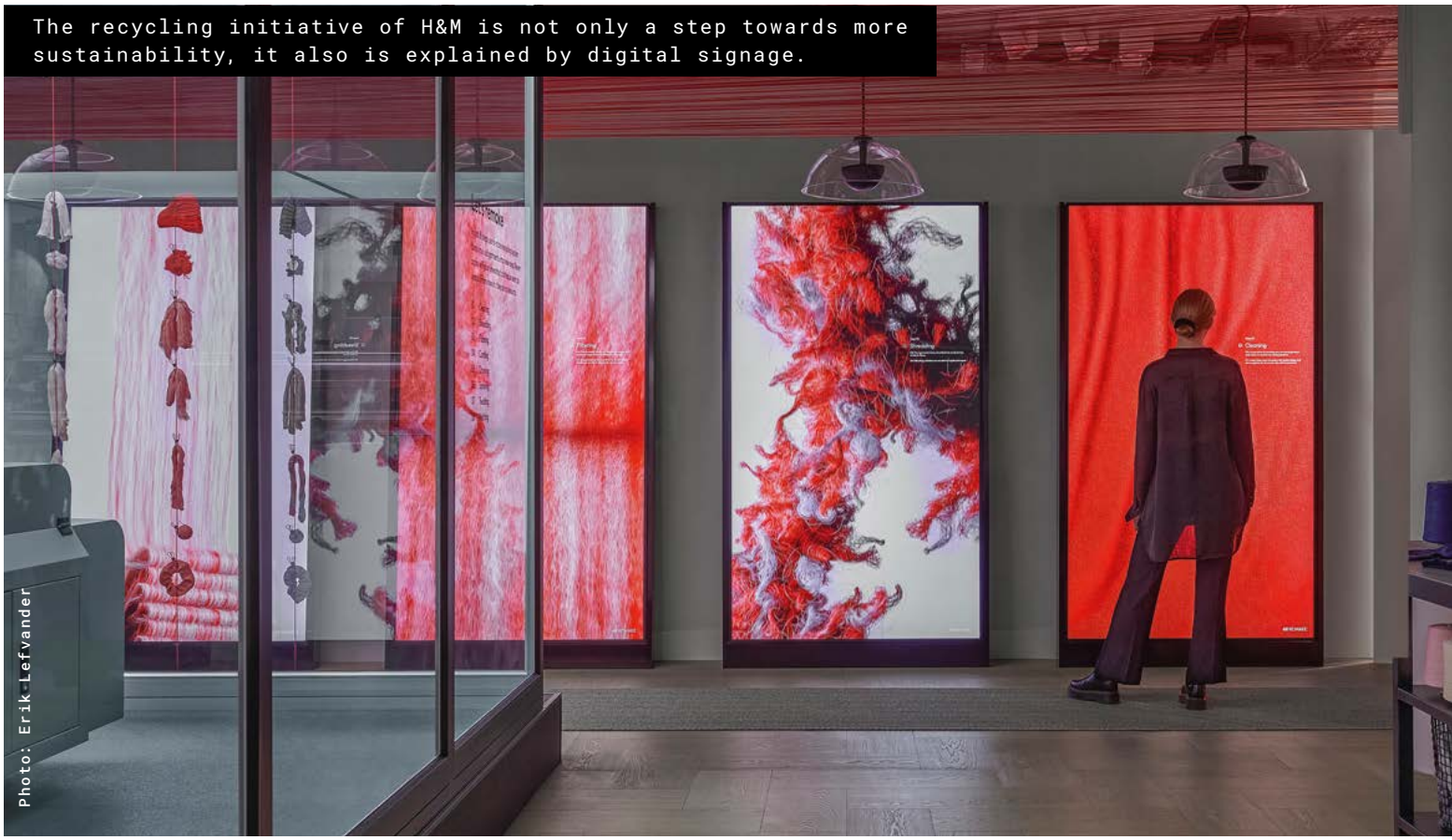
DIGITAL SIGNAGE AND ENVIRONMENT

The Sustainability Imperative

Sustainability is the word of the hour. Like every industry, the Digital Signage value chain will have to be more climate-compatible. The goal Green Signage can be reached with little steps.

Climate protection, renewable energies and electric vehicles are omnipresent in public discourse. But the debate is greener than reality. While the past 18 months were dominated by the pandemic, sustainability, circular economy, and Fridays for Future remain top of mind. The growing focus on more sustainable solutions has great influence also on digital signage, retail tech, DooH and smart city concepts. Even more so as Europe is leading the green movement. B2B-customers are explicitly requesting greener signage as consumers/citizens increase the pressure on retailers, brands, employers, and governments.

Green Signage offers great potential for the digital signage industry to re-engage with existing



The recycling initiative of H&M is not only a step towards more sustainability, it also is explained by digital signage.

Photo: Erik Lefvander

customers and to reach out to new potentials. As sustainability has become top priority for more and more enterprises, C-Level attention is guaranteed. For the first time digital signage gains the attention of CEOs, CIOs and CMOs – driven by consumers, shareholders, and the society in general.

Swedish fashion brand H&M creates regularly global buzz with the launch of H&M conscious collections and initiatives around recycling and reuse of apparels. In Stockholm, customers can return pre-loved items to the retailer, which converts them back into new clothes by cleaning the returned garments and shredding them into fibers. The new yarn is then knitted into new fashion finds directly instore. By the way, not only a great example of circular economy but also one of the best instore experiences invidis has seen in past years.

Other brands like Adidas are cleaning the ocean and reuse the collected plastic to new Parley sportswear. The initiatives and the recycled products play an increasingly important role in flagship experiences in stores worldwide. Adidas showcases the recycling process prominently in its London flagship store. Global IT-powerhouse Microsoft is leading the industry by shifting not only to a carbon neutral but even a carbon negative organization till the end of the decade.

But Green Signage also offers many pitfalls like greenwashing or temptations of supposedly simple solutions, for example playing black content instead of shutting screens completely off. Also just buying certificates to offset the carbon footprint is not sufficient anymore. It is a complex mix of strategic, conceptual and operational measures which are necessary.

invidis Green Signage is an initiative to raise awareness, show ways of more sustainable digital signage within the industry and with buyers. Especially in markets outside of Europe sustainability is often not yet on the agenda, as an invidis interview with a CEO of one of the largest LED manufacturers from China showed: “Soon we will be able to reduce energy consumption of direct view LED by half, but customers don't find it worth the extra cost. No one in the business is interested in green signage.” But times are changing fast, and the industry will need to adapt to the new requirements.

The digital signage industry is built on energy-hungry products that are using scarce resources partly from poor countries and are built and distributed via a global supply chain. The industry’s and end user’s responsibility goes far beyond in-

Why “Green Signage”?

invidis uses the term “Green Signage” – a term that emphasizes the environmental aspects – mainly because it is more striking than other terms like “Sustainable Signage” or “Responsible Signage”. It captures one of the main levers for digital signage – reducing the carbon footprint. However, we do not want to restrict the discussion and thinking purely of the ecological dimensions, but explicitly also want to include all the other aspects referred to in the United Nations' SDGs.

Microsoft wants to become CO_2-negative

In 2020, Microsoft announced its intention to be CO_2-negative by 2030.

The company sees this as a necessary step in order to meet the Paris Agreement's goal of keeping global warming below 1.5 degrees Celsius. To achieve this, it would be essential not only to reduce carbon dioxide emissions – for example, by using regenerative energy – but also to actively remove CO_2 from the atmosphere, for example by planting forests. The company also aims to more than halve its CO_2 emissions by 2030.

To achieve this, the internal CO_2 tax will also be applied to indirect emissions from the supply and value chain.

dividual aspects like energy consumption or the use of "green energy". This may sound intimidating, and some smaller businesses might think "this is a global problem for global businesses" – but it isn't. It can only be solved in a collective effort.

The key questions revolve around "Where to start?" and "What to do practically?" A good starting point are widely accepted frameworks like the 17 UN Sustainable Development Goals (SDGs), or Environmental Social Governance (ESG) concepts. The majority of blue-chip businesses have started some form of ESG initiative on corporate level in recent years. But how can typical digital signage players become more sustainable?

A good basis to start the process are brainstorming sessions to collect ideas – an exercise that should involve the whole organization. Once a basic understanding has been reached, an in-depth value chain and process analysis is necessary – from product/materials sourcing to repair/reuse/recycling. If you feel uncomfortable with this step or do not have the right skillset within your company, specialized consultants can facilitate this process.

Following the brainstorming process, "quick wins" can be identified and prioritized – activities and measures that can be quickly and easily implemented. And especially measures that provide a direct benefit for the environment as well as motivation for the team. It is important to know that more than 80% of life cycle carbon emission of a display is produced during the typical 5-to-8-years use of the digital touchpoint.

Measures easy to implement for the installed base could be to

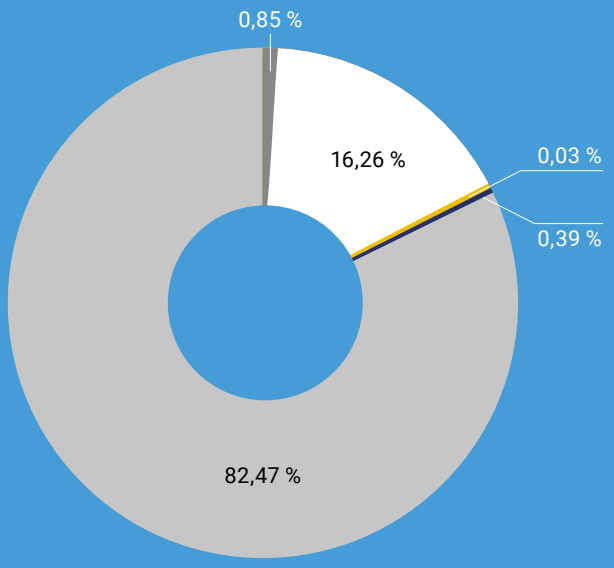
- finally activate the brightness sensors on installed displays
- fully turning off displays instead of displaying black content or stand-by mode
- optimize content (use dark colors instead of white on LEDs or reduce animations for LCDs)

Very Important: it doesn't always have to be the big solutions – many small steps also add up. The Green Signage process is not about reinventing the wheel but raising awareness and finding levers which move the needle in the right direction. The market and especially also customers offer many inspirations – it is a common effort. Once concrete measures have been identified, it becomes necessary to look at their costs/efforts and benefits to prioritize.

The direct financial impact shouldn't be the sole focus, but also considering the wider effects like

Product Life Cycle Carbon Emission

Life cycle carbon emission of digital signage screens is one of the most relevant green signage topics currently. LG published a detailed carbon emission split for displays. It shows that more than 80% of emission are produced while the screens are in use. While the rest, especially materials, offer much potential for improvement, green signage initiatives and eco-design should focus mainly on how to operate screens more sustainable. That includes energy efficient hardware, remote manageable infrastructure, and energy efficient operations.



Pre-manufacturing	16,26 %	Use	82,47 %
Manufacturing	0,03 %	Disposal	0,85 %
Distribution	0,39 %		

Source: LG Electronics Sustainability Report 2020-2021

opening-up new sales opportunities or creating a competitive edge (commercial success and sustainability can/do go hand-in-hand). A growing number of businesses are under pressure to operate more sustainable, digital signage can provide its share to customer carbon neutral goals.

Once the low hanging fruits have been harvested, consider getting certificates, adding a dedicated sustainable product and service portfolio or ideally shift the offering towards Green Signage. Energy efficiency labels (e.g. EU, ISO, LEED) are widely available. Replace combustion engine vehicles with electric ones and start deploying even more reliable components which require less on-site service.

Finally, setting business goals and establishing sustainability processes and – very important – the matching mindset. Green Signage and ESG in general are not a short sprint but a marathon.

The approach outlined above is very pragmatic and should provide just some first ideas. Eventually it will become necessary to move sustainability to a more strategic level, e.g. creating a separate value proposition — tasks usually provided by consultants like invidis.

New Energy Labels unsettle Display Buyers

Since March 2021, new regulations on energy efficiency and eco-design have been in force in the European Union. The confusion is great, because virtually all displays (previously A+) are now only in category F and G. Even more complicated is that small and very large digital signage displays do not need labels.

In order to avoid the inflation of A+++ products, the EU's energy efficiency scale has been recalibrated and expanded to include eco-design evaluation criteria. The result of the new scale is that virtually all displays are now only classified in energy efficiency class F or G. You can't get any lower than that, and there's a reason for that. The EU wanted to avoid that due to technological advances within a very short time new displays quickly reach the highest energy efficiency level again.

Until now, the consumer-oriented scale did not consider the special features of digital signage displays. In general, the energy labels did not have much relevance in the B2B market. This is now changing: the labels are omnipresent in everyday consumer life in the EU as well as across the globe. And EU regulations have been expanded to cover additional categories including many digital signage screen sizes.

Interesting enough, not all professional displays need to be fitted with an energy label. Exceptions are granted to screens with an area smaller than 0.3m² and larger than 1.3 m². That leads to the strange situation that manufacturers are not required to label professional displays larger than 65”. Special purpose displays like high brightness or videowall displays are also exempt from the energy label requirement.

The new recalibrated scale has been designed to remain relevant for at least 10 years.

In addition to the new energy labelling rules, there are corresponding new regulations on eco-design that took effect on 1 March 2021. These relate notably to the updated minimum efficiency requirements and reinforce consumer rights to repair products and support the circular economy. Manufacturers or importers will now be obliged to make a range of essential parts (motors and motor brushes, pumps, shock absorbers and springs, washing drums etc.) available to professional repairers for at least 7-10 years after the last unit of a model has been placed on the EU market.

Test capacities of Lang AG: These were also used to measure the energy efficiency of displays.

Photo: Lang AG

LED DISPLAYS

Technology for Savings

Energy efficiency – the term is often used when talking about more environmentally friendly digital signage. But it only comes to life when it is translated into concrete action – from flip-chip to white content.

The many years of debate about the necessary energy transition show it: If the digital signage industry wants to position itself for the future, it must think about how it can save as much energy as possible in the long term. This is something that invidis and the distributor Lang AG from Lindlar were also concerned about. Therefore, both companies started a green initiative: They looked for possible sources of energy waste in displays and analyzed them systematically. In the process, three pillars were identified where there is potential for energy savings: hardware, operations and content.

Hardware

The hardware used is a key point when it comes to potential savings. Since its introduction, LEDs have been seen as a particularly energy-saving light source. But if you look at energy efficiency, it is not all that optimal: "Two-thirds of the power you put into an LED is usually lost. About one

third is actually used," clarifies Benjamin Valbert, Director LED & Displays at Lang AG. The rest is emitted as heat, as with other light sources.

In part, the lost power is a result of the design: For example, in many LED products, all the basic colors of an LED (RGB) are operated at the same voltage, although different voltages are required for red, green and blue. This results in unnecessary power dissipation due to the necessary insertion of resistors.

One solution to the problem: common-cathode technology. Here, the RGB LEDs are not operated with a common anode, but use a common cathode. This allows each basic color of an LED chip to be operated at its specific voltage. Power losses due to pre-resistors, which occur with common anode technology, are avoided this way.

The production process is more expensive in this case due to the more complex circuitry. But this method can save 20 percent, and under ideal conditions even up to 30 percent, of energy.

LED manufacturers are still hesitant regarding the common cathode method. Currently, very few manufacturers are actually using it. Of all products, around ninety percent are outdoor displays that require high brightness. The remaining ten percent are new screens where the manufacturers make the investment – but mostly only to get more brightness, energy efficiency is not – yet – a priority.

Bonding Area

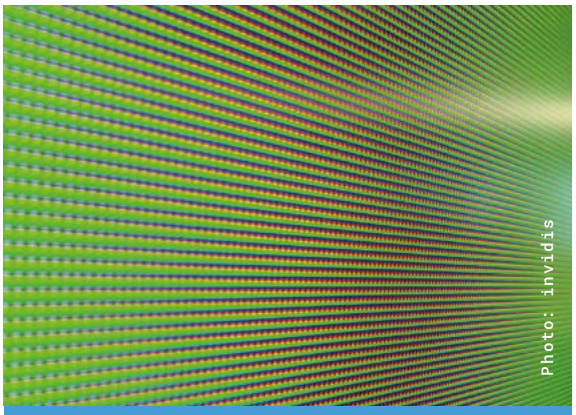
Another energy aspect in hardware is related to the pixel pitch. As a rule of thumb, the finer the pixel pitch, the less efficient. However, this is not because more LEDs must be operated in an area. It is again related to the manufacturing process.

In principle, chips are cut from a larger substrate. This is also the case with micro-LEDs. However, the light emission at the cutting edges is weaker, which has a more serious effect on smaller LEDs.

In addition, conventional LEDs are also contacted at the light-emitting upper surface, which leads to a certain loss of light output. Since the light-emitting surface also becomes smaller as the pixel pitch decreases, but the wires for contacting remain the same, this has a negative impact on the energy yield.

There is a technical solution here as well: flip-chip technology. The contacting is done completely on the backside so that the light emission is not hindered by the omitted contact wires on the front.

Display manufacturer Samsung already uses this technology for "The Wall" displays with a pixel pitch of 0.8mm, and other manufacturers use it as well. It would be possible to save energy here if manufacturers would generally use flip chip for pixel pitches below 2mm, for example.



Some Ways to save Energy with LED Displays:

- Production: up to 30 percent with common cathode technology
- Production: significant increase in brightness, in special cases up to 100 percent, when using flip-chip technology for fine pixel pitches
- Operation: up to 20 percent during non-operation when the display is set to stand-by

Operations

When it comes to operating an LED display, Lang AG identified a major energy guzzler: most products don't offer a true stand-by mode. "Stand-by is one of the biggest issues", Benjamin Valbert emphasizes. One option in this case is to turn the display off completely, another is to set the LEDs to black. If the screen is not switched off completely, but instead only the signal is switched to black, it can still consume up to 20 percent of the maximum power consumption.

But why don't customers just turn off the power to the display? The LED expert reckons it's because of how customers have handled LEDs in the past. "In the past, many LED products had a complicated workflow, they were more complex. Controllers and receiving cards were much more prone to failures." This became apparent when components suddenly stopped working as they had before when they were switched on and off. Therefore, the general belief prevailed that it was better not to switch off the screen if it was still going to be used in the next few days.

This was also commonly suggested by manufacturers or retailers. Now, this is usually no longer necessary. Constantly switching the display on and off does put stress on the screen, but it is harmless with more up-to-date products and at reasonable intervals. For example, it is no longer a problem to turn the display off in the evening and switch it back on the next morning.

Content

It is commonly known that power consumption also depends on the content. Basically, white content consumes more power than dark content. The darker the image content and the lower the white content, the lower the power consumption. This can be particularly important for office and collaboration solutions, since Powerpoint or Excel-based content, for example, often has a lot of white space.

To estimate the actual power consumption of LED displays in operation, Lang AG ran a series of LED products with a test sequence. It contained different still images and videos.

Brightness of displays can be optimized, for example by production technologies.

Photo: Lang AG

Photo: Lang AG

The current tests focused, among other things, on the power consumption of various motifs.

The power consumption in this test was about 40 percent of the maximum power consumption specified by the manufacturer. But in the manufacturer's data sheets, only a third of the maximum power consumption was given as the average value.

A difference of about 7% doesn't sound like much at first. But it is still 15 to 20 percent of the measured average power consumption. So, in order to get a proper overview of the power consumption, users and integrators should not blindly rely on the data sheet. It makes sense to analyze what kind of content is to be displayed on the installed screen.

Moving images are more consuming for LCD panels – this is usually less the case for LEDs because there is a master clock frequency, even for a still image.

Conclusion

The studies by Lang AG and invidis thus show that there are opportunities to save energy throughout the entire digital signage user chain: from the manufacturing process to operation to the content provided. But they also show that it takes the will to do so – and the necessary know-how. Because only companies that have control over the different process steps and know exactly the energy traps can advise their customers accordingly.

The figures that Lang AG calculated prove that the measures described can mean significant savings. Double-digit percentage reductions benefit both the budget and the ecological footprint. In addition, synergy effects can be generated in the ideal case: For example, when you exchange a collaboration display with a more energy-efficient one in a regular replacement cycle, you may be able to cut back on the air conditioning due to the lower heat emission. And thus, save twice on electricity.

What is BTU?

BTU stands for British Thermal Unit and actually measures a specific heat energy. However, it is also used for the thermal dissipation of a system. Particularly in public tenders, a specification of the BTU value is increasingly required. However, only few manufacturers specify the value in the data sheet, and in practice it is difficult to determine the exact figure by calculation. Integrators should also here not blindly accept the data sheet figures, but do their own calculations und analysis.

REMOTE MANAGEMENT

Reduce and extend

To some, it may sound like a paradox to use additional technology to save power. But remote control and monitoring for digital signage solutions can contribute to significantly lower consumption.

Remote control and monitoring using sensors: above all, this sounds modern and practical. But it can also have a real impact on sustainable operations of displays – and save electricity as well as costs. That's why, for an installation, you should check whether a remote management solution makes sense – for example, such as the one offered by the Cologne-based company Gude Systems.

As explained in the previous article, turning off displays – or putting them in stand-by mode – has a major impact on power consumption. "Many digital signage solutions, especially in retail, but also in office buildings, actually only run for a maximum of 12 to 17 hours a day. And usually not throughout the entire week, either. Nevertheless, they remain in full operation, even if they do not produce any customer touchpoints or atten-

Power savings potential in digital signage applications can be huge – as Gude shows with a collaboration case study.

Photo: Gude Systems GmbH

tion. This doesn't have to be the case, for it costs the system operator a lot of electricity", describes Philipp Gude, Sales Manager at Gude Systems.

With a remote solution, you can deliberately control the switch-on and switch-off. Both event-based and schedule-based power-down is possible. "By not leaving the display on 24/7, the lifespan is probably also increased according to our analyses", adds Philipp Gude. In addition, it is possible to restart the system remotely. In some cases, this saves a journey by a technician, who often only reboots the system, too.

If sensor-based monitoring is added, failure-free operation becomes even more likely. Measurements of power consumption and nine electrical parameters, for example, provide information about malfunctioning devices. In addition, environmental monitoring can be implemented using temperature and humidity sensors. Actions derived from this can in turn increase the service life of the digital signage system – for example, a fan that is activated when a certain temperature limit is exceeded.

Numbers please!

To underpin the savings through remote management with figures, Gude Systems conducts studies with partners, for example a year ago with the technology operator Kilchenmann and the JCDecaux subsidiary APG. For this, 42 DooH totems were equipped with a remote control system. Gude calculated various failure scenarios and concluded that the remote systems had been amortized after eight to ten months. This was mainly because fewer on-site service visits were required.

While the totem case was primarily about costs, another study also calculated the carbon footprint. This time, the project involved the installation of various collaboration solutions in cooperation with the company Macom.

The aim was to equip meeting rooms of various sizes with audio/video and IT hardware, while at the same time implementing remote control. The system was used to control not only the power supply of the displays, but also that of the media players, power supply units, control, and extender systems. For this purpose, Gude used switchable IP power strips. They can automatically turn off devices at night and on weekends – previously, the devices ran all the time.

There were three room sizes: large, medium, and small. For the small room, 8 AV devices were planned, for the medium 13, and for the large conference room 20. Due to the larger number of appliances, the medium and large meeting rooms used distribution strips with 8 power outlets, while for the small huddle room, a distribution strip with 4 power outlets was sufficient.

More than 200 Flights

Gude's calculation arrived at about two years of payback for each room size. In the calculation, the company assumed that one kilowatt-hour of electricity would lead to emissions of 0.5 kilograms of CO_2 on average. Over a 10-year period, therefore, 14.5 metric tons of CO_2 would be saved in all three rooms combined.

Thus, in 10 years, the CO_2 saved would be roughly equivalent or more to hundred flights (broken down for the individual) from Munich to Frankfurt am Main – including the return trip. Gude's calculation shows that remote solutions actively contribute to a reduction in power consumption. And more importantly, they demonstrate that power savings in digital signage are not just for penny-pinchers and CO_2 particle counters. Quite the opposite: They really make a difference.

The studies "Sustainable operation of media technology systems in meeting rooms" and "Getting a grip on service costs with remote control" can be downloaded free of charge from the Gude Systems website (both in German).

GREEN DISPLAYS

Big Players, green Intitiatives

There is a lot of catching up to do when it comes to displays in terms of sustainability. But the manufacturers are reacting and implementing environmentally friendly features and components. One company stands out especially.

In general, the digital signage industry, as B2B industries in general, is late in the green game. Displays, LED or projection will most likely never be fully green or just carbon neutral. With manufacturing mainly located in Asia (plastic, rare earths), transportation across half of the globe (carbon footprint of transport) and considerable energy consumption (digital signage typically runs at least 16 hours a day around the year).

Also, with a typical lifecycle of around five years the average usage is rather short. Especially visual solutions like professional displays, projectors and LED are losing visibly brightness and picture quality conformity after operating nonstop for five years. Media players and other AV/IT infrastructure in the background are often remarketed or repurposed for a second life in less business-critical use cases.

Even most visual solutions run considerably longer than five years, technology advancements make it uneconomically (new solutions can be up to 50% more energy efficient) and not desirable for continued operations. Some end-customers and integrators move older screens to backend facilities and less critical locations, but in the end cost of operations rises considerably as reliability diminishes (more service calls).

The pandemic has certainly also brought some positive changes. For example, higher awareness for environmental protection and energy consumption. Consumer and business behaviors have changed, and more and more manufacturers are adapting their products and services to the new normal. Samsung has become visibly more sustainable in product development (materials, power consumption, repairability) and product management (packaging).

Not only in Europe – where energy costs are up to 10 times higher than in North America or Asia – but in most industrialized nations, consumers and businesses are demanding more sustainable and accessible digital solutions. “The past year has shown us how important technology is when it comes to maintaining everyday life and staying connected,” said JH Han, President of Visual Displays Samsung Electronics at CES 2021. “Our commitment to an inclusive future goes hand-in-hand with our drive for innovation. Our efforts range from reducing our environmental footprint, to providing various features for a high level of accessibility, to delivering an immersive viewing experience that fits a user's lifestyle.”

The industry has still a long way to go, but many initiatives were launched in the past 18 months to improve the carbon footprint and to enable digital signage users to operate more sustainably.

Best in class is NEC Display Solutions, since the merger part of Sharp NEC. Over the past five plus years, NEC developed a breadth of features and tools enabling users to operate their national and global digital signage more sustainable while

the rest of the industry focused more on larger, brighter and higher resolution.

NEC uses predominantly metal housings and designs components which can be easily repaired or exchanged. It also integrated, as one of the first visual solution providers, brightness sensors which adapt the brightness of the backlight to the surrounding. As more than 80% of the life-cycle carbon footprint is generated during the use of the screens, energy efficiency is the largest lever. NEC was launch-partner of the OPS-slot and its successor SDM, both developed by Intel. Integrated media players consume less energy as they share the power supply with the screen. In addition, swappable PC power enables a longer lifespan of displays, as the media player can be exchanged with a more powerful


Photo: Sharp / NEC

Stefanie Corinth

"AV and Sustainability Hand in Hand"

Stefanie Corinth
Senior Vice President Sales EMEA of
Sharp NEC Display Solutions Europe

"Awareness of the climate crisis is growing in all industries, including the AV sector. Environmental protection and sustainability are playing an increasingly important role in purchasing decisions. End consumers and companies alike are looking for brands and business partners who are serious about environmental responsibility.

For decades, Sharp/NEC has been guided by three clear principles: recycle, reuse and reduce consumption.

The quality of our products and solutions is our top priority; durability and reliability are our keywords. We manufacture with high-quality components and, unlike many of our market competitors, use metal instead of plastic in the design of our large format displays and LED modules. As a housing, the material plays a decisive role in both durability and fire protection: metal can efficiently dissipate heat from heat-sensitive electronic components. The material can also be recycled and returned to the production cycle at a rate of 100 per cent.

Our open modular approach offers maximum flexibility. Our products' computing power can be individually adapted, so it can grow alongside user needs. In addition, our comprehensive service programme ensures the long-lasting, flawless performance of our LED solutions. And with our cinema projectors, we offer the Prism Refurbishment Program as a fast and cost-effective way to clean, repair and refurbish faulty components.

With our holistic approach, we want to ensure the greatest possible added value, continuously reduce environmental impact and help our customers achieve their ecological goals. AV technology and sustainability can and should go hand in hand."

PC. Beyond product feature NEC is recognized industry-wide for the only global service concept enabling digital signage integrators to repair or exchange displays in every market regardless of where they have been purchased. Until today it is still common practice in the industry to ship products back to the country where they have been purchased for RMA. Alternatively, malfunctioning products are disposed before their typical usage time. In addition, NEC offers most reliable product life cycle management including early end-of-life announcements.

In contrast to NEC, which until the merger with Sharp / Foxconn was a pure ODM, Samsung and LG are typical consumer electronics factory-driven visual solution provider. The OEMs' production volume of displays (TV, Desktop, Hospitality and Digital Signage) dwarfs that of ODM specialist NEC. But it takes OEMs longer to adopt user trends. But as OEMs have a much tighter control of the supply chain, their influence is potentially higher and the speed of how they can implement changes can be much faster. While Sharp/ NEC (Foxconn) and Philips (TPV) are also part of a large OEM holding, they operate much more independent from the consumer display business compared to Samsung and LG.

On product level Samsung jumped the green signage bandwagon most notable at the beginning of 2021. At CES, the manufacturer announced its "Going Green" initiative which has since then gained momentum. While Samsung in general created a Green Value Management System already in 2008, users of Samsung digital signage solutions are just starting to reap the benefits. Today Samsung is fully committed to greener products and future product launches will show more greener feature.

Some of Samsung's CE-focused initiatives announced at CES 2021:

- Reducing the environmental footprint and optimizing energy efficiency: Samsung is striving to systematically reduce the environmental footprint created during manufacturing. First newly launched display solutions have already been certified by UK-based Carbon Trust to be more environmentally friendly due to substantially reducing CO_2 emissions during produc-

Metal for display housing is more sustainable than plastics.

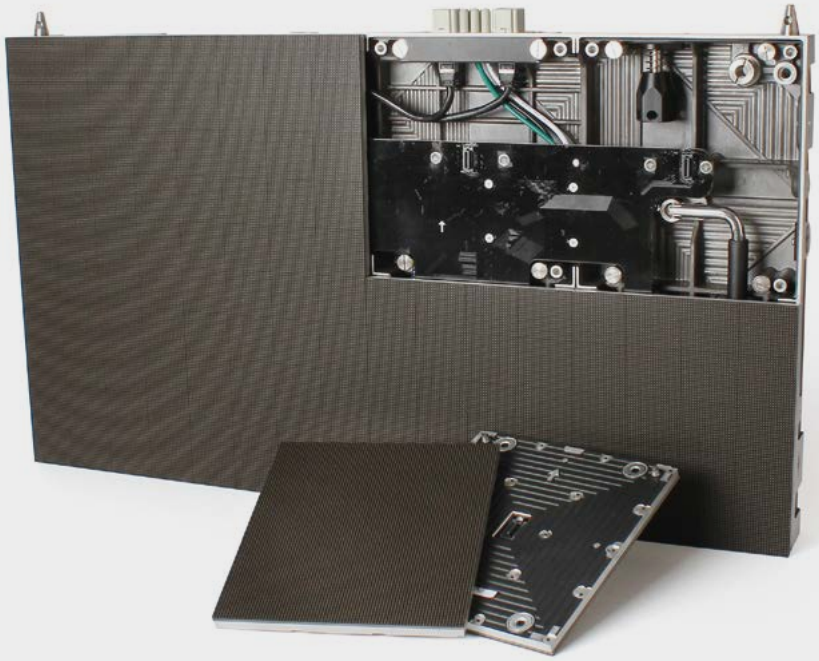


Photo: Sharp / NEC

To promote its new eco-packaging, Samsung started a design competion last year for reusing the cardboard.

Photo: Samsung

tion, optimizing material use, and minimizing power consumption during product use compared to older product generations.

- It also aims to reduce the power consumption of its products and use more recycled materials.
- Expanding sustainable packaging – Samsung is expanding its "eco-packaging" design. In addition to minimizing inscriptions and illustrations, Samsung is also eliminating the use of oil-based ink in color printing, which may help further reduce waste.
- Solar-powered remote: In 2021, all Samsung TVs will ship with a solar-powered remote that can be charged by sunlight, artificial light or a USB source. Samsung developed a manufacturing process that recycles plastics from recyclable bottles. New remote controls include around 24% recycled plastic.
- Samsung displays should also be easier to repair in the future and thus be usable for longer. At the end of life, the screens will also be easier to recycle.

In Germany, Samsung launched an Eco Service Partner certification program, which initially focuses on CE-partners only as they manage the bulk of repairs of Samsung products. Repair and Replacement of products is usually outsourced to partners. A typical partner is Letmerepair, a BPO (Business Process Outsourcing) provider focusing on supporting the complete, "presales" and "after sales cycles" for IT manufacturers.

Similar to Samsung, LG Electronics is lacking behind with the complete transition to 100% renewable energy. LG plans to use only renewable energy by 2050. But recently sustainable product design and especially green signage features have become available to users of LG hardware.

Most interesting is the latest micro-LED product innovation of LG. The manufacturer designed with LG Magnit a direct-view LED with just 3W power consumption per cabinet. Power consumption of dvLEDs are relatively high compared to LCD and especially projection.

TPVision (Philips) in its DNA is a Hong Kong based manufacturer with Taiwanese roots (AOC) and therefore more focused on manufacturing. That is reflected in TPV's current green signage initiatives, which are mainly corporate focused and offer benefits for product users yet. TPV executed a materiality assessment in 2020. Packaging, sustainable products, circularity and transparent supply chains were selected as most important topics.

But as the display product division TPVision is based in Amsterdam, it is expected that they will catch up with their peers in also offering green signage features which are especially relevant for European end-customers.

DIGITAL RETAIL

Sustainability needs Partnerships

Sustainable concepts and certifications are relatively easy to develop. Much more difficult is the implementation in the own organisation and the partner-ecosystem. Hardly anything can be done alone; the entire supply chain and all partners have to work together.

The pressure is high, and it is continuously growing: large retail chains and brands in particular are requiring their suppliers to deliver sustainable products and services.

How do digital signage providers and shopfitters best position themselves to meet the requirements? invidis talked with sustainability manager Theresa Kirchweger of umdasch The Store Makers. “Our customers want to build according to the latest sustainability standards; topics like regional sourcing, sustainable materials and low energy consumption are daily on the agenda.” However, shopfitters and other suppliers like umdasch do not want to be driven by customers. “In the future, we also want to manage and actively shape the process as a trustworthy partner.”

One challenge in particular is the global supply chain of materials and production goods, which cannot really be monitored today. Already today, most retailer’s sustainability requirements are demanding; it is even more challenging to comply with them at the desired price point. Environmental standards mandate the use of sustainable materials and energy-saving equipment.

In addition to the compulsory standards required by customers, umdasch focuses on developing solutions with a longer lifetime – in shopfitting

Umdasch built a sustainable sporting goods flagship store for Bründl Sports in Kaprun / Austria.

Photo: blocher partners

Photo: blocher partners

The flagship store, which opens in October 2021, was developed in cooperation with the architects blocher partners.

as well as in digital signage and retail tech across the whole organisation of umdasch and umdasch Digital Retail. The use of recycled materials from old fishing nets, yoghurt pots or discarded textile waste fascinates customers. “Today, such materials are used especially in flagship stores”, explains Theresa Kirchweger.

Circular Design in Demand

In digital concepts, sustainability is not yet as much in focus as in shopfitting. Also, many technology providers are not yet ready to provide sustainable products. The industry is in a transitional phase, and measurable, ambitious sustainability goals are still lacking.

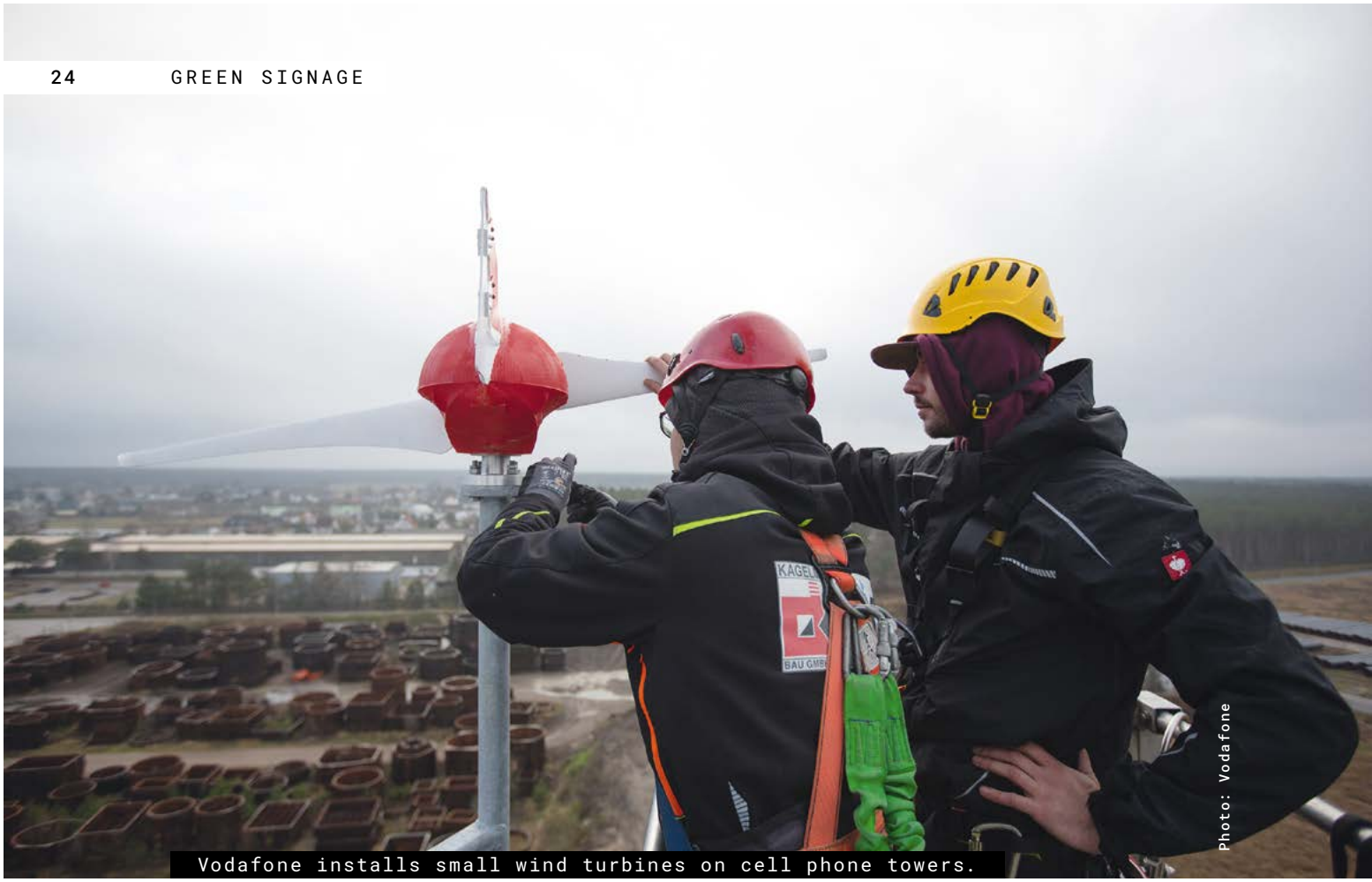
Most obvious is the lack of circular design, i.e. lifecycle planning and establishing corresponding processes already during product development. Awareness of this is often not yet sufficiently developed on the part of digital suppliers. While sustainable digital signage solutions are still in the making, umdasch developed together with the industry already sustainable ESL solutions like label refurbishment, battery replacement, conversion to shelf-power or simply a significant increase in service life. However, it is difficult to put pressure on the manufacturers because the worldwide demand for ESL currently exceeds the supply by far. Nevertheless, umdasch wants to stay on top of the sustainable ESL agenda and other green signage topics.

Great potential for more sustainability can be found in a holistic design and planning of buildings, both in shopfitting and digital signage. How much heat will be emitted by digital signage components? Is the HAVC-System (heating, air conditioning and ventilation) properly dimensioned? Can digital touchpoints be easily maintained and replaced? And how can energy consumption be reduced during operations with the use of technology and by optimizing content management? Early planning coordination of the individual work streams offers great energy-saving opportunities. Coordinating or combining remote building automation and digital signage device management also brings many advantages. Every unplanned service trip reduces the carbon footprint.

R&D of Asian visual solution providers are still lacking the awareness that repairs are more sustainable than replacements. But precisely the combination of operational improvements and their influence on sustainable operating concepts still get too little attention. This is where digital signage integrators, shopfitters and retailer need to coordinate – a role umdasch sees itself well positioned.

invidis opinion: Sustainability Concepts must be viable

Sustainability concepts are important, but they must also be implementable for the industry. Countless sustainability standards and certifications have been developed in recent years, some more sensible than others. Complying with them leads to the same challenge: only very few B2B-customers are willing to pay more for sustainable solutions yet. Especially in economically challenging times like we experience currently. Public pressure for more sustainability in retail/digital signage is passed on from the retail chains to the suppliers. Therefore, stricter requirements are currently not needed. First, the existing standards should be implemented – in partnership with the retail chains.



Vodafone installs small wind turbines on cell phone towers.

Photo: Vodafone

POWER CONSUMPTION

Wind of Change?

Green electricity and eco-power sound good at first. But are they? One thing is certain: The source of electricity for running companies and digital solutions will become increasingly important in the future.

Energy efficiency is one thing. Yet the actual source of the electricity is another matter. The aim is to drive forward the energy transition and reduce electricity from fossil fuels – depending on the future federal German government, probably to a greater or lesser extent.

But more and more companies are taking the initiative themselves and committing to solely or mainly use electricity from renewable sources for their own operations – mostly as part of the big goal of becoming climate neutral. Thus, for example, Vodafone announced that it would operate its European network with "100 percent green power" starting July 1, 2021. This is to include mobile and fixed networks, as well as data centers, retail and offices. Many other communications groups have also already made the switch – Telefónica Deutschland, for example – or have announced the complete changeover, such as Deutsche Telekom for 2021. Another example is Epson: the group plans to supply all its sites worldwide with electricity from renewable energy sources by 2023. Outdoor advertisers such as Ströer and Wall Decaux also claim to supply their DooH networks entirely with green electricity.

