



# Consumer Electronics Trends in 2022

Futuresource Perspectives

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Simon Forrest

## Introduction

2021 was seen as a challenging year for the CE industry, with uncertainty surrounding the impact of COVID-19 coupled with the ongoing semiconductor shortages and ensuing supply chain issues. Yet the industry shipped almost 4.3 billion devices globally, a 5% increase over 2020, and is forecast to repeat similar growth during 2022. So, we approach this year with refreshed optimism.

Combining existing research from Futuresource along with announcements made during CES in January, we assess the wider trends and market expectations for 2022. Overall, we expect considered progression, rather than impulsive attempts at transformation, as businesses addressing the consumer electronics sector emerge from the COVID pandemic and reassess opportunities for innovation in a world with several “new normals”. Here are some of the top trends to watch during 2022.

## A Smart Lifestyle built around Smart TV

Inclusion of gaming, fitness, and remote access of connected devices were some of the major announcements during CES 2022, setting the trend for Smart TV in the coming years. Samsung, Sony, TCL, and LG each revealed the inclusion of cloud gaming platforms on their TV line-ups. TCL has announced Game Centre on its Smart TV, using a smartphone as the controller. Sony, with its A95K TVs and a strong pedigree in gaming, offers 4K at 120Hz and auto-HDR tone mapping when connected to a PlayStation 5. While Samsung further announced the release of a cloud-based gaming hub on its TV, and LG introduced Nvidia’s gaming service GeForce and fitness app Peloton on its OLED TVs.

While consumers are inclined towards controlling their smart home devices remotely, TV vendors are embracing this trend by adding control of Smart Home products via apps and services accessed via the television. Indeed “apps, apps, apps and ecosystem” are the mantra for 2022, as the Smart TV is positioned as a central control point for the home, and TV vendors attempt to deliver a unified experience.

This year, voice interfaces are expected to penetrate more deeply in Smart TV. Near-field voice has become the baseline for Smart TVs, often in the remote control, however vendors are now widely examining the opportunity presented by far-field microphones. The idea is that Smart TVs could become another Smart Display in the home, with “always listening” features and low-power modes

to enable TVs to participate more widely in the world of virtual assistants. LG has collaborated with audio solutions provider DSP Concepts and implemented the TalkTo audio front end in some of its Smart TVs. Meantime, AI based voice technology is set to increase the prominence of far-field voice support with improved voice pick-up and more effective noise cancellation. Futuresource anticipates that this year will witness more focus on far-field voice control not only for Smart TVs but all connected devices.

And, of course, improvements in picture quality and increasing screen size are expected to lead to new high-end product releases this year. During CES, Sony unveiled the world’s first quantum dot OLED (QD-OLED) TV



Sony’s Master Series A95K Smart TV with QD-OLED display technology



Hisense 8K Laser TV, using ultra short throw projection to deliver 100- inch and 120-inch displays

– the Bravia XR A95K. The vendor also announced its range of Mini LED TVs, the Z9K and Premium X95K. Samsung is the top-selling TV brand worldwide but, arguably, its QLED televisions have never quite matched the performance of OLED TVs made by rivals, given that LG Display presently manufactures all the OLED screens available today, and supplies them not only to LG Electronics but also to Philips, Sony, Panasonic, Vizio and others worldwide. During CES 2022, Samsung revealed its new QD-OLED, a new kind of display that combines organic light-emitting diodes and quantum dot technology.

Meantime, Hisense mused that ultra-short throw laser projection technology is the best option for 8K, given the challenges of manufacturing large format display panels of over 100 inches in diagonal. Hisense is investing heavily in 8K and will start mass production of 8K 120Hz chipsets for its range of Smart TVs in the first quarter of 2022.

### The drive towards high quality, lossless audio

There was significant innovation in the audio industry throughout 2021, delivering the groundwork for higher quality audio rendering and paving the way towards more immersive experiences. The music industry, and indeed the artists, had expected to generate increased revenue from the migration to higher quality streaming services. However, Apple elected to include CD-quality and Hi-Res lossless audio as a standard part of its Apple Music subscription package, and Amazon responded by bundling its “Music HD” Hi-Res tier into its standard plan. In doing so, over 110 million subscribers worldwide were awarded access to Hi-Res audio almost overnight.

