NOKIA

Issue 1

Know, now

Know the early signals in the market and what they mean now

Welcome

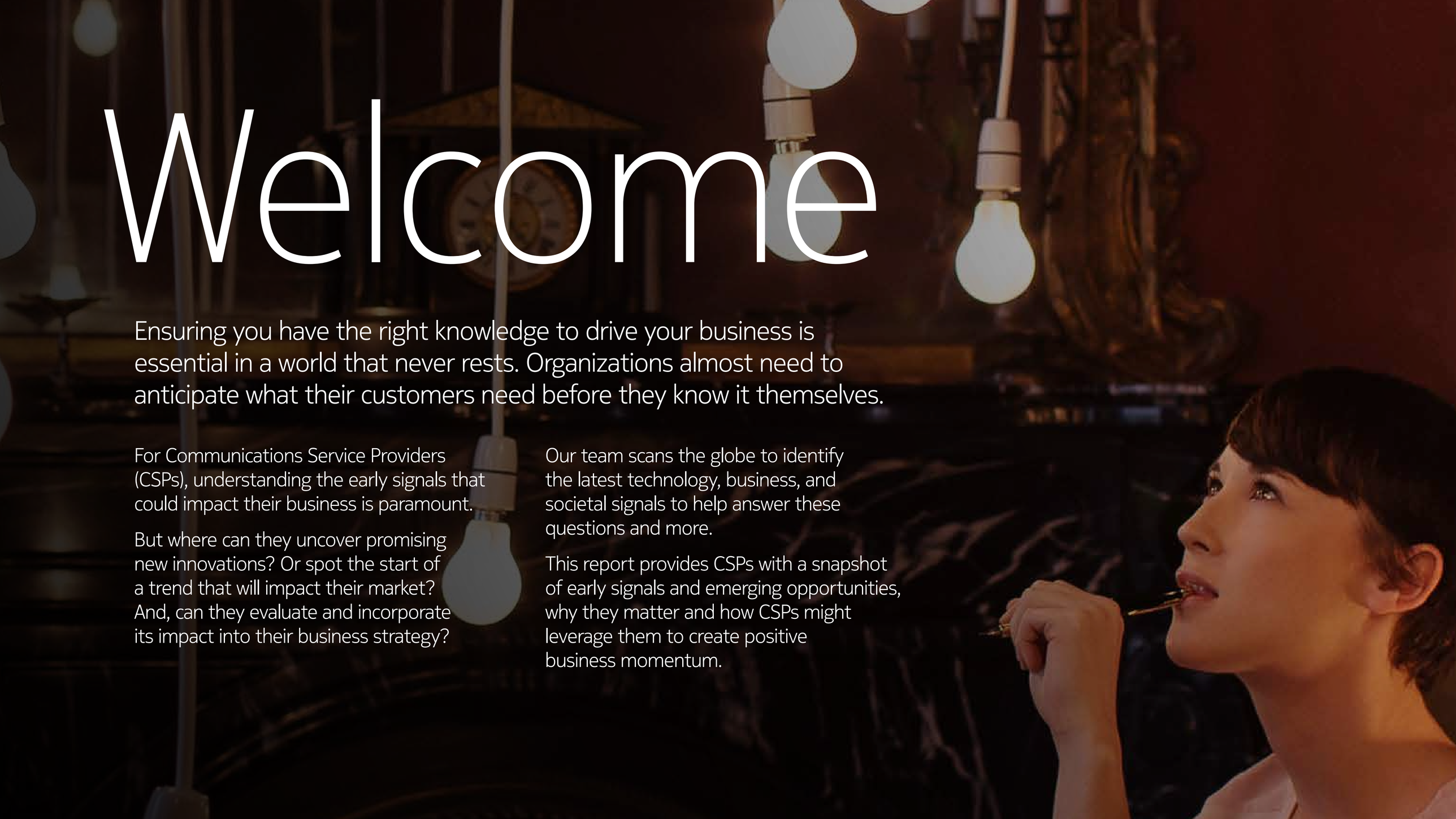
Ensuring you have the right knowledge to drive your business is essential in a world that never rests. Organizations almost need to anticipate what their customers need before they know it themselves.