Balancing gray Electricity

However, in many cases, these statements may not be taken one hundred percent literally. When companies rent offices, for example, they have no influence on what kind of electricity comes from the socket. This “gray electricity” is then offset by certificates – just like certificates for climate neutrality. Companies are therefore also focusing on generating renewable energy themselves. Epson, for example, installed a photovoltaic system at its German headquarters in Meerbusch already in 2009. Vodafone also banks on solar units and, in cooperation with the start-up Mowea, plans to install smaller, modular wind turbines, for example, at cell phone base stations.

As an industry that fundamentally needs power for its products, the digital signage industry should not overlook the question of electricity. Clearly, it is beyond their control which type of electricity is powering a display. But companies themselves – be they large corporations or SMEs – will set the benchmark here and thus continue to drive the energy transition through increased demand for green power – if the indulgences don’t get too big.

Data also needs (eco)Power

Data centers are a major energy guzzler, processing huge masses of data to enable the digital world to work. In addition to the question of how they can become more energy efficient, another major factor is the source of the power needed to operate them. Northern Data has an answer to this. According to a FAZ report, the data center operator is relying on mobile container solutions that can be installed anywhere in the world where renewable energy sources are located – for example, Norway, where hydropower accounts for the lion's share of power generation.

Epson in Meerbusch features a solar plant since 2009.

Photo: Epson

E-MOBILITY

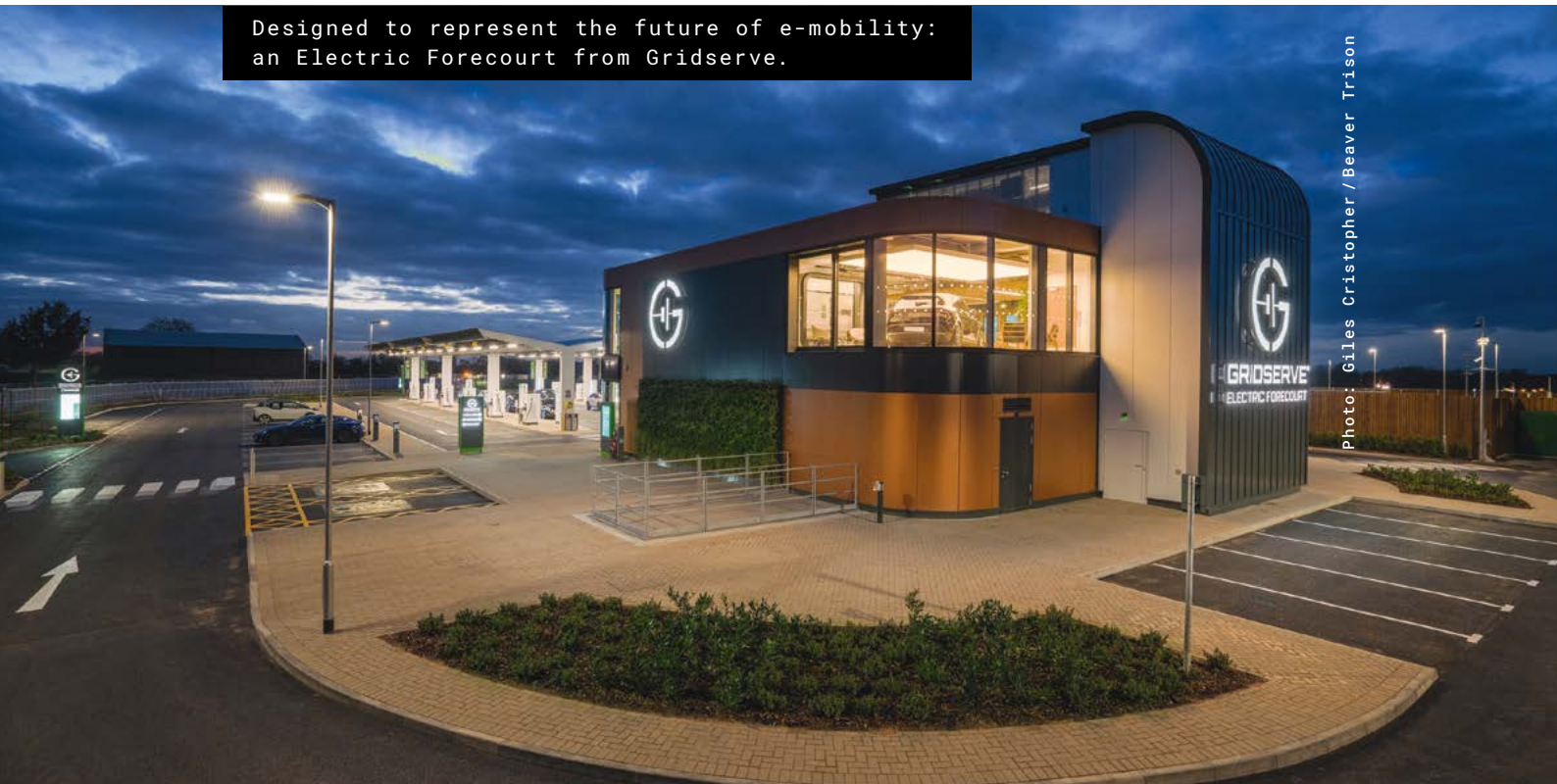
The new Home for EV-charging

Gridserve's Electric Forecourt is one of the most modern e-fueling stations in the world. Electromobility and sustainability merge there. Numerous digital touchpoints are part of the mix. As a result, a simple charging station is transformed into a rest area full of experiences.

Endless green pastures and old manor houses: The area around the English village of Great Notley near Braintree is considered the epitome of romantic country life. Surprisingly, one of the most modern electric charging stations in the world has been located right there since winter 2020: the first Electric Forecourt from Gridserve.

Founded in 2017, the company develops infrastructures for sustainable energy generation and its distribution. The Electric Forecourt on the A131 is the flagship of the start-up, which wants to accompany British electromobility into the future – with the latest charging technology, a sustainable concept, state-of-the-art design, and lots of digital signage.

For charging – the primary task of an e-charging station – there are 18 high-performance charging stations with up to 350 kW and two connections each. Despite the large capacity: The standard charging process for some 300 kilometers of



Designed to represent the future of e-mobility: an Electric Forecourt from Gridserve.

Photo: Giles Cristopher / Beaver Trison

Photos: Giles Cristopher / Beaver Trison

User experience re-imagined at service stations by Gridserve.

range takes at least 20 minutes, even at the powerful fast charger. The charging time is one of the biggest criticisms why many people wait to switch to e-cars. This is where Gridserve's concept comes in: The Electric Forecourt is designed to keep drivers extensively entertained during the waiting time.

The service station building resembles a combination of shopping center and business hotel. Inside, for example, there is a coffee shop, a post office, bookable meeting rooms and a shop selling regional gourmet products. There is also a small wellness area. The centerpiece, however, is the showroom, which takes up most of the second floor. There, on the one hand, the latest electric vehicles are exhibited and offered for lease, and on the other hand, sustainable technologies are presented. The Electric Forecourt is also an information center on sustainability and green energy. The information is presented digitally with customized LED totems, installed by Beaver Trison – British integrator and brand agency combined. The company supplied the large LED wall for brand messages at the back of the showroom, as well as the numerous other digital signage solutions in the building: from the menu boards in the coffee shop to the interactive door signs in the meeting rooms and the DooH totems outdoors.

And there's more to the collaboration: to ensure consistent design at every step of the customer journey, Beaver Trison also created all other design elements, such as wall and floor graphics and the chargers. “It was great for us to develop the Gridserve brand identity”, Peter Critchley, CEO of Beaver Trison, announced on the company's website. He said the company was able to translate that identity to a digital customer journey across the Electric Forecourt. Even the animations that run on the displays were designed specifically for Gridserve by Beaver Trison. The two companies worked together on the project throughout 2020 to open the Electric Forecourt in December.

In line with the sustainability theme, the Electric Forecourt is meant to represent, all technology in the building is powered by solar energy. Even the power for refueling is green. However, the solar panels on the building and charging stations alone would not be enough to power it. Instead, the bulk of the power comes from a solar park a few kilometers away. Like the e-charging sta-

→

Digital signage informs visitors inside the building.

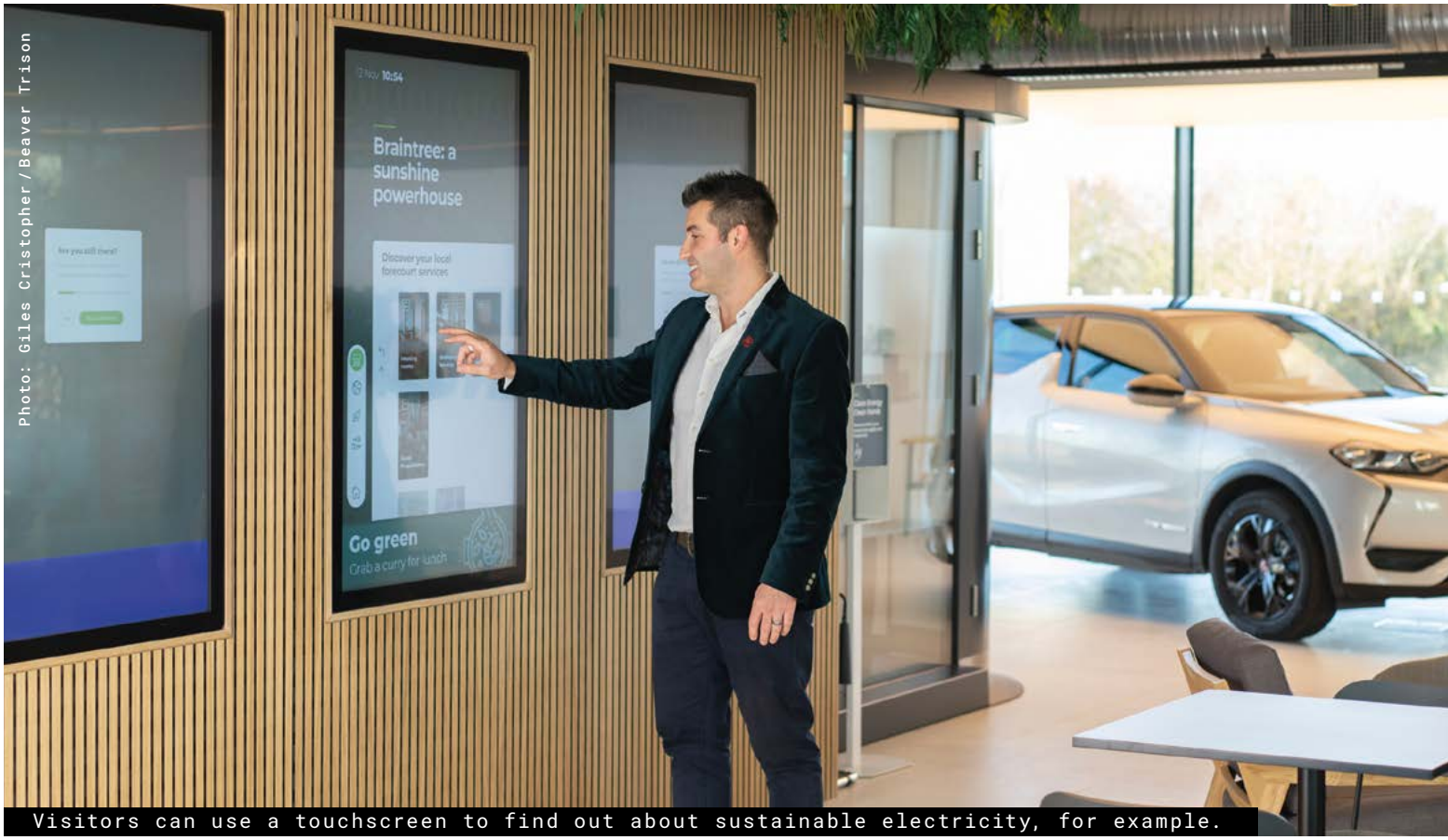
Photo: Giles Cristopher / Beaver Trison

tion, it also belongs to Gridserve. This completes the circle that makes the start-up successful: a well-rounded concept from sustainable energy generation to its distribution at a location that is dedicated to electromobility – and hopefully pushes its success. The start-up plans to build a good 100 of the e-service stations in the United Kingdom over the next five years. To this end, it has a budget of one billion pounds.

The time for modern e-fueling stations is just right. From 2030, the British government under Boris Johnson wants to tackle the great electric turnaround. The sale of new diesel or gasoline vehicles is then to be banned. Germany and other European countries are also pursuing similar goals.

Of course, there will be no political campaign for digital signage. The industry itself must drive the demand for its products. The first step is to be alert to new concepts such as electric forecourts, to benefit from such developments. So that we can say more and more often: This is where digital signage resides.

Digital room management is also available at the Gridserve station.



Visitors can use a touchscreen to find out about sustainable electricity, for example.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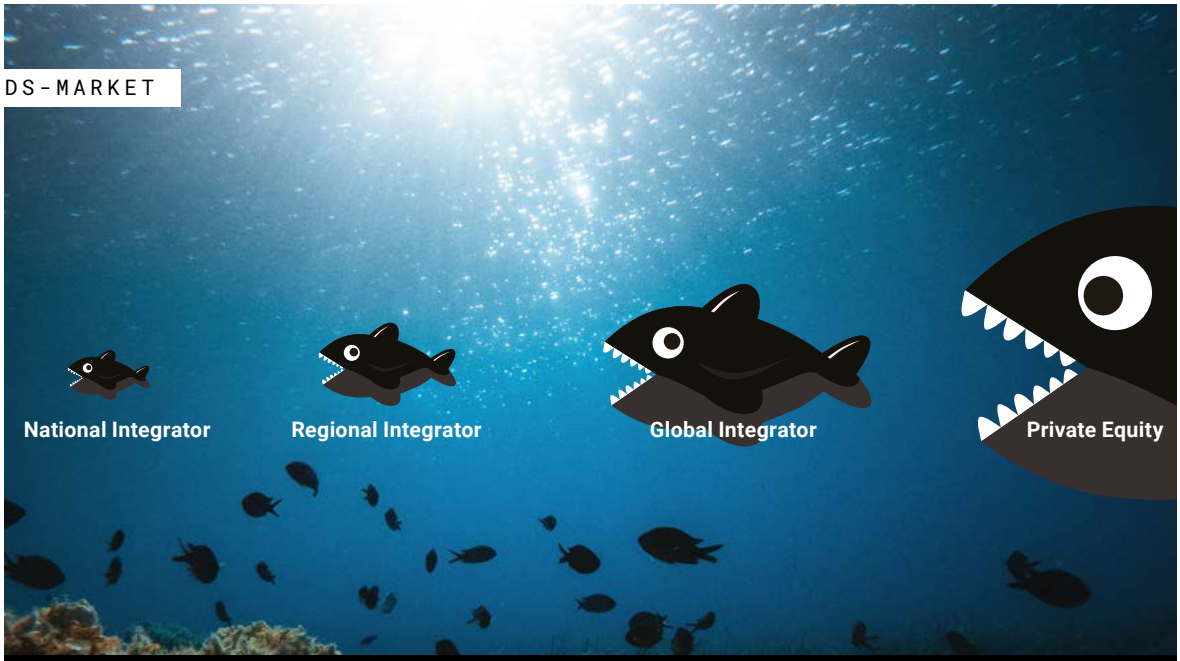
DIGITAL SIGNAGE MARKET

Photo: Couleur von Pexels



Consolidation in the digital signage industry is progressing. The food chain here is often characterized by the same structure.

Graphic: Adobe Stock
Photo: Lino Thaesler von unsplash

MERGERS & ACQUISITIONS

The Race to Consolidation

From IT corporations to hidden champions: M&A have shaped the digital signage and ProAV industries – and will continue to do so after the pandemic shock.

Due to the pandemic, the highly fragmented digital signage and ProAV industry experienced for the first time a declining market. While the industry lost two years of growth, the mid- und long-term outlook remains excellent. The wave of consolidation to build larger international players was only shortly interrupted during the beginning of the pandemic. Since fall of 2020 and even more since 2021, digital signage M&A deals make the headlines every week.

The largest deal dominating 2020 was the merger of Sharp and NEC Display Solutions to Sharp/NEC. NEC Corp decided to combine the visual solution business with fellow Japanese Sharp, which is owned by Foxconn. Sharp holds a majority stake in the newly formed Sharp/NEC entity. Due to the pandemic, the Sharp and NEC merger took longer than anticipated to materialize. But in spring 2021, the two display solution providers started to integrate operations in EMEA.

The display market has seen tectonic shifts from the traditional Korean and Japanese display vendors to Chinese players. While Chinese display producers already dominate the LCD component business, the solution business is still dominated by Koreans (Samsung, LG), by Japanese (Sharp/NEC, Panasonic, Sony) and Taiwanese (TPV-Philips).

The vast majority of M&A transactions in the past 18 months were in the integration space and in the digital signage software market. The dominant M&A driver was the mostly private equity driven trend of building vertical champions and expanding solution portfolios with digital customer experience services.

IT discovers ProAV & Digital Signage

Global IT-Manufacturers Ricoh and Sharp have both acquired integrators across Europe to participate in the trend from hardware to recurring service business. The document management industry (printers, copiers) could be an example of how consolidation could also reshape the digital signage and ProAV industry. While printer manufacturers like HP, Canon, Kyocera, Ricoh or Sharp sold primarily through partners for more than a decade, this sales strategy changed within a few years. As enterprise customers were not demanding just hardware but document management solutions and pay-per-page billing models, the hardware vendors rushed to acquire their most important partners. Within two years the most important independent integrators were acquired.

Ricoh and Sharp continue this strategy also in the ProAV and digital signage market. Especially Ricoh acquired one of Germany's largest AV integrators (DataVision) with more than 100m EUR annual revenues in addition to Techno Trends (Spain) and other IT integrators. Besides acquisitions, Ricoh has been very active and successful in Switzerland and Austria competing for large digital signage tenders. Sharp follows a similar strategy in Europe with the acquisition of Swiss ITPoint and British Complete IT. Both integrators are not dedicated digital signage providers but operate mainly in the IT-market.

But eco-system partners across the digital signage industry are sensitized if and how their display vendors remain committed to partner sales. Samsung has been often accused of undermining partners with sister company Samsung SDS (global IT-integrator) and Magicinfo software. While this may be sometimes the case outside of Europe, the display leader remains strongly committed to its eco-system partners in Europe. In general, display vendors continue to sell through eco-system partners, in contrast to digital signage ISVs, which are increasingly going direct.

In April 2021, the Swiss market was surprised by the M&A transaction of Swisscom acquiring the nation's largest digital signage integrator JLS Digital. With SFR 30m annual revenue, JLS has been the undisputed market leader in the small but very lucrative Swiss market serving mainly banking and retail customers. Swisscom operates in a mostly saturated telecommunication and IT-services market and is constantly looking for new solutions for their more than 2.500 business customers. Digital Customer Experiences was identified as one of the growth areas and JLS as the market leader a natural fit for the 11bn EUR annual revenue group. The real impact of this deal on the Swiss digital signage market is potentially big.

Building Vertical Champions

- Ricoh acquired among others UC & Video Conferencing specialists DataVision (DE) and Techno Trends (ES)
- Sharp acquired ITPoint AG (CH) und Complete IT (UK)
- Swisscom aquired JLS Digital (CH)
- Four Winds Interactive (FWI) acquired Poppulo (IE)
- Uniguest (US) acquired Onelan (UK), Tripleplay (UK), Janus Display (US) in addition to senior living tech platforms
- LCS (FR) acquired NDS PADS (NL)

Industry Mergers

- ZetaDisplay (SE) acquired Nordland (DE), Gauddi (NL)
- M-Cube (IT) acquired Storever (BE/FR)
- Pyramid (DE) acquired Polygon (DE)
- Spectrio (US) acquired among others Enplug, ScreenScape, Industry Weapon (all US)

Global Leaders ProAV

- AVI-SPL merged with Whitloc (combined 1.3bn) and displaced Diversified (1bn) to second place

Building Vertical Champions

Vertical technology specialists have also been active in acquiring digital signage market players in the shadow of high-visibility ITC deals. One of the most prominent hast been the Hospitality Technology Specialist Uniguest. The US-based company acquired with Oneland, Tripleplay and Janus Display three digital signage solution providers to form a leading hospitality platform provider. Uniguest also acquired senior living tech providers to complement the hotel business.

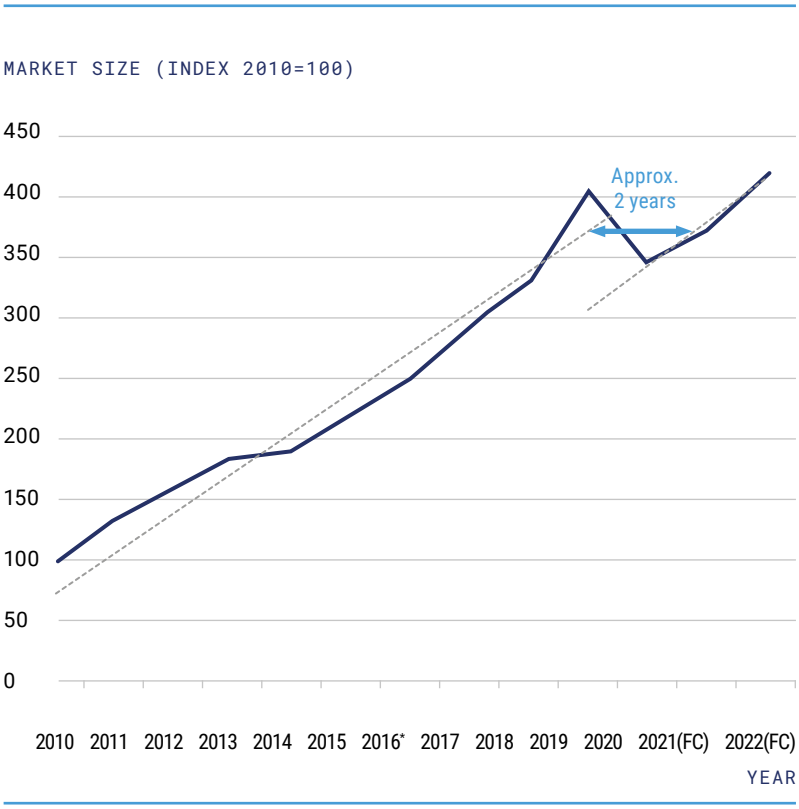
Digital Signage CMS provider Four Winds Interactive (FWi) acquired Irish Poppulo, an internal communication omnichannel platform to complement the FWi digital signage offering. The acquisition of Dutch NDS PADS by French LCS follows a similar M&A rationale. LCS has been a market leader for door signage solutions and NDS offers with PADS an established full-feature digital signage solution. The combined offering of the merged company should now be more attractive to corporate clients for a full enterprise campus digital signage solution.

Industry Mergers

Of the Big Four integrators, ZetaDisplay and M-Cube were most active in consolidating the EMEA digital signage market in the past 18 months. The most recent transaction was ZetaDisplay's move into Europe's largest digital signage market Germany. The Swedish integrator acquired technical integrator Nordland Systems. After consolidating the smaller Nordic and Benelux markets, ZetaDisplay is entering the lucrative and by far largest market in Europe.

- The digital signage industry recorded the first downturn since its inception approximately 15 years ago.
- 2019 was a record year for the industry and the growth rate climbed to 21%, followed by a decline of -14% in the first pandemic year.
- Demand in 2021 is still subdued but market is forecasted to grow again especially in Q3/Q4. Limiting factors of growth can be silicon (CPU) shortages and logistical bottlenecks from Asia.
- Latest in 2023 market growth should be back to pre-crisis levels.

Two lost Years due to the Pandemic



M-Cube has been consolidating mainly the Italian and French market, the acquisition of Belgian/French Storever gives M-Cube access to 10.000+ retail locations and offices in Germany, Benelux and Spain.

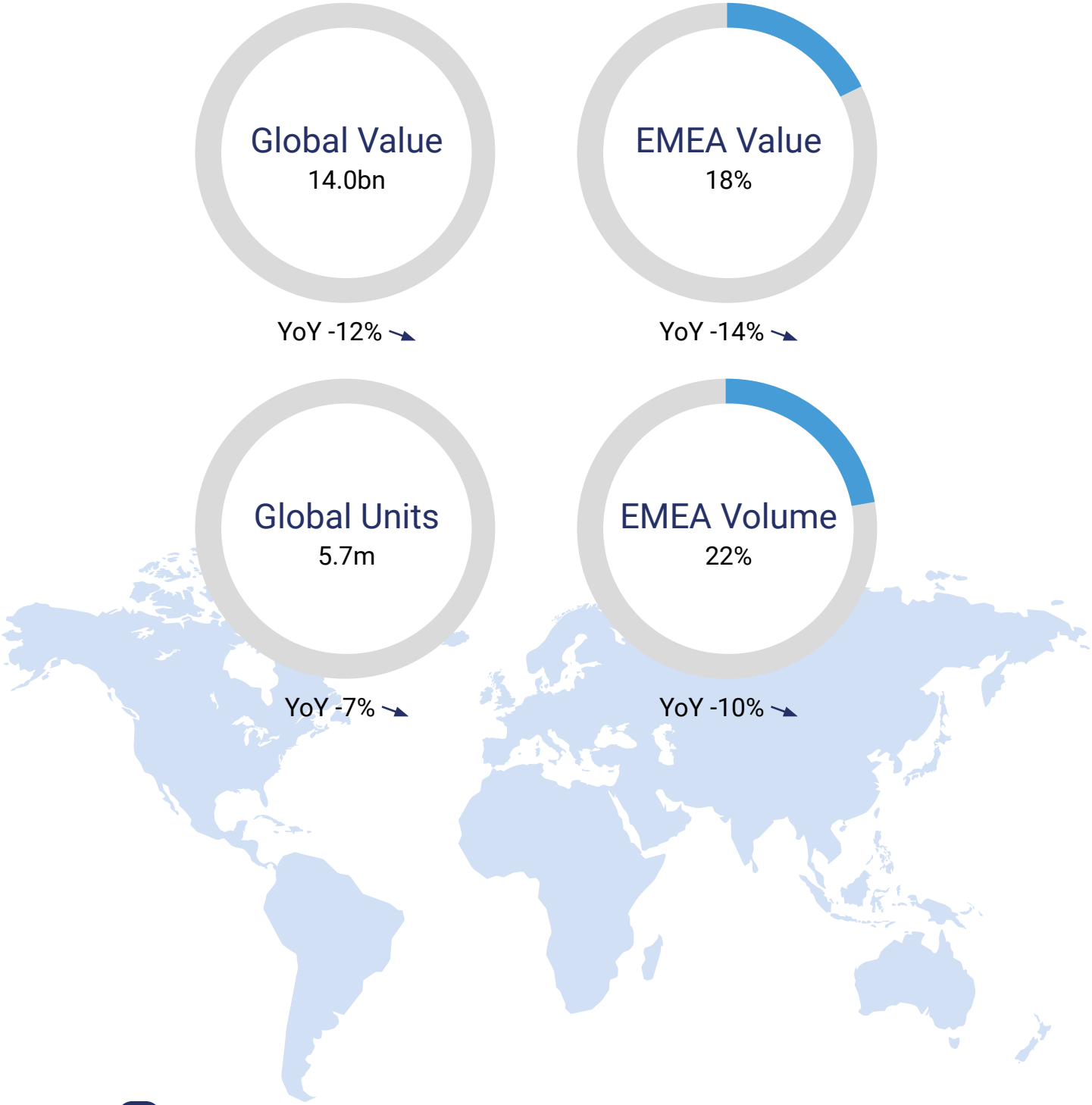
A less known but hidden champion is Pyramid, a self-service kiosk manufacturer from Germany. Pyramid designs and manufactures kiosk terminals for airports, retail, and telecommunication. The merger with a SPAC enabled Pyramid to find a succession plan and to acquire fellow-German competitor Polygon.

Across the Atlantic, a lesser-known digital signage CMS-provider, Spectrio, consolidated the market by acquiring competitors almost monthly. PE-owned Spectrio acquired among others three digital signage providers, Enplug, ScreenScape and Industry Weapon. Spectrio focuses on the long tail of the digital signage market and sells successfully direct to businesses via website and call center.

The elephants in the room are AVI-SPL and Diversified. Both US-based AV integrators acquired dozens of ProAV- and digital signage specialists in recent years. In 2020 both generate more than 1bn USD revenue each – mainly in North America but also across the globe. While both operate also in EMEA, their role remains so far limited to serving entities of US-based Fortune 500 customers in the region. Their main USPs are highly industrialized and scalable processes and services for ProAV and Digital Signage projects. Eventually this will enable them also to compete for European clients with large heterogenous networks.

Growth in the pandemic: Display sales dropped globally 2020

invidis yearbook 2021



Source: 2021 Futuresource
2020 Market Share in Units
(Professional Screens >32")
YoY: 2019 vs 2020

Growth 2020: EMEA 1.2m LFD | YoY Volume -10% YoY Value -14%

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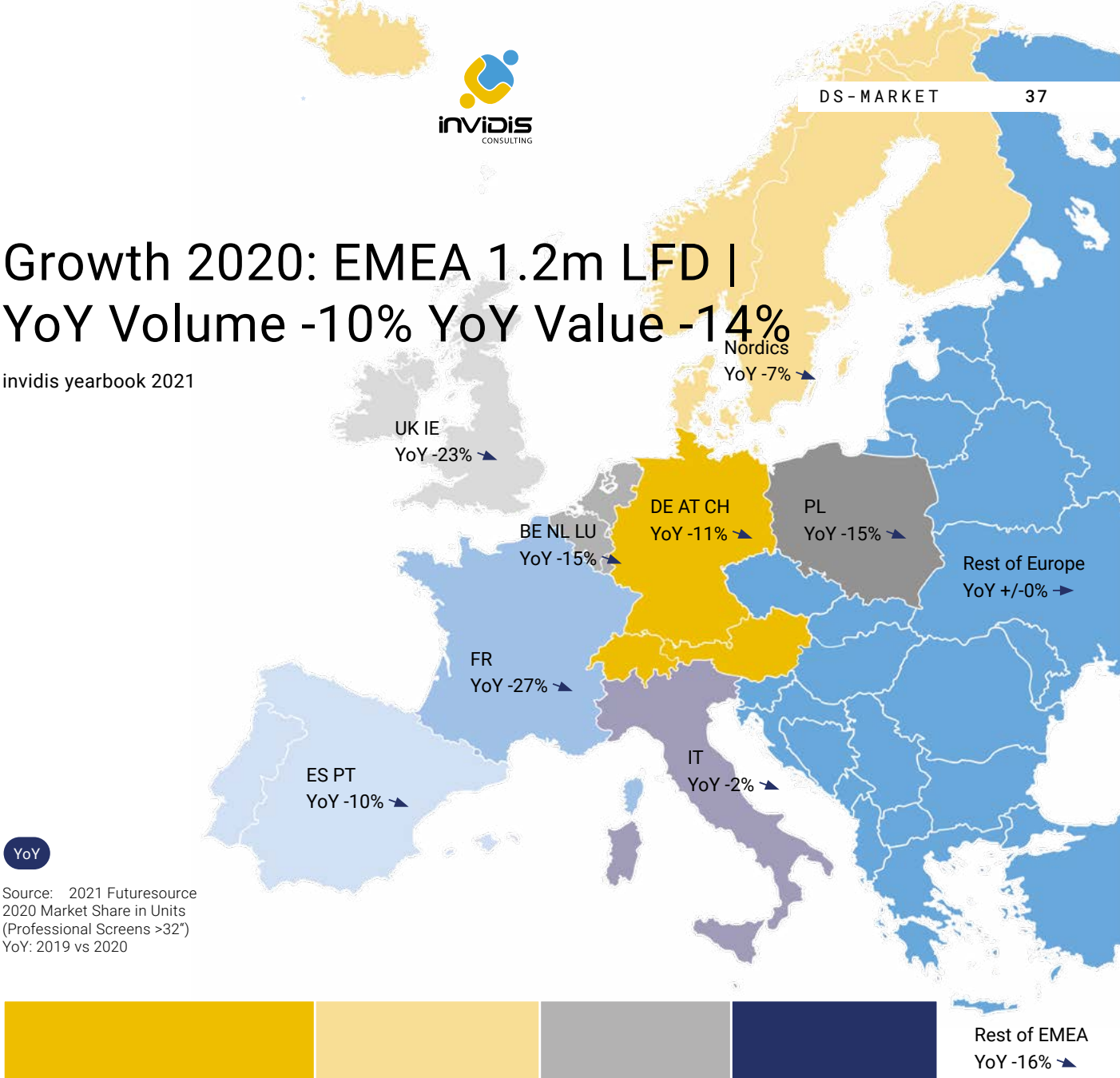

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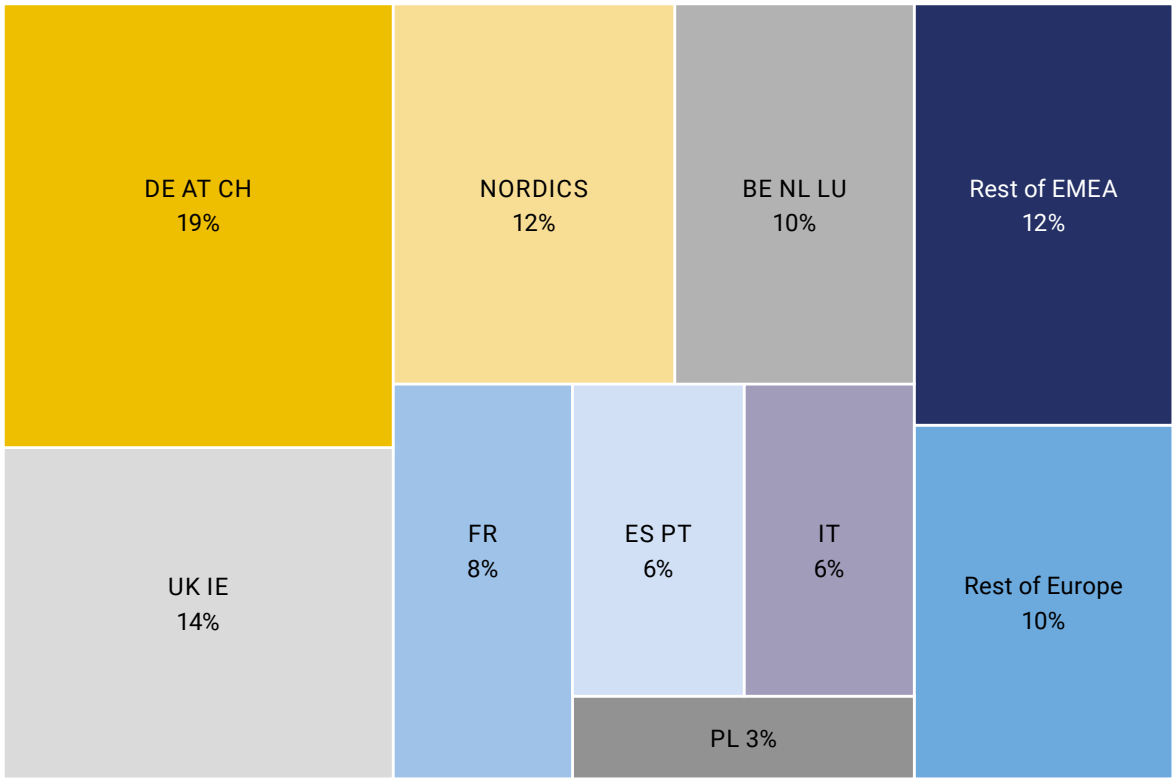


EMEA Market Share

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

VISUAL SOLUTIONS & MEDIA PLAYER

How the Pandemic changed the Market

A change in the top 3, the effects of the pandemic, the rise of micro-LED: The display market is in a state of upheaval.

Markets in turmoil, pandemic supply chain problems and the rise of LED bundles – the once solid visual solution market has experienced its most volatile period ever. Manufacturers of media player and IT infrastructure are experiencing similar disruptions in the supply chain.

In recent years, the digital signage market transformed into a buyer's market. Professional displays became in many ways a commodity as more and more display manufacturers started sourcing from the same Chinese display producers. Once unknown Chinese manufacturers like BOE – often supported by government subsidies – gained market share, to the extend that the once dominating Korean manufacturers Samsung and LG decided to stop producing LCD panels altogether. Soon LCD mother glass will mainly be produced by a few Chinese and Taiwanese manufacturers, the well-known OEM brands will all assemble the same LCD panels.

To counter that dependency, both Samsung and LG focus on display technologies beyond LCD. For Samsung, the future of display is Quantum Dot (marketed as QLED) while LG pushes OLED. Customer uptake of OLED and QLED in the digital signage market is still small, but recent product launches and marketing activities push the new technologies. Samsung and LG own most of the intellectual property (IP) of their respective technologies making it harder for mainly Chinese competitors to offer similar solutions.

But LCD remains the bread-and-butter business in the large format display and desktop monitor market. While Samsung retained the LFD market lead, Philips replaced NEC as top 3 vendor in Europe. Industry analysts expect Philips to even overtake number 2 positioned LG Electronics until the end of 2021. NEC merged with Foxconn-owned Sharp in 2020, to form a display market player with Japanese roots. After more than a year – in admittedly difficult times – the combined Sharp/NEC joint-venture is still lacking the agility it has been known for. PPDS (Philips) has gone through similar organizational changes when Hong Kong based TPV acquired the Philips display business. But currently Philips is very successful with a mainstream offering and highly acclaimed Android SoCs.

Top 3 Displays 2020

COMPANY	MARKET SHARE
Samsung	35%
LG	15%
Philips	7%
Others	43%

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

LCD Market driver and USP for most screen vendors are SoC and increasingly sensor integration. But since spring 2021, the market sentiment has shifted dramatically with the begin of serious supply chain problems. In the beginning, only special displays e.g. high brightness were unavailable. Soon after also mainstream displays became rare. Something the industry has not witnessed before, as lack of containers, space on vessels from China to Europe and the sudden rise in global demand brought the finely balanced logistic stream to a standstill. Display availability remains low in the summer and is expected to stay so until later this year.

On a more positive side, the winner in the visual solution business is LED. Fine-pitch LED is not only replacing thin bezel videowall displays but also enabling large digital canvases close to the audience. While everyone talks about very fine-pixel micro- and mini-LED (Sony Crystal, Samsung The Wall, LG Magnit), the majority of projects is realized with LED of 3mm or less. But direct view LED has come to stay and will replace most display-based solutions 120" and larger. While LED is still much more expensive than LCD, market prices are dropping across the board. An average LED wall costs around 50k depending on size and resolution. Samsung surprised the market in summer 2020 with larger pixel pitch "The Wall for Business" solutions in 1.2mm and 1.6mm for very competitive prices. The market was eager to get hold onto the new Samsung solutions especially in automotive and studio projects.

Most LED market players started offering LED bundles including mounting and video processor to enable integrators to easier sell LED into projects. In contrast to LCDs, LED is more complex to install and maintain. The latest micro-LED solutions don't require to connect each module with cables anymore simplifying handling on site. LED will remain the space with most innovation in the years to come as the display business continues to commoditize.

The demand for high performance and android-based media players remained high, while simple signage solutions are increasingly realized with built-in SoC players. But similar to displays, getting the right product was a difficult task. While Intel suffered severe supply chain challenges in 2020, it was rival AMD which suffered the most since the beginning of 2021. Integrators are forced to look for alternative media player solutions, often choosing a more powerful player due to very limited supply.

In 2021, Samsung launched the latest version of "The Wall".