But not all those subscribers will actually be listening to Hi-Res audio. Although higher quality music streaming services are becoming more widely available, outside of the “audiophile” space most consumer products are not yet able to reproduce the intended experience. For instance, Apple’s own headphone and true wireless products don’t support lossless audio; and Amazon’s Music HD service is presently accessible only via their apps, with no guarantee that the consumer’s headphones are compatible. There’s an upgrade in wireless connectivity necessary for users to fully enjoy Hi-Res lossless music services. Meanwhile smart speakers are being upgraded by vendors this year to provide the necessary support.



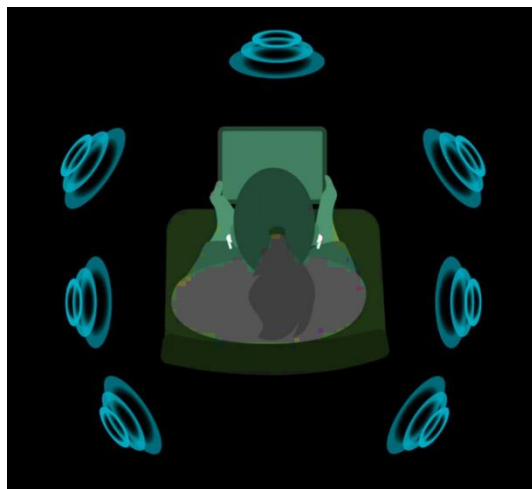
So, the race is now on to fully deliver on the “true” promises of Hi-Res audio in 2022. Futuresource anticipate that Apple will debut a new H2 silicon chip to support their next generation of products; meantime other vendors will benefit from using Qualcomm’s silicon to feature aptX Lossless. Consumer products will “catch up” with the capabilities of music streaming services and consumers will gain more choice, the results being that Hi-Res and lossless services will become more widely available to audiences as 2022 progresses.

### A wider market opportunity for spatial audio

Another trend that continues into 2022 is adoption of spatial audio. Directional acoustics are now driving the audio market, notably the inclusion of Dolby Atmos and DTS:X technology on soundbars is beginning to penetrate more deeply, creating enhanced home theatre systems that pique consumer demand.

Meanwhile, Echo Studio speaker owners can access Amazon's catalogue of 3D audio tracks, of which the company claims there are now over 750 encoded in either Dolby Atmos or Sony 360 Reality Audio.

Moreover, personalised audio is a trend to monitor during 2022, especially in headphones, true wireless and a new generation of hearable products, as users select acoustics for different listening environments or personalised sound profiles to improve hearing health.



Spatial audio is a key trend to watch in 2022

Finally, more movies and music than ever before are now consumed at home, and so the major streaming platforms will invest more heavily in delivering a wider catalogue of videos with spatial audio in 2022.

### The immersive in-vehicle experience

In 2022, vehicle manufacturers will include Dolby Atmos as options in some of their cars. Spatial audio in this environment works exceptionally well, given that placement of the speakers can be optimised for each cabin. Front, rear, side and height speakers are positioned around the inside of the car so passengers can "feel" the movement of whatever they're listening to. Not only does this produce far more immersive rendition for music, but it also enables directional acoustic signalling for notifications, driver warnings, and other alerts. For instance, things like blind-spot detection and unbuckled seatbelt warnings come from the direction of concern.



Cabin interior of the Lucid Air, equipped with 21-speaker spatial audio

New vehicles to debut this year include the Lucid Air, which is equipped with a 21-speaker setup for Dolby Atmos. And from the second half of 2022, Mercedes plan to integrate spatial audio into S-Class vehicles via a "4D sound system" that includes 31 speakers, six of which create the 3D effect from above, and with all four seats having sound transducers embedded within them, allowing occupants to feel the audio. Of course, the introduction will be contingent on the ongoing semiconductor supply shortage.

Beyond, manufacturers will introduce in-cabin communication more widely across vehicles, amplifying the conversations between occupants. Spatial audio is also being used to manipulate the acoustic environment within vehicles, allowing more effective road noise cancellation, and more realism in recreating engine sounds – such as those conspicuously absent from electric vehicles. Indeed, manufacturers are devoting research and development investment into how their vehicles sound, since the audio they produce is now considered an essential part of the brand experience.