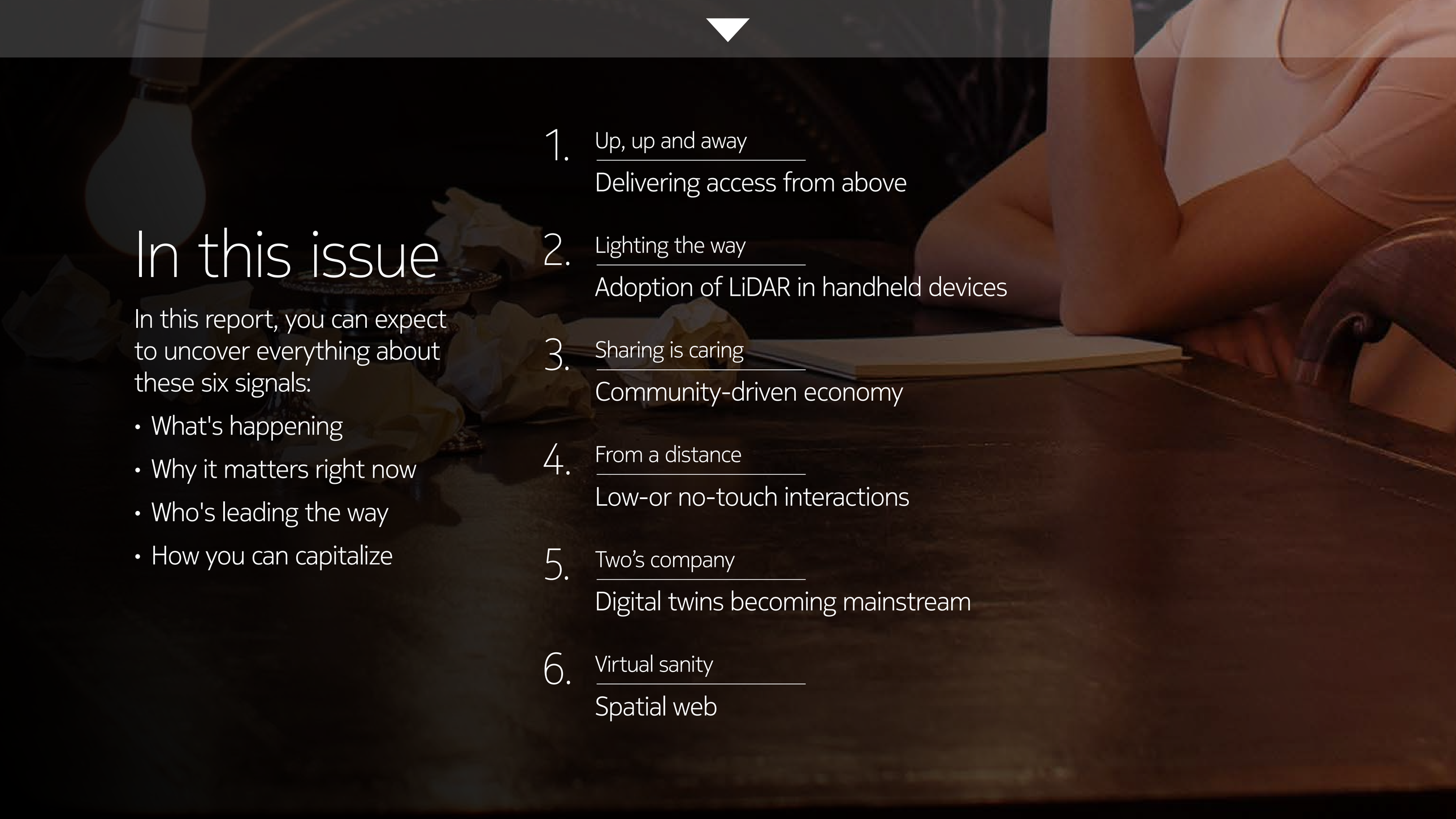
For Communications Service Providers (CSPs), understanding the early signals that could impact their business is paramount.

But where can they uncover promising new innovations? Or spot the start of a trend that will impact their market? And, can they evaluate and incorporate its impact into their business strategy?

Our team scans the globe to identify the latest technology, business, and societal signals to help answer these questions and more.

This report provides CSPs with a snapshot of early signals and emerging opportunities, why they matter and how CSPs might leverage them to create positive business momentum.





In this issue

In this report, you can expect to uncover everything about these six signals:

- What's happening
- Why it matters right now
- Who's leading the way
- How you can capitalize