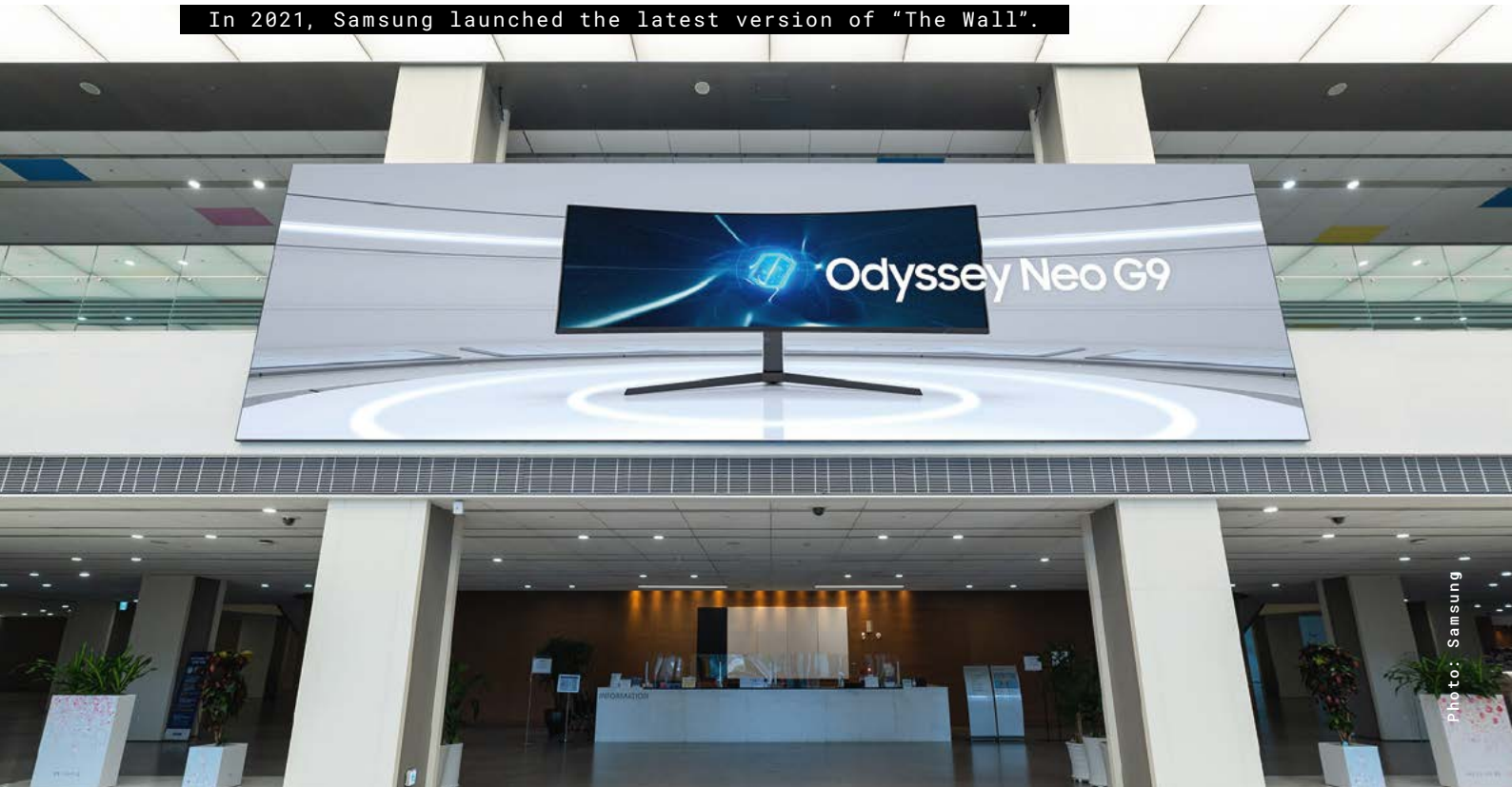
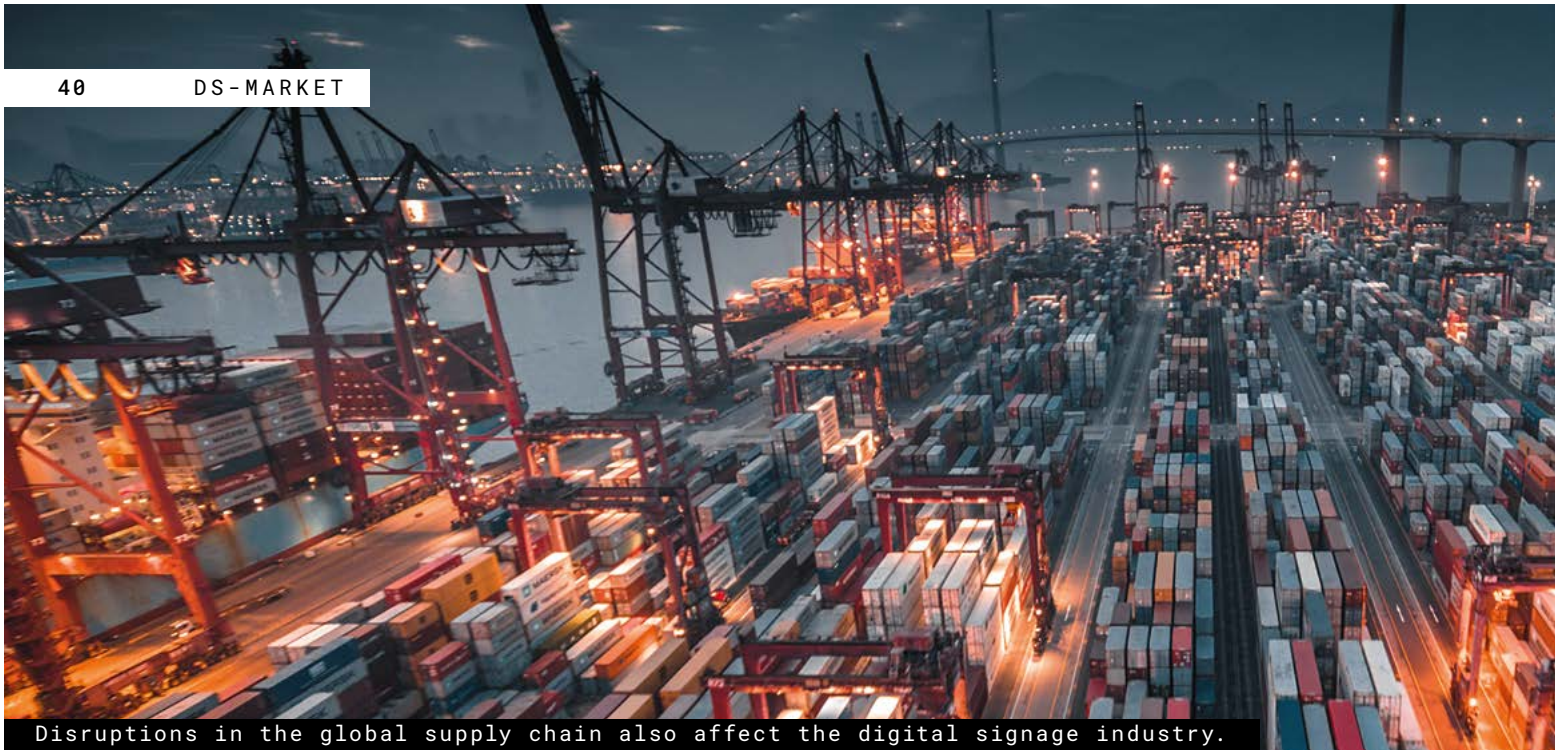


Photo: Samsung



Disruptions in the global supply chain also affect the digital signage industry.

TOP 8 DISTRIBUTORS DACH

Supply Chain Challenges

Closed ports, delayed freight: the global supply chain continues to be disrupted – and will remain so well into 2022, according to experts.

The Covid pandemic lockdowns in 2020/21 hit many sectors of the economy hard, but the effects across the global supply chain will be felt much longer. Availability and transport capacities are far from a return to normal, independent of how the pandemic will develop during fall/winter. Besides limited availably of semiconductors, congestion at international ports remains the most pressing issue since spring 2021. The situation will not ease before the Chinese New Year in February 2022, as Bob Biesterfeld, CEO of C.H. Robinson Worldwide, one of the world's largest freight brokers, told the Bloomberg news agency.

The image of the freighter Evergiven stuck in the Suez Canal dominated press coverage in spring. But the constraints caused by the Covid-19 pandemic continue to be a determining factor. The German Association of Materials Management, Purchasing and Logistics, for example, determined in a survey of 166 German companies that the Corona-related closure of the southern Chinese trading port of Yantian in May caused more severe disruptions than the blockade of the Suez Canal in March. The most recent incident happened in early August, when the Chinese cargo port of Ningbo closed in parts due to a single Covid case, triggering further delays and congestion. “If trading with China does not quickly find its way back to normal processes, the crisis also threatens to make itself felt in the Christmas trade with missing products and higher prices”, said Vincent Stamer, head of the Kiel Trade Indicator, a measurement tool for global shipping traffic of the Kiel Institute for the World Economy, at the end of August.

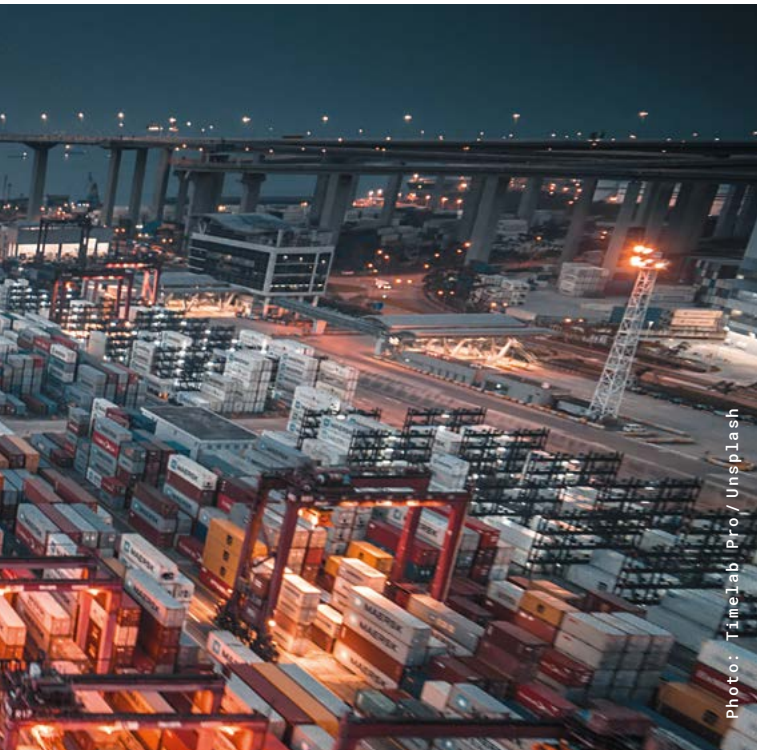


Photo: TimeLab Pro / Unsplash

Added to this is a chronic shortage of semiconductors, which is estimated to last at least until summer 2022. In addition to the Covid challenges, semiconductor shortage has been exacerbated by a fire in a Japanese chip factory.

Digital Signage industry seriously affected

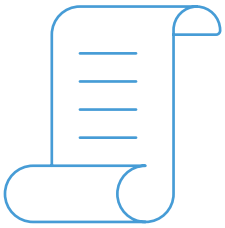
The difficult supply situation has been causing problems for the industry in Germany in particular. In a survey conducted by Reichelt Elektronik, 95% of the respondents stated that there had been production stoppages in their company since the beginning of 2020 due to supply bottlenecks. The reasons were late deliveries or missing components. 41 percent experienced production stoppage of more than one month. In addition, 39 percent confirmed that the prices for certain components had increased significantly.

Digital signage market players are also massively affected by the disruptions in the global supply chain. Summer 2021 was supposed to put the industry back on track. While demand is picking up – orderbooks reach record levels – there remains shortages of displays and media players. Goods that are still available can only be purchased at noticeably higher prices. Supply and demand have caused display prices to fall continuously for more than ten years, but now the game is turning around, at least in the short term: Very low supply meets high demand.

This in turn brings also good news: demand for digital signage is back, and with close cooperation of manufacturers, distributors and integrators, the period of supply shortages can be managed jointly.

Top Digital Signage Distributors DACH 2020

COMPANY	FOCUS
ALSO	IT & AV
Bechtle (ITZ)	AV
Concept Intl	AV
Delo	AV
Ingram Micro	IT & AV
Littlebit	AV
Midwich Gruppe (Kern & Stelly)	AV
Tech Data Maverick	IT & AV



Companies in alphabetical order. Note: All figures are based on reports from companies or on estimates by an advisory board, Source: invidis consulting GmbH, company informations

TOP 3 GLOBAL INTEGRATORS

The Billionaires' Club

The world's two biggest digital signage integrators are in a different league. But third-placed Stratacache is catching up.

Consolidation in the industry has been driven by a series of M&A transactions, some more spectacular than others. While one single merger of AVI-SPL with Whitlock created the world's largest ProAV integrator, other players like Diversified followed the track of continuous acquisitions. Along the line the US-based integrator built an integrator group in similar size. Today both AVI-SPL and Diversified account 1.3bn USD annual revenues.

The silent one on third place

The third largest global integrator is Stratacache which is slightly trailing behind AVI-SPL and Diversified in size. But CEO Chris Riegel is very ambitious to be part of The Billionaire Club soon.

The opening of the Stratacache display/LED fab in Oregon in late 2021 will boost Stratacache revenue in the coming years. Stratacache is very secretive about revenues and the size of the group (see also article on page 68). But industry experts estimate Stratacache's annual revenues in the mid-three-digit million range. All top 3 players are US-based, privately held or at least partly funded with private equity.

Many much larger market players like Telcos, IT-Integrators or professional service organisations (e.g. Accenture, Deloitte) also offer digital signage solutions as part of a large technology and communication portfolio. But the top 3 lists pure-play integrators only – companies solely focusing on ProAV and digital signage.

Global Top 3 Integrators

COMPANY	COUNTRY	REVENUE IN M USD
AVI-SPL	US	1.300
Diversified	US	1.300
Stratacache	US	500 - 1.000

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

TOP 3 INTEGRATORS EUROPE

The Eye of the Storm

The pandemic dampened M&A activity among the three largest European DS integrators. The anticipated acquisition of Zeta Display could set an example here.

The ranking of the top European digital signage players did not change during the pandemic. All three integrators suffered declining organic revenues during the pandemic. Spain-based Trison managed to diversify their client-base with new project wins like Porsche, therefore reducing the dependency from main customer Inditex. ZetaDisplay was the only Top 3 player actively acquiring during the pandemic. The Swedes acquired Germany-based Nordland Systems, the Top 3s first active move into the region's largest digital signage market. The DACH region (Germany, Austria and Switzerland) account for 19% of all digital signage activities in EMEA. Trison (Stuttgart) and M-Cube (Frankfurt) both operate with small teams in Germany but are not yet relevant market players.

ZetaDisplay dominated the headlines with the so far largest transaction in the European digital signage market. London-based private equity Hanover Investment offered 72m EUR (almost 100m EUR enterprise value including debt) in summer 2021 to take ZetaDisplay private. The offer was made public after the board of ZetaDisplay announced it was looking for strategic alternatives to its stock listing. The deal has been welcomed by most investors and is scheduled to be closed in early fall. The new owners plan to build a European champion with future acquisitions.

The third largest pan-European digital signage integrator – Milan-based M-Cube – suffered during the lockdown. But business has recovered in the first months of 2021 as many of M-Cube's customers are in the booming luxury retail segment. To the surprise of most economists, luxury retail is back on track even surpassing 2019 levels. M-Cube operates across Europe and China.

Europe Top 3 Integrators

COMPANY	COUNTRY	REVENUE IN M EUR
Trison	ES	50-100
Zeta Display	SE	20-50
M-Cube	IT	20-50

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

INTEGRATORS DACH

Grow or Go

The big ones are growing, the small ones are having a hard time: The market of digital signage integrators in the DACH region shows very different developments.

The digital signage market declined in low single digits for the first time due to the pandemic. The only notable exception being Austrian integrator Peakmedia, who managed to double digital signage revenues amid the crisis. The most important development is the increasing different growth rate. The top players continue to grow while we observe a collapse of the middle. For medium sized players with 5-10m EUR revenue, it is either to grow rapidly or to go niche/leave the market. For small integrators below 5m EUR revenue the outlooks remain difficult.

Leading Europe's largest market are three very different integrators – Cancom, Radio POS and Umdasch Digital. Cancom is one of Germany's largest system integrators achieving 1.65bn EUR revenue – a plus of 6%. Digital Signage solutions made up less than 3% of total revenue. But the focus on corporate projects helped Cancom to retain the market lead even during lockdown.

Different at the Top

Kiel-based Radio POS climbed to 2nd place in this year's invidis DACH ranking. The instore radio and digital signage solution provider benefitted from the crisis-resistant subscription business and a robust digital signage business. The third largest digital signage integrator is umdasch Digital – a subsidiary of umdasch Shopfitting with offices in Austria and Germany (including former Seen Media). While umdasch Digital's retail-oriented standard digital signage business suffered under the lockdowns, the CAPEX-heavy ESL-business boomed.

For the first time Swisscom is listed in the top DACH ranking. The Swiss telco acquired JLS Digital in spring 2021 with the goal to capitalize on its huge business customer base. Instore customer experiences for the Swiss B2B world should be developed and delivered from Swisscom if the telco has its way. It will be interesting to observe if a digital agency like JLS will be able to keep its creative DNA. Swisscom plans to give JLS team maximum freedom.

Acquisitions and Reorientations

Göttingen-based xplace experienced a few tough years seriously downsizing the company. Xplace is majority owned by Europe's largest consumer electronics retailer Media Markt Saturn (Ceconomy), which withdrew from major European markets selling hundreds of stores. In a management reshuffle, longtime CEO and co-founder Marco Wassermann left xplace. The new CEO Stephan Lange – a long time Accenture executive and VP Technology at Media Markt Saturn – plans to bring the digital signage integrator back into growth territory together with Frank Hagemann. Xplace offers very sophisticated and unique retail tech, digital signage and ESL solutions for consumer electronics retail.

Heineking Media was acquired by mid-market investor Premium Equity. Majority owner of Heineking for the past six years was the publishing house Madsack. The new owners plan to quadruple the business in the coming years with expanding the so far education-focused digital platform business to the factory floor. The company is convinced that blue collar workers require similar digital collaboration solutions as students and office staff. In addition, Heineking plans to internationalize the existing education business on its own and with partners.

Another transaction dominated the headlines in late spring: Vienna-based Grassfish was acquired by Vertiseit. The Swedish integrator snapped away Grassfish, which was on top of many competitors' acquisition list. The combined entity plans to adapt with ISV+ a hybrid business model between a CMS-platform provider and an integrator. Global digital signage players are less dominant in the DACH region except for ZetaDisplay (acquired Nordland in March 2021). Trison and AVI-SPL remain smaller players while Stratacache (Scala) quietly builds a respectable business.

Photo: invidis

The digital signage meadow is not equally green for all DACH integrators. Smaller companies in particular are having a hard time.

DACH Top 20 DS Integrators

COMPANY	COUNTRY	CATEGORY*	M EUR
Cancom	DE	TSI	30-50
Radio P.O.S.	DE	FSI	20-30
Umdasch Digital	AT	FSI	20-30
Swisscom (JLS)	CH	FSI	20-30
xplace	DE	TSI	10-20
Heineking Media Group	DE	TSI	10-20
Stratacache (SCALA)	DE	TSI	10-20
ZetaDisplay (Nordland Systems)	DE	TSI	5,0-10
Bütema AG	DE	TSI	5,0-10
PMS Perfect Media Solution	DE	TSI	5,0-10
Kapsch	AT	TSI	5,0-10
Grassfish (Vertiseit)	AT	SW	5,0-10
Peakmedia	AT	FSI	5,0-10
4D magic	DE	FSI	2,5-5,0
DMS	AT	FSI	2,5-5,0
Screenfood	CH	FSI	2,5-5,0
ICT AG	DE	TSI	2,5-5,0
trison GER	DE	TSI	2,5-5,0
AVI-SPL	DE	TFI	2,5-5,0
easescreen	AT	SW	2,5-5,0

* TSI: Technical Service Integrator; FSI: Full Solution Integrator; SW: Software (Developer)
Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

The Big Four are dominating the integrator industry in Europe through expansion.

Photo: invidis

THE BIG FOUR

The golden Era of pan-European Champions

Europe's four largest digital signage integrators have different roots. But all of them have expanded their position across the continent through acquisitions. But the Corona crisis hit them, too.

For many years, the European digital signage market was dominated by national champions. This changed in 2016, when Stratacache acquired Scala.

While Scala was technically already a US-company, its roots and main partner eco-system where in Europe. For many of the largest integrators in Europe, the acquisition of Scala forced them to look for a new software supplier, as the most important supplier has turned into a competitor. Additional transactions by Stratacache followed in Europe: Belgian pharmacy DooH media owner IDKlic, and Nordic retail analytics experts Walkbase.

At the same time at the edges of Europe in Spain and Scandinavia, investors discovered the potential of digital signage for retail and started building pan-European integrators. The most secret of the Big Four till today is Trison. The digital signage integrator became a global player with its main client – a Spanish fast fashion retailer. Until today, Trison supplies its main customer's 7.200 stores in 93 countries with LED-Walls, displays and retail technology solutions. But Trison has grown since then with acquisitions in France (TMM), UK (Beaver) and Spain (Necsum). In addition, Trison opened an office in Germany enabling the Spanish integrator to have its own presence in one Europe's top-3 markets.

As part of the invidisXworld video series, Florian Rotberg and Stefan Schieker analyzed the latest activities of the Big Four:

While Trison expanded into Europe from the Iberian Peninsula, Scandinavia was conquered by Swedish ZetaDisplay. The Malmö-based integrator acquired competitors across the Nordics (Marketmedia, ProntoTV, LiveQube, Seasam, Webpro) followed by the Netherlands (QYN, Gauddi). In March 2021 Zeta expanded also into Europe's largest market Germany. The acquisition of Nordland will be followed by additional transactions according to ZetaDisplay CEO Per Mandorf. While ZetaDisplay focused long on its Nordic home market, the recent global project win of a well-known Swedish furniture chain has put ZetaDisplay on a global map.

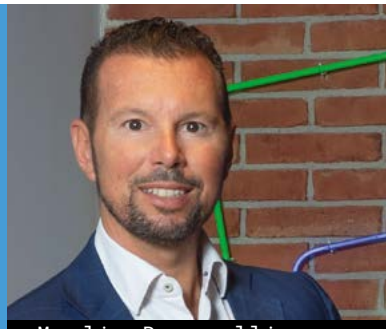
Managed Touchpoints (as of Q1/2021)
52.000


Per Mandorf

Per Mandorf | Zeta Display – The platform specialists

- Zeta well positioned handling the shift to global projects
- Strategy to move from time/material to digital signage as a service
- Platform is in the center of solution offering, adding complementing solutions
- Rebuilt group to a functional based organization in the past year – positive impact on SaaS

Managed Touchpoints (as of Q1/2021)
46.000


Manlio Romanelli

Manlio Romanelli | M-Cube – The luxury experts

- M-Cube counts the largest French and Italian luxury brands to their customers in addition to a large Swiss Luxury watch group
- Retail experiences from large LED to small one-to-one digital touchpoints for more than 60 luxury brands globally
- Following the customer required M-Cube to be present in China with own staff – in total 14 entities
- The deep understanding of luxury needs helped M-Cube to master the pandemic with hyper personalization experiences instore, via Video and via App (Stentle)

Managed Touchpoints (as of Q1/2021)
60.000


Alberto Cáceres

Alberto Cáceres | Trison – Industrialized processes meet creation

- Challenging 2020, but 2021 started with a record quarter
- Trison is much more than global fast fashion, main project wins have been Porsche global, Lisbon metro or a large shopping center in Seoul/Korea
- Projects in Asia and America have helped to offset postponed lockdown related projects
- WoW concepts for shopping malls from creative entity Necsum

The latest member

Latest addition to invidis' top European integrators ranking is M-Cube. The Italy-based integrator, owned by French private equity group HLD, started to consolidate the European market in 2019 with the acquisition of French digital signage integrator Carlipa. Earlier transactions in Italy and the 2020 acquisition of Storever in Germany have catapulted M-Cube in the Champions League of the European digital signage business.

The Big Four digital signage pure-players compete with hundreds of smaller digital signage experts, but mainly with much larger IT-Integrators, global agency groups and professional service organisations. But the expertise of creating immersive, but highly scalable digital experiences in physical spaces is the USP of pure players.

The Big Four suffered in the past 15 months as wide parts of Europe were in lockdown and most retailers kept their stores closed for many weeks. But at the end of the year most outstanding payments have been collected, as digital signage proved to be business critical for many customers. All CEOs are planning to expand their footprint via Buy & Build, acquiring integrators and software vendors and organically by opening new offices.

Managed Touchpoints (as of Q1/2021)
3.5m (Scala/Stratacache)


Chris Riegel

Chris Riegel | Stratacache – Adding value and intelligence to DS

- Display industry does not meet need of customers – own micro-LED production will offer large and small display solutions
- 2021 good year – but still choppy
- Stratacache operates entities in 20 countries
- Simple digital signage is not sufficient – integrators have to add value & smartness
- Stratacache plans DS complementing solutions and products

SCANDINAVIA

Seismic Changes

Ranking hasn't changed, but the circumstances: The pandemic left its mark also in the Nordic Digital Signage market.

While the 2020 ranking of the Top 5 Digital Signage integrators did not change year-over-year, revenues of most players dropped between 10 to 20 percent due to Covid-19. As with most 2020 rankings, a fair comparison is even more difficult than in previous times. But the industry has seen some major announcements since the beginning of 2021, which will shape the industry's role of the Nordics in years to come.

ZetaDisplay acquired Hamburg/Germany-based Nordland Systems in March 2021. It is its first acquisition in one of Europe's top-3 markets. Nordland adds approximately 7-8m EUR revenue to ZetaDisplay's balance sheet making up for the pandemic losses. Combined, ZetaDisplay and Nordland generated 43m EUR in 2020.

End of June it was announced that Hanover Partners would acquire ZetaDisplay, consequently taking the Nordic's leading digital signage player private. The London-based private equity firm valued the company (incl. debt) at almost 100m Euros. One of the largest deals yet in the European digital signage industry. The new owners announced that ZetaDisplay will be the nucleus for additional acquisitions in the foreseeable future.

Stockholm-based VisualArt recorded some substantial project wins since the beginning of 2021. Covencience store operator 7Eleven Australia chose the VisualArt platform for the new 2.500 display network Down Under, complementing customers like McDonalds and ICA supermarkets in Sweden. Even more important for the future was the successful bid for the EMEA rollout of one of the world's largest QSR chains.

Swedish Vertiseit made the headlines in May by a surprise move acquiring Vienna-based Grassfish. Vertiseit almost doubles its revenue with the acquisition of Grassfish adding prominent customers like BMW and Porsche to its roster. The transaction put Vertiseit on the European digital signage map with a new business strategy. The combined Vertiseit/Grassfish organisations plans to follow an ISV+ strategy, offering more services than a CMS provider but short of an integrator. CEO Johan Lind plans to capture the control points in the digital signage industry without providing low margin on site installation and services. ISV+ enables the combined entity to expand faster by also adding IT-integrators with "people on the ground" to its ecosystem.

Top 5 Nordic Integrators

COMPANY	TURNOVER
ZetaDisplay	30-40m
MultiQ	20-30m
ATEA	20-30m
VisualArt	15-20m
Vertiseit	5-10m

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

INTERVIEW

Tech can't replace a good Story

Berlin is home to many digital studios and agencies, and the city is setting creative standards. One of the leading digital studios is Tamschick Media + Space. invidis met Charlotte Tamschick, Creative Lead and Partner, discussing international projects, trends and the secrets of immersive content.

invidis: Ms Tamschick, what makes Berlin so special?

Charlotte Tamschick: Berlin inspires and attracts interesting, skilled talents and potential partners from all over the world. There is hardly any other city that offers this and at the same time has such a fantastic quality of life.

Do you focus on clients from Germany, Europe or internationally?

Quite clearly, we are passionate about working internationally. Besides Germany, we are currently working on projects in the USA, Saudi Arabia, Austria, Switzerland and Morocco.

Photo: Tamschick Media+Space

To what extent do the clients differ in the various countries?

The very different cultures of our clients also shape the projects. Of course, the mentality in the negotiations and the design process are also very different in each case. That's why we start each of our projects by listening. We meet with the clients and let them tell us the stories they want to tell the world. And while we are listening, first ideas of how to interpret the theme in terms of content and technology are already developing in our heads. The initial briefings are just the beginning of many client workshops to develop unique concepts and to avoid cultural misunderstandings.

What technologies are most popular and what is trending?

More than 20 years ago we started creating immersive media experiences. It was a novelty for visitors to completely immerse themselves in the stories and interact with the content. Our virtual themed worlds are still very much in demand. Museums, exhibitions, but also brand experiences are looking for this educational way of communication. In the meantime, however, we are also breaking new technological ground and integrating other hybrid, interactive and participatory formats and apps into our experiences. Small poetic productions in which technology recedes into the background, at least visually, are currently a trend.

Can you name some typical projects?

One example are AV-supported audio experiences. We captivate visitors emotionally by creating narrative worlds supported by visual, interactive and acoustic technologies. People enjoy listening to stories again while interacting with small visual elements. Perhaps the times of Expo 2000, when everything had to be bigger, faster, more blatant, are over for now.

Tamschick received a silver ADC nail for the multimedia exhibition "XXHL, giga tours et méga ponts".

What is a bigger challenge: the development of content or the technical implementation?

The content, the focus on information, on objects and the communication goals, is much more time-consuming if you want to make it right. Our entire creative team always works its way into the topics together with the client and their subject matter experts. Because without knowing what you want to communicate in terms of content, it is not possible to develop the appropriate messaging and design. No technology and aesthetic design implementation can replace a coherent story.

What boundaries have you come up against in projects?

Clients who embark on a journey with us are curious, eager to experiment and innovative. Like us, they want to use the latest technologies to tell their stories. Obviously, that leads to more trial and error in the innovation process than with standard applications. But I wouldn't call it boundaries. They are challenges, and they are part of our business. Occasionally, the political or social environment of an ongoing project changes. In Jerusalem, for example, we had difficulties getting different religions of our team into the Old City in troubled times. But passion for the project also overcomes such boundaries.

Talking about sustainability: To what extent is this a topic for you and your clients?

Internally, we are an environmentally conscious company. Our office is in the middle of Berlin-Schöneberg and many team members cycle or take public transport to work. We try to keep email communication to a limit, use regional green electricity for our server and use biodegradable filament made from corn starch for the 3D printer. On the customer side, the demands are very different and we have acquired quite a bit of knowledge for advising our clients in regards to sustainability. Many customers also no longer insist on the numerous on-site appointments, but are satisfied with video-based meetings. In European public tenders, sustainability requirements are outlined clearly, but the topic is also increasingly relevant for our international clients.

What was a recent highlight project of Tamschick?

This year we were awarded a silver ADC nail for the immersive and interactive temporary exhibition "XXHL, giga tours et méga ponts" at the Cité des Sciences et de l'industrie in Paris. An interactive experience on 1.000 m² providing insights of radical concepts for buildings. On behalf of Universcience, we created, designed and realised the multimedia exhibition as general contractor.

Photo: invidis

To survive globally, ISVs must now offer a complete experience platform.

SOFTWARE

Watch out for the new World

Consolidation and changing customer requirements: Some of the independent CMS providers are losing their business model. But some have adapted to the new market – with platform thinking and a holistic approach.

The market of independent software vendors (ISV) is highly fragmented, it seems it is too easy to develop a digital signage CMS. "It's just like HTML – it's easy" – that is what we often hear while talking to digital agencies. But realities bite and the challenges of digital signage platforms start where online and mobile ends: non-standard hardware, touchpoints integrating software and embedded hardware, and most important: the spatial effect on the digital experience.

While the vast majority of CMS providers struggle to survive in a market with thousands of competitors, a few have come out strong in recent years. The success of some the leading digital signage CMS providers comes as a surprise, as they seemed to be on the losing end of the value chain. Software fees were usually only 5% of total project costs. But the rise of recurring pricing (SaaS) and mandatory annual updates has doubled the share of software to 10%.

The Market is changing

Most smaller independent CMS providers struggled to follow the lead of Scala, Navori, Signagelive & Co. While most ISVs moved to a recurring pricing model with the benefits of continuous

cashflow and higher enterprise valuation, smaller ISVs lacking the upfront payments cannot afford major software developments to stay competitive. Only some larger ISVs managed to adapt.

The second selection process started with the consolidation of digital signage integrators across Europe. The Big 4 and other larger national integrators started to gain market share especially with large enterprise customers. Many of the larger integrators either developed or acquired their own software platform. Another threat for ISVs losing their best partners.

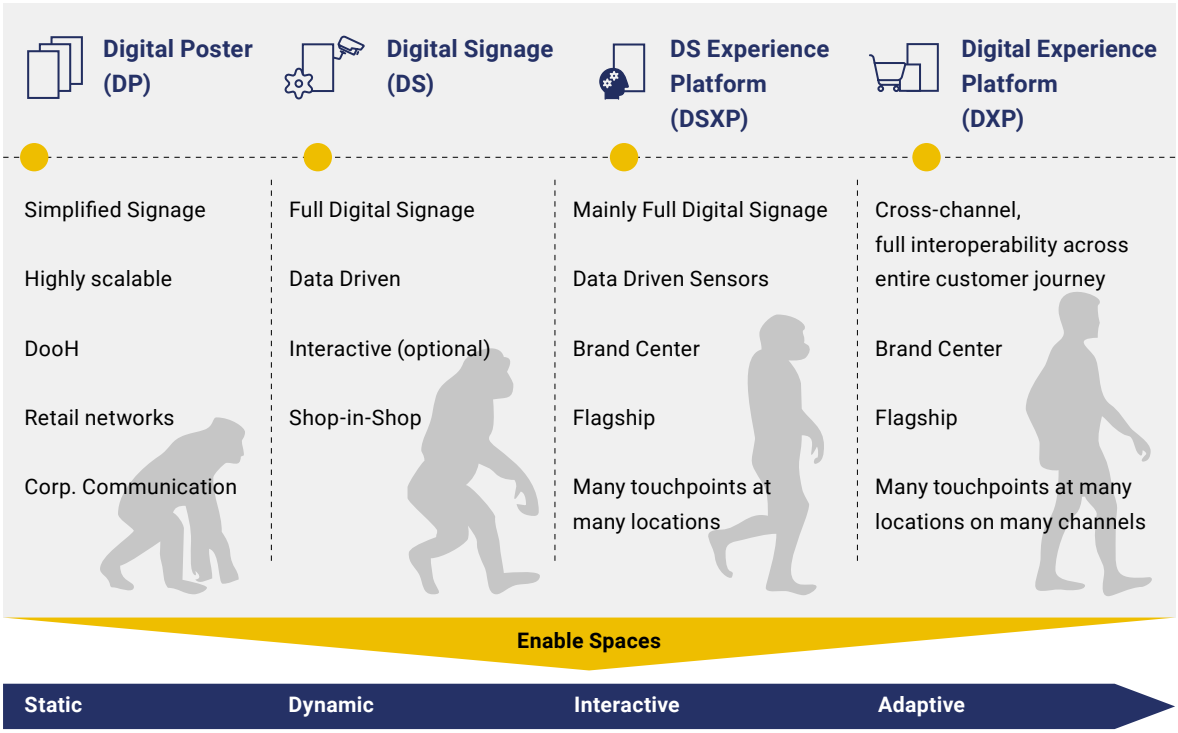
The Emergence of experience platforms was the next hit for ISVs. Customers weren't looking for silo solutions, but for cross-media solutions able to manage digital assets and campaigns across digital signage, online and mobile. Giants like Adobe, Salesforce or SAP are showing up on the horizon impacting the way digital signage will be managed.

Last but not least visual solutions manufacturer Samsung, like others, launched with Magicinfo a software solution optimized for the inhouse SoC platform. In the beginning Samsung's solution wasn't really a threat to the established CMS industry, but in the meantime MagicInfo has evolved into a full-blown digital signage platform offering many APIs to backend systems and even powerful analytics features.

A new Kind of Platform

The days of simple CMS solutions are not yet numbered, but a new breed of digital signage experience platform (DSXP) is emerging. Content

Solution Complexity: From Simple Signage to DXP



To survive globally, ISVs must now offer a complete experience platform.
Source: invidis

and device management, bidirectional connection to backend systems, and orchestration of multiple digital touchpoints along the customer journey are the new must-have features.

Looking back at the past five years it looks more like a miracle that more than a handful of ISVs have not only survived but thrived and extended their market share. The secrets of success are an extended solution portfolio (e.g. analytics), introduction of value-add services on behalf of partners and backend-connectivity (e.g. ERP, CRM). Today's leading CMS have evolved from just creating, scheduling, and playing out of digital signage content to full experience platforms managing sensors, exchanging data and AI-powered smart features.

ISV+: Filling a Void or disrupting the Value Chain?

The merger of Vertiseit and Grassfish has the potential to disrupt the digital signage value chain as the industry knows it. While in the past, integrators "owned the lead" and software suppliers were just indirectly involved with the client, this will change, at least according to the founders of Vertiseit and Grassfish, Johan Lind and Roland Grassberger.

Photo: invidis

Roland Grassberger, CEO of Grassfish (left) und Johan Lind, CEO of Vertiseit

The digital retail platform becomes the center of every digital signage experience concept naturally shifting the power towards CMS providers. "Digital Signage platforms and the integration into client backend systems (e.g. CRM, ERP) have become too complex for the majority of integrators", according to Vertiseit/Grassfish.

In this new ISV+ World hardware components are selected and certified by platform providers and IT/AV integrators are relegated to deployment and maintenance of networks. The power shifts to platform providers – in the case of digital signage in retail to ISV+ market players. Consequently, that could also include general contracting.

The ISV+ approach enables less digital signage experienced IT- and AV-integrators to realize complex digital signage projects, as concept design and platform complexity is handled by the ISV+, e.g. Vertiseit/Grassfish.

It remains to be seen if the industry will go down this path or remain in the traditional distribution of work.

Photo: unsplash / Robert Bye

invidisXworld 4
Sweden

Photo: Erik Lefvander

INVIDISXWORLD

Sweden

Stockholm | invidis was on the road in Sweden looking for new trends in digital signage, retail tech and sustainability. In the first episode we visit Volvo, H&M, Europe's largest store builder ITAB, the retail tech platform Epicenter and the digital signage integrators VisualArt and Vertiseit.

For the show, we traveled to Stockholm, Gothenburg and Jönköping for exciting background discussions and site inspections. Highlights are certainly the visit of one of the most modern Volvo dealers in Europe as well as our site inspection of the H&M flagship store at Global HQ.

The latest broadcasts always on invidis.de and for subscribers of the invidisXworld Youtube Channel.

WATCH THE VIDEO HERE:
invidisXworld #4 – Sweden – YouTube

Photo: invidis

Photo: invidis

VisualArt is an integrator offering the full spectrum of digital experience platform solutions – from technology to content production. The company counts both Scandinavian retailers and international players such as McDonalds among its customers. invidis spoke with VisualArt CEO Anders Apelgren in Stockholm about content, software and the future role of integrators.

GLOBAL CMS SOFTWARE

Global Platforms as Turbochargers

The larger the installed base, the more opportunities CMS developers have. And the more they make modern platforms available, the greater opportunities they have for growth.

The digital signage software market has long been dominated by hundreds of smaller, most regional champions lacking real global players. The entry hurdle for a CMS has always been low, enabling developers to market thousands of CMS often with limited USPs. As the software share of the value chain was less than 5%, most independent software vendors (ISV) struggled to gain considerable relevance or necessary scale.

Therefore, larger global players emerge which are building reputation and market share across

Global Top 10 CMS Software*

COMPANY	COUNTRY	CLIENTS	ACTIVE LICENSES (IN '000)
Stratacache (Scala)	US	McDonalds US, BurgerKing, Adidas	3.000 - 4.000
Samsung MagicInfo	KR	various	2.000 - 3.000
Navori	CH	LVMH, Faurecia, German Lottery, Carrefour	1.000 - 2.000
Uniguest (Onelane, Tripleplay ...)	US	Large Hotel chains	500 - 1.000
Four Winds Interactive	US		500 - 1.000
Broadsign	CA	JCDecaux,	100 - 500
Telelogos	FR	Bank of China, SAP	100 - 500
Grassfish / Vertiseit	AT	BMW, Porsche	100 - 500
Brightsign	US	various	100 - 500
Mood Media	US	various	50 -100
⋮	⋮	⋮	⋮
ZetaDisplay	SE	Ikea	50 -100
M-Cube	IT	70 Luxury Brands, McDonalds IT	50 -100
SignageLive	UK	Various	20 - 50
VisualArt	SE	7Eleven, McDonalds Sweden	20 - 50
Intuiface	FR	various	10 - 20

*min. Americas & EMEA, predominantley recurring SaaS Model
Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

5 Stratacache CMS Platforms

- Scala (Marketing/Allrounder),
- X20media (Collaboration, Immersive Education, Corporate Communications)
- ActiVia (AMP – Digital Menu Board and Digital Retail)
- PRN (In-Store/Retail Media – DooH)
- Real Digital Media – RDM (Retail Free-standing and Retail Experience platform)

many regions and continents. invidis compiled for the first time data from leading digital signage platform vendors for the Global Ranking. We only considered ISVs for the global listing which are truly global players, with customers (not just projects) on at least two continents.

Leading the global listing is Stratacache, powering more than 3.5m screens globally. Besides the allrounder solution Scala, the best-known CMS brand in the industry, Stratacache offers four more specialized CMS platforms plus supporting platforms. In an interview with invidis, CEO Chris Riegel stressed that the installed base of 3.5m warrants specialized platforms, a comfortable position the competition would also like to be in.

The second largest global CMS provider is Samsung with MagicInfo. The Korean display giant doesn't publish any figures about active licenses and is in general tight-lipped about the performance of any complementing business activity. But the feature-set of the CMS platform has grown considerably in the past year and a subscription-based business model was introduced. While the installed base of one-time licenses is most likely with a wide margin the largest the world, the subscription base is still considerably lower. In contrast to popular industry believe, MagicInfo has grown into a full-scale solution on par with many Tier-One competitors. MagicInfo has become popular with IT-Integrators and large campus/factory floor installations, not so much in the retail space.

Bronze Medal for Europe

The third largest digital signage CMS provider is Swiss-based Navori with 1.2m active licenses. It is also the highest-ranked European player. Quite unusual for a high-labor cost Swiss company, Navori managed to win tenders across the world, e.g. Saudi Arabia, Latin America and USA as well as in Europe. In the past, focus has been on its strong integrator partners outside of Europe. Recently Navori has been increasingly focusing on Switzerland and its neighboring markets. The Lausanne-based ISV has high hopes for its standalone analytics platform Aquaji, which was launched early 2021. A well-known French Luxury Goods Group and Navori client holds a minority stake in the Swiss digital signage player.

Important Navori customer are Carrefour, French luxury conglomerate LVMH and a taxi-based DooH network in Saudi Arabia. Navori launched

In addition Stratacache offers supporting Platforms:

- Walkbase (Mobile/Wireless Analytics)
- ActiVia Computer Vision (Analytics)
- Superlumin (Media Acceleration in support of scaled media networks)
- OmniCast (Media Distribution in support of scaled media networks)

The major CMS vendors are building global platforms to compete in the worldwide market.

Photo: invidis

with Aquaji a second platform, specialized in retail analytics and therefore complementing the CMS platform.

Ranks four to six are held by vertical specialists – US-based Uniguest acquired numerous digital signage players like Onelane and Tripleplay to build an end-to-end hospitality and senior living platform. Fifth ranked Four Winds Interactive (FWI) merged in March 2021 with Irish Poppulo to form a global employee communication provider – or a digital signage and mobile solution workplace specialist. Montreal-based Broadsign is the sixth largest global digital signage platform provider with full focus on Digital-out-of-Home. The Canadian company acquired a programmatic and ERP-specialist to offer an end-to-end solution for the DooH industry. Most of the world's leading Out of Home media owner use Broadsign solutions in one way or another. It pays to specialize, as Broadsign is often considered the de facto standard of the DooH industry.

CMS providers must now provide platforms for holistic experiences.

Photo: invidis

Success without Private Equity

Telelogos follows on seventh rank with a 25-year experience of device management and a strong focus on SAP connectivity. The French software specialist is an example of how privately and employee held companies can be globally successful even without private equity backing. Telelogos' customers are retail banks in China and South Africa or the French automaker Renault.

The ISV is quite unique in its market position. It has a strong focus on connecting digital touchpoints and ERP-platforms. A competence gaining in relevance as most digital experience platforms communicate with backend systems.

Grassfish – just recently acquired by Sweden's Vertiseit – is the third largest European ISV in the global listing, providing Porsche, BMW or DHL as its customers. The ISV is currently shifting its business model from a pure software supplier to a mix of integrator and ISV. It remains to be seen how existing integrator partners are dealing with the new market positioning, but it is very likely that the combined Vertiseit/Grassfish company will become one of the leading DSXP provider in retail. Other integrators with owned CMS platforms are Mood Media, ZetaDisplay and M-Cube.