### Advancements in Headphones and Wearables

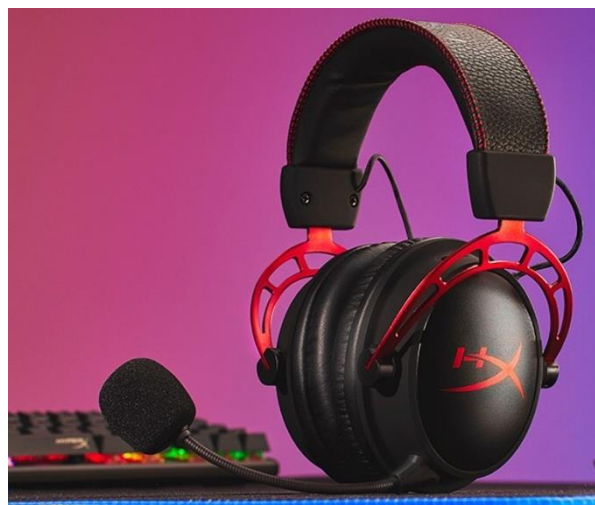
Some of the notable themes for personal electronics this year will include improvements in battery life and latency, edge-based voice interactions and the pervasiveness of gaming.

Brands are competing on battery life in headsets. More battery per charge and fast chargers are rapidly becoming key criteria for differentiation. Improvements in battery life are dependent on efficiency of other components, utilising power efficient chipsets and harnessing the Bluetooth LE communications standard. Consumers are used to tens of hours of lifespan today in headphones, but the most compelling offering now comes from HyperX, with its Cloud Alpha Wireless Gaming headset, offering 300 hours of battery life on a single charge.

The trend in voice technology has been moving towards edge-based computing, reducing the reliance on cloud processing and circumventing latency and privacy issues. There's also growing opportunity for "domain specific" assistants in headphones and wearables, which can complete "command and control" tasks more efficiently on the device itself. Nevertheless, the future for generic virtual assistants – those servicing enquiries and information requests – will require a hybrid of edge and cloud AI. Knowles has partnered with Fluent AI to provide offline and app-free AI powered voice control for TWS earbuds and other hearable products. This makes it more comfortable to use without relying on touch features. Meanwhile, Sensory demonstrated the new SensoryCloud.ai platform for voice at CES.

Voice remains an important part of a brand's strategy. For instance, Fossil announced that it will be bringing Alexa to its Gen 6 watches in the first half of this year, and when updated it will become one of the few wrist-worn wearables to offer a choice of virtual assistants. Futuresource research discovers that while the inclusion of a virtual assistant as a feature doesn't influence a consumer's decision to purchase personal electronics, voice is still used extensively since it helps to seamlessly integrate new hardware into the mobile ecosystem.

Nearly all major consumer electronics brands are hoping to grab a slice of the growing gaming revenues and a share of consumers' time for entertainment. While the market only has a handful of players and low volumes, the opportunity within mobile gaming space is vast, as it comprises the majority of market share for gaming overall. The trend for 2022 is bolstered by new entry-level gaming earbuds released from Tozo, JBL entering the space and lifestyle headphones brands such as Xiaomi, Vivo and Realme incorporating low latency "gaming mode" features in their true-wireless product line-ups. This year, true-wireless gaming earbuds are expected to expand the community beyond just the hardcore gamers.



The HyperX Cloud Alpha wireless gaming headset offers 300 hours of battery life



Voice interfaces are becoming a key component of wearables. Fossil plans to introduce Alexa into its Gen 6 Smartwatches during 2022

### Revitalised interest in AR and VR

In 2022, expect renewed interest in XR devices as a stepping-stone towards the metaverse, plus a focus on developments in features that improve user experiences. XR is gaining traction from brands across the board, and indeed there were some significant announcements during CES, all capitalising on the growing interest in this space.

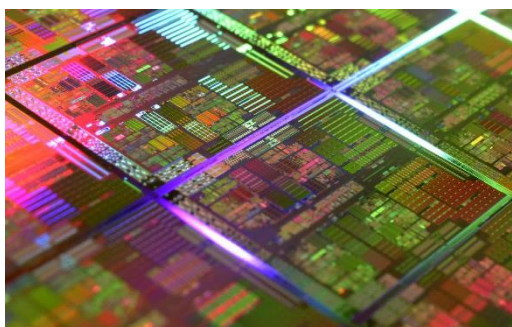
Firstly, a much-anticipated announcement from Sony for the PSVR 2, considered a serious competitor in the VR space. This introduction will give a boost to console based VR gaming in late 2022/early 2023, as predicted by Futuresource. Meanwhile, HTC introduced a wrist controller for its Vive Focus 3 headset. This will track wrist worn movements in situations where arm movements are important; aimed at enterprise rather than consumer use. Whilst XR will retain its relevance with gaming, the primary use of XR will likely be more enterprise-focused in the longer term and also for social interactions, meetings, and even augmenting the physical shopping experience.