Although LCS/NDS did not make it into the initial ranking, the French-Dutch digital workplace specialist was formed through a merger in October 2020. The combined solution provider focuses on becoming the leading smart digital building platform including workspace, wayfinding, IoT management and digital signage solutions.

LONGTAIL CMS

Cutting out the Middle Man

CMS vendors for the longtail market have a hard time finding the right sales strategy for their software. Companies like Intuiface and Enplug rely on direct sales for this.

Today as digital signage has become a well-established communication channel and the technology is on the brink to commoditize, more than 2/3 of digital signage touchpoints are simple signage/ digital poster installations. The longtail market offers immense potential but is traditionally difficult to address as it is highly fragmented on the demand as well the supply side.

Whether it's a gym or a pharmacy, the longtail market offers great potential.

Photo: invidis

Attempts to sell digital signage software via distribution mostly failed for various reasons: in the beginning demand was just not there, the market was not yet ready for out of box digital signage.

The young Guard's Turn

A new generation of pure longtail digital signage CMS vendors have managed to establish successful go-to-market strategies. Toulouse-based Intuiface managed to become a global leader in touch-solutions by building up a very active user community and offering support with teams in Europe, the US and Asia. The digital signage touch specialist generates approx. 3-5m EUR annual revenue with selling directly to digital agencies and customers its no-coding CMS. The French ISV with offices in the US and Taiwan is one of the most innovative market players and a rare example of a globally relevant longtail vendor.

While Intuiface is mainly targeting digital agencies and corporate marketing departments directly, ISVs like Los Angeles-based Enplug have been successful in targeting SMB with a app-platform model. Enplug was acquired in early 2021 by Spectrio as part of extensive M&A activities in order to build a global longtail leader.

In general, longtail distribution has become more successful recently as no-code CMS platforms do not require solution-specific development skills and entry-level hardware prices have dropped (SoC/Commercial TV). Also, regional and cultural differences play an important role how successful independent software vendors are across the world. North America seems to be much more open to longtail solutions than Europe.

In total, there are five common long-tail strategies, all with their own challenges. Companies like Enplug and Intuiface have established direct selling as a serious option.

Strategy 1: AV/IT-Distribution

- Listing of CMS solutions with established IT/AV hardware distributors
- Challenge: revenue potential very small compared to hardware sales. Larger distributors record billions of Euro revenues annually with hardware logistics

Strategy 2: Area Distribution

- Main sales channel: partner with established field sales force
- Challenge: for software solutions very expensive; sales force consumes most of the margin
- Best Practice: Swisscom acquired JLS digital to sell digital customer experience solutions to existing 2.000+ B2B clients; or digital printer flyeralarm sells white-labeled Germany-based MDT software to existing clients

Strategy 3: Direct Sales

- Main sales channels: website and call-center (US)
- Challenge: How to get visibility?
- Best Practice: Intuiface (Touch) and Enplug/Spectrio (SMB)

Strategy 4: Vertical Solutions

- Added value on top of digital signage solution
- Challenge: Connection to specific industry backend solutions, industry-typical processes that need to be mapped
- Best Practice: Online Software's prestige software is uniquely positioned as it complements a leading supermarket product photo/information database

Strategy 5: Solution Bundling

- Oldest form of longtail – bundling of displays and CMS
- Challenge: CMS has low value for display buyers
- Best practice: Samsung MagicInfo – the world's most successful display manufacturer CMS. Samsung recently changed the license model from one-time fee to subscription model.

DACH SOFTWARE

Change of Guard

A new frontrunner, a display manufacturer and a locally underestimated global giant: The DACH ranking 2020 for digital signage software shows that there is movement in the market.

Digital Signage Software DACH

(active Licenses 2020)

COMPANY	LICENSES (IN '000)
Grassfish/Vertiseit	50-100
mdt Medientechnik GmbH	50-100
Pichler Medientechnik (easescreen)	50-100
Samsung Electronics GmbH (MagicInfo)	50-100
Scala BV	25-50
Online Software AG	25-50
PMS	25-50
heinekingmedia	25-50
Radio POS	15-25
Navori SA	15-25
~sedna Gmbh	15-25
screenFOOD AG	15-25
engram GmbH	15-25
dimedis Gmbh	15-25
Net Display Systems/LCS	15-25
SalesTV GmbH	5-15
STiNO GmbH	5-15
netscreens digitale Schaufenster GmbH	5-15
komma,tec redaction GmbH	5-15
BrightSign LLC	5-15

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations

After many years leading the DACH market, MDT has been replaced on the number one spot by Grassfish. The Austrian digital signage platform provider managed to win and renew a few major deals. Porsche and BMW are now globally running on Grassfish. MDT holds the second rank providing ten thousand of licenses to Deutsche Telekom, McDonalds and many other customers. The third rank is held by Easescreen, another Austrian CMS provider. Easescreen is the largest CMS-provider in the DACH region with a longtail business model selling most licenses through distribution and partners into small projects.

Samsung climbed the ranks to fourth position with MagicInfo. The global display leader has become also one of the most successful CMS providers worldwide. The MagicInfo footprint in the DACH region is still relatively small, but the once unpopular CMS platform has grown to a full feature solution on par with many other digital signage software. Most notable Samsung shifted this year to a recurring license model.

The worldwide most popular digital signage CMS Scala ranks fifth in the DACH region. Since the acquisition of Scala five years ago, Stratacache built up successfully a full end-to-end offering in Europe. While Scala projects are often below the industry's radar, the solution provider remains very competitive with bundling Scala-branded screens, media players and the CMS platform.

Similar to most markets globally, the DACH region is still dominated by local CMS providers. Very likely this will change as the industry is moving from digital poster and digital signage

Changeover: On the Top3 podium for DACH software, the order has changed.

concepts to digital signage experience platforms (DSXP) and eventually to DXPs. Experience platforms are highly connected to customer backend platforms (e.g. ERP, CMS) and orchestrate digital content across many platforms and media. Installed base, market relevance and API-management will become more relevant in choosing the right platform. In addition, supporting multiple platforms (Windows, Linux, Android and dozens of SoCs and appliances) and 3rd party APIs requires capital and skilled labor. Smaller CMS provider will struggle to remain competitive or need to connect to CMS and device management middleware solutions like Signage OS.

There is movement in the Olymp of DACH software – DS installation in Munich

"Some say we are middleware": Stan Richter, CEO of SignageOS.

Photo: SignageOS

SOFTWARE

Connecting the Dots

The SignageOS platform is a middleware between display SoC and the digital signage CMS. The Czech start-up led by founder and CEO Stan Richter were inspired to create a DS middleware while developing a CMS platform.

Which digital signage CMS is compatible with which display SoC? If the Czech software developer SignageOS has its way, this question will be obsolete in the future. Its digital signage integration and device management platform will take care of adaption.

"Some say we are middleware, some consider us as a bridge between systems", says Stan Richter, CEO of SignageOS. "I prefer to call us a unification platform."

Three Pillars

The main goal of SignageOS is to eliminate the challenges of running any CMS on the many SoC hardware platforms on the market. SignageOS unifies the interfaces of the individual systems and in this way enables easy integration of CMS and SoC. In a highly fragmented market, a solution with almost unlimited potential.

The business model of SignageOS is based on three pillars:

- The main proposition is providing value to CMS platforms/ISVs. SignageOS enables CMS providers to support almost any SoC-platform on the market.
- SoC/display vendor independent device management is also increasingly used by integrators to conveniently operate multi-platform systems.

- Display manufacturers are the third target group for SignageOS. Value add and provided services to the display industry varies a lot. It may be that SignageOS merely advises the manufacturer on the choice of chipsets for the next SoC. In other cases SignageOS develops benchmarks or carries out performance tests. Some screen manufacturers are outsourcing the SoC-development completely to SignageOS.

In 2016, Stan Richter and a small team started developing their first digital signage CMS platform. “We knew that we would be most competitive if we took a hardware-agnostic point of view”, the CEO tells invidis. SigangeOS decided to develop a platform that allowed for easy integration. “After we won some local tenders, our competitors asked how we did it.” That's when Stan Richter realised there was a problem in the digital signage world. “We said to ourselves, let's put CMS aside and focus on the bigger problem.”

Currently SignageOS supports about 40 display vendors and about 100 platforms (such as Samsung Tizen 2, 3, etc.). In addition, the Czech start-up counts about fourty CMS partners. If Stan Richter has his way, there should of course be more in the future.

The company employs more than 30 experts, most of whom work at the company headquarters in Prague. But SignageOS has its sights set on North America and plans to significantly expand the sales office in San Francisco. Expansion to North America is driven by the strong growth of the US customer base recently. By the end of 2021, SignageOS plans to have around 45 employees. The start-up is well financed, having successfully closed another funding round in late 2020.

According to SignageOS, annual turnover is in the low single-digit million Euro range. However, the figure could change significantly by the end of the year, as many deals with major clients are currently in the pipeline.

“Our vision is clearly global”, Stan Richter affirms. Once a critical mass has been reached, the company could present itself as an alternative to in-house development for any ecosystem. “Why should any CMS vendor employ a team of engineers when there could be one company that does it for the entire industry?” the CEO elaborates. “It works in other industries like mobile, and it should work for digital signage as well.” SignageOS could be the leading interface between market players – if they play ball.

SignageOS unifies the interfaces between hardware and software.

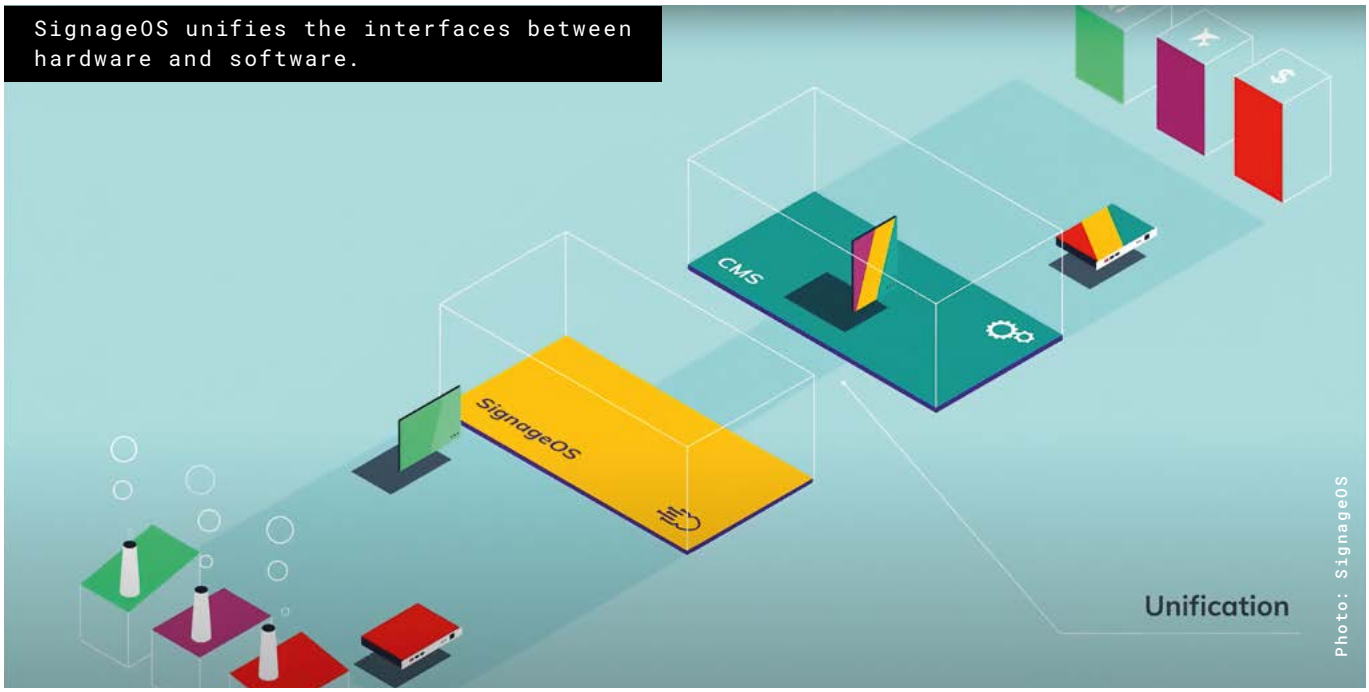


Photo: SignageOS

SIGNAGELIVE

Winning as a Team

Signagelive has been one of the most innovative digital signage software providers on the market for years. With their enhanced enterprise-grade platform, the British provider relies fully on data and flexibility, but remains loyal to partner sales. invidis spoke to CEO Jason Cremins.

As soon as a new SoC platform is launched, Signagelive is usually the first digital signage software provider to adapt its CMS. For Samsung SoC, the team at the Cambridge-based provider needed almost 18 months lead time, six months were enough for LG WebOS and only three months for Google Chrome and BSCloud (Brightsign).

According to CEO Jason Cremins, the recipe for success about Signagelive lies in the system architecture. As early as 2013, Signagelive decided to move the intelligence away from the media player to edge computing and into the cloud. This architecture has proven itself especially for SoCs, which usually only have limited computing power. The library approach enables Signagelive to port the CMS very quickly and easily to new operating systems, SoC platforms and appliances. Signagelive has been using HTML completely since 2007, at a time when Flash was still widespread in the market. Today more than 2.500 digital signage networks run on Signagelive.

Like many software providers, Signagelive has hardly seen any sales losses since the outbreak of the pandemic. For the current year, Jason Cremins expects growth of more than 20% again. “We are very broadly positioned geographically and in the vertical markets.” Signagelive has its own offices in the UK, USA and Singapore and is moving to 24/5 support in H2 this year. For Cremins, good service is crucial in partner sales. “We continue to rely on 100% partner sales, but the complexity of the projects is increasing and we have to be available to our partners when questions arise.”

The British software provider has so far been represented in retail, healthcare and stadiums in particular. Increasingly, however, the focus is on corporate and enterprise projects. To address the demands and expectations of enterprise customers, Signagelive has evolved its platform to be 100% API-first, offering a comprehensive headless CMS solution that delivers extensive integration capabilities including the ability to efficiently manage and play data content company-wide across all channels. Signagelive doesn't just leave it with headless CMS – the enhanced platform also follows the no code approach, enabling citizen and community developers to extend Signagelive with custom apps and integrations. “Content and app creation as well as business workflows in corporate networks should not be dictated by the CMS or require design and implementation by agencies, no-code apps integrated with Signagelive allows for users with simple Excel skills to create the solutions required for their exact needs.”

Global consulting firms such as Capgemini are among the most valuable partners in the ecosys-

tem, giving the digital signage provider with its 40 employees access to global corporations. In particular, the feedback from the partners were incorporated into the development of their enhanced enterprise-focused platform. Many of the new projects are new tenders from corporate customers with existing digital signage networks that they wish to migrate to an enterprise cloud-based platform. Hardly any other provider supports as many platforms as Signagelive, ideal for existing, slowly growing networks with heterogeneous hardware. “We are currently winning a lot of projects in the corporate environment.”

Jason Cremins sees Signagelive well positioned for the future. “We are developing in the direction of complex digital signage platforms where the focus is on the integration of data.” To this end, Signagelive is now increasingly looking to win customers in the DACH region.

Jason Cremins and Signagelive work completely with HTML since 2007.

Photo: Signagelive

STRATACACHE

Breaking the Chains on Micro-LED

With a factory in Oregon, integrator Stratacache is taking micro-LED production into its own hands. The annual capacity of square meters is expected to be in the seven-digit range by 2023.

In the summer of 2020, Stratacache CEO Chris Riegel made headlines with the announcement that the company plans to manufacture micro-LED solutions and digital signage displays in its own factory in the USA. A big step for a formerly small software provider that has evolved into a leading digital signage integrator to date. The display and LED production has so far been firmly in the hands of a few East Asian companies, mainly from China, Taiwan, Japan and Korea. With its own production facilities, Stratacache intends to reduce its dependence on the major suppliers while offering a full end-to-end portfolio. Through an acquisition of Popscreen (today Scala China), Stratacache already manufactures kiosk systems and media players at a facility in China.

Clean room capacities are available in the new factory. (symbol image)

Photo: L N / Unsplash

Now Stratacache is expanding its in-house production capacity with LFDs and LEDs in a plant in the USA. Stratacache CEO Chris Riegel is focusing on micro-LED in particular. Compared to an LCD or OLED fab, which costs between 8-12 billion USD, manufacturing facilities for micro-LED can be realized for a fraction of the investment. Industry experts estimate the investment for a micro-LED Fab at less than one billion USD, Chris Riegel expects costs of less than 500m USD. In any case, the relatively inexpensive production facilities for micro-LED will enable many new companies to manufacture visual solution themselves for the first time.

Stratacache is planning a full micro-LED production line (E4) in Eugene, Oregon on the US West Coast, which will cover the entire micro-LED manufacturing process from epi wafer (on 300mm silicon wafers) to the transfer process and final module assembly. In addition to micro-LED products, a broad portfolio of LCD displays will also be assembled in Oregon, ranging from tablet size to large format displays. Some of these displays will be flexible and transparent as Stratacache expects strong market demand here. Start of production is planned at the end of 2021. Annual capacity of the E4 production line is expected to start at 1 million square meters per year after ramp-up by 2023.

Those who know Chris Riegel know that a focus on digital signage alone is not enough for him. In addition to finished display products, the company also plans to produce component-level display solutions for other manufacturers in a variety of industries, such as automotive (e.g. digital dashboards). In the future, not only in Oregon, but at other Stratacache-owned locations worldwide.

Stratacache purchased the idled 1.5 million-square-meter fab, formerly used by Hynix Semiconductor to manufacture memory chips, at an auction in March 2020 for only 6.3 million USD. At the heart of the E4 facility are several clean rooms where microchips as well as displays and LED modules can be manufactured.

Stratacache is not the only company taking advantage of micro-LED's disruption; new options are also emerging within the Samsung Group. For the first time, Samsung Electronics itself, and not its sister company Samsung Display, is developing and producing visual solutions like "The Wall". For this purpose, a dedicated micro-LED production line was set up in Vietnam. Other manufacturers of display solutions and companies from outside the industry are also toying with the idea of entering Micro-LED production. Despite the pandemic, capital is abundant in the market and production facilities closer to the European sales market are not only more sustainable, but also bring additional advantages in the context of the current supply chain problems.

TRENDS

Photo: Kaitlin Dowis von Unsplash

FUTURESOURCE STUDY

LED gets the post-Pandemic Boost

It doesn't take a crystal ball to predict the growing importance of LED in the digital signage market. But a confirmation and further analysis from Futuresource's research experts provide interesting insights.

Like many others, the global LED industry was unable to escape the pandemic in 2020 – with sales of 5.6 billion USD, the industry dominated by Asian suppliers experienced a decline of 750 million USD compared to 2019, according to a report by the market researchers of Futuresource. However, for the current digital signage year 2021, the British research experts expect the market to grow again by 16 percent to 6.5 billion USD.

"Although global sales fell by 12 percent last year, the market has performed better than many expected", says Chris McIntyre-Brown, Director of Futuresource Consulting. That was largely thanks to the recovery of China, which bounced back much faster and stronger than expected, accounting for more than half of all global LED sales in 2020, he said.

While LED demand fell sharply in North America, it was the EMEA region in particular that was hit hardest by the decline. However, the individual European markets also developed very differently due to divergent reactions to the pandemic.

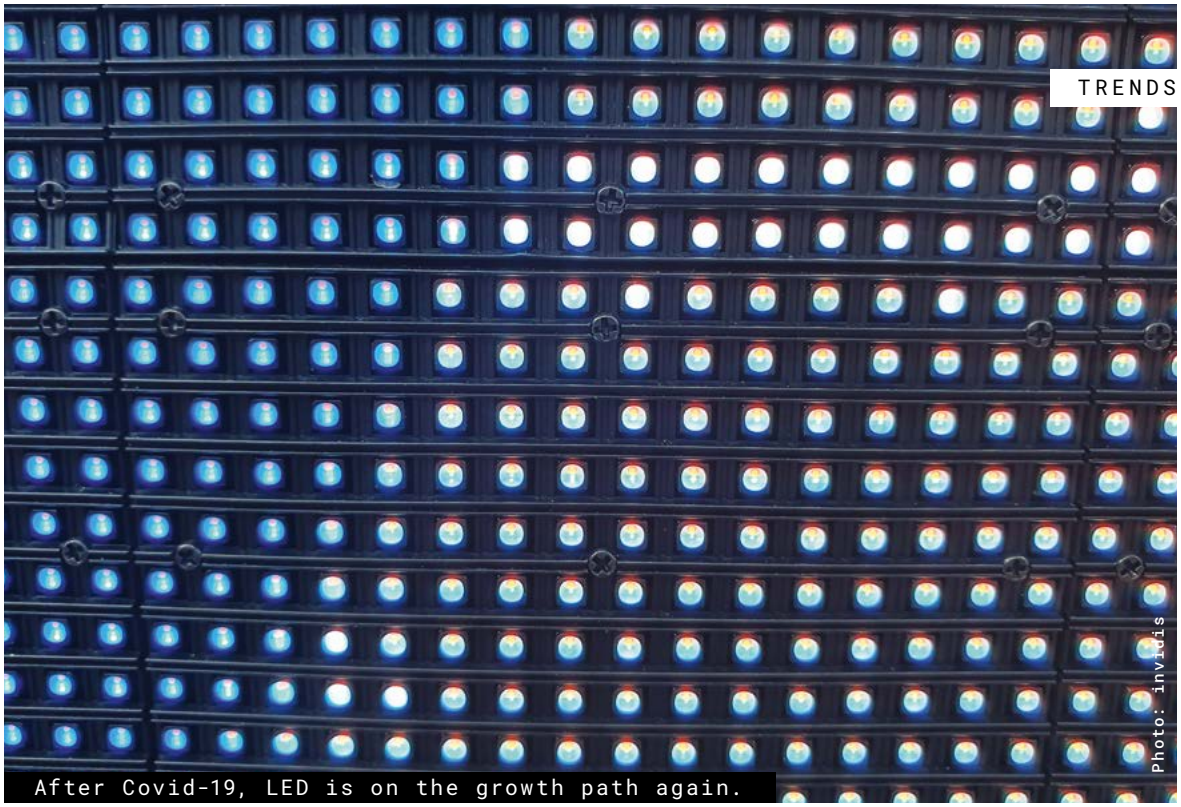
High-resolution LEDs – also known as narrow pixel pitch (NPP) – continue to be the most successful LED product area. It shrank by only 1 percent in 2020, while standard LED saw a 24 percent decline. Much of this success is due to strong demand in China, but major Western markets also showed strong interest in NPP above 1.2mm. The global trend for ultra fine pixels 1.2mm and lower – as offered by Samsung, LG and Sony with their micro/mini-LEDs – was only pandemically interrupted due to lower budgets. In 2021, the boom for ultra-fine resolution should pick up again.

Weakening Retail, booming Control Rooms

Most verticals were hit hard last year, mostly retail, media & advertising and stadiums & venues. However, Futuresource expects a full recovery for all three industries.

But LED demand in other use cases boomed even in the midst of the pandemic. Virtual studios were the quintessential crisis solution, as film and commercial productions could not take place in original locations due to travel restrictions. "They were a particular lifeline for the LED industry, not only from a product perspective, but also because it allowed distributors to use inventory and warehouse space for studios and set construction", explains Chris McIntyre-Brown (see related article starting on page 110).

Demand for LED has also been growing rapidly in the control room sector. Interest in it has existed for a number of years, but 2020 was the tipping point when mission-critical control rooms, particularly in the energy sector, began using more and more LED. Despite the pandemic, the control room market grew 2.7 percent year-over-year.



After Covid-19, LED is on the growth path again.

Changing market Dynamics

In addition to the rapid recovery in China, the global pandemic also led many Chinese LED vendors to call their international staff home to focus on domestic digital signage projects. However, this also led to fierce competition for projects, with many smaller LED vendors failing.

At the same time that Chinese brands were pulling out of Europe, many established display vendors began to step up their activities in the LED segment. The broad LED market entry of Samsung, LG and Co. radically changes the market landscape and proves the strength of these international brands. Even in times of crisis, these established companies are able to operate globally and provide local support. The long-term future for many Chinese LED suppliers looks increasingly difficult, according to Chris McIntyre-Brown, “as Samsung, LG and others continue to flex their international muscles”.

30 percent Growth in 2022

As LED solutions mature, all-in-one LED offerings will dominate the industry. Today, many digital signage and ProAV integrators still lack the necessary knowledge and experience to successfully implement LED projects. As a result, LED vendors are investing in training and accelerating LED simplification through all-in-one solutions.

Despite the challenges, Futuresource believes the industry has a bright future ahead. “Our forecasts expect a strong rebound next year, with 30 percent year-over-year growth, resulting in sales beyond the 8-billion-Dollar mark”, says Chris McIntyre-Brown. In addition, experts expect mini-LED and micro-LED products to lead the LED industry into a new growth phase, exceeding 15 billion Dollars by 2025, he adds.

Too many Buzzwords?

Another challenge for the digital signage industry that Futuresource points out is the flood of marketing terms currently being used. “Terms like SMD, IMD, multipixel, COB, GOB, mini-LED, micro-LED and many more are being used by LED vendors trying to differentiate themselves in an increasingly crowded marketplace”, says Director Chris McIntyre-Brown. “While this makes sense at the brand level, it is ultimately detrimental to the industry as a whole.” Market researchers predict that three technology types will coexist in the market for the foreseeable future: SMD, mini-LED and micro-LED, all based on chiplets and red-blue-green (RGB) pixels.

ANALYTICS

Waiting for the Breakthrough

AI technology is advancing at a breathtaking pace, but scalable business scenarios are still scarce in this area. An invidis background analysis.

Analytics and Artificial Intelligence (AI) have been trending in the industry for more than five years. While the potential remains high, the demand and supply side have experienced many forms of disillusion. AI capabilities are exploding at a breathtaking speed and technology is advancing rapidly but scalable business cases in the field are still limited. Where is the industry today, what can we expect and when will we see the breakthrough?

Many different sensor technologies are widely available, e.g. Bluetooth, Lidar, Wifi, RFID and most prominent visual/optical sensors. Often referred to as camera-based technologies, standard optical sensors are widely used in CCTV soluti-

Sensors make it possible to collect a lot of data. However, these must also be used.

Photo: Navori Labs / Aquaji

ons. They are very precise and due to wide range of applications relatively cheap.

Also, the technology behind the optical sensors improved considerably in the past years. Today's video/picture analytics algorithms can identify anything from persons (incl. age, gender, mood), over movement patterns (incl. walking speed, viewing direction) to license plates and brand logos.

A dominating trend in data processing is the move away from the cloud towards the edge. More and more solution providers are betting on on-sensor processing. Not only due to data security and privacy compliance – namely GDPR – but mainly driven by performance advantages. Cost of sensors are coming down considerably with 3D sensors well below EUR 1.000 and 2D cameras for less than EUR 200, sometimes even as low as EUR 100.

Analytics solution providers range from large multinational to start-ups. For example, two typical market players are the two Swiss-based Xovis and Advertima. Both target the analytics market with very different backgrounds. While Xovis is a well-established analytics solution provider with more than 20 years' experience, especially in people counting at airports, Advertima disrupts the market as a private equity financed start-up with radical new ideas.

Unfortunately, analytics providers are currently battling with supply chain problems – e.g. shortages of GPUs which are required for video-based AI – as much as media player vendors and the visual solution industry. This short-term effect will not hinder the breakthrough of analytics, the main questions remains when it will happen.

Convincing Business Cases are required

Aspects often underestimated especially by technology providers are convincing business cases. Analytics can only work if the generated insights add value. Collecting data itself is not sufficient, e.g. knowing gender and age of a customer, without any action to follow. The industry needs to develop more convincing business cases beyond targeted ads. Personalized advertisement adds no value for the consumer – against popular believe in the media industry – and the media industry is not yet set up to apply the insights at scale.

Even if the analytics concept design is set up properly, clients often lack organizational readiness, i.e. it requires data scientists and managers open for data driven operation models. Post-pandemic, most retailers are spending their digital budgets on e- or m-commerce (might change in 2-3 years) and not on instore analytics.

Regarding the technology, solutions need to become scalable and more reliable. Larger connected analytics operations are still lacking the necessary 99.x% uptime. The main challenges are

- simplicity of installation & calibration
- automated mapping of physical environment to plan
- transition from single sensor to multi-sensor grids (sensor handover)

In summary, there are still too many pieces that do not fit perfectly to create a real breakthrough – be it the teething troubles of the new technologies or the client readiness.

Access Control – the Crisis Winner

While the pandemic and especially the lockdowns brought the first downturn in digital signage history, one winner emerged: access control solutions. The undisputed beneficiary and analytics bestseller of the pandemic popped up at thousands of stores across the globe. Sensors and digital signage displays at the entrance managed restricted access to stores during lockdown. Until today the only scaled case for retail analytics.

ANALYTICS

Sensor meets Screen

Gathering data through sensors is a good thing – but the devices also need to be connected to the digital signage system to enable efficient use of the insights gained.

Sensors provide valuable information that can add significant value to many digital signage applications – or even open up new application areas. Technology continues to advance in this area, and the range of possibilities for which analytics can be used is becoming more and more broad.

What is important here is that not only the collected data is actually used (see the article starting on page 78), but that there are also solutions that combine sensors and digital signage systems and can thus present the user with a meaningful overall solution. This is where companies like 99sensors come into play: the sensor specialist from Elz in Hessen not only carries products for touchless operating concepts and sensor-controlled hand sanitizers, but also offers complete solutions that combine digital signage and sensor technology for various application scenarios.

The technical management at 99sensors is led by Florian Bogeschdorfer, who has been active in the industry since 1993 and is best known in the industry as the founder and managing director of DS Connekt.

Adapting the Content

One central aspect, for example, is the use of sensors and the observation of the surroundings to manage and improve the customer experience. The sensors and customer interactions thus determine the digital signage content. For example, the content can be changed depending on whether viewers are closer or further away from the display. The data can be managed and evaluated from the Cloud Control Center.

Wireless networking allows screens, switching units and sensors to be placed decentrally in a location. In order to optimally adapt the experience in each case, it is possible to integrate data from various sources – sensors from other manufacturers can also be integrated, for example products from Nexmosphere or Axis cameras.

For Humans and the Environment

Environmental analyses by sensors also play an important role: Measurements of parameters such as light incidence, movement, temperature, air pressure, humidity, vibrations, or air quality enable optimized operations of the digital signage solutions. The screens are controlled by fully integrated and constantly updated drivers for LG, Samsung, Philips, Dynascan, and other manufacturers.

For example, the system can adjust screen brightness to ambient light or turn off panels when no motion is detected. This can save energy and extend the service life of the displays (see also the articles starting on pages 12 and 16).

But health aspects can also come into play. For example, occupancy rates and air quality can be considered in a room management system.

Remote monitoring and diagnostics for digital signage screens can also help to keep maintenance costs low. Alarm rules and appropriate escalation management reduce response time in this case. If device behavior deviates from the norm, the sensors can detect this and, for example, suggest early maintenance or other preventive measures.

invidisXworld 7 & 8 Switzerland

INVIDISXWORLD

Switzerland

Little Switzerland showed itself to be big on the subject of digital signage: Our trip took us to Zurich, Bern, Grindelwald, Kilchberg and other places. AI and analytics are the big topics, not only in digital signage projects, but also in DooH.

We spent a lot of time in the largest cinema center in Switzerland – the Arena Cinema in Zurich Sihl City. Here we set up our studio and interviewed the who's who of the Swiss digital signage industry. Among others, Xovis, Advertima and Navori were present. In conversations with integrators such as JLS, Screenfood and Westiform, we learned a lot about digital signage projects between Geneva, Basel, St. Gallen and Lugano.

The brand new invidisXworld episodes will be available from September/October 2021.

The latest shows always on invidis.de and for subscribers of the invidisXworld Youtube Channel.

WATCH THE VIDEOS HERE:
The invidisXworld Youtube Channel

We discovered what is currently probably the best digital exhibition concept at Lindt Home of Chocolate Credit Suisse's bank branch of the future showed us how a transaction room becomes a marketplace. Also under the magnifying glass: SBB with mobile apps for the train platform and Swisscom branches.

ANALYTICS

Understanding the Customer

Online is the role model: data on customer behavior can offer great benefits to retailers – provided that the information is used correctly.

For too long brands and retailers were convinced to know what's best for their customers based on decades of experience and "gut feeling". But customers' needs and desires are changing constantly with fundamental shifts since the beginning of the digital age more than 10 years ago.

Understanding customer needs and desires has always been the secret of success in retail. But since the emergence of CRM, sophisticated loyalty programs and data analytics retailers are able to achieve better customer insights; decade old customer profiles and categories are not sufficient anymore.

While a customer may be well known, the same person can enter the store with widely different purchasing mindsets:

- Direct need: "I need a new pair of socks/milk."
- Concrete search: "I want a new iPhone/Samsung S21."
- Indirect/complementary need: "a cover/bumper for my new smartphone would look good/make sense."
- Open search: "I need a new outfit for a party/wedding/work/..."
- Desire: "That Céline bag looks nice."

In the past, experiences sales assistants either knew their customers personally or were skilled in finding out needs via a short personal conversation and observation. Today's retailers (with the exception of luxury) are spoiled by eCommerce and betting on less expensive and highly scalable digital solutions.

Most online shops rely on Google to understand what the customer is looking for. Google product searches are often very detailed, e.g. "Adidas Stan Smith Size 40" and therefore offer the retailer a very high conversion likelihood. However, Google search campaigns have become very competitive, and prices are constantly rising. Customer acquisition costs are increasing, and converting new customers (often unprofitable) into loyal customers (profitable) is essential. A business approach diametral to stationary retail.

An international Company as Vanguard

Amazon has become the new benchmark in eCommerce and offers many approaches which are also interesting for stationary retail. More and more customers start their product search not on Google but on Amazon (wide selection, good prices, user ratings) directly. Amazon goes beyond direct product search and offers more relevant options for users, e.g.

- complementing products ("people who bought this also bought that")
- alternative products
- recommendations ("products you might like")

What does the costumer want? For retailers, this question is essential.

Photo: invidis

Amazon is able to track every click and connects them with the Amazon account as most users are constantly logged into their accounts. For recommendations Amazon uses industry leading AI algorithms that leverage the full breadth of the Amazon prime offering (e.g. past searches, past purchases, music/film preferences). By using "contextual information", Amazon is able to create detailed preference profiles for its customers and to predict their needs and desires. Jeff Bezos defined once the ultimate goal for Amazon to start shipping products even before the customer has ordered.

No Data without Analyis

Unfortunately, in a stationary world, collecting this kind of detailed information is much more complicated. Often, customers do not openly state their needs, don't want to be approached by a shop assistant or shop assistants are not readily available to serve customers. Even registered, loyal customers are "unknown" in a store as they do not "check-in" (loyalty programs only work at check-out). Available instore technology seldom offers little more contextual information beyond age, gender and mood. Instore Analytics are an established technology and increasingly deployed to gather more customer information.

Reliable instore analytics offers great value, but it requires substantial investments if done the right way. While hardware and installation are relatively cheap, continued analytics and consulting is more expensive.

The biggest challenge is the growing reluctance of consumers for retailers to gather more information in public spaces. While consumers accept cookies and detailed information gathering on online platforms, they are very reluctant in real life. Regardless if on- or offline, GDPR-compliance is a prerequisite.

However, there is still a lot of room for opportunities in public spaces. The technology and tools to collect rich data are widely available. But it is essential not to blindly gather as much information as possible, but to focus on useful insights. Collecting gender data doesn't add too much value if the retailer is not able to offer gender specific offerings.

Know your Customer

Very useful can be to know whether customers come in groups e.g. to optimize fitting rooms (partner spaces, group fitting rooms). Also, to provide "natural" connection points for customers to continue their online/mobile customer journey, e.g. product locators or test stations for customers who already researched online and want to buy in the store (extended shelf kiosks) or to offer special benefits (service, special deals) for (loyal) customers to "log-in" in the store.

Measuring frequencies and customer behavior inside the store is one part but as important is to understand why the customer has chosen to visit the store. A task which cannot be provided by sensors as of yet.

ANALYTICS

Activating the Customer

Ambient or intercative? Or traditional? There are many possibilites of using digital signage. The right choice should be made in regard to the desired effect.

Once businesses understand their customers' needs, mindsets, and expectations, it is time to develop strategies and concepts about how to activate customers. This is a multichannel and multi-touchpoint exercise, in which digital signage technology offers a broad range of solutions for customer interaction:

Traditional Signage

- Single displays, video walls, LED
- One-to-many medium
- Attracts attention, e.g. shop window, visual merchandizing areas, behind the cashier desk
- Activation: sales promotions
- By far the most common use case for digital signage

Ambient Signage

- Displays/LED often combined with light, sound or scent
- One-to-many medium
- Create a feel-good environment
- Activation: subtle (branding)

Sensor-enabled Signage

- One-to-one, one-to-few medium
- Uses sensors to react to actions in the vicinity of a display, e.g. lift-and-learn, approach sensors, gender/age recognition
- Activation: targeted messaging and sales promotions

Interactive Applications

- Usually touch but might also use alternative interactive technologies such as voice, gesture or gaze control
- One-to-one medium
- Interactive touch terminals are used for many purposes like wayfinding, endless aisle, product comparisons, services etc.
- Activation: specific information

Kiosk Systems

- One-to-one medium
- Kiosk systems allow transactions like orders, check-out; in combination with mechanical/robotic systems they can also be used to provide physical goods
- Activation: self-service transactions

Different Kinds of Stores

Depending on the depth of integration, invidis classifies stores into four categories:

- Static – no digital signage
- Dynamic – traditional and ambient digital signage
- Interactive – dynamic and interactive elements (touch, kiosk)
- Adaptive – smart, sensor- and AI-based combination of dynamic and interactive digital signage elements

In addition to the use cases above, there are many other special applications for digital signage systems, like Electronic Shelf Labels (ESL), staff support devices etc.

While each of these elements can be used as a standalone application, the real power of digital signage solutions comes from the combination and the smart use along the customer journey.

Before deciding on any digital touchpoint, we recommend asking these two questions:

- What is the purpose of this digital touchpoint?
- What role does the digital touchpoint play in the customer journey?

However, digital technology is only half of the story – the other key element for successful digital signage is content! In contrast to online and mobile content, digital signage content needs to be created with the context in mind. Here are a few examples:

- Just putting website content on a touchscreen in a store does not work – screen size, features like favorites, basket etc. are not required (or needed differently).
- Accessibility and barrier free access to a breadth of users should be possible by integrating a software-based switch to move relevant user interactions to the bottom of the screen.
- portrait orientation often activates better in retail environments (“lean forward” (mobile) instead of “lean backward” (TV) impression)
- product and price promotions content should always be combined with usage examples or serving suggestion animations

While some content optimization levers are obvious, often times certain forms of AB-testing is required to find the optimal content for each environments. Although AB-testing is often frowned upon, it is standard procedure in digital media creation. We have seen content designs where only small content optimization increased effectiveness of the digital signage touchpoint by double-digit percentages.

Key Takeaways

- Digital signage offers countless options for customer activation
- The best effects of digital signage are always achieved by the right combination of technology, content and context
- Best activation is achieved when digital signage touchpoints are combined to create a customer journey

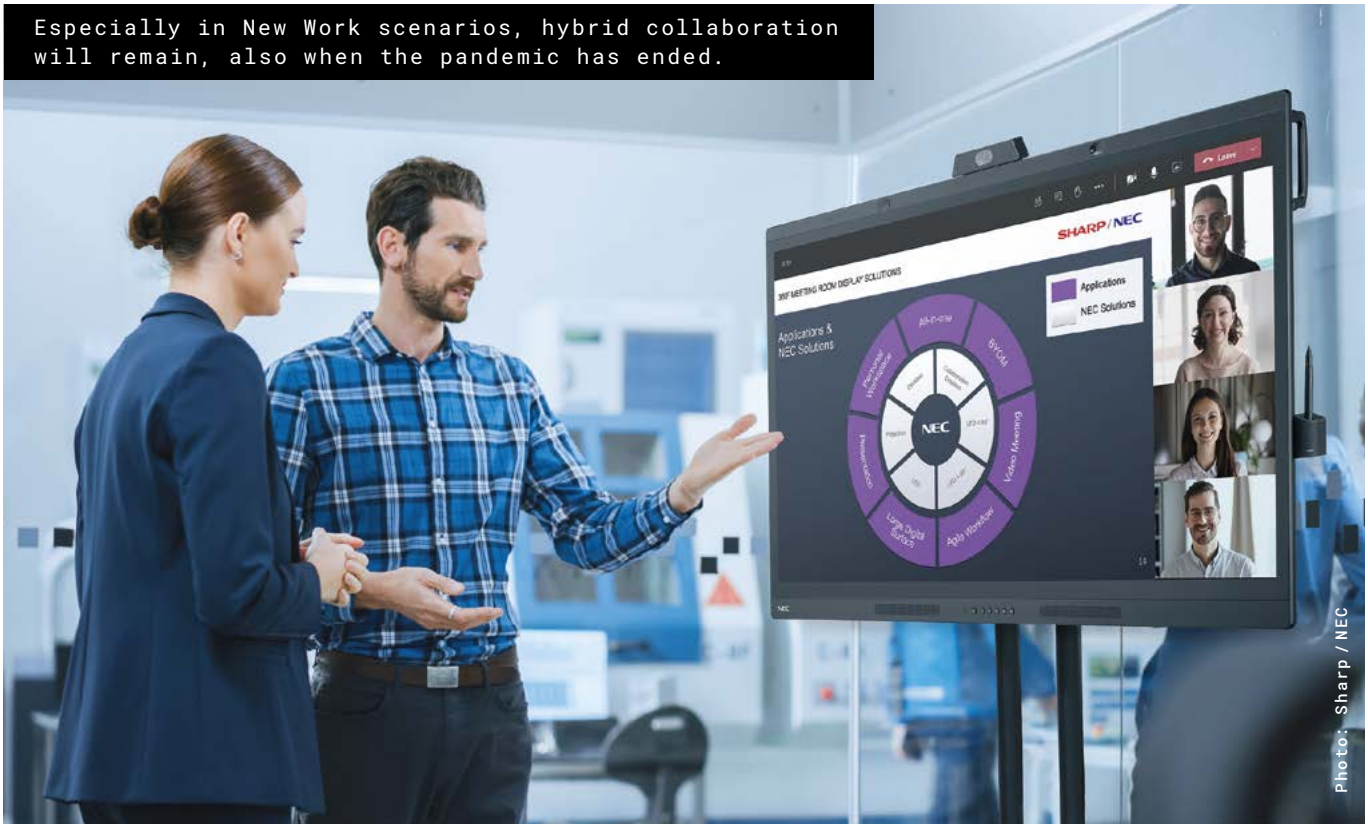
THE NEW NORMAL

Suddenly, the whole World has gone hybrid

Corona forced many industries into the online world. Now, retail, corporate and events sectors are shifting towards hybrid concepts – which creates new challenges.

With the start of the pandemic, as public life came to a standstill around the world, we experienced an enormous push towards online and mobile solutions. Not only revenues of eCommerce grew by almost 100%, sales of notebooks, desktop monitors and webcams multiplied, but also investments into online and mobile solutions peaked.

The online push was very broad, it included retail, but also corporate, education, and the events industry:



Especially in New Work scenarios, hybrid collaboration will remain, also when the pandemic has ended.

Photo: Sharp / NEC

A lot has changed to hybrid – also DSS – The Show 2020, with was co-organized by invidis.

Photo: invidis

- Retail: e- or m-commerce websites and apps, live shopping
- Corporate: collaboration and remote work platforms, mainly videoconferencing (Zoom, MS Teams etc.)
- Events: online presentations and webinars, as well as (live) podcasts (i.e. the short-lived hype around clubhouse)
- Education: dedicated collaboration solutions, investments in digital campus and classroom infrastructure

Most of the trends existed already before the pandemic, but as work from home and home schooling became the new norm, even laggard businesses, education providers and governments realized that they needed to become more digital.

However, during the pandemic and with the return to a new or next normal, many companies realized that it isn't enough to just operate an online or a mobile offering next to their existing physical operations. Therefore, the new buzzword became "hybrid" – hybrid retail, hybrid work, and hybrid events.

The ideas of hybrid concepts wasn't new, it already existed as "omnichannel" or "unified commerce" in retail, as "home office" or "distributed teams" in the corporate world. The fact that we have not seen a real breakthrough of these concepts pre-pandemic as well as till today, shows that everything hybrid isn't cheap or easy. Hybrid is much more than just to add some new digital tools to your existing business. Hybrid requires breaking down existing silos between the online/mobile and the physical world and transforming processes to the new requirements.

Hybrid Challenges

New concepts bring new challenges. For example, facilitating corporate meetings is relatively easy

→

when either everybody sits in the same room, or when everybody attends by video. Once the organization faces a hybrid situation, with people sitting in a meeting room and other members participating remotely, things start to get more complicated.

Unfortunately, technology doesn't solve all hybrid challenges. The tools exist and work decently with sufficient bandwidth, but it is rather a matter of habits and training.

It also depends on the kind of work that needs to be done in these meetings; presentations are easier in a "mixed" mode, whereas creative sessions benefit from physically being together in one room
A good "hybrid" concept takes these considerations into account and combines technology with processes, and the question whether a company allows "work from home" turns into a set of questions like

- What tasks need to be accomplished?
- What is the best way to get them done?
- Who do we need in which location?
- How can technology help to facilitate the process?

The answers might be that there is a mix of some core office time for certain teams during which the creative teamwork can be done and the rest of the time employees can be flexible in their work location. In any case, this will impact the way offices are structured and technology is used – a discussion that is ongoing under the term "New Work".

For most this will mean, less individual desks/ workstations, more and flexible meeting spaces and huddle corners, and a lot more digital tools.

Surprisingly enough, many digital signage players still struggle to offer innovative digital infrastructure solutions catering the new hybrid world. Sharp NEC seems to be best positioned with a broad range of solutions with integrated webcam, microphone, and speakers. Some of the solutions are even Microsoft-certified. Redmond is also offering with the Surface Hub 2 a fully-integrated solution. Especially Samsung and LG are so far missing fully integrated hybrid solutions which are expected to be launched early next year at ISE 2022.

Hybrid also means offering a choice of tools and providing the right kind of training to use these tools properly.

Hybrid: Key Takeaways

- After the pandemic-triggered online push, hybrid becomes the new normal
- Hybrid is not just the coexistence of online, mobile and offline solutions, it is their combination
- Hybrid concepts are applied to many applications in retail, corporate and events
- So far, most businesses are still struggling to develop real hybrid concepts. Currently they get stuck with high(er) costs and missing sustainable business cases

Convincing Concepts needed

In retail, the omnichannel idea has been around for quite some time. But so far, most businesses still operate in separate online and offline channel silos. There are some connection points like BOPIS (buy-online-pick-up-in-store, in Germany "click-and-collect) or delivery from store, but so far we have seen no fully integrated concepts (please let us know if you know one). For today's hybrid shopper there is still only the choice to either use the online or the offline channel (and create the link for themselves).

For events, the hybrid concept probably is the newest (and the most difficult). Of course, it has become very easy to provide mixed in-person and live streaming events like Apple's keynotes. But today's hybrid events are often more or less one-way communications with limited participation tools. But online participants are usually missing the back channel, and of course the hands-on experience.

In general, key part of events are hands-on (product) experience and networking. Both are very hard to replicate in an online and mobile space. But hybrid means not just to transform an in-person event online, but to leverage the strengths of each, to create a better combined solution. For example, to adapt the agenda as online attention span is much shorter then in-person. In the events space, we see a lot of experiments, however most of them are still too expensive or just lack a proper business case.

DSS 2020 was realised with a hybrid concept.

Photo: invidis

COLLABORATION

Welcome to New Work!

Work from home? Go to the office? Or both? The Corona pandemic has raised fundamental questions about the working world of tomorrow. Hybrid models have the best chance of prevailing.

Surveys on home offices, hybrid offices and the mobility they bring have been plentiful this year. No wonder: Because on the one hand, home office obligations expired (in Germany in July), and on the other hand, the pandemic experience will have a lasting impact on the working world – and thus on both the technologies used and the way employees are treated.

Forsa conducted a survey on behalf of the initiative "Standortinitiative Deutschland – Land der Ideen". For this, 1,009 citizens aged 18 and over were surveyed. The result: More than half of those surveyed, 51 percent, want to continue using digital working – home office, video conferencing and the like – even after the end of the Corona pandemic. The desire to continue working remote from home is most pronounced among the target group of 30- to 44-year-olds; here, more than two-thirds, 71 percent, no longer want to do without digital working.

Work has changed

Similar results can also be found in Sharp's report "The Future of Work". For this, the company

How do we want to work in the future? Hybrid work is not only an opportunity, but also brings challenges.

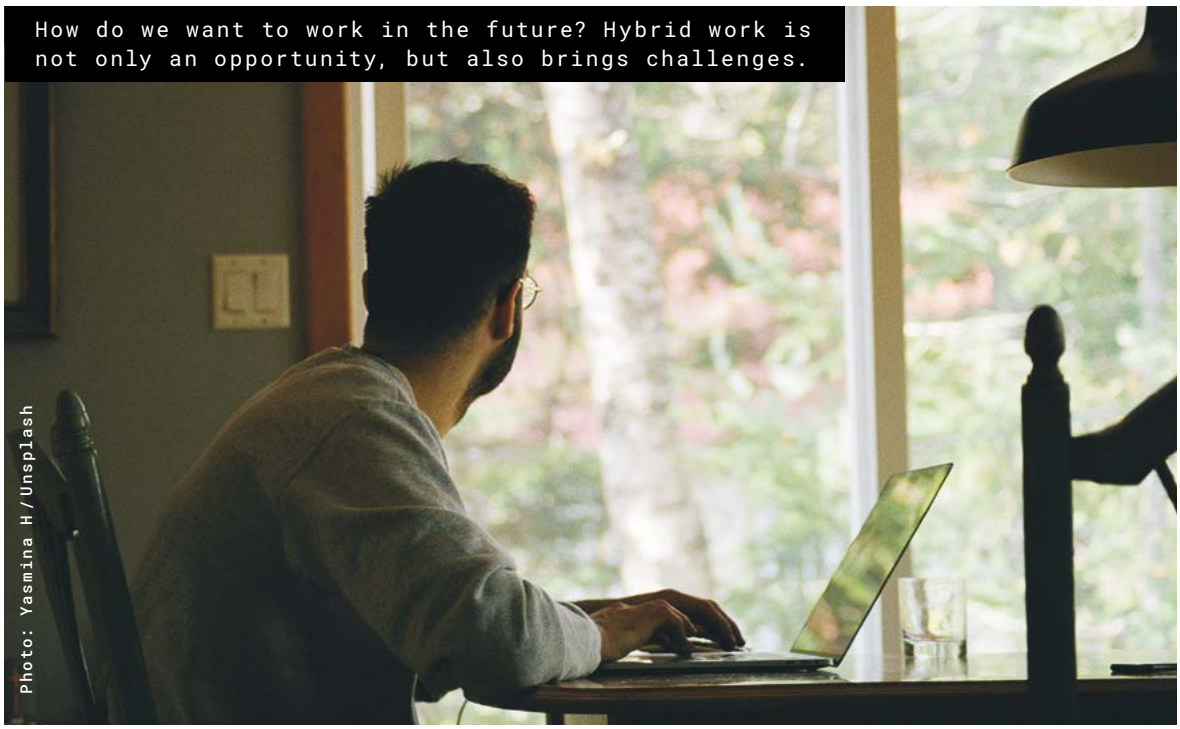


Photo: Yasmina H/Unsplash

surveyed around 6,000 office employees in small and medium-sized companies back in September last year. The aim was to find out what impact the Corona pandemic had, especially on the youngest generation of office workers and their workplace requirements.

For example, 66 percent of 21- to 30-year-olds said the ability to work from anywhere had become more important to them. At the same time, 56 percent of them said the ability to physically meet colleagues had also become more important since the pandemic.

Sixty-seven percent of younger people worked from home during the pandemic. For about two-thirds of them, this meant they were better able to organize their personal lives because of the increased flexibility. As for what impact the home office had on productivity, opinions seem to be split: While just over half confirmed that they worked more productively in the home office, just as many admitted to having problems with motivation at home.

Is hybrid the Future?

But even if there is not a complete switch to the home office: The hybrid model alone will entail significant changes to the working world. The company toplink, for example, which says it operates one of the largest digital telephone networks in the world, including telephony via Microsoft Teams and full integration with Microsoft 365, added several thousand subscribers to its digital telephone network during the months of the pandemic and created mobile workstations using Microsoft products.

“A fixed workstation with filing baskets, a desk phone and a potted plant has had its day,” says Jens Weller, CEO of toplink. “The future, like the present, belongs to a mobile workplace from the cloud, which provides the important office functions of telephony, collaboration as well as Office applications at any location and almost on any end device.”

Employees want New Work

Also according to a survey by management consultancy EY – from May 2021 – most employees see hybrid working as the future standard. About half of the respondents can imagine that there will be no company buildings in ten years. “Companies should take advantage of the opportunities that arise from the high level of willingness and motivation to change and involve employees in the transformation”, comments Nelson Taapken, partner at EY.

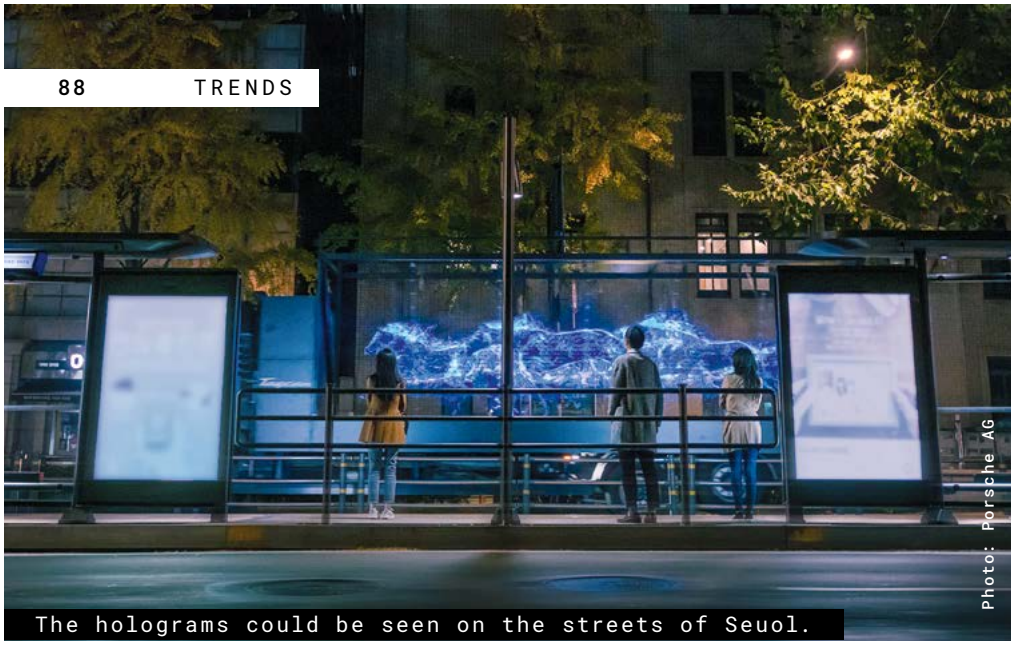
Jens Weller agrees: “The working world will never be the same again – employer branding must also adapt to this. Being able to work anywhere and having the office only as a choice is more crucial than free fruit or a tabletop soccer.”

Home and hybrid office present major challenges for employers as well as employees that will need to be addressed, once Covid-19's sense of exception fades. To a large extent, that will also happen through technology solutions. Many mature collaboration products are already available, but the labor market itself has yet to adapt. And then also show which solutions it needs.

Even Google distrusts the Home Office

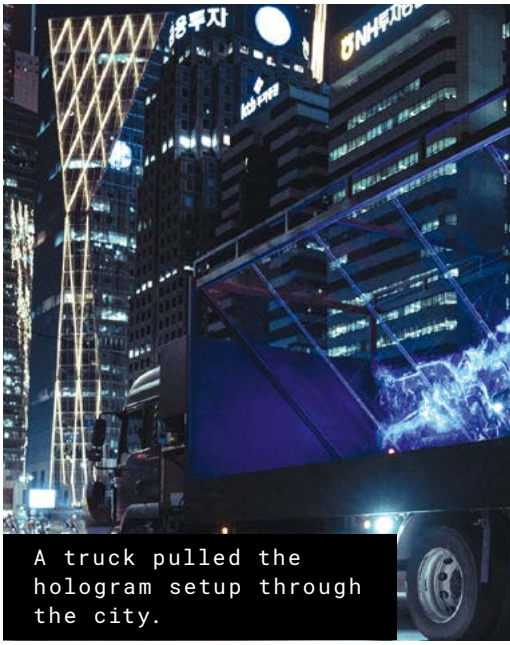
As the news agency Reuters reported, Google wants to cut the salary of certain employees who want to go to the home office completely – there is talk of 10 to 25 percent.

To do this, Google is taking advantage of the different cost of living: Someone who commutes to Google from a less expensive area will in the future receive a salary based on the local standard of living – unless they decide to travel further to the office. Employees who live in the same city where the office is located would not experience any salary restrictions with the permanent home office.



The holograms could be seen on the streets of Seuol.

Photo: Porsche AG



A truck pulled the hologram setup through the city.

PROJECT

Digital Horsepower

Porsche implemented an outstanding campaign with mobile holograms in Seoul for the Taycan model. It was not the only special project as part of the international market launch.

The Porsche Taycan is a first for the Stuttgart-based car manufacturer. It is Porsche's first fully electric vehicle. Accordingly, the group beat the marketing drum hard last year to place the model on the international market.

For the premiere in South Korea at the end of 2020, for example, Porsche came up with something special. In the digital stronghold of Seoul, there was a real WoW project to admire: a mobile hologram demonstration.

Holographic Horses

For two weeks, holographic horses galloped through the streets of the South Korean capital. A truck with a special frame drove the blue holograms through the metropolis for two weeks and attracted attention.

Taycan means roughly “soul of a lively, young horse” in Korean. Accordingly, the holographic horses were intended to highlight the name as well as the design aspirations and state-of-the-art technology in the vehicle.

The campaign culminated in a performance in the Taycan Arena, where a Porsche Taycan 4S was presented to a selected audience. Experts in kinetic art developed a futuristic light show for the occasion, which in turn matched the appearance of the holographic horses.

Not the first Project

This was not the first spectacular project with which Porsche promoted the new car. For the launch in the Middle East and Africa market, the company booked what is probably the largest ad-

The horses symbolized the Porsche Taycan.

vertising space in the world: the LED facade of the Burj Khalifa in Dubai. The brand displayed its most important milestones on 33,000 square meters of LED space: from the Lohner Porsche in 1900 to the modern Taycan.

Another eye-catching advertising measure took place in mid-2021: For the launch of the Taycan in Australia, Porsche had the car driven forward as a hologram on the water against the backdrop of Darling Harbour in Sydney. High-pressure waterjets created a cloud of mist a good 20 meters wide above the waterline of the harbor basin. It served as a screen for the projection of various lightning effects, lettering, the logo and the holo-Taycan.

Spectators in the harbor could enjoy the light show in combination with an atmospheric soundtrack. The event was accompanied by another almost inconspicuous projection on a skyscraper near the harbor.

Digital equals spectacular

The lack of international trade fairs and exhibitions in particular will have led Porsche to these unusual advertising measures. But the projects show the power of innovative advertising in public spaces. And what possibilities digital technologies offer for creating impressive immersive experiences in physical space.

There was also a hologram show in Sydney Harbor.

NEW RETAIL

Reviving the inner City Ecosystem

It's not just Corona that has turned retail structures in the city upside down. How city centers can be revitalized and what role digital solutions can play in this.

Closed stores and empty shopwindows on the one side, and long lines in front of H&M, Zara, TK Maxx, or the likes on the other side. When you walk along a high street or a pedestrian area these days, you can see the signs of an ecosystem under pressure. The inner cities of the 20th century are facing a test of endurance.

If you believe the augurs of eCommerce, online and mobile retail will dominate the world and the remaining physical retailers, hopeless romantics, should give up rather earlier than later. But do we really want to live in a world in which we order and organize everything from the comfort of our homes and life outside is dominated by Gorillas and Amazon or DHL delivery trucks?

Photo: invidis

Extinct pedestrian zones show that the inner city ecosystem no longer functions – scene from Munich.

It is true: For inner cities, the old formula of a shopping monoculture is dead. Lining up some international brands, some department stores and adding some coffee just doesn't cut it anymore. The same is by the way also true for its artificial counterpart, the shopping mall.

This is not just one of the many effects of the pandemic, nor just the fault of the ecommerce giants. It is rooted deeper in changing habits and needs of consumers. And the inner city ecosystem needs to adapt, or it is going to die out.

So, what is changing? In the old world, one of the main reasons to go downtown was product selection and availability. It was the raison d'être for department stores and lined up brand stores. One place where you could get anything from shoes and dresses to computers and electronics. This reason is gone with online shopping where Amazon & Co. offer thousand times the product assortment at a click of a button.

Another driver was opportunity. As people were commuting to work, they regularly passed the inner city and stopped there for shopping. This changed with the pandemic and our collective move to the home office. And it likely changed for good.

Corona accelerated the problems of the retail ecosystem city.

Photo: Gary Butterfield / Unsplash

Changes root deeply

On a more fundamental level, our western societies move away from owning things to using products and services, the famous "experience economy". In addition, consumer studies show that peoples' favorite pass times move to medial experiences. For example, the top seven most frequent leisure activities in Germany are all medial, like surfing the internet, watching TV, or listening to music (according to "Freizeitmonitor 2020"). However, if people are asked what they would like to do more, they predominantly mention social activities, like being outside, meeting friends, or just shopping.

Therefore, the new reasons to leave home and to go to the city seem to be entertainment, eating out, meeting friends, or treating yourself on a shopping tour. Or, to put it in the terms of the office and furniture design company vitra, it is about inspiration, experience, identity, affirmation, gratification, "heimat", belonging, community, collaboration, and socializing. So, conceptually it seems very easy. Just add a bit of experience and social elements to your store and consumers will come back. Unfortunately, in a grown city ecosystem it isn't quite that easy.

There are many elements that need to interact in order to create that compelling reason to get the consumer off her couch. And they are not limited to retail itself. It is a completely new mix of shops, restaurants, entertainment, offices and living. All embedded in a city infrastructure that is both efficient and provides a high quality of stay.

To be honest, most of today's shopping monoculture cities and pedestrian areas aren't very well set out to provide this. So, what does it take to revitalize our struggling inner city ecosystems? First of all, all stakeholders need to realize that they do not operate in silos. An ecosystem thrives on the mutual benefits that the individual players provide, be it city planners, landlords, restaurant owners, mobility service providers, international brands or local retailers. For example, an in-store café might make sense for the individual store by itself, but not if it is the fiftieth in the city – or how much coffee can you drink on a single shopping trip?

Life can come back

The good news is that we see a shift of the economic balance towards offline retail, because of declining rents and rising customer acquisition costs for online retailers, especially higher costs for google. Because in the end the business cases for all the fancy experiences also have to work out.

Furthermore, we see promising examples of making cities more attractive. Retailers like Apple design their store like community centers, embedding their stores into the respective environments and providing spaces for gatherings or events. Ikea just recently opened an inner city

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The new Apple stores also offer space for events, like this one in Singapore.

Photo: Apple

store in Copenhagen that features a rooftop park, bicycle parking and space for gathering with friends. Starbucks puts great efforts into customizing their store concepts to local needs and tastes. And even McDonald's, the epitome of standardization, adapts its menus and concepts to different environments.

We see city revitalization projects like the Champs Elysées in Paris – reducing traffic and restoring its character as a Boulevard. Or the redevelopment of London King's Cross, a diverse and dynamic community with a mix of offices, homes, shops, hotels, leisure and community facilities, music venues, galleries, bars, and restaurants – and even a university campus.

But it is not only big cities that lead the way. The northern German city of Osnabrück has seen a strong revival fueled by the regional sports and department store L&T and its famous indoor surf

Vitra sees different motivations for what brings people back to offices. Very similar motivations are also decisive for customers to return to stores and city centers.

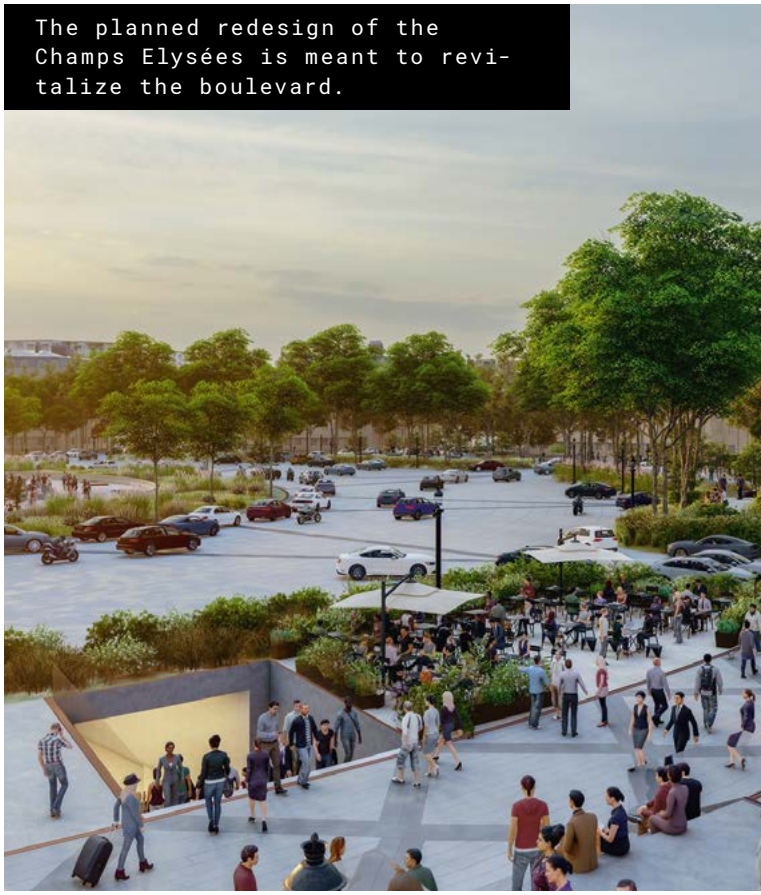
Why do People return to the Office?

- Inspiration
- Identity
- "Heimat"
- Belonging
- Community
- Collaboration

Why do People return to Stores?

- Inspiration
- Experience
- Affirmation
- Gratification
- Belonging
- Socializing

The planned redesign of the Champs Elysées is meant to revitalize the boulevard.



wave. This strong anchor also allowed many smaller companies to thrive on the higher visitor frequencies.

Flexible Platforms are needed

So, what does this all mean to digital? First of all, a lot of opportunity. Consumers finally want those integrated customer journeys across different touchpoints and devices. And these journeys are definitely not limited to personal devices, they can and should also include displays in public or store settings. Moreover, consumers are looking for experiences and social activities. Digital is in a unique position to provide or support great experiences, like immersive spaces or personalized fitting rooms.

However, to create these personalized journeys and experiences a lot of data has to be collected in the real world (not only on devices) and also to be shared. Especially in Europe, companies have to be very sensitive to privacy aspects and must provide a clear benefit to the consumers when they want to collect and use their data.

Project Examples

- Apple stores
- Ikea Copenhagen
- Starbucks
- McDonald's
- Champs Elysées
- London King's Cross

And finally, digital solutions need to provide platforms that make it easy for many players in the ecosystem to build flexible and modular solutions. Because in the end it is the diversity that makes ecosystems attractive and resilient.

Photo: PCA-STREAM

Ikea is breaking new ground when it comes to the shopping experience – for example, in Copenhagen.

Photo: Dorte Mandrup

The Bahn and Edeka store does not need any staff.

Photo: Deutsche Bahn/Carmen Göbel

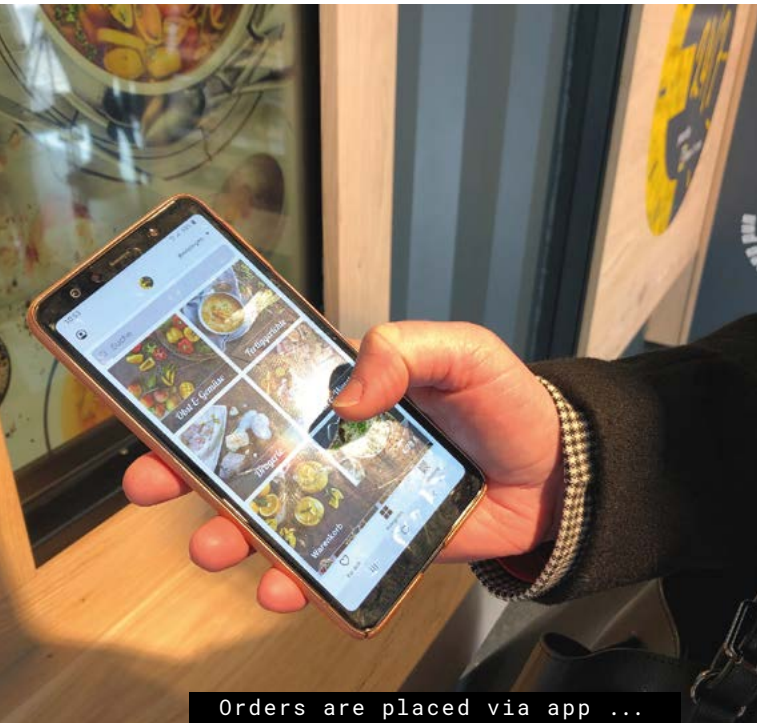
RETAIL

Little Heroes for big Convenience

They are open around the clock, don't need staff and fit on just a few square meters: mini stores. Concepts with the compact, partly fully automated stores are currently being tested all over Germany. The potential for digital signage is huge.

Quick shopping on the go: on the way to sports, to work or to a date – at any time of day, cashless, right around the corner. Mini-stores make it possible. For some years now, shopping containers have been regarded as the model of the future. With their modern digital sales technologies, they are supposed to be the stationary answer to online shopping and people's changed consumption, living and working habits. And they do so in the smallest of spaces.

One well-known representative of the mini-store concept is organic grocer Tegut with its Teo stores. There are three so far, two of them in Fulda and one in Rasdorf. The sales areas are just 50 square meters. The Teo stores are to go wherever the classic supermarket would be too big: in new development areas, in front of public facilities such as clinics and universities, at transport hubs or even on company premises. Customers can buy around 950 groceries and other products



Orders are placed via app ...

... or via the touchscreen.

Photos: Deutsche Bahn / Carmen Göbel

for their daily needs. In addition, there is enough space for extras such as seating, a bicycle repair shop, a book exchange or a dog rest area – to suit the respective location.

What is the same everywhere is that Tegut does not rely on sales staff, but on digitally controlled self-service. Either via app or a credit card. That's why, for example, the store door only opens after a personal QR code is presented, which is generated by the app. Or by checking in with a card. A digital signage display at the entrance also provides information about this, and can also be used to advertise current offers and promotions. Once inside, customers scan their purchases themselves. They can either use their smartphone directly at the shelf or at a self-service checkout. At the end of the shopping trip, app users can pay their bill. If the user has stored his or her billing data in the application, the QR code is again easy to use. If the checkout is not in use, advertising appears on the display. Depending on Teo's features, additional displays can be integrated in later versions.

As digital as Teo is, the stores also stand for sustainable, analog living. Wildflowers and grasses grow on the roof. Important habitat for insects, especially in the big city. So it's a concept that picks up on the diversity of the modern city dweller – because increasingly, young people in particular have high expectations when it comes to technology and the environment.

The goods are dispensed automatically.

Photo: Deutsche Bahn / Carmen Göbel

Without shelves and 24/7

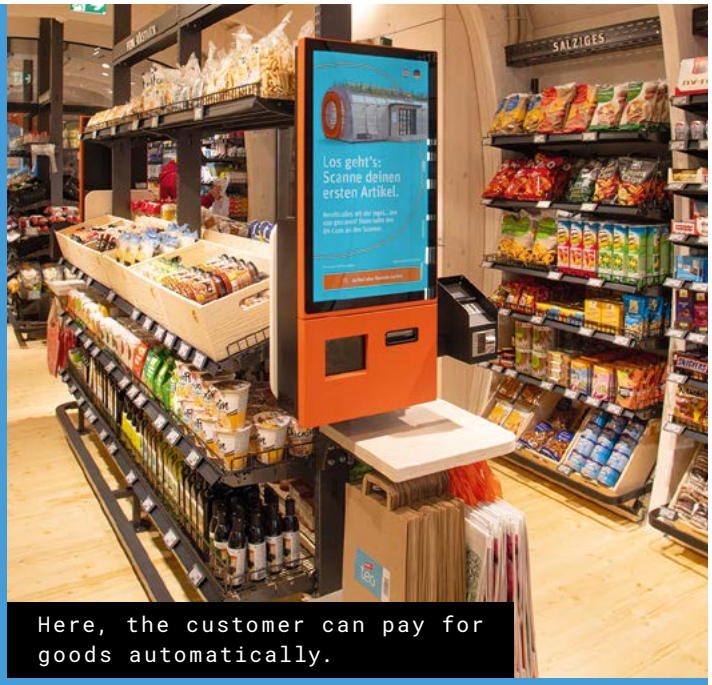
Fully automated mini-stores are even more technical. Here, customers don't even have to reach into the shelves themselves, because they no longer exist: There are mainly displays and a goods issue in the stores. Edeka and Deutsche Bahn, for example, have implemented such a concept with the start-up Smark in Renningen, Baden-Württemberg. The “E 24/7 Karow & Sommer” is the first mini grocery store of its kind at a German train station. Here, people shop via smartphone app or touchscreen. A logistics system hidden behind walls collects the ordered products from a small warehouse and makes them available in a pick-up flap. The assortment ranges from food to drugstore goods. Additional vending machines for fresh baked goods or coffee varieties are connected.

Whether it's a mini-market with self-service or a fully automated supermarket pick-up station, the goal of both concepts is clear: shopping should become a stress-free triviality. The faster, more spontaneous and simpler, the better.

The Tegut stores are intended to represent analog sustainability and digital shopping.

Photo: tegut… gute Lebensmittel / Björn Friedrich

The Screens from Tegut... Teo



Here, the customer can pay for goods automatically.

Photo: tegut… gute Lebensmittel / Björn Friedrich

Tegut... Teo can't do without – not without displays. Because in a digital self-service store without staff, "screens that respond to individual questions and situations are essential", describes Verena Kindinger from Tegut. The screens would pick up customers within the customer journey, through a thoughtful user experience between analog and digital touchpoints for easy, fast and intuitive shopping. "We are trying to manage face-to-face communication, which in classic grocery formats may be solved by the employee on site, through screens." Furthermore, the project manager cites sustainability. Because of the screens, there is no need for printed flyers, advertising and information posters. "And yet we reach the customer efficiently." Paper is also saved because customers can reject printed receipts and request digital ones.

There are essentially the following screens at Tegut... Teo: an outdoor screen on the facade, one at the access terminal at the entrance door, and at the two payment terminals – the self-checkout terminals. And last but not least: your own smartphone.

The outdoor screen replaces the classic offer poster, so to speak. It displays information about the product range as well as the store concept itself. It is a Samsung with a diagonal of 46 inches from the OHF series. The resolution is 1,020 x 1,080 pixels, the brightness 3,000 cd/m². Equipped with a robust protective glass, it weighs around 60 kilograms. Tegut specifies an operating time of 24/7. It is protected according to IP56.

The access terminal is a TFT display with a diagonal of just under 18 centimeters. It welcomes the customer. It also tells him how to open the store door. Customers who have the Tegut... Teo app scan a QR code; others use a credit or EC card to enter. If the store is closed, for example for maintenance work, this information also appears on the 7-incher.

The self-checkout terminals at which the customer pays are mounted on a column. This is the Essence V27 kiosk model from Pan Oston. Snabble is used as the checkout system. A product search is also integrated.

The content of the screens is developed within the project team in coordination with the sales team. Among others, the internal graphics and marketing department takes care of the design and implementation of the content – supported by the external service providers Snabble and Wanzl as well as, for example, the agency "design for human nature".

DISPLAY INTERACTION

Don't touch!

Touchscreens are all about interaction, about consciously requesting information. In public spaces, in a hotel lobby or on the production line in an industrial company. And now, since Corona? Alternatives are becoming more commonplace.

invidis opinion: Is Corona the End for Touch?

By 2020, the trend toward touchscreens was ubiquitous, from mobile devices to self-service kiosks in stores. With Covid-19, people began to resist. Too unhygienic, the accusation or fear went. Yet touchscreens unfairly carry this judgment with respect to Corona. As the US Centers for Disease Control (CDC) has found out, the Sars-CoV-2 virus does not normally spread through skin contact when general hygiene is good. At 1 in 10,000, the risk of infection is low even when touching contaminated objects, according to the CDC. Many touchscreen manufacturers also now offer their products with antibacterial/viral screen protectors or directly applied coatings. In the meantime, the fear has also become less. The often-rumored end of the touchscreen has not come about. And it won't. The success of the smartphone, if nothing else, has shown us in the past decade that no form of interaction is more intuitive than the touchscreen. Accordingly, it is in widespread use. The changeover to touchless control technologies will be, if anything, a slow one. And they will probably only complement touch solutions. If the need is there, and if it makes sense.

There are many situations in which you would wish something to work touch-free: opening a trunk with your hands full; answering a phone call while doing the dishes; or just pushing down the less-than-appetizing doorknob in a public restroom.

What is not yet commonplace in private life is often standard practice at work – because it has to be: Perhaps the hands are in protective gloves because hazardous substances are handled. Or there are hygienic and health reasons for not touching anything with one's hands – whether in the chocolate factory or in the surgical room. And all this has not just been happening since Corona. But the current situation has increased interest in contactless control options, even in everyday private life. And especially when it comes to displays. An Intel survey last year showed that 80 percent of people think touchscreens are unhygienic. That's why 73 percent would prefer to interact touch-free in the future.

Even though concerns among many consumers about using public touchscreens have diminished since the beginning of the pandemic, the basic desire for touch-free controls has remained. This applies to ticket machines, self-service terminals at banks, and information displays in museums. In addition, there are other factors in favor of touch-free terminals – for example, an improved experience in some cases, when gestures represent a more natural interaction for certain actions.

Nowadays it is not necessary to touch an interactive screen – there are other technologies.

Photo: istockphoto

Of course, these touch solutions are unlikely to be completely replaced in the near future. However, many companies are keeping an eye on the touchless alternatives, which have been more present than ever for the past year. New products for this purpose come regularly onto the market as well. For example, Imageholders launched a gesture-controlled self-service kiosk in collaboration with Ultraleap in July.

But gesture control is not always behind a touchless display. The next few pages provide an overview of various technologies that enable touchless control. The application specialist Hy-Line has supported us here. Although some of them still sound like futuristic dreams, others can already be used to enhance experiences – whether at the PoS, at the workplace, or at the DooH installation.

Holographic Display

Holo-Touch is very similar to infrared touch, but with the addition of a holographic image projected into the air. The virtual image is not a hologram in the physical sense, however, because neither monochromatic, coherent light is used here, nor does the image change depending on the viewing angle. Rather, a special material property is used that convergently bundles the diffusely emerging light rays at the location of the virtual image, thus creating the impression of a freely floating image in the air. The best examples of this are head-up displays in cars. With Holo-Touch, the setup looks very similar to these. The 3D panel creates a virtual image that is “tangibly” close to the user. The virtual image is generated at the point that is equidistant from the mirror and the display. If you now mount an infrared sensor which overlooks the image plane, you can detect and evaluate touch events and gestures that are made "in the air" without having to touch anything.

Air-Touch

With Air-Touch, a targeted touch point is detected before a direct contact with the surface occurs. There are various approaches to this; the most common uses infrared beams. In principle, it is similar to the familiar IR touch: a finger or stylus breaks through a curtain of infrared light. This interruption is evaluated and returned to the controller as a touch event. In the case of Air-Touch, however, the infrared mesh is not located directly above the glass of the display, but a few centimeters away. Hy-Line offers this technology under the name Flying Touch. One of the applications: For example, when the screen is behind a shop window and the infrared mesh is in front of the glass. Passers-by can then control the screen – on which, for example, a product catalog is displayed – contactlessly through the shop window.

One drawback, however, is the parallax created by the distance between the sensor plane and the image plane, i.e. the perceived offset between the two.

This creates a certain inaccuracy; the touch fields must therefore be appropriately large so that the user can easily hit them.

In addition, standard infrared touchscreens do not support multi-touch applications or swipe gestures like smartphones but are limited to targeted taps. In addition, the sensor array should be protected from external light sources using IR filters in order to function properly.

The latest generation of infrared touchscreens could provide a solution. Instead of interrupting a light grid, they evaluate the reflection of an object located in the beam path. By cleverly arranging emitting diodes and photodiodes, two touch events can thus be detected simultaneously, as well as gestures in the light field. However, the possible distance between the infrared mesh and the glass is still too small for applications with Air-Touch.

But Air-Touch also works without infrared. Intel, for example, offers a solution that can even be used to retrofit touch displays with touch-free control. The American IT manufacturer combines one of its Realsense depth cameras with the Touch Control Software (TCS). The smart camera detects the finger or pen already a few centimeters away from the screen, as well as the distance to the camera itself. The software uses the data to calculate the expected touch point and passes it on to the core content software as a click.

Ultraleap's “Mid-Air Haptics” technology, which relies on ultrasound, is also exceptional. On the one hand, it recognizes a finger position even before contact. On the other hand, the user receives haptic feedback. This can be electrical force fields, crackling bubbles or even a virtual button. The British outdoor advertiser Ocean Outdoor has already tested the technology extensively at small events and let people use it to control its DooH screens.

Devices that are used by many people are ideally suited for Air-Touch: Whether digital signage in retail, such as menu selection in fast-food restaurants, elevator controls, or wayfinding and information boards in shopping centers.

3D Gesture Control

Gesture control enables the operation of a device with the help of hand motions. In contrast to the technologies already presented, this does not require absolute coordinates, but rather relative positions. For example, the volume can be changed with a turning gesture; or horizontal wiping gives the system the signal for a scrolling action.

There are various approaches to recognizing the gestures: either via intelligent cameras or, in the case of 3D gesture control, via electric fields directed towards the user. During calibration, the capacity of this capacitor is measured as a reference. Every object that enters the field influences the field lines and thus the capacitance between the two electrodes.

A sensing method evaluates this change and thus calculates the movement. Sounds simple, but it is very complex. This is because external influences such as temperature, humidity or mechanical tolerances within the devices can greatly change the measured field strengths.

Accordingly, this technology tends to be used where accuracy does not play a major role.
The big advantage is that gestures can be performed “blindly”, i.e. without looking at the touch-screen. One example is the use in a car, when you can use a swipe gesture in front of the steering wheel to select the next CD track or radio station. Feedback is provided via the operator's ear, not the eye. Air-conditioning and sunblind controls or light switches can also be operated in this way. Or customers can browse through the current catalog at a fashion retailer's digital signage display. Or they can be entertained with interactive games.

Eye-tracking

Eye-tracking evaluates the movement of the pupils and eyelids to control a cursor and trigger actions by blinking or by looking at a certain spot for a longer time. This is rather difficult for the in-experienced user. The rigid focus of the eyes also leads to fatigue, so this input method should only be used for a short time. Although eye-tracking does have its advantages, for example in analyzing the interest of customers in the store, the technology has rarely been used for controls.

Voice Control

Voice control is at the top of the list of touch alternatives. You no longer have to lift a finger, just say a word. A basic distinction is made between online and offline voice control. Devices that tend to be networked with others online, such as smartphones, consumer electronics, home automation, or media control, rely on the former. Alexa, Siri and Co. send their regards. By networking, other devices can also be controlled. With offline voice control, on the other hand, the devices are self-sufficient and function in areas without network coverage, which in turn is interesting for DooH and digital signage. Areas of application include ordering terminals in fast-food restaurants, information displays in shopping and travel centers, and check-in kiosks in hotels.

Online and offline voice controls accelerate complex commands. Only this technology allows different parameters to be combined in one step – i.e. sentence. And whether it's podcasts, digital voice assistants or smart speakers: the topic of voice has arrived both in retail and among consumers. There are still problems, especially with unclear pronunciation due to foreign language or dialect. Or when the commands do not follow a predefined pattern but can be expressed freely. But as artificial intelligence advances, this problem should soon be a thing of the past.