CES showcased a varying array of AR glasses, as vendors work towards perfecting the glasses form-factor. Qualcomm also announced an expansion of its relationship with Microsoft to improve AR by developing a custom augmented reality Snapdragon chip. This will power lightweight AR glasses for Microsoft's ecosystem, combining Microsoft Mesh and Qualcomm Snapdragon Spaces. So, a major objective for AR glasses is in their development as a pathway product, moving consumers seamlessly between the physical world and the virtual, gradually introducing them towards fully digital experiences.

### Supply chain issues will ease

COVID-19 brought supply chain disruption that will continue well into 2022. Semiconductor manufacturers have been hit severely with higher demand, both from the consumer electronics and automotive segments, as markets rebounded from the lull imposed during regional lockdowns. Notably this has delayed new vehicles coming to market because the automotive industry has become so reliant upon electronic components and "just in time" supply chains to service production lines. Moreover, vehicles often utilise older types of semiconductors – those that have demonstrated longevity, with high reliability and considered appropriate for safety-critical environments – and these are likely to be among the last chip inventories to be restored.

The lead time for chip supply is now around 22 weeks (as of September 2021), double that seen the previous year (October 2020); that's five and a half months. This is causing disruption to SMEs in particular, who find it difficult to secure slots for smaller manufacturing runs. That said, there was an increase of 8% in chip production capacity during 2021, and this is expected to double to 16% in 2022 as semiconductor



manufacturers steadily recover to more normal levels of supply. But the long-term solution is to build more fabrication plants. Intel have four new facilities planned, with two in Europe and two in USA, plus a \$3.5bn expansion of their existing Mexico facility. Meanwhile, TSMC are expanding production capacity with a \$100bn investment; and Samsung are now pursuing leadership in chip production via a massive \$205bn investment in new manufacturing facilities over the next few years. These new fabrication plants will take several years to come online, and they are expected to be in production by 2025.

Alongside there are the associated shipping costs for consumer products. Shipping now costs on average \$14,200 per 40-foot container, up seven-fold from approximately \$2,000 before the onslaught of the COVID-19 pandemic. Nevertheless, shipping costs are now declining from previous highs of around \$17,100 per container, but it will take most of 2022 – and no further waves of COVID infections – before normality resumes and supply chains are fully restored. As Steve Koenig of the Consumer Technology Association eloquently highlights, the supply chain difficulties can be summarised as "Chips" then "Ships".

### The video conferencing phenomenon continues

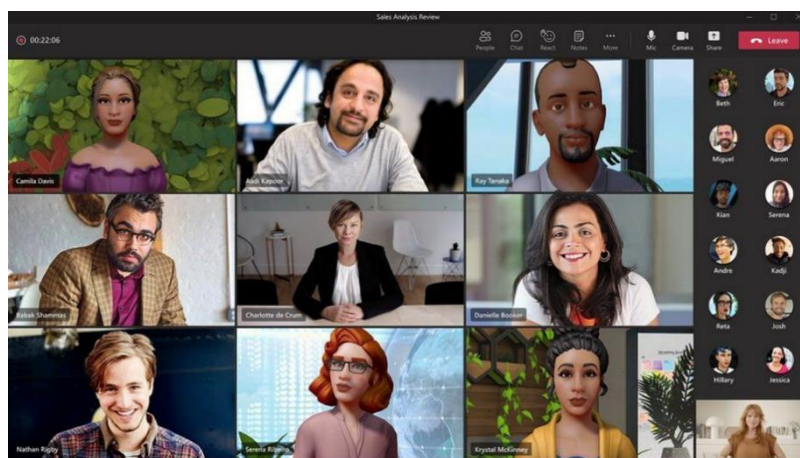
Video conferencing is another area expected to see significant development throughout 2022. Lockdowns during the COVID-19 pandemic amplified the market opportunity for products addressing the segment, and companies including Zoom increased in value as ordinary consumers switched to previously commercial platforms for social communication.

It can be argued that video conferencing works very well today, with features such as far-field voice, microphone beam forming and echo cancellation improving the experience massively; however, users report that it remains an awkward medium to use. When people talk at the same time, humans rely upon the spatial relationship between each in order to communicate.