BCI (Brain Computer Interface)

Controlling machines with your thoughts – that's the short description of Brain Computer Interface, also known as Brain Machine Interface. At its core is the analysis of electrical brain activity. It is stimulated as soon as a person thinks about a movement. The technology is used, for example, in modern exoskeletons – mechanical support structures – that help people with heavy physical activities. Or in prostheses that replace limbs or their missing functions. However, the technology is still fundamentally in its infancy and is particularly immature for everyday mass applications, as artificial intelligence software is needed to properly interpret the detected signals.

In summary: With so-called HMI techniques – the abbreviation stands for Human Machine Interaction – it is difficult to detect the exact will of the user. Artificial intelligences are trained accordingly. However, this takes time. And as long as even more sophisticated intelligences like Amazon's Alexa don't understand every word, it will probably be a few years before this alternative to touch becomes established.

Photo: unsplash / Robert Bye

invidisXworld 5 & 6

Germany

Photo: invidis

INVIDISXWORLD

Germany: Interactivity

These two editions of invidisXworld are all about interactivity and interactions. We traveled through south-west Germany and visited Frankfurt am Main to get to know as much as possible about interactive technologies.

In Frankfurt am Main, we tried out the conversational interaction with SEMMI. Jannik Oberlies from DB Systel and Alexander Stricker from Charamel describe some of the challenges of understanding customers correctly in more than 100 languages and of giving machines a more empathic and human face. They orchestrate many technologies like AI and avatars to help you to find a coffee at a Deutsche Bahn railway station or to correctly understand the difference between “Aegean Airlines" and "Ed Sheeran”.

As our store highlight, Florian Rotberg and Stefan Schieker visited the SamsungZeil Flagship Store in Frankfurt.

The latest shows always on invidis.de and for subscribers of the invidisXworld Youtube Channel.

WATCH THE VIDEOS HERE:
The invidisXworld Youtube Channel

invidisXworld #5
Germany Interactive 1
Youtube

invidisXworld #6
Germany Interactive 2
Youtube

We talked to Josef Schneider and Michael Stoebe at Pyramid Computer about interactive systems, like kiosks and customer terminals, and to Dirk Bockelmann of BD Rowa about the combination of robots and Digital Signage for pharmacies, opticians and other businesses. We also sat down with Johannes Tröger of Ameria, the Heidelberg-based company that built a non-touch interactive platform that smoothly connects to backend systems like SAP.

INTERACTIVE TECHNOLOGIES

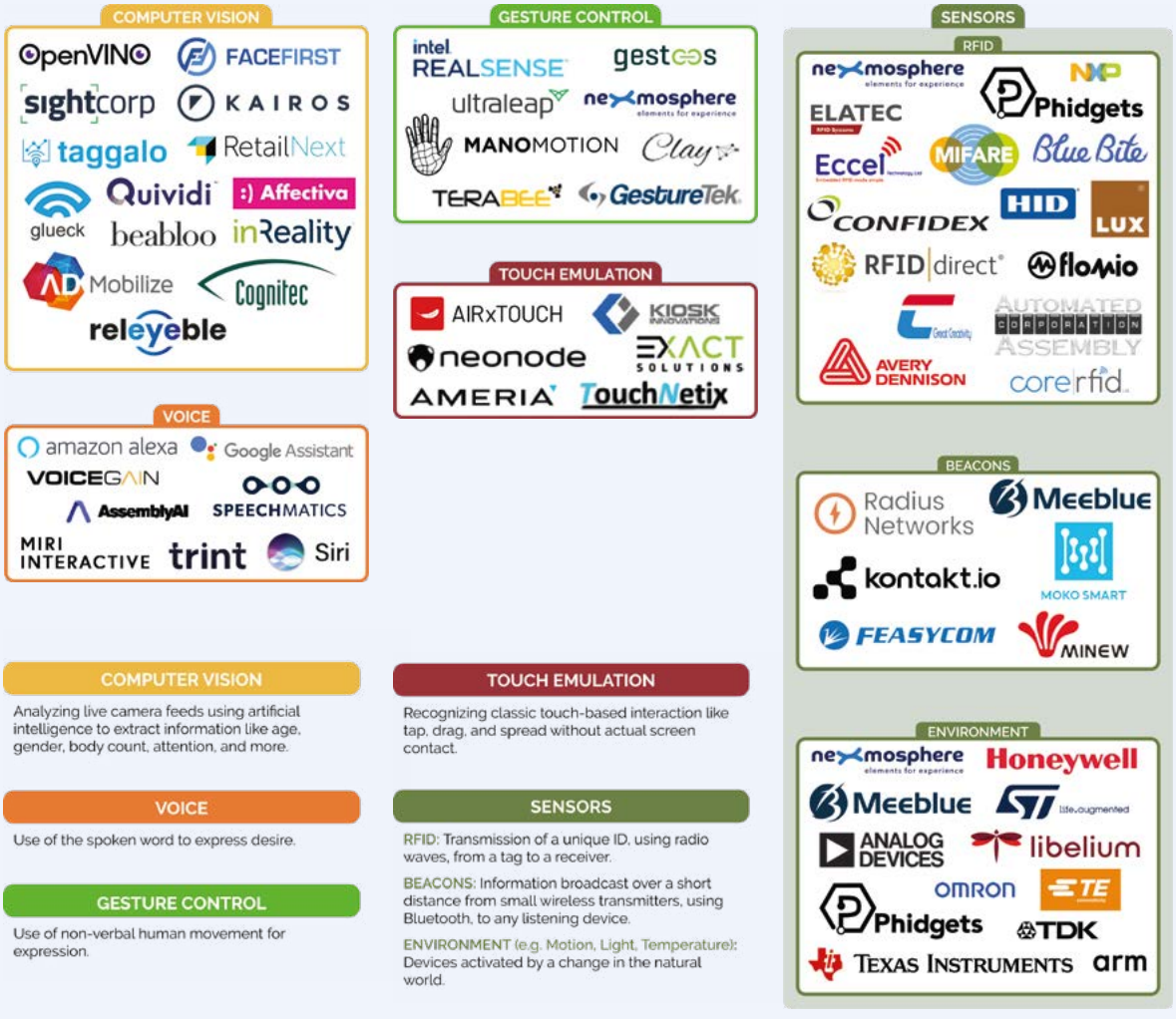
At a Glance

There are many digital retail solutions. But who offers which interactive technologies, from voice to touch to sensors? The poster “The Digital Interactivity Landscape” provides an overview.

The Digital Interactivity Landscape*

State of the Industry

May 2021



COMPUTER VISION
Analyzing live camera feeds using artificial intelligence to extract information like age, gender, body count, attention, and more.

VOICE
Use of the spoken word to express desire.

GESTURE CONTROL
Use of non-verbal human movement for expression.

TOUCH EMULATION
Recognizing classic touch-based interaction like tap, drag, and spread without actual screen contact.

SENSORS
RFID: Transmission of a unique ID, using radio waves, from a tag to a receiver.

BEACONS: Information broadcast over a short distance from small wireless transmitters, using Bluetooth, to any listening device.

ENVIRONMENT (e.g. Motion, Light, Temperature): Devices activated by a change in the natural world.

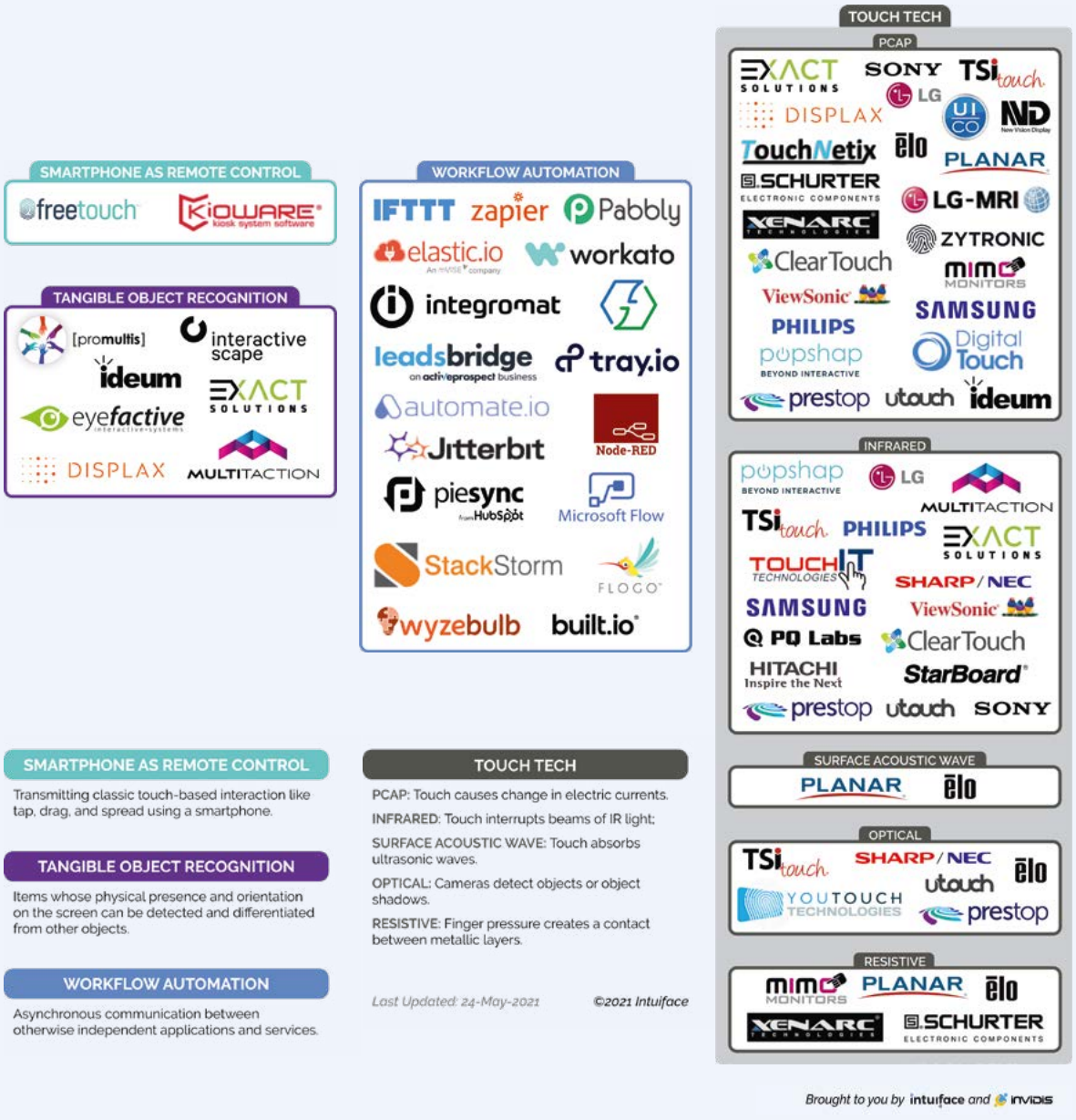
*Suppliers of CMS-neutral technology that can trigger a response in Digital Signage and DooH content.

Since its founding, invidis has made it its mission to provide transparency and an overview of the digital signage market – and this is also the case with the current poster: "The Digital Interactivity Landscape" presents an overview of the ecosystem of interactive displays.

Together with the French digital experience platform expert Intuiface, we collected numerous providers of interactive digital signage solutions. An important factor to be included was that the solutions were developed specifically for the retail market. At the same time, the poster is a first attempt at a CMS-independent overview of the highly fragmented market – for only platform-independent systems were taken into account.

When designing the new poster, we were inspired by technology market overviews in the online sector. These often categorize hundreds, sometimes thousands of solutions in the form of logo collections. In the end, we didn't end up with that many providers – at least not yet. But we are keeping the project going and will regularly update the overview in the future.

You can find the poster under:
www.interactivitylandscape.com



INVIDIS ONSITE

Fan Experience beats Megastore

FC Bayern World is not only masterful when it comes to store design, but also plays in the Champions League with its digital elements.

The newly opened FC Bayern World, not far from Munich's Marienplatz, is one of the best brand stores you can currently experience. It's not the size – the store is surprisingly well laid out – but the number and conception of the digital elements that is quite unique. The German record champion has refrained from setting up a fan megastore like the ones operated by, for example FC Barcelona – there, busloads of fans are dropped off at the doors.

The downtown location is a mixture of fan store and fan experience. Of course, fans will be able to buy the latest jerseys and club memorabilia at home games. This is a standard feature and works all over the world. The real challenge was to create a concept that would also be interesting enough between match days to attract fans on a regular basis.

For example, the football cage or the Fifa Playstation offer entertainment, while the selfie touchpoints with players and in front of the Allianz Arena provide free souvenirs. This offers many experiences, especially for young fans.

The store design and especially the dressing rooms show great attention to detail. Each dress-

LED wall of a special kind in the FC Bayern World.

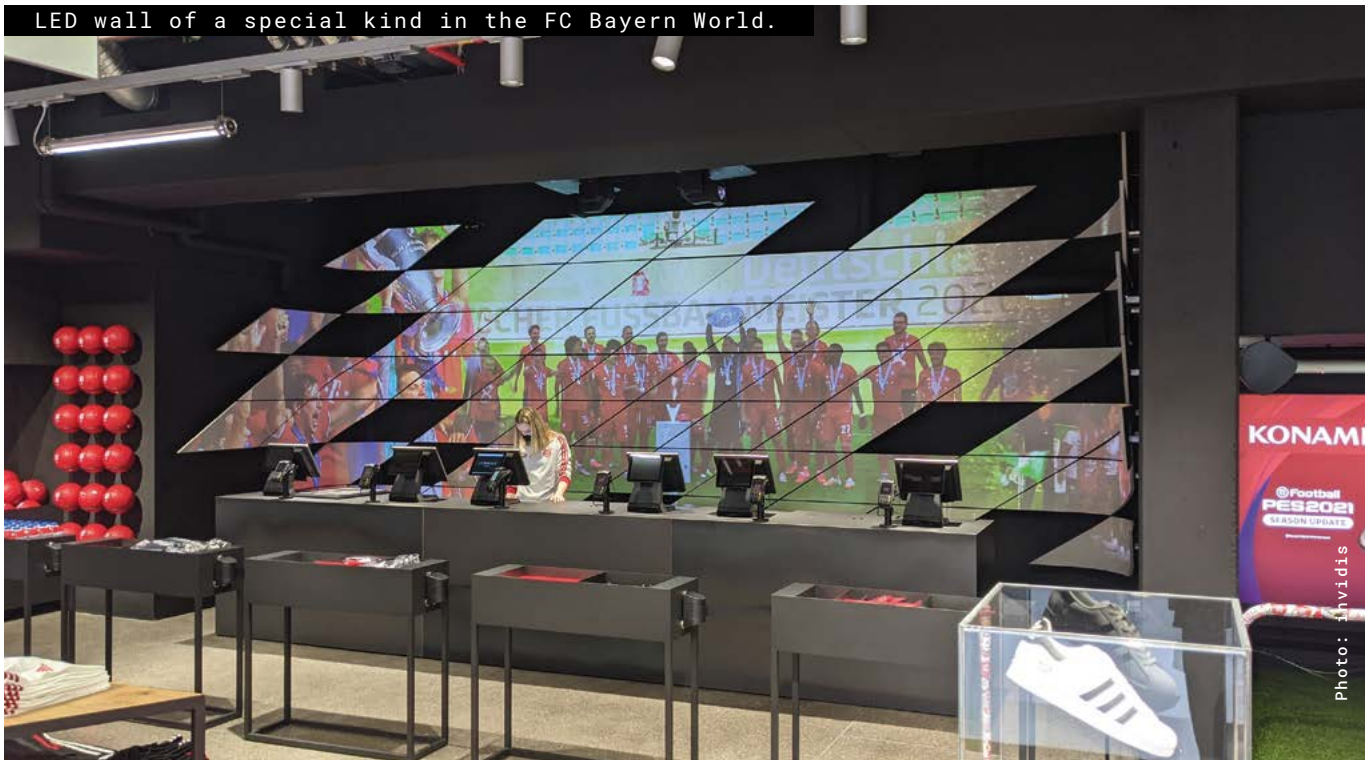


Photo: invidis

Even the stairwell is equipped with digital screens.

Photo: invidis

DS also encourages interaction.

Photo: invidis

ing room is individually decorated with FCB photos and souvenirs. Old photos and posters can be found throughout the store, as well as rows of seats from the Allianz Arena, of course.

From a digital signage point of view, almost everything that is currently available was installed. Transparent displays in front of the trophies, LEDs in the entrance area, Epson Ultra-Short Throw projection at the central checkout, Magic Mirrors in front of the changing rooms, transparent LED strips, Elo touchscreens and, of course, micro-LEDs. Some touchpoint concepts did not have to be newly developed for the flagship store, but are also used by the FC Bayern shareholders. Magic Mirrors, for example, are already familiar from the Adidas flagship LDN in London, and the Audi Configurator with micro-LED will also be experienced in Audi showrooms in the future.

The integration of digital and store design has been superbly realized – probably no coincidence that the digital specialists responsible for FC Bayern World are also the house and court suppliers for Adidas and Audi. The attention to detail is striking – fewer big WoW effects for the masses, but many experiences for the individual fan.

Bundesliga, CL and DFB trophies with digital projection.

Photo: invidis

REAL VS DIGITAL

One Reality isn't enough

Augmented reality is probably the best-known term when it comes to digital realities. Right behind comes virtual reality. And augmented virtuality and mixed reality? We dive into the new realities and look at the differences.

Photo: Darlene Alderson von Pexels

Other worlds – mixed realities make it possible.

In 2019, Coca-Cola for the first time let the bears loose. But only via smartphone. If you pointed your camera at one of the beverage cans, a small animation ran in which polar bears played around the drink. The company's Christmas campaign from the year before last is just one example of augmented reality (AR) – and shows that this technology has long had a place in our everyday lives. Virtual content is superimposed on actual reality. One of the older familiar examples of this is the range markers in ski jumping that can be seen in TV broadcasts. Or head-up displays in cars, so that the driver sees information projected onto the windshield, for example from the navigation system. Lego was also a pioneer: The ready-assembled playing bricks virtually built up on the packaging when the products were held in front of a camera installed in a store.

Today, there are numerous AR apps for smartphones, for example, to retrieve videos within advertising campaigns. In addition, apps bring video game characters onto the train platform, the picture in the museum presents itself in an animated way; or customers can have sofas shown to them in different colors. Meanwhile, it is almost normal to encounter AR content. The British outdoor advertiser Ocean Outdoor has already used AR several times at the Piccadilly Lights in London to support events or DooH campaigns. At London Fashion Week, for example, arrows in the smartphone display showed the way to the fashion retailer offering the garments shown on

the DooH screen. And at the House of Innovation New York, a flagship store of sporting goods manufacturer Nike, customers can go on an AR scavenger hunt – accompanied by a digital mascot they only see on their smartphone.

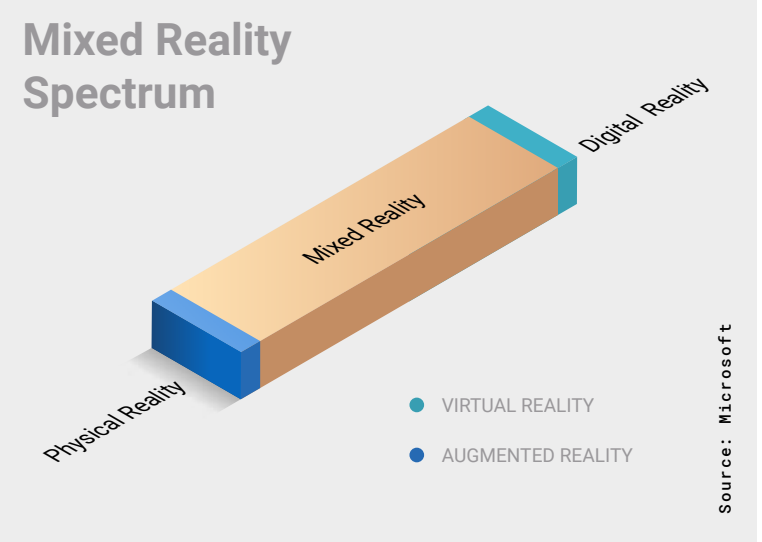
Into Digital with Glasses

While the smartphone currently plays the biggest role in augmented reality, virtual reality (VR) involves a kind of headset including glasses. Only then do you find yourself in another world, for example in the landscape of a computer game. Real reality is hidden from view. To enable users to move around in the virtual world, the headsets are coupled with sensors that detect head movements. This allows the user to look around in virtual reality.

For a long time, the technology was only celebrated by early adopters and technology enthusiasts. But since the first major attempts in 2015 with headset solutions such as Oculus Rift or HTC Vive, virtual reality has made a big leap. At the moment, such implementations can only be found in selected places such as museums, showrooms, flagship stores or among gamers with the necessary budget. In a few years, however, industries such as retail and events could rely more heavily on VR. In the meantime, large companies such as Ikea or Audi are relying on VR and offering corresponding experiences in some stores. In this way, customers can experience products virtually when they are not available in the store. And technology groups such as LG already offer virtual walk-in VR showrooms and trade show booths, which has just proven itself in the pandemic.

What lies between AR and VR

Augmented and virtual reality – the concepts are catchy, the applications fascinating. But where does one start, where does the other end? And is there anything in between? This is where Mixed Reality (MR) comes into play. Between purely real and purely virtual experience lies a multitude of possible combinations, all of which fall under this term. Microsoft, among others, uses it to explain the range of applications for its Hololens MR glasses: The company describes augmented reality as very close to reality. On the opposite side, virtual reality is just before the completely digital world.



This is how Microsoft, among others, describes the spectrum of Mixed Reality: AR close to the real world, VR to the completely digital world.

In addition, the term augmented virtuality (AV) pops up from time to time. It is clearly on the digital side of the spectrum. Here, a virtual world is enriched by objects or impulses from the real world. An example: You are wearing VR goggles and sitting on your sofa, but you see a sandy beach in front of you. Suddenly, the real front doorbell rings. Sensors detect the doorbell and relay the information to virtual reality. The user is then shown a message, perhaps even with a live feed from the digital door peephole, to see who is ringing.

Clear Definition difficult

Because there are many parameters that determine the degree of digital or even virtual, there are no conclusive definitions for the various realities that can be used to strictly classify all applications. Moreover, as technology continues to advance, the possibilities are in flux.

A particular variety of mixed reality has become established in the field of filmmaking. Here, LED walls are used to merge the real and virtual worlds. But that's another story ... which you can read on the next pages!

Photo: ARRI / David Noton

LED mixed reality studios enable new ways of filming.

DIGITAL CINEMA

RGB beats Green

LED displays are increasingly being used in film productions to create a virtual set. They offer several advantages over conventional methods.

Anyone looking behind the scenes of a Hollywood blockbuster has always been a little disappointed. You would often only see actors acting somewhat lost in front of a green screen, which was later replaced by a futuristic battlefield or an ancient kingdom with the help of computer technology.

This could soon be a thing of the past, because instead of green screens, LED displays are now being used more and more often. Huge screens project the alien worlds directly into the setting, with the camera practically filming the illusion simultaneously.

The use of LED screens has advantages for everyone involved. On the one hand, it allows the same flexibility as the green screen – and more: Because the content can be adjusted in real time, camera angles, for example, can be arranged more flexibly. A change in background, from day to night, for example, is visible to all; and the lighting the screen casts is correctly reflected on actors and conventional props – making the scene more real. It also helps the actors get into character, or rather the environment. Instead of a green wall, they act in front of a real backdrop, which allows for more realistic reactions.

Thus, productions with LED are more flexible and can even save costs: new sets don't require major rebuilding – which is often necessary even when using green screen.

To realize this, more and more mixed reality studios are being built that allow direct filming of imaginary worlds. For example, in 2020,

Cologne-based MMC Studios became the first in Germany to realize such a film set.

And just recently, Arri collaborated with production and technology specialist NEP Live Events Creative Technology near London to set up one of the largest LED wall studios in Europe to date. The 708-square-meter studio features a total LED screen area of 343 square meters.

The main LED curve has a width of 30 meters and a height of five meters. In addition, there are two movable, tilting side walls, each with a width of 3 meters and a height of 4.2 meters, as well as a height-adjustable ceiling measuring 9.6 by 9.6 meters. The solution is completed by a back curve with a width of 18 and a height of 4.2 meters. In this way, an encapsulated and at the same time flexible space is created. It can be programmed to display 360-degree images that cast dynamic, fully integrated lighting effects on the actors and the scene being shot, even when they are out of frame.

The products used for the front wall were ROE Visual Ruby modules with a pixel pitch of 2.3 millimeters. The side walls, ceiling and back curve are made of ROE Visual-Carbon-CB modules – with a pixel pitch of 5 millimeters.

And further projects are in the pipeline: The technology is also to make its way to Munich. At Bavaria Studios in Geiselgasteig, the construction of an LED studio is being funded with 2.7 million euros by the Bavarian State Ministry for Digital Affairs. Alongside the German-American Eye Lines Studio Munich, Arri is again involved as a partner and technology and studio specialist. The project is scheduled for completion by mid-2023. Total costs are estimated at around 5.4 million euros.

The Arri studio near London enables omnidirectional shooting.

Photo: ARRI / David Noton

Photo: Steve Douglas von Unsplash


DOOH

MARKET AFTER CORONA

DooH back on the Road

Programmatic, Start-up culture and Smart Cities: The out-of-home market experienced big changes – also because of the pandemic. In any case, in the view of experts, the market tends to go in the right direction.

DooH has long been an attractive business for a few large media-owner and an economic gamble for the rest. Access to the lucrative 10-15 years DooH-deals in large cities, airports or public transportation was mostly limited to the OoH-Establishment e.g. JCDecaux, Clear Channel or Ströer. The large players are till today too big to fail, well connected to government offices responsible for tenders and, probably most important, highly interlinked with media buying agencies.

In addition, the roadside business model was reinvented by JCDecaux in 1964. By creating the advertising bus shelter JCDecaux invented the combined business model of providing free street furniture to the public in combination with advertising rights for the media owners. A win-win situation which was later extended to public toilets or recently to bicycle sharing schemes. Today OoH-financed street-furniture has become standard around the globe.

A few years later the industry launched MUPIs – standardized city information panels (aka City Light poster). The new panels brought a global standard to an industry, which is dominated by individual billboard sizes in every country.

About 15 years ago the next innovation was launched: the first display based DooH advertising faces were introduced. Neither technology (lack of brightness, display size and durability) nor costs were ready. But dynamic messages roadside, in metro stations or at airports promised to be the future of advertising. It took ten more years for the full breakthrough of DooH, triggered by programmatic and the necessity for real-time connectivity.

DooH beyond Out of Home

The emergence of programmatic advertising enabled DooH media owner for the first time to target non out-of-home media budgets, especially online and mobile, by focusing on target groups rather than media channels. Although programmatic advertising is one of the dominating industry topics, it is still in its infancy. Hard data is difficult to get but it is widely believed the share of programmatic is around 10% of all DooH transactions. Many media owners and media buyers claim to have higher programmatic shares, but that usually still includes excel spreadsheets or manual work somewhere along the transaction. But there is no doubt that programmatic will become a major revenue stream.

The second trend – the emergence of data – also shifted the balance of power away from the cozy relationship of Out-of-Home network operators and media buying agencies. Well-established but often too slow frequency metrics and research was challenged by current digital smartphone data provided by mobile network operators. Media buyers were enabled to improve targeting of their campaigns as well as plan along typical customer

journeys. Even though some players tried to establish a one-to-one planning, DooH remains one of the last one-to-many mass media channels. Just much faster, dynamic, and smarter.

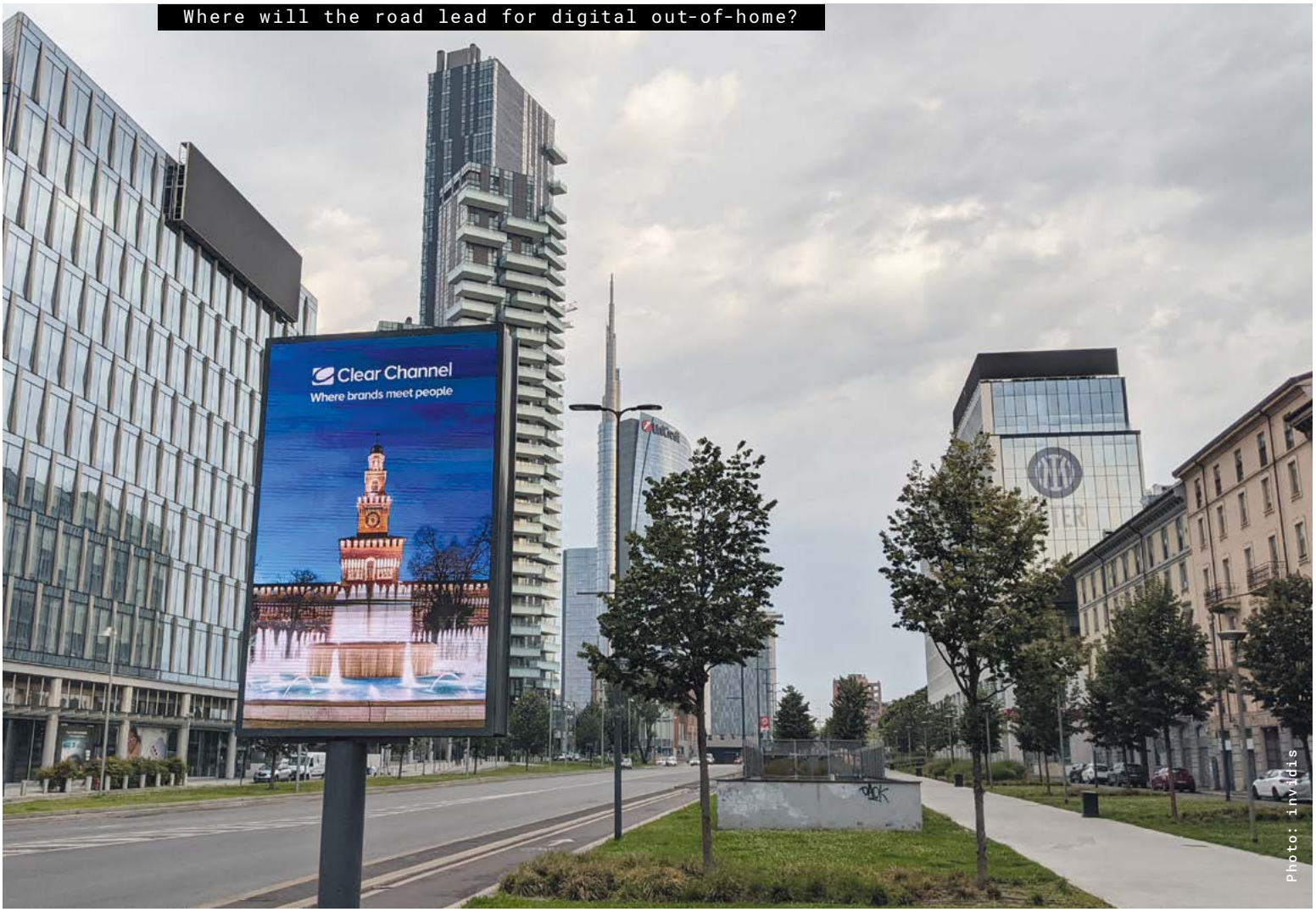
Democratizing DooH

But programmatic not only enabled media owners to tap new revenue streams, but also opened the market for start-ups and non-industry businesses alike. Access to media buyers is not anymore controlled by a few but by many real-time advertising platforms. Platforms have been established on both sides of the industry. A Demand Side Platform (DSP) is part of the automated trading and bidding on digital advertising. The DSP accumulates inventory from various media owners while Sell Side Platforms (SSP) bundle ad network inventory from various media owners.

With so many disruptions, the DooH industry has entered a gold rush phase. Numerous start-ups and new media owners entered the market. Most prominent are disruptors like Framen, Hygh, UZE mobility or Digooh in Germany (see also page 122).

The hype of DooH attracted many investors to finance start-ups or, more spectacular, acquire young start-ups like Framen. The Berlin company was acquired by one of Europe's largest media holding for an enterprise value of more than 100m EUR, less than two years after foundation. While Framen markets third-party inventory, Hygh focuses on their own network of PoS and shop window screens. UZE is banking on mobile screens on vans and taxi roofs. Digooh believes in bringing roadside DooH screens beyond big cities.

But ad-tech innovations also lead to shifts in the value chain. Roles are challenged as can be observed by Goldbach. Today the DooH sales house is closely connected to DooH media owner and sister company Neo Advertising in Switzerland. In contrast Goldbach Germany continues to op-



erate independently of any media owner, but the Munich-based team is now fishing in Ströer/Wall Decaux territory by exclusively marketing all digital assets in Bochum (Germany's 16th largest media market). Another headliner in the DooH industry was the acquisition of Switzerland's third largest DooH media owner Live Systems by Swiss Post. Live Systems won the tender to exclusively market the Swiss Post instore network, after a few months Swiss Post decided to insource media sales by acquiring Live Systems. The government controlled post service has become one of the leading DooH media players with exclusive inventory on public busses, trains, train stations, gas stations and in retail.

Many new start-ups are in the process of launching DooH networks sparked by the new opportunities of programmatic. It remains to be seen if real-time advertising keeps democratizing DooH or if the established players find new ways to strengthen their market position. Because JCDecaux, Clear Channel, Ströer and Co. continue to grow and capture new tenders.

Resurrected from the Pandemic

Out-of-Home was hit tremendously hard by the pandemic-induced lockdowns. The world came to a grinding halt basically from one day to another with mandatory work from home, closed shops and deserted inner cities. In spring 2020 mobility in Germany declined by 39%, recovered throughout the summer of 2020 before mobility declined again by almost 3% during the second lockdown around Christmas. It took another half year till June for mobility in Germany to be back to 2019 levels.

Lonely displays: The lockdowns brought the markets into the red.

Photo: invidis

Ocean Outdoor began to focus on forced-perspective-campaigns this year.

It comes at no surprise that OoH advertising declined in line with reduced mobility as consumers stopped using public transportation, worked from home and shopped online. At the end Out of Home finished the pandemic year 2020 with 6,7% less revenue according to Nielsen data. More than the total market (-3,2%), but with much less impact as cinema (-74,7%).

Compensation possible as early as 2022

In April 2021, the gross advertising volume of OoH advertising reached the level of April 2019 again, while in June 2021 the result exceeded June 2019 figures by 9%. Although it is still too early to speculate on a result for 2021, the German Out of Home Association (FAW) expects that under stable economic conditions, Out of Home can make up the ground lost during the pandemic. FAW Managing Director Prof. Kai Thäsler "Already in the course of 2022, the losses from the lockdowns could be compensated."

One of the few winners has been DooH in supermarkets, drugstores and other essential points of sales which remained open throughout the lockdown. Instore displays benefited from the general boom for retail media. While eCommerce giants like Amazon started selling highly targeted advertising on online platforms, grocery groups like Carrefour started monetizing instore screens also with third party campaigns. While trade marketing campaigns on instore screens have long been standard across supermarket chains, third party campaigns were rare. Here again programmatic real-time advertising enabled media owners to tap new markets even during the height of the pandemic.

Content becomes King

While JCDecaux still refrains from mixing news and advertising, most other DooH media owners show relevant content with campaigns to raise the relevance of the touchpoint for consumers. Axel Springer surprised the market by bidding successfully for the Bundesliga video rights for DooH for the next seasons. Recently acquired Framen started delivering exclusive Bundesliga video news to their partner screens with the begin of the season end of August. Ströer continues to build its editorial competence by investing into their T-Online newsdesk and complementing editorial products. Ströer screens across Germany are fully integrated into T-Online coverage. One great example was the Tokyo Olympics. Ströer cooperated with the German Olympic team and published medal alerts and Olympic news in real time. Ströer combined the real time editorial coverage with perfect minute advertising – campaigns with real time claims related to medal alerts.

Forced-perspective-campaigns surfaced as another DooH trend during the pandemic. Eye-catching forced perspective content illusions on giant corner LED screens have now spread from Asia to Europe. Quasi-3D advertising LED media facades caught social media headlines across the planet first in China and Korea. Today more and more media buyers are looking for WoW-moments on landmark DooH screens to compensate for cancelled in-person events.

Transportation - Station

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Station Video	Ströer	195	1.488	LCD
Infoscreen	Ströer	102	625	Projektion
DigitalUndergroundBerlin	Wall	25	74	LCD
Fahrgast-TV Station	X-City Hannover	6	33	Projektion
Digital Poster Gallery	Wall	1	12	LCD
Supermotion	Ströer	3	7	LED

Transportation - Airport

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Airport Channel	Goldbach	12	1.639	Totems & LCD/LED Screens
Airport Bremen	Airport Bremen	1	16	14 LCD + 2 LED Videowalls
Airport Berlin BER	FBB	1	42	LCD
Airport DUS	Airport DUS	1	361	LCD & LED
Airport Frankfurt	Media Frankfurt	1	918	LCD & LED
Flughafen Hamburg	Media HAM	1	8	LCD
Flughafen Köln/Bonn	Airport Köln/Bonn	1	46	LCD & LED
Flughafen Leipzig/Halle	Airport Leipzig	1	8	LCD
Flughafen München	Airport München	1	215	LCD & LED

Highway

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Autobahn Channel Subnetze	Cittadino / Goldbach	370	4.355	LCD
Check-out / Kassen	Cittadino / Goldbach	370	358	LCD
Gondola / Gondel	Cittadino / Goldbach	370	1.467	LCD
Kühlthekenscreens	Cittadino / Goldbach	370	1.011	LCD
DCLP	Cittadino / Goldbach	370	270	LCD
DTB (Digital Travelboard)	Cittadino / Goldbach	370	236	LCD
Digital Mirrors Sanifair	Cittadino / Goldbach	370	1.013	LED
Shell DooH Filling Stations	ISM	500	1.000	LCD

RoadSide

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
DigitalDeluxeNet	Wall	483	483	LCD
DigitalCityNet	Wall	255	363	LCD
RoadsideScreens	Ströer	27	379	LED
CityScreen	Ströer	12	52	LCD
MegaVision	Ströer	14	14	LED
Hygh (BER. CGN, HAM)	Hygh	527	527	LCD
Digooh	Digooh	500	500	LCD
Various Roadside Screens	various	1.100	1.100	LED & LCD

Passenger TV

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Fahrgast TV Hamburg (U-Bahn)	Ströer	-	1.614	LCD
Fahrgast TV Hamburg (S-Bahn)	Ströer	100	1.100	LCD
Fahrgast TV Hannover	Ströer	240	864	LCD
Fahrgast TV Munich (S-Bahn)	Ströer	127	2.000	LCD
Berliner Fenster	mc R&D GmbH	-	3.768	LCD
Münchner Fenster	mc R&D GmbH	-	3.000	LCD
Various Passenger TV Germany	mc R&D GmbH / Buspot	-	9.690	LCD
TAXi AD	UZE Mobility	300	300	LCD
Taxi Channel (Tablets)	-	-	3.058	LCD

Entertainment, Leisure, Sports

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Cinema TV	Ströer Edgar Ambient Media	24	565	LCD
Hairstyling TV	Ströer Edgar Ambient Media	168	655	LCD
Fitness Channel	Airtango	518	1.932	LCD
McFit	El Cartel	165	1.698	LCD

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations, DMI

Hospitality

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
McDonald's TV	Ströer Edgar Ambient Media	709	1.126	LCD
King Channel	Goldbach	517	1.136	LCD
Edgar Art Screens	Ströer Edgar Ambient Media	950	1000	LCD

Shopping Center

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Mall Video	Ströer	112	2.215	LCD
Digital Dream	Ströer	1	5	LED
Mall Channel	Goldbach	84	1.115	LCD & LED
Unibail-Roamco-Westfield	Ocean Outdoor	15	400	LCD

POS

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Rewe TV	Brandlogistics	3.900	3.900	LCD
Hygh	Hygh	129	129	LCD
Media Markt TV	Ströer Edgar Ambient Media	275	33.000	TV
Saturn TV	Ströer Edgar Ambient Media	156	18.720	TV
MEDIMAX TV	Ströer Edgar Ambient Media	110	7.280	TV
Food Channel Edeka	Ströer NeoAdvertising	972	3.894	LCD
ECHION Shop Channel real,-	Echion	266	1.076	LCD
DOoH.de	DOoH.de	4.211	4.211	LCD
Various PoS	Various	10.000	20.000	LCD

Healthcare

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Apotheken TV	UAM	1.010	1.215	LCD
TV Wartezimmer	TV Wartezimmer /	5.847	5.847	LCD
Vetiprax TV	VetipraxTV	429	429	LCD

Education & Office

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Digitales Schwarzes Brett	Heineking Media	7.500	8500	LCD
Unicum TV	Unicum TV	137	350	LCD
Executive Channel Network	ECN	180	228	LCD

Switzerland

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
ePanel	APG	800	800	LCD
eBoard	APG	250	250	LED
TrafficMediaScreen	APG	1.400	1.400	LCD
Digital Convenience Network	Clear Channel	198	198	LCD
Zurich Bahnhofsstraße	Clear Channel	1	99	LCD
Digital Shopping Media	Clear Channel	20	112	LCD
Digital Street	Clear Channel	7	180	LCD
Public Transport	Live Systems	3.000	5.500	LCD
Gas Station	Live Systems	380	2.000	LCD
City	Live Systems	16	21	LCD
Retail (Post Office)	Live Systems	360	1.000	LCD
Various Networks	Neo Advertising*			

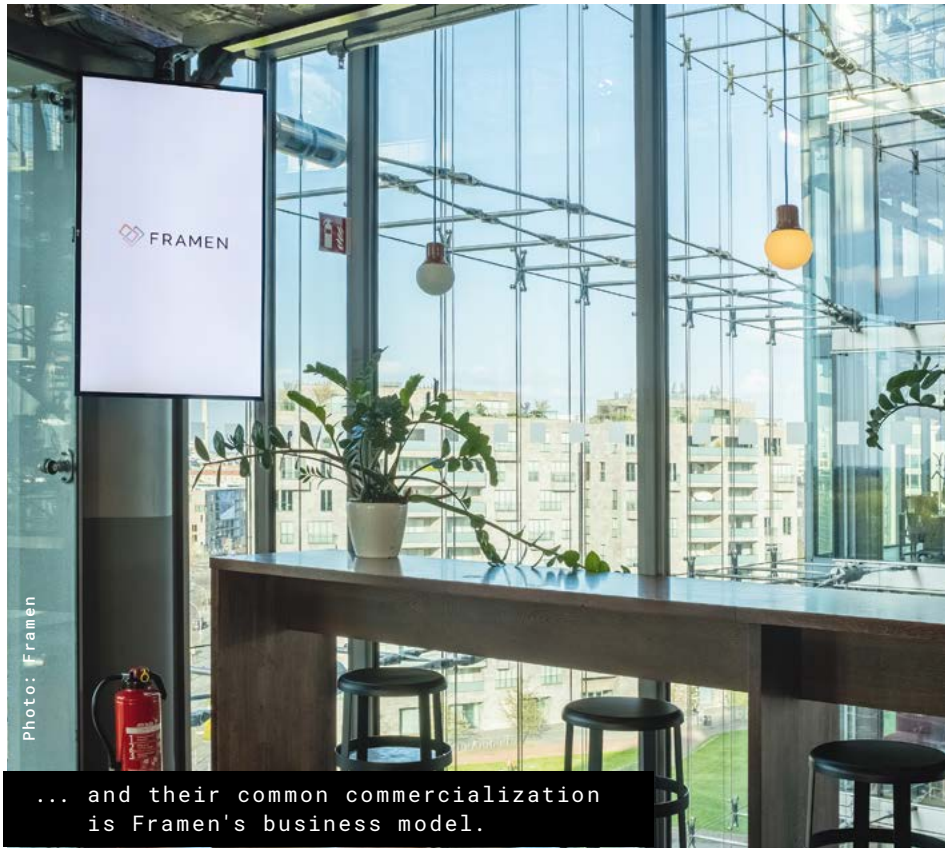
* Neo Advertising operates and offers 1000+ screens across Switzerland. The media owner won numerous tenders in 2020/21 which will become available soon

Austria

	MEDIA OWNER/ SALES	NUMBER OF PLACES	NUMBER OF SCREENS	TECHNOLOGY IN USE
Airport	Goldbach	8	148	LCD
Bahnhof	Goldbach	105	147	LCD
DooH Vienna outdoor	Gewista	64	64	LCD
DooH Vienna Transport	Gewista	7	400	LCD
DooH Austria	Gewista	75	75	LCD
Infoscreen Station	Infoscreen	48	48	Projection
Infoscreen Bus / Tram	Infoscreen	1340	1340	LCD

Note: All figures are based on reports from companies or on estimates by an advisory board
Source: invidis consulting GmbH, company informations, DMI

Individual longtail screens ...



... and their common commercialization is Framen's business model.

START-UPS

Time for Disruptors

The German Digital out of Home market has been disrupted not only by the pandemic with over-all bookings collapsing, but also by new market players beyond the DooH mainstream. Most notable two Berlin-based start-ups – Framen and Hygh – which disrupt the market with unconventional business concepts.

Towards the end of 2020, Framen made the headlines: Europe's largest publishing house Axel Springer acquired a majority stake in the DooH Sales Platform – less than two years after founding. The deal valued the start-up at more than 100m Euros.

Framen operates a combined content and DooH-advertising business model for screens in semi-public spaces. In contrast to typical DooH media owners, Framen does not invest into DooH screens or operates networks (asset light). Their platform services targets media owners and corporate clients to enable them to get better audience attention for digital screens. The founders phrase their vision "to be the internet of connected screens". The service targets the long tail of the market – millions of screens which are already installed in co-working spaces, hotel lobbies, gyms and other semi-outdoor locations. Historically owner of these screens struggled to monetize their digital signage assets due to low frequency, uninspired and outdated content, and missing scale to be relevant for DooH advertisers. Framen entered the market to connect these lonely screens by delivering high-quality and relevant content and to market the screens to A-Brands via its own programmatic platform.

Quality Content from Springer

The Springer deal catapulted Framen into the front row of media sales as they benefit from Springer's content and media sales units. CMO

Locations in small, but nice streets is one of the features of Hygh screens.

Photo: Hygh

and Founder Magdalena Pusch to invidis: "The [Axel Springer] Media Impact team is experienced and knows what works. At the same time, Axel Springer holds the DooH-Bundesliga rights until 2025 and one of the largest newsrooms with BILD and WELT. Framen delivers this high-quality content to the appropriate DooH-screens and increase audience attention. And thus, the DooH-ads are also gaining more attention." Framen follows the well-established business model of OoH market leaders by mixing quality content and advertisement for higher relevance and acceptance with frequent passers-by. "We offer additional experiences alongside advertising and thus turn displays into a point-of-experience." Framen connects 10.000 screens in Germany and started to expand across Europe.

As any relevant player in the DooH-business is Framen also investing heavily into its own programmatic platform and connections to DSP and Corporate platforms. Framen identified time-to-play-out as one of the weaknesses of many DooH booking processes. Historically Out of Home bookings required a long lead-time and relatively high minimum purchases.

The other 2020 disruptor in the German DooH market has been Hygh. Similar to Framen, Hygh also wants to enable advertisers to book and play-out their campaigns faster and more efficient as in the past. Hygh prides itself with a 5 minute book-to-playout process via its own programmatic/CMS platform. Hygh was founded by a team of young experienced blockchain experts who made a fortune with selling their first venture. For the new DooH-venture the team is also banking on blockchain technology. Investors can invest via equity tokens, an option mainly used by start-ups as an alternative to going public in order to finance the company.

Adapting Social Media

Hygh follows a more traditional DooH strategy by investing in their own screen networks and selling advertising. The company started in Berlin by deploying 500 high-brightness screens in shop windows and sidewalk glass cabinets. In 2021 Hygh started expanding to Cologne and Hamburg, which will be followed by a pan-European roll-out. While similar concepts of DooH in shop windows failed in the past ten years, Hygh seems to have found the right time, tools and offering. The majority of Hygh screens are inside shop windows of smaller stores off the main shopping streets. Emerging from the pandemic, consumers prefer smaller shopping areas over cramped downtown areas.

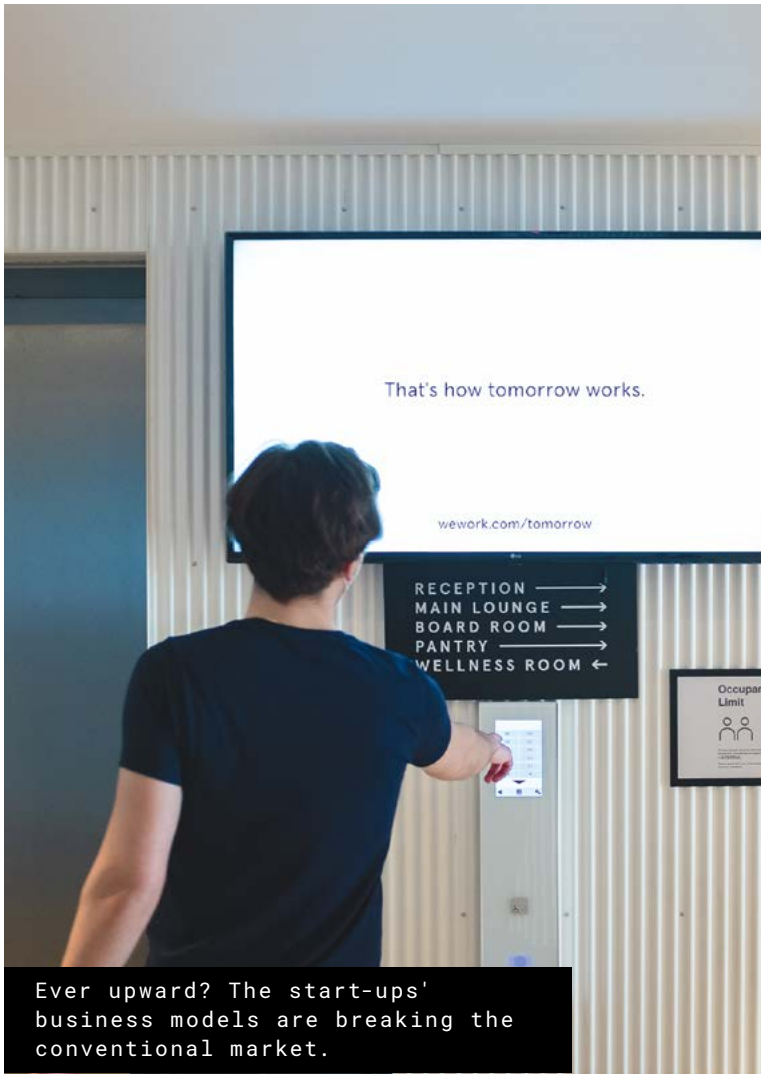
Not only A-Brands book Hygh screens, but also government institutions and Social Media oriented businesses and influencers. Hygh optimized the CMS for advertisers to easily integrate exis-

→

ting Instagram, Facebook, and other social media content. Especially small fashion boutiques, bars, restaurants and other SMBs don't have sufficient creatives available for stand-alone DooH campaigns. Reusing existing social media content saves costs and expedites play-out.

The Hygh business case is not limited to selling space on owned networks. Recently the team started to market also existing screens in supermarkets and other locations. It remains to be seen if the USP of Hygh's own screens and locations can be transferred to the more standard Ooh locations in grocery and other retail locations.

Many more DooH newcomers have entered the German market. Obviously, the pandemic has halted most the expansion plans. It remains to be seen who will survive the crisis and who will emerge stronger. Well financed, private equity backed ventures like UZE mobility (acquired Taxi-Ad in May 2021) will gain relevance, with more established DooH media owners willing to sell their business. The second half of 2021 will see much anticipated movements in the industry.



Ever upward? The start-ups' business models are breaking the conventional market.

Free ride? Hygh's blockchain technology offers investors new opportunities.

Photo: Framen

Spotlight: DigooH

The development of Cologne-based start-up DigooH shows how painstaking slow the build-up of DooH outside of city centers can be. After more than a year – admittedly in the midst of a pandemic – the team of 50 employees managed to get 16 DooH outdoor totems online. Each location requires tedious paperwork for approvals. And even after all has been approved, availability of construction teams for earthworks and of digital signage hardware – especially high-brightness screens – takes longer than ever anticipated. DigooH believes in the potential of DooH locations on private property in suburban areas, which are usually not covered by the large Out-of-home players. It remains to be seen how fast DigooH and other media owner start-ups – even many of them are well funded - will be able to ramp up growth.

Photo: Hygh

Spotlight: UZE Mobility

Another disruptor is Bremen-based UZE Mobility. The data-driven media owner started deploying screens on the back of delivery vans and trucks. UZE considers itself more an Ad Tech than a traditional DooH media owner. The vision revolves around location-based data-driven advertising, playing out relevant ads in context of location and time. In May 2021, UZE acquired the Hamburg-based Taxi-Ad business, complementing the van-based with taxi-roof based inventory. To reach critical mass, UZE also launched a booking platform integrating a wide range of German DooH inventory. UZE Mobility marketplace is supposed to enable SMB-clients to book DooH campaigns at a one-stop-solution, as conveniently as possible.

PROGRAMMATIC

Retail Media: Break-through at last?

The concept of instore DooH is as old as DooH itself, but the time was not right 10-15 years ago. But the pandemic has been a catalyzer for many trends, did it also bring the breakthrough for retail media? In addition, today's programmatic advertising is also offering many new opportunities for instore DooH at the point of sale.

DooH is returning to its roots. At least that could be the impression for industry observers around the sudden hype of retail media. More than 10 years ago – high-brightness LCDs were only available in homeopathic doses from digital signage manufacturers such as Screen NT and the finest LED pixel pitch was way above 10 millimeters – all hope rested on DooH business models of screens at the point of sale.

The US-based DooH media-owner PRN, today a Stratacache subsidiary, equipped thousands of Walmart stores with CRT TVs. Clunky TVs hanging in the aisles were the first commercial attempts of moving images aka instore-TV to the stores. The DooH business model at the PoS was born.

A few years later, two former investment bankers from the shores of Lake Geneva rolled up the DooH market. Industry pioneers Christian Vaglio-Giors and Alexandre de Senger set up Neo Advertising with the support of investors, based on a then largely unknown software, Broadsign. The Canadians were one of the first CMS providers to offer SaaS and meta tags instead of manual playlists.

Neo Advertising expanded very fast with global DooH-networks stretching from Europe to North America and Asia. The then still obscenely-expensive LCD screens were installed by the hundreds in supermarkets and shopping malls in countries like Germany, Canada or Indonesia. Driven by the conviction that instore advertising, directly at the point of decision, should provide the greatest influence on buying behaviour.

The DooH-concept in general did provide the impact it was designed for, but the market was not yet ready. The hardware was too expensive, the digital advertising market was still in its infancy and the out-of-home media-owner establishment did everything in their power to block access to media budgets for the DooH disruptors. As the first hardware generation reached its end of life, Neo Advertising and other early disruptors had not managed to establish a sufficient revenue stream. Except for Switzerland (now TX Media/ Goldbach), Germany (now Ströer) and Spain, Neo's DooH-businesses were either sold or closed.

Covid Boom for Supermarkets

Fast forward to 2020: in the midst of the pandemic, the world is in lockdown. City centers and train stations are virtually deserted, the out-of-home business model is experiencing one of its most difficult times. Only "essential stores", i.e. mainly supermarkets, are allowed to remain open and are therefore the only place with relevant footfall. Leading supermarket operators like Carrefour & Co. remembered their unique role at the intersection or decision point of consumer and brand. And even a year later, while the world is out of lockdown, supermarket operators remain sticking to the new strategy.

Footfall in supermarkets remained high even during lockdown – which has made them an attractive DooH market.

Retail media is not unique to stationary retail, eCommerce platforms – above all Amazon – have developed the retail media sector into a money printing machine in recent years. Amazon now generates a double-digit share of its turnover from the sale of advertising and top-listing on its online platform. It has been reported that Amazon will generate 26 billion US-Dollars in 2021 with retail media alone. Amazon's recipe of success: combing its eCommerce platforms with Google's search engine advertising business and retail trade marketing budgets and listing fees. Et voilà: retail media.

According to a recent BCG study, the global retail media market will soon reach the 100 billion USD mark – a high-margin business in contrast to the core retail business. But retail media in brick-and-mortar retail is extremely complex, especially in terms of data, technology and media knowledge. Retail has been shaped by merchants, not media experts. But Amazon's retail media success is also driving traditional retailers, first online and now increasingly in-store. Pioneering instore retail media are the usual suspects Walmart and Target in the US and Carrefour in Europe.

The timing seems just right: the growth curve of the online advertising market is flattening, especially since the use of cross-site tracking cookies is severely limited by Apple and EU privacy rules. The post-pandemic advertising market is also accelerating the break-up of existing silo structures: the decades-old system of healthy trade marketing budgets and listing fees that used to flow into newspaper ads, flyers and retailers' out-of-home campaigns, is in danger.

Retailers have the Data Advertisers are longing for

Then, of course, there are the megatrends of data and programmatic; they have completely changed the way campaigns are planned, played out and

Example of digital advertising in a Rewe supermarket.

tracked. Retailers have tons of data, and the DooH industry, analytics providers and many investors are betting on bringing data and DooH together. It is far from certain that screens in supermarkets, DIY stores and specialized retail will develop to the next big DooH business. But the trend seems to be the friend as there are many good reasons to expect a breakthrough. Investors and retailers are ready.

"The last mile is the one area that has yet to fully benefit from automated digital content delivery", Jan Reiners, account executive at DooH platform provider Broadsign, tells invidis. "Retailers typically have a wealth of data, and their use enables them to deliver contextual advertising. Retail media on DooH screens at the point of sale is an ideal platform for this." Programmatic would open doors to new buyers and budgets, beyond CPG.

Unlike the first DooH attempts by PRN and Neo Advertising more than a decade ago, retailers are now unlikely to outsource the media business to outsiders again. Supermarket chains such as Walmart or Carrefour want to control the new revenue stream. Broadsign was able to win some supermarket chains as new clients during the pandemic. Whether it is the collection and analysis of customer data in the store, the connection of customer loyalty programs, cross-media omnichannel campaigns or the mix of classic OoH and trade-marketing budgets: retailers will try to crack the market by themselves.

Support as a Partner

The media business, which is foreign to retailer, presents major challenges. Therefore retail and Dooh industry are debating for external media service providers to operate the in-store media retail area on behalf of the retailer. The installation, operation and maintenance of DooH networks is also not in the DNA of retailers. An untapped potential for both digital signage integrators and DooH media owners able to bank on economies of scale and experience.

Content management for inhouse campaigns, especially media asset management, also remains a challenge for retailers. But external service providers are offering product images, product descriptions et cetera – even if a product image and price alone are not sufficient at the PoS, as many studies of the past years have shown. In contrast to TV campaigns and DooH campaigns in the public spaces, PoS campaigns must show a product shot, price and ideally an animation of the product in use, preferably in direct proximity to the product placement. Campaigns for complementary products and services should also have a direct reference to the location or product for better advertising impact.

However, PoS networks require an online connection to the retailer's ERP for current prices and product availability. APIs to ERP-systems are complex and require continuous developments.

Retail analytics providers such as Switzerland-based Advertima also have high hopes for the breakthrough of retail media in grocery. Advertima's self-developed sensors and algorithms track and analyze customer behaviour directly in front of the screen and enable advertisers to further personalize the playout of retail media campaigns.

As ten years ago, today's market players do not lack technical solutions to optimize DooH at the PoS, but rather lack an understanding of retail business models and processes. Most challenging for retail media is retailers almost non-existent willingness to take risks in a very conservative industry. But eCommerce providers like Amazon and the disruptive forces of the pandemic could really bring the breakthrough of DooH/Instore Retail Media this time.

"Retailers usually have a lot of data at their disposal." – Jan Reiners from Broadsign.

City furniture with plants can be an important aspect for green cities.

Photo: invidis

SMART AND GREEN CITY

Enabled by DooH

Digitization, mobility, and the environment: street furniture from outdoor advertisers can help with the necessary transformation of cities.

Cities are facing the biggest challenges in decades: the pandemic has ruined many retailers in city centers, a large majority of office workers have not been back to the office for more than a year, leading to vacant cities while tax revenues declined. In addition, the emerging climate crisis requires investments in smart city and electric mobility infrastructure. Furthermore, citizens expect greener, more livable public spaces.

In Summer 2021 invidis surveyed leading cities in Germany to better understand what the interest and demand for smart and green cities is and how the pandemic has changed the outlook. The biggest challenges for Germany's cities in 2021 are declining tax revenues in the follow-up of the pandemic followed by handling new smart city requirements and how to revive vacant inner cities. Since the invention of street furniture, Out-of-Home is one of the established ways to finance projects in public spaces without tax money. We surveyed which green city and smart city services and infrastructure are most popular with governments across Germany.

Green City

We received the most obvious and least surprising results around cityscape and environmental topics. Top of mind with city administrations are green energy (PV), more greenery and improved outdoor air quality (outdoor air purifica-

tion systems). Ideally all new projects are built with sustainable materials. For Out-of-Home media owners aiming to win the hearts and minds of cities it boils down to more sustainable street furniture. 3D-printed street furniture could offer a sustainable approach with a smaller carbon footprint than steel and by using recycled material would support circular economy initiatives. Easier and much faster to implement are moss covered street furniture or small city meadows on the top of transit shelters. The climate crisis also requires the use of brighter colours. In a pilot project Sydney requires all roofs of houses as well as street furniture to be painted with bright paint to reduce heat formation in the city. Many green city initiatives have also been launched by the Out-of-home industry in Europe, but too often city officials are struggling to approve more radical ideas. While citizens and politics are requesting greener cities, administrations are reluctant in enabling new ideas, often hiding behind building code requirements.

Smart City

Smart City requirements can be subdivided into four main categories: communication, mobility, safety and services. Cities strive to offer better, fully digital and barrier-free services to their citizens. Citizen Apps enabling a frictionless communication are high on the agenda offering real-time services like damage reports of broken public infrastructure. More bike lanes, mobility hubs and better solutions to manage park search traffic. Heading safety are emergency call touchpoints, digital public screens to communicate in case of emergencies as well as physical safety with vehicle barriers. Improving mobile coverage (small cells), turning streets into smart spaces with smart poles and improving outdoor air quality are the main topics driving smart city services.

For Out-of-Home media owners the goal needs to turn static street furniture into smart city platforms. A transit shelter can house small cell broadcast equipment for better mobile reception, moss and air filters improve the air quality in the immediate surrounding and DooH screens double down as public emergency communication tools.

To our surprise sensors and public data collection is less popular with city officials. We believe privacy issues are still widely limiting the scope of action for public services as well as the fear of how to get actionable insights. Turning data into decisions remains one of the key challenges for most governments.

Smart City and Green City issues are top of mind with cities across Germany and Europe. Due to limited budgets, the private industry plays a pivotal role as an enabler. Digital Out-of-Home as well as OoH-financed street furniture can offer the fastest and most efficient road to reach the ambitious goals.

The Velohub is a reaction to new urban needs.

Photo: designit

Mobility Hubs

In a future with fewer and fewer cars in our cities, mobility hubs can transform the public spaces formerly occupied by personal vehicles. VeloHub – developed by global design agency designit – is one of many concepts to help people reclaim cities congested by cars. The average size of a parking space in Europe – 2.5m x 5m – perfectly fits a modular VeloHUB system. These customizable systems feature safe, protected bike or scooter parking, while also offering seating and shelter for pedestrians to relax and mingle.

GREEN CITY

Street Furniture as green Eye-catchers

Whether as a home for insects or to set an example for sustainability: Inner cities need more green spaces. The trend: planted infrastructure. Here, technology gets added value through nature – or the other way around.

The city of Bonn and Ströer implemented this green bus stop shelter.

Photo: Stadtwerke Bonn/Martin Magunia

They promote biodiversity, protect insects, filter CO_2 and particulate matter, retain rainwater and cool the city on hot days: green spaces improve the quality of life for people and animals. In inner cities in particular, however, it is difficult for urban planners to keep space free for nature. The trend is therefore to retrofit concrete buildings from above – with green roof surfaces. Advertising pillars and public transport bus shelters are particularly suitable for this purpose because they are located at the edge of the road, where particulate matter is generated by traffic. Last year, numerous cities and out-of-home providers joined forces to transform bus shelters into small city oases.

But the concepts for sustainable street furniture don't end with the garden on the roof. The Filtreo bus shelters developed by outdoor advertiser JC-Decaux, for example, also have a ventilation system. The developers were inspired by a natural process: evaporative cooling. Warm air entering the bus shelter flows through a wet, honeycomb plate and cools down. Water for the cooling concept comes from a tank in the back wall of the waiting hall, which collects rainwater captured by the green roof. On windless days, small fans support the system. They blow the cooled air in the direction of the people waiting near the street furniture. In summary, these bus shelters not only bring nature to the city, but actively cool people. Those waiting for the bus on hot days should be happy about this concept.

With green street furniture, cities can not only improve their image and protect the climate. Advertisers also benefit. Especially when they themselves promote the topic of sustainability at the green bus shelters. From sports shoes made of recycled material to a call to use fewer plastic bags: Green motifs are more credible to the public on an advertising space that is close to nature.

This is also confirmed by corresponding pilot projects, for example in the French city of Lille, the Belgian city of Ghent, the Dutch city of Utrecht, or in Duisburg and Berlin. But the pioneers on the outdoor advertiser side are not just the big providers such as Ströer, Clear Channel and JCDecaux. Small regional companies are also flying the green flag and diligently installing

Sustainability at Ströer

Anyone looking for something on sustainability and outdoor advertisers comes directly to Ströer via a search query on Google. The PDF “Sustainability Strategy 2030” of the Cologne-based company – published in 2020 – appears promptly. The cover comes in a warm green to match the motto.

Already in the editorial, founder and Co-CEO Udo Müller, Co-CEO Christian Schmalzl and CFO Christian Baier promise a lot: “In the future, we want to align our company even more strongly with the criteria of sustainability and corporate as well as social responsibility.” All just marketing? Certainly, the 34-page brochure is a good marketing tool. But it doesn't just contain general information about the company's goals and responsibilities. There is also concrete information. For example, in the chapter “Environment and Climate Protection” on page 12: “Ströer achieves a reduction in electricity consumption of up to 90 percent for its digital advertising media with a switch 'black font on a white background' to 'white font on a black background.”

Furthermore, the company describes that cleaning street furniture now depends on how dirty they are. “This has cut in half the amount of water used and the number of trips the cleaners make to the furniture.” Previously, cleaning was done at fixed time intervals.

Greening street furniture is also a topic for Ströer, because plants look good and are said to improve the air – although “the effect cannot be quantified exactly”. The challenge is, among other things, to use the right plants because they can be exposed to both strong sunlight and longer dry periods. That's why the company is testing the thick-leaf plant Sedum in addition to the drought-sensitive moss.

There is no question that Ströer cannot be held responsible for its future actions on the basis of this brochure; this is also pointed out in a disclaimer at the very end. Nonetheless, the company is creating a basis for discussing the issue of sustainability and is exposing itself to the scrutiny of market participants. This is also a step in the right direction.

Photo: invidis

Air purification included: This Ströer video pedestal is equipped with a filter system.

sustainable street furniture. For example, Ruhfus Außenwerbung equipped the city of Hamm with a green bus shelter. But only after its predecessor was destroyed in a truck accident.

This reveals a problem that also explains why the large rollouts of green street furniture are not yet to be seen: the complicated implementation and high costs. Existing bus shelters cannot simply be converted. The statics won't allow it. Since the green spaces collect rainwater as part of their concept, the weight on the roof is significantly higher than under a normal snow load, for example. The scaffolding must therefore first be reinforced or the bus shelter rebuilt, as in Hamm. This is another reason why the green turnaround in city centers is proceeding slowly.

Nevertheless, the interest of the cities seems to be quite high. Perhaps also because of the increasing pressure from the public for more sustainability. Ströer and JCDecaux, for example, have received numerous requests for advice on their green street furniture and are planning many more small pilot projects. So while not every roof is going to be green right away, we should at least soon see a few of the stops for people and nature in many different cities.

Advantages of Greenery in Cities

- Heat reduction
- Fine dust filter
- Diminishment of background noise (due to the substrate on which the greenery is planted)
- Green roofs store water during heavy rains and release it more slowly into the sewer system, reducing the risk of flooding

Photo: unsplash / Robert Bye

invidisXworld 1 & 3

Berlin

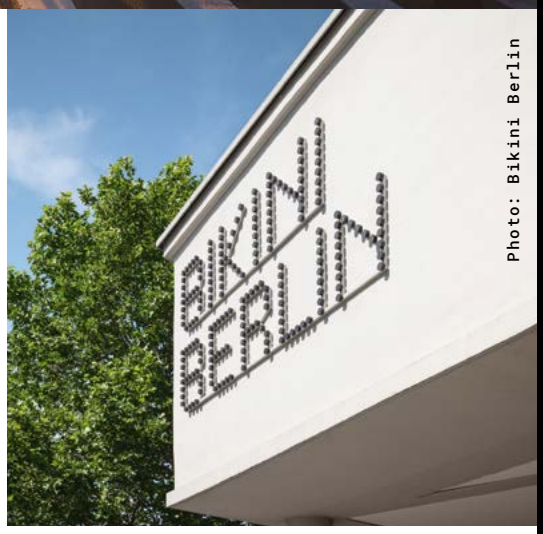


Photo: Bikini Berlin

INVIDISXWORLD

Berlin

In our first big invidisXworld show, we explored the digital signage world of the German capital. We visited the Bikini Berlin, the Globetrotter flagship store and the KaDeWe department store, among others, and saw impressive immersive installations live.

In addition to taking a look at numerous digital signage and digital retail projects, we talked to the world's leading creative agencies both in front of and behind the camera: we were pleased to welcome Tamschick Media + Space, Fauna & Floravision and Art+Com as guests at invidisXworld. Deep insights and outlooks are also offered by the fireside chats with retail star architect Nicole Srock.Stanley (Dan Pearlman), customer experience consultant and CX designer Jens Fauth (Experience One), FAW managing director Kai Thäsler and top manager, investor and advisory board member Heinrich Arnold.

The latest shows always on invidis.de and for subscribers to the invidisXworld Youtube channel.

HERE YOU CAN WATCH THE VIDEOS:

invidisXworld #1
Berlin – Youtube

invidisXworld #3
Berlin – Youtube

Photo: Hygh

On the future of Smart City and DooH, we met Green City Solution founder Peter Sänger and DooH disruptors Fritz Frey and Antonius Link from Hygh. Also joining us are Guido Matzer from digital signage provider Sedna and the touch experts from Interactive Scape.

GREEN CITY

Green meets Screen

The City Breeze from Green City Solutions combines DooH and a moss wall – the company already used this with the City Tree.

City Breeze is the second out-of-home product from Green City Solutions: Last year, the company launched the City Tree, which also uses air-purifying moss. The City Breeze now combines greenery and digital signage.

On one side of the City Breeze is a moss wall and on the other is a 75-inch LCD screen. Also integrated is a high-brightness backlight to make the LCD display easily visible even in direct sunlight. The slim design should ensure flexible installation even in tight urban spaces.

Digital advertising in front, moss surface in the back: the City Breeze.

Photo: Green City Solutions

Also built in are sensor and wireless technologies that allow the integration of smart city applications. An air quality sensor, for example, measures filter performance as well as environmental data, which are shwon in the display in real time.

The moss area is cultivated by Green City Solutions in its own moss farm near Berlin. According to the company, the mosses bind pollutants from the air, which are then metabolized, biodegraded or stored in the moss sediment. Thanks to its many small leaves, the moss wall used in City Breeze has an effective area of 20 square meters that can absorb pollutants. According to Green City Solutions' calculation, the moss can filter the breathing volume of up to 2,000 people per hour.

Smart irrigation and ventilation functions are installed to maintain the moss. Once it has lost its purifying properties, it can be revitalized in the moss farm.

The first pilot installations of the new product have already taken place: In the summer of 2021, the City Breeze stood in the entrance area of the Schönhauser Allee Arcaden in Berlin for two weeks as part of a roadshow. It was integrated into the network of Goldbach Germany's Mall Channel, including 80 malls. Ritter Sport advertised on them with a six-second spot for the new "Ritter Sport Mini Bunte Tüte", packaged in FSC-certified paper bags. And in September of this year, the Impact Festival, an event for sustainable technologies in Offenbach, used a City Breeze as a communication tool.

OUT OF HOME

Clean Print

It's not just DooH that is looking at more environmentally friendly product alternatives – this issue is also becoming increasingly important in analog outdoor advertising.

The printing industry as a whole has always had to contend with the image of a not-so-clean industry. But in large-format printing in particular, a lot of thought has recently been given to greener alternatives – partly because advertising customers are demanding sustainable products. This is especially true for the printing materials and consumables.

Companies like blowup media have been taking this trend into account for some time and are constantly taking steps towards sustainability. Thus, the Ströer subsidiary, which specializes in giant posters for outdoor advertising, has been offering its customers the option of booking posters made of PVC-free materials since June 2021. Depending on the product type, the substrate can also be made from recycled materials. PVC is, if at all, difficult to recycle and is considered harmful to the environment in part because of the plasticizers used.

Since the beginning of the year, blowup media's giant posters are already carbon neutral. In cooperation with his print service provider and the climate protection agency natureoffice, it analyzed the emissions for the poster material and compensates them with certificates from the climate protection project "Burn Stoves" in Kenya. In order to also contribute locally, blowup media supports the initiative "Green City e. V." in Munich with an additional 5 euros per ton of CO_2.

Giant posters from blowup media are from now on printed on PVC-free material.

As proof, customers receive a certificate for each booking showing the emission compensation of the poster production. Customers can offset these CO_2 savings as part of their own sustainability projects. In addition, a "climate-neutral printed" -logo with a customer-specific ID can be printed on the giant posters on request.

What is possible for street furniture with planted roofs and for screens with moss backings, blowup media implements for its print media with "The Pure": Customers can optionally choose this coating, which is already in use at blowup in the UK: a thin transparent layer of active titanium dioxide, which is said to decompose pollutants such as exhaust nitrogen oxides and clean the air through photocatalytic properties. According to blowup, a poster with an area of 500 square meters is said to have the air-purifying effect of 35 large deciduous trees.

Warning test on a display from Wall in Dortmund, connected to the Mowas system.

EMERGENCY MANAGEMENT

DooH Screens as Livesavers

Since the great flood in Germany, there has been an intense debate: How effective is the country's infrastructure for disaster warnings? Potential could still lie in increased cooperation between DooH outdoor advertisers and the government.

After the devastating flood disaster in the west of Germany, a discussion has flared up about how and whether the population could have been warned of the flood in good time. In this context, Armin Schuster, President of the Federal Office of Civil Protection and Disaster Assistance (BBK), pointed out on Deutschlandfunk that in the future, there would have to be an effective "warning mix" of different methods. He said that the reporting chain and the warning infrastructure had worked, it was just that the warnings had not got through well enough to the population and the authorities. Therefore, the BBK president called for comprehensive measures – including the use of loudspeaker trucks and the reintroduction of sirens, which were largely dismantled after the Cold War.

It's a discussion that also concerns the Digital-out-of-home industry. DooH screens in public spaces, with their ability to inform ad hoc and locally, count as official warning multipliers since 2018, alongside TV, radio and mobile apps. This was regulated in a nationwide multiplier agreement of the BBK, which since then can be used by every city and state with only a few modifications.

DooH is included

Thus, public screens in urban regions are also part of the warning media mix that can be used to provide information in disaster situations via "Mowas". Mowas stands for "modular warning system". It is a satellite-based warning system that sends warning messages to a number of multipliers. The apps Nina and Katwarn also receive their warnings via the system. In addition, the message goes to radio and television stations, to the warnung.bund website – and to DooH networks. Screens from Ströer, for example, have been integrated since 2018. Wall Decaux's screens are also connected to the system – for example, the outdoor advertiser has been working with the city of Dortmund since spring 2021; the digital city information systems are now directly connected to the Mowas.

Strengthening Public Communication

Ströer sees great potential, in association with cities and municipalities, to use DooH networks even more as a communication platform in public spaces. "As a long-standing partner of cities, we are contributing to a smart, municipal communication infrastructure with our digital city information systems", Alexander Stotz, CEO of Ströer Media Deutschland, tells invidis. "We see considerable potential in integrating digital data and services into a city's infrastructure to provide municipalities with tools that simplify smart city management and that help find solutions for administration and public safety."

Using a new, very easy-to-use CMS access and enhanced features, city and municipal partners can better leverage digital infrastructure for their communications. In addition, it is also increasingly possible for the police or crisis teams to access Ströer's digital network for information of the population. An initial project, for example, was the search for missing children by the initiative "Vermisste Kinder e. V". In this way, they could be searched specifically in the vicinity of their suspected whereabouts. Another example is the use of information systems by the city of Hamburg. Furthermore, the DooH manhunt for Wirecard board member Jan Marsalek grabbed international attention – photos on DooH advertising media with the fugitive manager's portrait were distributed worldwide.

invidis opinion: Dialog at Eye Level

The relationship between cities and municipalities and street furniture providers is ambivalent: Digital out-of-home advertising pillars in particular are still too often regarded as a "necessary evil" that has to be accepted in order to get shelters at bus and streetcar stops, public toilets or bicycle rental systems free of tax money. The potential of displays as citizen communication platforms in public spaces is largely underestimated.

The recent discussion about the warning infrastructure should make everyone sit up and take notice. Because it is clear that every opportunity to expand the warning media mix must now be seized.

To some extent, the infrastructures are already there, they just need to be used better. Loudspeaker announcements and public screens are effective? Why not make more intensive use of the DooH screens from Ströer, Wall & Co., which are already clearly visible in public spaces by the thousands?

This means for DooH providers: Outdoor advertisers must provide easy-to-use access to their systems for public administration, ideally take over editorial production on behalf of cities and municipalities, and enable even more automated messages. The technology is there, what is missing so far is the knowledge and the will of the municipal partners to make more out of DooH infrastructure in public spaces,

Authorities need to recognize the potential that lies in working with DooH service providers. The offers and solutions of the OoH providers are often on the table – they must now be actively accepted and used for joint projects so that an expansion of public communication can take place quickly and easily.

BROADSIGN

From CMS to system-relevant Market Leader

Although Broadsign has grown to a full-blown DooH platform provider, the CMS still plays a central role. Broadsign's Maarten Dollevoet explains the role of CMS and how programmatic plays changes the rules of the DooH industry.

There is no getting around Broadsign in the DooH business. The CMS company, headquartered in Canada, develops and distributes one of the most widely used CMS software solutions for numerous clients, including many of the world's largest DooH media owners. But it has not stopped there: Broadsign has evolved into a full DooH-platform soltuion provider. "Digital signage has never been static for us", says Maarten Dollevoet, Chief Revenue Officer at Broadsign, commenting the development.

"The player is intelligent, and the cloud is intelligent as well": Maarten Dollevoet, CRO of Broadsign.

Photo: Broadsign

In addition to CMS Broadsign Direct, the portfolio now also includes many programmatic solutons: The SSP Broadsign Reach is linked to 39 DSPs. Campsite is Broadsign's own DSP solution which is currently only available in Australia, the USA and Canada. "In Europe, we have many national, well established DSP-players", explains Maarten Dollevoet. "This allows us to focus more on our SSP solution in Europe." Europe is a key market for Broadsign and similar to many other regions the Montreal-based DooH experts is considered one of the market leaders. 90 to 95 per cent of its customers are DooH media owners.

But the pandemic opened up many new opportunities. Surprisingly, supermarket chains such as Carrefour, Ahold and Albert Heijn have also started deploying Broadsign's DooH platform across instore networks. During the lockdown railway stations and shopping streets were empty, footfall remained high in supermarkets and advertisers started exploring retail media networks.

Photo: Broadsign

Europe is a key market for Broadsign: DooH in front of the Moco Museum Amsterdam.

Partner, not just a Supplier

For Maarten Dollevoet, working with clients and responding to their needs is one of Broadsign's strengths:. "Even in difficult times, we take a long-term perspective and commit to the industry." This has also allowed the company to grow beyond the CMS business. Customers consider Broadsign not as a supplier but as a partner: Broadsign is recognized as the safe option – also because many have built their business on the Broadsign platform. "For many customers, we are systemically relevant in terms of their business model," affirms Maarten Dollevoet.

These business models are constantly influenced by new developments: the increasingly programmatic-oriented DooH market, sensors, IoT as well as mobile data play an important role. "As far as the technology is concerned, we take an agnostic viewpoint", says Maarten Dollevoet. "The openness of our system has always been important to us." The approach, he says, is "API first". This means that the customer can choose 3rd party solutions and hardware that seem most suitable to them. Often, they continuously develop new features based on Broadsign's open API platform.

Despite DSPs and SSPs: CMS remains the central solution in Broadsign's strategy. And although all eyes are currently on programmatic, the CMS will remain core as Broadsign continuously develops new features. Broadsign considers the CMS as far more than just a media player. "The player is intelligent, and the cloud is also intelligent. If you pull the plug on the media player, you still have intelligence in the system", summarizes the CRO. While programmatic continues to drive the DooH-market, the CMS-core highly benefits from the increasing interest and demand.

From Bavaria to Europe

Maarten Dollevoet is not only CRO of Broadsign, but also heads the European business. Broadsign's German branch office in Berlin is home to 20 employees. While developers prefer the German capital, Maarten Dollevoet prefers working and living from a small rural city an hour west of Munich.

E-MOBILITY

Mobile fast charging Station meets DooH

Munich-based start-up Jolt Energy developed mobile battery-powered EV fast-charging stations. The transportable containers do not only offer an easily accessible charging infrastructure for electric vehicles, but also integrate a DooH-platform. Only media-sales becomes a challenge.

Whether in the supermarket car park, in front of the restaurant, at the office or at the concert hall – in order for the much touted big turnaround of electromobility to work in our cities, ten-thousands of charging points are needed, preferably at every corner. Unfortunately setting up new

The truck for positioning the charging units has also been developed by Jolt Energy.

Photo: Jolt Energy

Jolt combines charging station and digital outdoor advertising.

charging points includes extensive and very costly earthworks to connect the charging points to the power grid. Not only impractical, but also cost-intensive.

Jolt Energy developed an elegant solution to this problem. The start-up was founded in 2017 by a team of former managers from the automotive and energy technology sectors and develops mobile high-performance chargers with an integrated battery – essentially large power banks for electric vehicles. The first generation has been available since October 2020 and goes by the name “Merlin One”. However, the charging station can not only supply electric vehicles with power, but they also feature a 65” high-brightness DooH screen.

The charging technology, which is naturally core of the offering, is quickly explained. There are three variants for power supply via Merlin. The first is flexible stand-alone operation, in which an internal 200 kWh battery operates as a stand-alone charging station supplying additional 200km range for around ten EVs within 10 to 15 minutes. The Merlin containers can be positioned independently of grid access, at locations with high demand for example, at shopping centres, petrol stations, taxi ranks, rental car operators or at car dealerships and schools. When the storage unit is 80 percent empty, the entire charging station is exchanged with a fully charged container. Replacing the unit takes only 5 minutes and the process is fully automated. Jolt devel-

Think Big

In addition to the Merlin One charging units, which are the size of a vending machine, Jolt Energy is also planning to offer an entire "power trailer" in the future, a truck with a mega-battery on board. This is intended to charge up to ten electric vehicles simultaneously at major events such as racing events, trade fairs or R&D facilities. Independent of the grid, usable worldwide and scalable as needed. There should also be sufficient space for a digital signage display or two.

oped in cooperation with automotive technology provider HIAB a special truck. The "Merlin Truck" is equipped with automated crane operation for a safe transport and exchange.

Additional operating modes of the Merlin series have been developed to enable charging at locations that do not offer sufficient power access. The charging units are connected to the low voltage grid and electricity is stored in the internal battery pack. By storing sufficient energy and releasing the energy at once, EV fast-charging can be offered at any location. This not only enables high-performance charging at low voltage locations, but also avoids costly grid expansion, for example at petrol stations. On sites with medium voltage, the Jolt stations can be used directly as DC chargers as a third option.

The advantages of mobile charging units to be able to provide EV fast charging anywhere is also interesting for the second important component of Merlin products, the display. Whether DooH advertising, public announcements or cultural content – anyone who charges or parks near one of the units comes into contact with the content. At least in theory, because Jolt has yet to prove whether the displays really attract the desired attention. Media sales of the DooH touchpoints also raises questions in practice that still need to be clarified. Jolt plans to use roadside locations in public spaces. DooH media sales would conflict with existing street furniture and city advertising agreements of Out of Home media owners like Ströer, Wall Decaux & Co. On private sites, however, there are no conflicts with existing marketing contracts. And it is precisely here that Jolt

Can the charging units support the shift to EV?