This is the 'cocktail party' effect, where the separation of people's voices in space is what the brain uses to differentiate and understand multiple voices at once. It's possible that regular "flat" audio in conference calls contributes to the phenomenon of Zoom fatigue: the human brain is denied the opportunity to use the spatial relationship between speakers, so we must communicate in a different way than we would in a natural in-person setting.

Given the indelible change to hybrid working following the COVID-19 pandemic, we expect video conferencing and online meeting platforms will start integrating spatial audio technologies during 2022, such that the direction of voices matches the physical arrangement of video feeds on screen.

Meanwhile, there will be a tentative transition towards virtual meeting spaces in 2022. Microsoft announced plans to integrate parts of their "Mesh" mixed reality platform into Microsoft Teams by the first half of the year, allowing virtual participants using avatars; and Meta recently released an open beta called "Horizon Workrooms", a collaboration tool for teams across remote working environments, providing virtual meeting rooms, whiteboards and video call integration.



Microsoft Teams is expected to allow virtual avatars alongside physical attendees in 2022 – an experiment in video conferencing

This is all part of a movement towards digital environments for collaboration, however getting users to engage with such immersive environments is often challenging, even though they require nothing more than a web browser, since all rendering can be done on remote servers. However, once there, user engagement levels are reportedly up to five times higher than on a standard conference call.

Alongside, these efforts form the early stages of the metaverse, but it's apparent that the world is moving towards more immersive digital experiences.

### Talking of the Metaverse

The "metaverse" is expected to be a buzzword throughout 2022, overtaking AI as the "next big thing", although it has an uncertain future. A metaverse is a completely digital environment where users can come together and inhabit a virtual space as avatars. Avatars are digital representations of people, although they can take the form of anything that a user might wish to present themselves as within the virtual environment. Even here, machine learning has application: AI behavioural recognition can transform avatars into precise virtual representations of real people, including social preferences, communication and manners.

Although Meta (formerly Facebook) and other companies might have you believe this is all futuristic, the concept itself isn't new:

- Second Life was released in 2003.
- Roblox report over 37 million active users.
- Fortnite pivoted from game venue to concert venue when Epic constructed a special studio in Los Angeles, complete with a large stage and lighting rigs, to introduce music gigs into the platform.
- VRChat released in 2014 but gained popularity during the pandemic with 40,000 simultaneous users convening on New Year's Eve 2020 to party online.

But the reason why this is interesting to large organisation is because there is revenue attached to the metaverse, either through digital merchandising of virtual items, or indirectly via advertising. Some metaverses today even allow purchase of digital real estate in the virtual world.

There are many challenges to overcome in building the metaverse. Who owns these environments? How are they regulated? What laws are followed – both real and virtual? What jurisdiction do they have? Can the technology truly scale? But, placing these difficulties aside, within the business sector the metaverse could be used for remote office workers to collaborate in a single environment, with examples of this including Meta's Horizon Workrooms and Microsoft Mesh. Within the education sector, the metaverse could be used for immersive field trips anywhere and any point in history; for instance, Together Labs is working on methods to create realistic avatars, which could reanimate historical figures using artificial intelligence.

The metaverse represents a transition from physical hardware to completely software-based rendering for audio-visual experiences, and improvements in graphics and soundscape are both vital in driving deeper immersion levels in such platforms. Beyond the early implementations, there are opportunities in tactile audio, and future ambient intelligent experiences.



Meta's Horizon Workrooms (left); the Decentraland metaverse (right)

It's apparent that there are many fundamentals that must be combined seamlessly in order to create a convincing metaverse: one that users trust and want to utilise. But the metaverse is closer than people think because all the building blocks necessary are already present and in play, such as 5G and Wi-Fi 6, fibre broadband, the cloud, haptic engines, volumetric video, spatial audio, high resolution graphics, AI and machine learning... the list goes on. Indeed, companies involved will be jostling for supremacy in finessing these essential components and building credible solutions this year.

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## About Futuresource

Futuresource is a specialist research and knowledge-based consulting firm with a 30-year heritage, providing organisations with ongoing insight and forecasting into media & entertainment, broadcast equipment, education technology, consumer electronics, digital imaging, storage media and professional displays.

[www.futuresource-consulting.com](http://www.futuresource-consulting.com)

[info@futuresource-hq.com](mailto:info@futuresource-hq.com)