Photo: Jolt Energy

initially sees the highest potential for its charging units. For example, on company campuses, private car parks or also at trade fairs, racing events or other major events.

The first roll-out of Merlin One is currently underway with the EG Group's Esso filling stations. Around 40 of the battery-powered high-performance charging stations are to be placed at gas stations in Munich, Nuremberg, Stuttgart, Augsburg and Frankfurt am Main in 2021 — also avoiding potential conflicts with existing out-of-home contracts. In addition Jolt also plans to start pilot projects in the US. By 2025, Jolt wants to operate a fleet of 15,000 charging units across 250 urban centers in Europe and North America. Jolt will set up the chargers in coordination with the location partner and take over operations including maintenance and support of the DooH screens. Open DooH-topics to be solved are local regulations regarding moving images and traffic safety in public spaces as well as the visibility of the screens during the charging process.

Filling Station Digital Signage: A Service offering with post-Pandemic Potential?

For a long time, the business case for DooH outdoor screens at filling stations seemed questionable due to a lack of customer frequency. Digital signage was mostly limited to the forecourt/shop area: whether at the cash register (paytray), behind the cash register (tobacco) or next to it (menu board, car wash) as well as on the shelves (ESL, gondolas). But many media owners are increasingly positioning screens outside the shop.

Tank & Rast was one of the first operators to equip the outdoor areas of its filling stations with high-brightness LCDs and LEDs on a large scale from 2017. This required quite large-format digital touchpoints for campaigns to be seen from the fuel pumps 10 to 20 meters away. German network operator ISM is currently rolling out Samsung large-format 75"/85" screens on concrete pedestals at Shell petrol stations nationwide. Complementing the outdoor screens are additional double-sided displays in shop windows. French filling station operator Total is also busy installing screens in the Benelux with partner ZetaDisplay and in the process of rolling out DooH also in Germany. EG/Esso is teaming up with Jolt Energy as BP/Aral is building dooh networks on its own.

How sustainable the DooH business model at filling stations develops, remains to be seen. Sure, e-mobility is developing fast – and it has the potential to change the dwell time and nature of the stay at filling stations due the much longer charging times. But it is not a foregone conclusion that filling stations remain the fill-up location for EV-owners. Jolt is challenging the role of filling stations with roadside units on one hand, while cooperating with Esso on the other. If filling stations want to play a role in the mobility of the future, they will have to reinvent themselves. Digital signage can be an enabler.

Photo: Jamshed Ahmad von Pexels

ABOUT US

INVIDIS CONSULTING

Adding Value for Readers and Advertisers

Both the editorial offering and the consulting services provided by invidis are highly regarded in the industry. We make sure that this continues to be the case.

Since its foundation 15 years ago, invidis has developed into the leading industry portal in Europe. The evaluations for the year 2020 are also impressive: More than 440,000 unique visits and almost 700,000 unique page impressions demonstrate the central role invidis plays as a trade medium for the digital signage and DooH industry, including Smart City. Our newsletter informs the industry about current events from Monday to Friday. With more than 2,000 subscribers and

The information offered by invidis is rich.

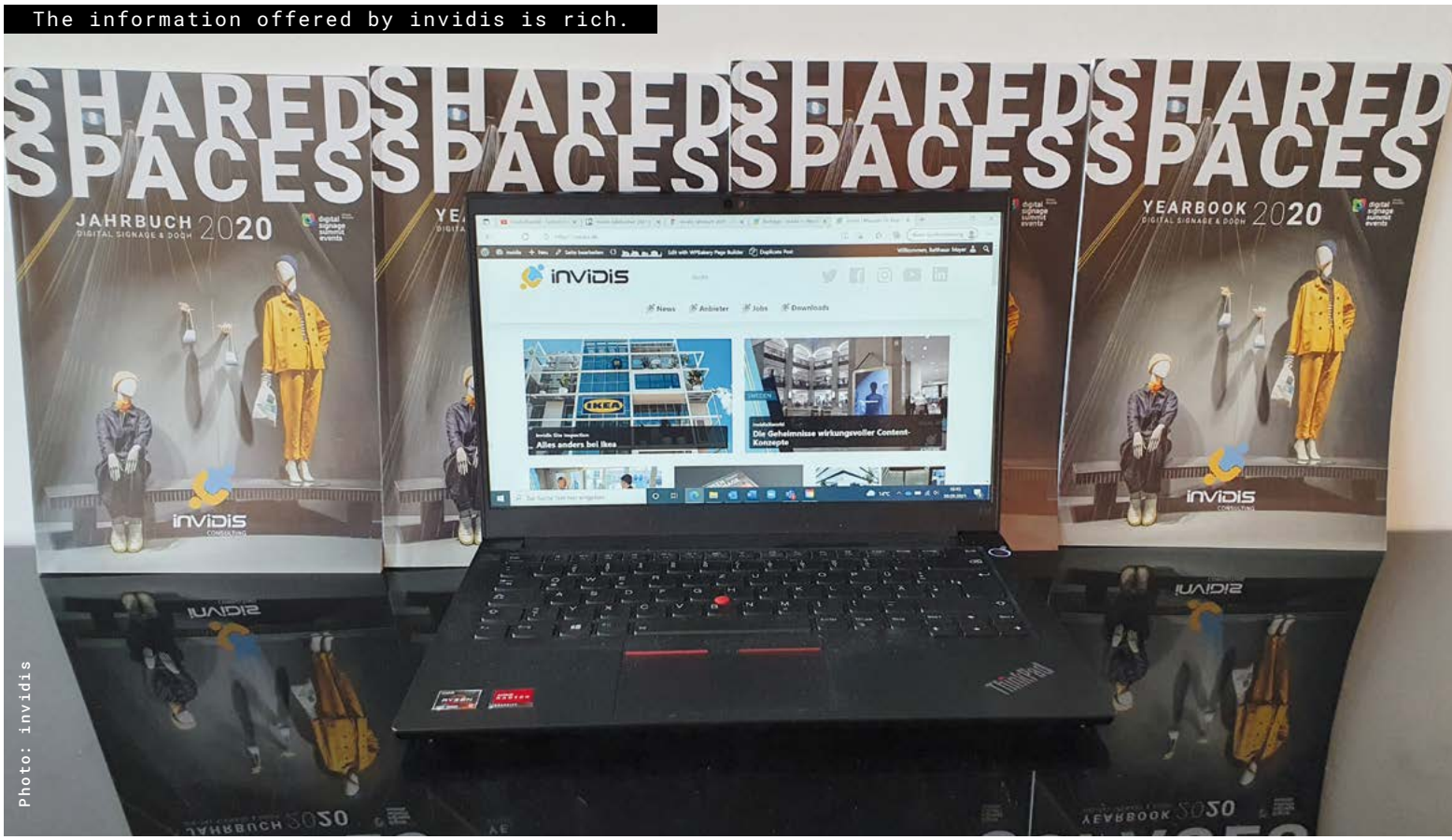


Photo: invidis

above-average open and click rates of 26 respectively 25 percent, it is one of the most important sources of information when it comes to digital signage and digital-out-of-home.

What is very important to us: In addition to user stories, product and HR news, you will find a lot of exclusive material on invidis.de: interviews, background analyses and on-site reports from our experts. In this way, we create real added value for our readers.

A good example of this was the acquisition of Heineking Media by Premium Equity Partners. Alongside the news itself, we published an analysis in which Florian Rotberg described the background and effects of the transaction; this was also followed by an exclusive interview with the brains behind the deal. We thus shed light on the takeover, which is highly interesting for the market, from various perspectives.

Another sign of the quality of our articles is their long half-life. Many of the more than 18,000 articles and almost 40,000 photos will be found and clicked on by search engines for years.

We also use the website to distribute the content of invidisXworld, our new video format that ideally complements our reporting. Of course, we are also present on social media to distribute our content on as many channels as possible.

In order to optimally cover the various channels, invidis has brought reinforcements on board: Balthasar Mayer is the new Editor-in-Chief since July 1, 2021. He will be responsible for the coverage on invidis.de, the invidis yearbooks and the invidis video production.

The 40-year-old comes from WNP Verlag, where he was editor-in-chief of the print magazine SIP and its online presence for the past seven years. Before that, he gained experience as an editor at WNP Verlag, among other things in the illuminated advertising and digital signage industry.

As an experienced B2B journalist and content manager, he will orchestrate content for the various channels — portal, social media, print, moving image and events.

"We are pleased to have Balthasar, an experienced B2B journalist and content manager, as our editor-in-chief. The content orchestration of the different channels – portal, social media, print, moving image and events — requires a specialist", comments invidis founder Florian Rotberg.

Thus, invidis is starting the next yearbook cycle full of drive. In addition to a stronger integration of invidisXworld, a quantitative and qualitative expansion of the social media presence is planned. And, of course, we are striving for continuous improvement in our daily reporting.

invidis consulting

In addition to publishing, invidis consulting has established itself as a consulting firm specializing in digital signage. invidis founder Florian Rotberg as well as Stefan Schieker, founder of Result MC Management Consultant and the joint team of experts are active worldwide in consulting at locations in Munich and Dubai. The focus is on scalable, sustainable digital concepts and strategies. Our services are diverse, as the following examples show:

- We evaluate and develop business models and strategies for investors and M&A departments. In addition, we offer strategic due diligences on the buy- and sell-side.
- We conduct market and competition analyses for digital signage integrators and support them in M&A activities.
- We develop strategies for marketing managers regarding cross-platform experiences and content.
- We provide retail architects and store planners with customer journey and mindset analyses as well as digital touchpoint concepts.
- We provide CFOs and analysts with recommendations for action, based on retail analytics.
- We support CTOs with tenders; in addition, we evaluate providers and help with the connection of front-end and back-end solutions.

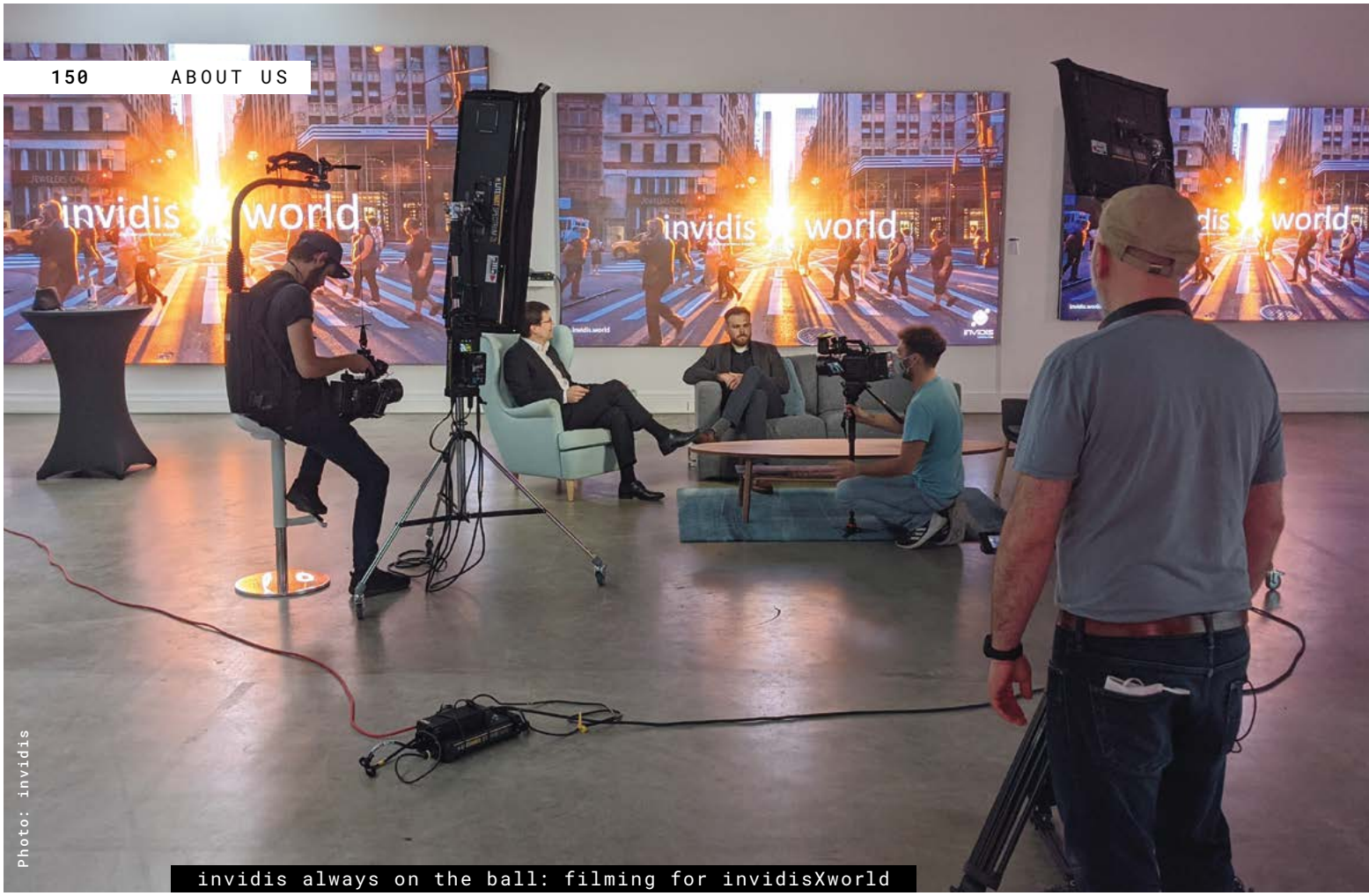


Photo: invidis

invidis always on the ball: filming for invidisXworld

BACKGROUND

Behind the Scenes of invidis

From consulting over publishing to conferences: We take an exclusive look on the work of invidis – and share some fun facts with you.

You are just reading through one of the most visible parts of what we do at invidis – our Yearbook. But there is so much more that we do, and we often get surprised reactions when people learn about the breadth of services we are offering. Therefore, we decided to share some insights into what we do in Consulting, Publishing, and Conferences, and to give you an exclusive look behind the scenes of invidis – and also some fun facts.

The most important part of our business is Management Consulting. That is where Florian and Stefan, invidis' Senior Partners, spend most of their time. In the past year, M&A was a major aspect of our work. We acted as lead advisors for the sale of an integrator and performed several commercial and market due diligences, helping investors to understand the European DS market, and to identify and to analyze target companies.

Actively driving the consolidation of the industry is something we enjoy a lot, but in addition to that we also help companies to adjust their strategies to this changing environment. Senior management workshops or longer-term projects to review or to implement strategies are the typical forms of engagement in this area of our work.

On top of the work that we do within the Digital Signage industry, we also develop concepts for end customers like (retail) brands or corporates. In this context, our role is typically being the "Digital Architects", i.e. the linking pin between architects and designers, the business, and digital signage integrators. Brands do like us in this role because we are technology- and vendor-agnostic, and we can be very honest about what works and what doesn't. In addition, we have a deep-rooted understanding of both business and processes, as well as technology.

And sometimes, we get special engagements that are so confidential that we cannot even write about them here.

A relatively new discipline in our consulting work is Analytics. Here it is all about creating actionable insights. Technology scouting and testing is equally important as building partnerships with AI and data analytics specialists. Unfortunately, there are still many unfulfilled promises on tech reliability in this yet very young field and a steep learning curve ahead. The happier we are that we have a patient lead client in travel retail for these solutions.

The situation during the pandemic was new to all of us. Therefore, we established a new discussion forum with industry leaders – the invidis Happy Hours. Even though it was pro-bono work, it helped us to exchange views with key players during these very special times.

The second pillar of our work is Publishing. This is the editorial work done by a small team within invidis that brings the daily market news to you on invidis.de and also compiles the Yearbook. Under Florian's direction, press releases and background information are collected and reviewed daily for latest industry developments, product news, personnel updates, and the latest Digital Signage installations. In addition, the team does 100 to 150 interviews per year to get first-hand insights from key people in the industry.

invidisXworld is our new video magazine format. A year-long trip around the world to discover the best of Digital Signage and to talk to innovators and market makers across different continents. The idea was born in pre-pandemic times. As so many people told us how hard it was for them that they could not travel to meet people or to experience installations or solutions live, we decided to realize it now. We started in our home market Germany, visited Sweden/the Nordics and Switzerland. Next on the list are UK, Dubai and

Fun Facts

- Over the past 12 months we spent about 1 ½ months in quarantine after returning from business trips.
- We tested about 100 times to be able to enter shops or buildings, to meet people, or to board a plane – and all tests were negative!
- Strangest test locations: small company bathrooms; favorite test location: local test station next to our office
- Biggest let down: take-away food
- We signed about 30 NDAs – therefore you will not find any company names in this article
- Most frequently asked question: Who are the top players in …?
- Most used (and copied) slide:
  Evolution from Digital Poster (DP) to Digital Experience Platform (DXP) aka Monkey Chart
- Number of articles published on invidis.de: about 1,800
- Hours of video content produced: more than 24 hours

Always on the cutting edge of applications: Stefan Schieker ...

Photos: invidis

... and Florian Rotberg from invidis

France. Asia will follow over the summer and the Americas in fall.

On our tour, we delved into Berlin's agency scene, talked to exciting personalities and took a look at retail and corporate highlights. Agencies like Tamschick Media+Space, flora&faunavisions, Art+Com, or Dan Pearlman showed us the creative potential of Digital Signage. Installations such as Lindt Home of Chocolate, the Samsung Flagship on Frankfurt's Zeil, C&A in Berlin, H&M and Volvo in Sweden, or the Futurium museum demonstrate the state-of-the-art in digital signage – and we are keen to see and to learn more.

The third and also very visible part of our business is Conferences. In normal years, we deliver keynote speeches or presentations on dozens of events. During the pandemic this was obviously shifted to webinars, Zoom sessions, podcasts, or Clubhouse talks. But we also had our on-stage appearances at the AV Innovation Days (AVID) at Lang AG and at our own DSS – The Show Event in ICT/Holtmann's hybrid studio in Hannover. DSS – the Show featured eight hours of live program with a diverse mix of speakers on stage or via video.

Invidis is active both in front of and behind the scenes.

Photo: invidis

Our own Digital Signage Summit (DSS) conference series is organized as a joint venture with ISE. Here again, the pandemic left its marks,. A fter the innovative hybrid event in Hannover in 2020, we were preparing for the DSS Europe at the Hilton Munich Airport on 29-30 September. Unfortunately, we had to cancel the event due to tightening corona measures in Bavaria. So we look forward to seeing many of you at the other DSS events at ISE in Barcelona, at Infocomm in Orlando, or at Expo in Dubai.

At invidis, we are a small, committed, and flexible team always on the forefront of what is happening in terms of digital in the real world, be it business, design, or technology.

IMPRINT

Publisher:
invidis consulting GmbH
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Florian Rotberg

Editor-in-chief:
Balthasar Mayer,
invidis consulting GmbH (responsible)

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Florian Rotberg, Stefan Schieker

Advertisement:
Christine Koller,
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Company presentations:
Meike Hannig,
Communication design

Photo Cover:
Erik Lefvander

invidis magazine

Daily updated news:
www.invidis.de

Free PDF download of the yearbook:
www.invidis.com/magazines

invidis social media

Invidis Linkedin
www.linkedin.com/company/invidis-consulting

invidis Twitter
www.twitter.com/invidis

invidis Facebook
www.facebook.com/invidis

invidisXworld

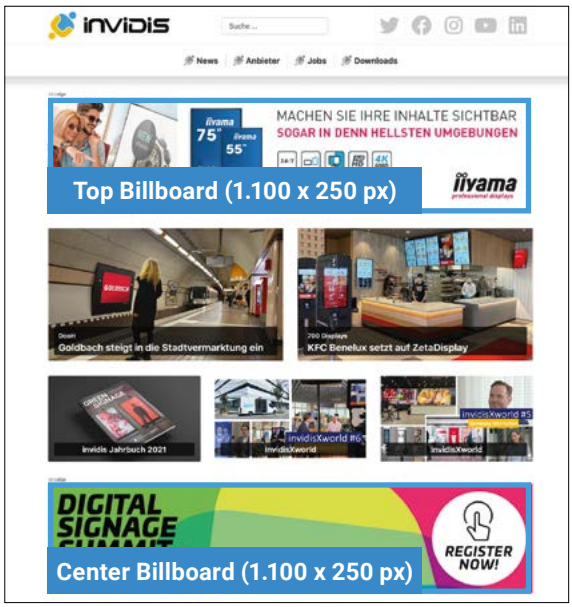
Youtube-Channel
www.youtube.com/invidisXworld

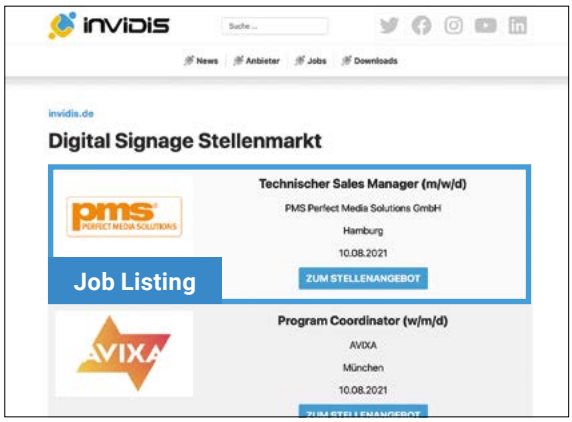
Digital Signage Summit

Digital Signage Summit Website
https://digitalsignagesummit.org

Digital Signage Summit Twitter
www.twitter.com/DSS_ISE

RATE CARD





invidis.de – Online-Banner

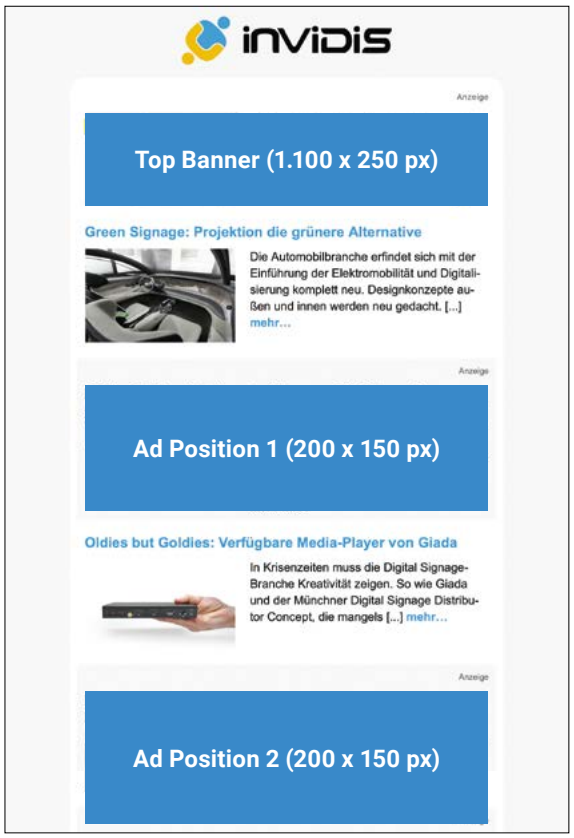
- Weekday news
- Annually more than
  - 1.850 Articles
  - 4.150 Photos
  - 434.000 Unique Visitors
  - 849.000 Page Impressions

Booking Options

- Top Billboard
- Center Billboard
- Job Listing

PRODUCT	FORMAT	PRICE
Top Billboard	1.100 x 250 px	990,- EUR*/WEEK
Center Billboard	1.100 x 250 px	880,- EUR*/WEEK
Job Listing		199,- EUR*/90 DAYS

*All Prices are net/net



Newsletter

- Weekday newsletter
- Subscribers: 2.100
- Opening rate: 26 %
- Click rate: 25 %

Booking Options

- Picture-/Text ad
- Top Banner

PRODUCT	FORMAT	PRICE/WEEK
Top Banner	1.100 x 250 px	1.000,- EUR*
Ad Position 1	200 x 150 px	690,- EUR*
Ad Position 2	200 x 150 px	590,- EUR*

*All Prices are net/net

MEDIA SALES CONTACT:

Christine Koller
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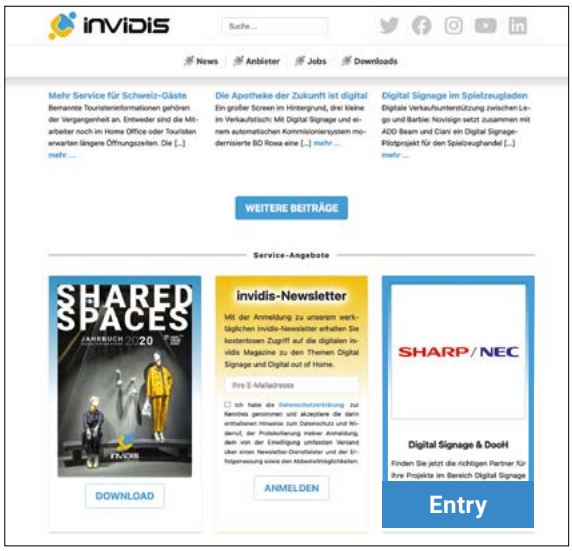
RATE CARD



Index of Suppliers

- Online directory with over 500 suppliers

Booking Options

- Premium entry

SERVICE	ENTRY FREE CHARGE	PREMIUM ENTRY EUR 590 PER YEAR
Company name	yes	yes
Logo	–	yes
Adress	–	yes
Contact	–	yes
Links (Website, Facebook, Twitter, YouTube)	–	yes
Company or product text	–	yes
Choose from max. 3 Categories	–	yes
Widget on invidis.de	–	yes

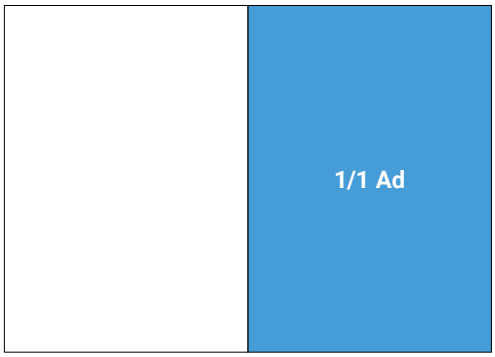
*All Prices are net/net

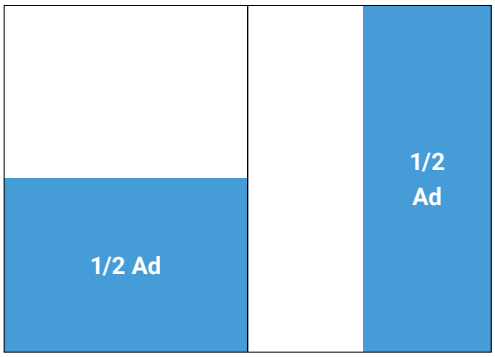
Yearbook

- German and English language version

Booking Options

- Ad
- Company profile





PRODUCT	FORMAT	PRICE
Ad, inside front cover (U2), 1/1 page, 4c	210 x 297 mm	2.890,-
Ad, inside back cover (U3), 1/1 page, 4c	210 x 297 mm	2.790,-
Ad, back cover (U4), 1/1 page, 4c	210 x 297 mm	2.990,-
Ad, editorial section, 1/1 page, 4c	210 x 297 mm	2.590,-
Ad, editorial section, 1/2 page quer, 4c	210 x 152 mm	1.590,-
Ad, editorial section,1/2 page hoch, 4c	103 x 297 mm	1.590,-
Company profile 1/1 page, 4c	210 x 297 mm	1.290,-

*All Prices are net/net

MEDIA SALES CONTACT:

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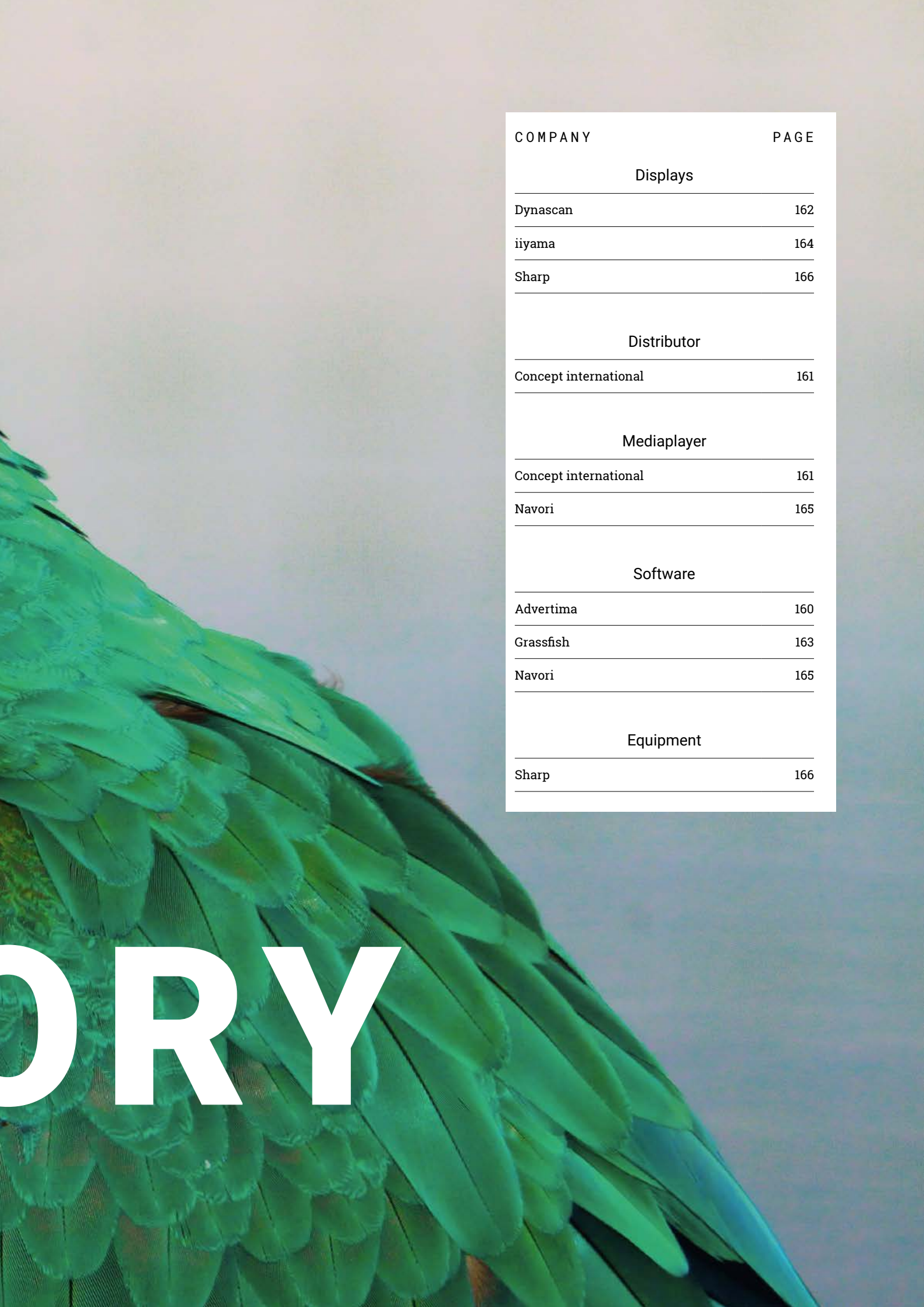
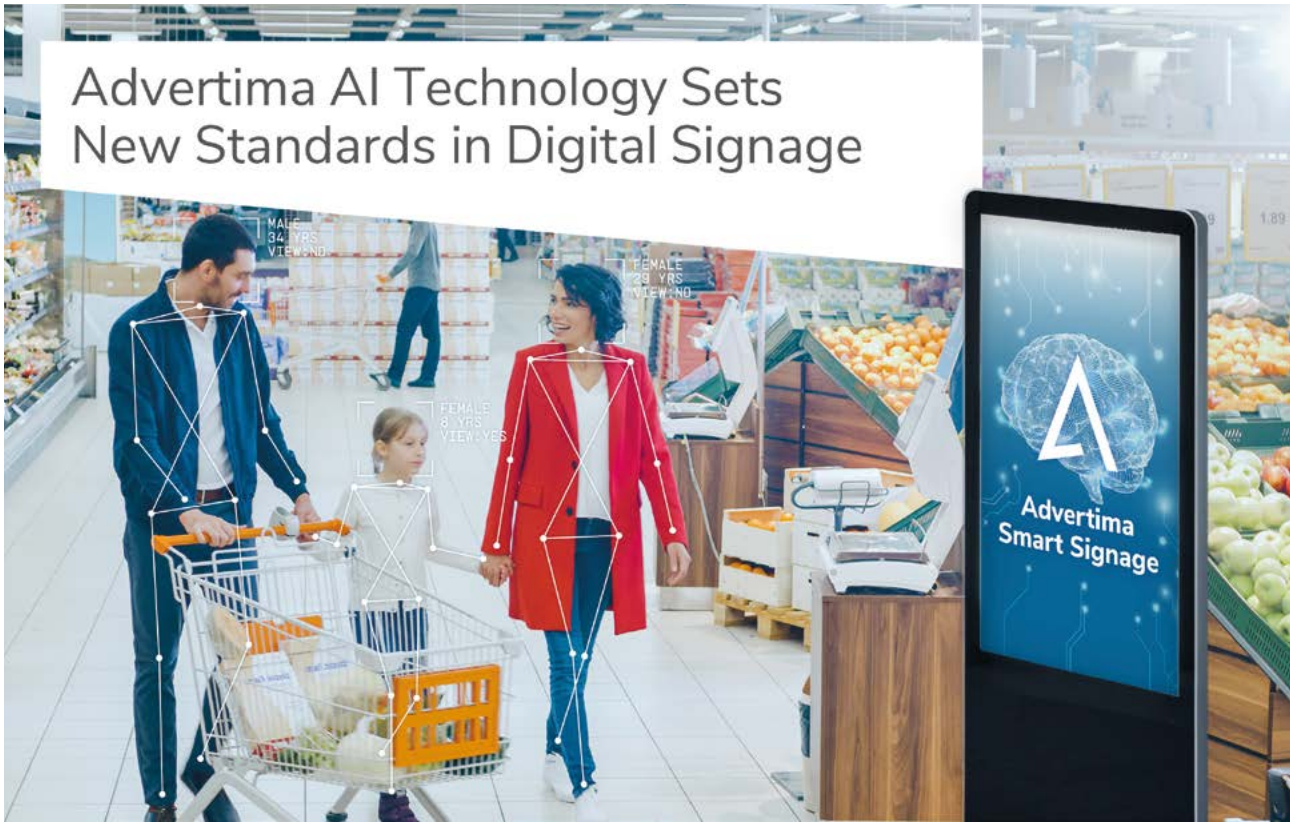
Photo: Oscar Due Wang von Pexels



ORY

Advertima



Advertima is the computer vision leader in real-time audience data and smart-targeting technology for digital signage. **Advertima Smart Signage** enables multi-brand retailers to monetize their stores' visitors to immediately generate significant revenue. By upgrading digital screens to an audience-driven communication channel for advertisers, Advertima enables data-based retail media for stores.

This DOOH and in-store media product fulfills the ever-growing demand from media agencies and their clients for a verifiable and targeted advertising channel at the point of purchase. **With smart-targeting technology, analytics, and automated ad booking and delivery capabilities**, retailers can enable advertisers to effectively reach verified in-store audiences according to their demographic groups. They also increase shoppers' basket size and harness valuable in-store customer insights to build a data-driven strategy.

"Advertima delivers game-changing live attribution for DOOH. With accurate real-time 3D data, smart-targeting, and automated technology it helps us to fulfill our clients' needs and provide them measurable ROI." **Christopher Ho, Innovation Director at Posterscope UK**

ADVERTIMA

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Iman Nahvi, CEO
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Switzerland
future@advertima.com
www.advertima.com

CONCEPT International

Concept International is a value added distributor of digital signage hardware. The Munich-based company supports more than 250 digital signage projects each year with around 28,000 digital signage players, mainly from the manufacturer Giada and is currently the leading provider of signage players, according to Invidis.

With the versatile range from Giada, the experienced distributor offers powerful PCs for all application scenarios, from entry-level to high-end areas, including the control of video walls. The latest additions: the bespoke booksize PC D611, now with the latest 11th gen. Intel Quadcore CPU up to 4.7 GHz, support of three 4K screens and the hot seller Giada DN74, an Android PC in industrial quality and unbeatable price-performance ratio and HexaCore CPU. All PCs can be conveniently installed behind flat screens and guarantee reliable 24/7 continuous operation with programmable watchdog and time control, thanks to Giada's patented JAHC technology. There are new LED walls this year: with LEDMAN, the Munich-based company represents a technologically leading manufacturer whose modules are manufactured using fully encapsulated COB technology. This guarantees high reliability, a pixel size of less than 1mm and attractive pricing. In addition to many years of experience and consulting know-how, Concept is particularly known for individual PC configurations and reliable support. Concept International offers system integrators its “Total Preparation Service”: the player-PCs can be quickly rolled out in large numbers, configured for specific projects, software-activated and burn-in tested. System integrators and resellers also receive attractive buying conditions.

CONCEPT INTERNATIONAL GMBH

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Phone +49 89 961608520
sales@concept.biz
www.concept.biz

DynaScan Technology

DynaScan Ultra-High Brightness Digital Signage Displays

DynaScan ultra-high bright displays are the proven solution for high ambient light environments. Brightness levels as high as 5.500 nits allow them to shine bright in direct sunlight – making them ideal for window-facing applications. DynaScan offers the largest portfolio of professional high bright LCDs in the industry, with models ranging from 32" to 86".

The DynaScan DI Series consists of indoor LCDs ranging in size from 55" to 100", brightness levels up to 1.000 nits, and includes models which are IP5X rated and as thin as 29 mm. Built to withstand the elements, The DynaScan DO Series outdoor displays are IP-rated. Available in a variety of sizes and single-sided or dual-sided configurations, they may be integrated with bus shelters and street furniture. Featuring direct sunlight viewable images, IK10 vandal resistance, and superb color, the displays offer unsurpassed security, performance, and visibility.

DynaScan works closely with system integrators around the world to deliver premium display solutions for its customers. With offices in Europe, Asia, and North America, DynaScan is equipped for international rollouts and support.

DynaScan

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GRASSFISH

Make every Store a Flagship Experience

For us, this slogan means the seamless integration of the store and the showroom into a homogeneous customer journey across all channels. In a modern retail environment, every store has a role to play in the brand and product experience, as a fulfillment point in the omnichannel network and, above all, as a place that consumers like to visit, where advice and experience are offered with a high level of expertise.

The basis for the scalable realization of these requirements is the Grassfish Experience Platform, which acts as part of the IT landscape in the company for the management, connection and control of all digital touchpoints in the store. The platform is interfaced with the other IT systems, such as CRM, ERP, DAM and PIM, to enable efficient process-oriented operation using common data and to provide homogeneous communication to the customer.

Together with our highly qualified partners, we offer comprehensive consulting services in addition to our software and, above all, solutions and customisation specifically tailored to your company to implement storytelling, customer engagement and staff empowerment in accordance with your corporate philosophy and needs.

GRASSFISH

Grassfish Marketing Technologies GmbH

Roland Grassberger, CEO

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Austria

Phone +43 1 522 02 70

office@grassfish.com

www.grassfish. com

iiyama

As one of the world's leading manufacturers of screens and displays, iiyama stands for special expertise in the monitor market. Founded in 1973 in Nagano, Japan, iiyama has built a strong reputation as a provider of best-priced, high-performance display solutions and outstanding service. The long-established, customer-oriented company has been active in Germany with great success since 1993.

Initially, the portfolio ranged from low-priced LCD/LED entry-level monitors to high-quality business devices with ergonomic features for professional use. Over the years, the innovative company has developed into an expert for digital signage, LFDs and interactive LFDs. A clear focus is on (multi-) touch screens and smart large format displays. These range from the interactive desktop model for office use to the highly robust device for 24/7 use in high-use environments with screen diagonals between 10 and 98 inches as well as state-of-the-art (multi-)touch technologies with up to 50 touch points. iiyama relies in particular on projective capacitive (PCAP) models (FHD & UHD), although the company also offers the full range of resistive, SAW and infrared touch screens in various sizes and formats up to 98 inches.

The portfolio is rounded off by high-quality holder and stand systems that cover all application scenarios. For the perfect all-in-one solution, iiyama also has a modular plug-in PC (Win10) on offer, which does not require any cabling and is immediately ready for use.

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sales.de@iiyama.com
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Navori Labs

Switzerland's Navori Labs is the world's leading developer of innovative digital communication technologies and AI-enhanced marketing analysis solutions software solutions.

The company, known for its QL professional digital signage solution recently launched AQUAJI, its AI and computer vision-based analytics solution for retailers, DOOH networks, quick service restaurants, and public institutions.

AQUAJI measures a business's performance, helps strengthen operations, and improves the customer experience. The software provides useful insights so you can make the best decision, every time. It delivers visitors foot-traffic, demographics (gender & age range), length of stay, waiting time, and attention span in physical spaces. Know more about your customers and track visitor behavior to optimize your products and service levels. Find out when your advertising appeals to your customers so you can increase sales.

Combine AQUAJI with the QL digital signage platform and your business intelligence applications to create a complete omnichannel marketing solution.

NAVORI LABS
Innovation & Performance

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Sharp

Enhancing workplaces of the future with Sharp's solutions

Sharp Europe enables small to large businesses and organisations across Europe to enhance performance and adapt for their workplaces of the future through a range of business technology products and services. As a manufacturer and a service provider, Sharp is uniquely positioned to provide trusted advice and assurance to customers on how technology can work together seamlessly.

Sharp produces the world's most advanced flat screen display technology that improves business and organisational performance through a range of applications.

- Its interactive screens, video walls, large format displays for digital signage, and professional displays are ideal for mission-critical control rooms, retail hubs, TV studios, design studios and wherever high fidelity screens are essential.
- In the office environment, in partnership with Microsoft it has developed the world's first Windows collaboration display designed to support and improve business and organisational team work.

Other services and products range from printers and collaboration platforms in partnership with other leading brands, through to full IT services for small companies to large Enterprise businesses and organisations.

SHARP

Be Original.

Sharp

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Reconnect.
Reimagine.
Rise Up.
ISE 2022 unites and inspires AV professionals to meet the latest challenges with innovative solutions. The future begins in Barcelona.
Fira de Barcelona | Gran Vía
1-4 February 2022
integrated systems europe
A joint venture partnership of
AVIXA
CEDIA
Discover more
iseurope.org

ZETA
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THINKING BEYOND THE SCREEN™