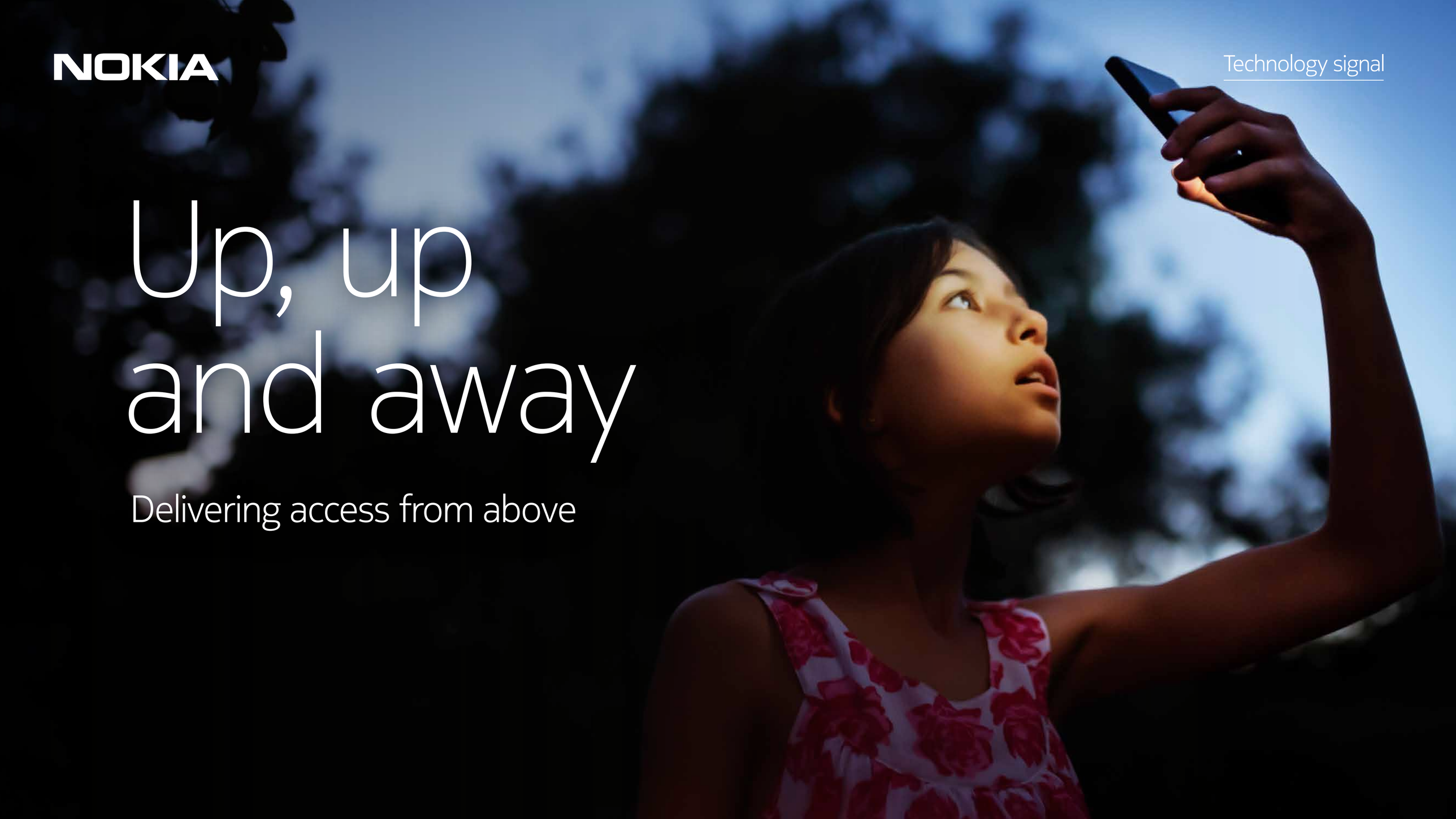
1. Up, up and away
   Delivering access from above
2. Lighting the way
   Adoption of LiDAR in handheld devices
3. Sharing is caring
   Community-driven economy
4. From a distance
   Low-or no-touch interactions
5. Two’s company
   Digital twins becoming mainstream
6. Virtual sanity
   Spatial web

NOKIA

Technology signal

Up, up and away

Delivering access from above



1

2

3

4

5

6

What's happening?

During 2020, broadband connectivity has become indispensable as the critical enabler of education, health services, employment and even voting.

And while this has been amplified due to global lockdowns, so has the stark reality that many people lack access because of where they live.

Even in developed countries such as the United States, Microsoft estimates that 19 million unconnected US households are in rural areas.

Plus, according to the World Health Organization (WHO)* 3.7 billion people, especially those in poorer countries, have no internet access at all.

This can be detrimental in passing on vital information to help rural areas combat the pandemic.

* Reference: World Economic Forum, 'Coronavirus has exposed the digital divide like never before'

With increased pressure to connect more people, aeriel-based solutions are stepping into the spotlight and gaining traction.

Why it matters

The need for reliable connectivity is acute, with some countries mandating rural fiber roll-out.

Without a dependable broadband connection, many communities can't carry out simple tasks that we take for granted, such as schoolwork, accessing telemedicine or ordering vital supplies. High-altitude platforms present an additional option to provide 4G and 5G connectivity, delivering high-speed broadband access to more people.

In addition to the game-changing LEO (Low Earth Orbit) satellite solutions that receive global press attention, the HAPS Alliance is developing common specifications to promote the standardization of HAPS network interoperability.

These networks can be viewed as both a possible competitor as well as partner, as they can help CSPs fill gaps in their offerings.

?

High Altitude Platform Stations – what are they?

An object - such as a high-altitude balloon or airship - operating at above 20km high, above ground infrastructure but below satellites. Within telecommunications, HAPS is designed to deliver broadband-level speed and capacity to a coverage area similar to satellite. This may be achieved at a lower cost to deploy than traditional fixed or wireless networks, making it promising for remote areas or during disasters.

Who to watch

Starlink Low Earth Orbit (LEO) satellite network

Constructed by SpaceX, Starlink has won a bid for $866 million from the Rural Digital Opportunity Fund (RDOF) after demonstrating download speeds around 100 Mbps, upload speeds around 40 Mbps, and latency around 18 ms – well under the 100 ms requirement and far faster than geostationary satellites.

Read more

Eutelsat's KONNECT satellite for rural broadband

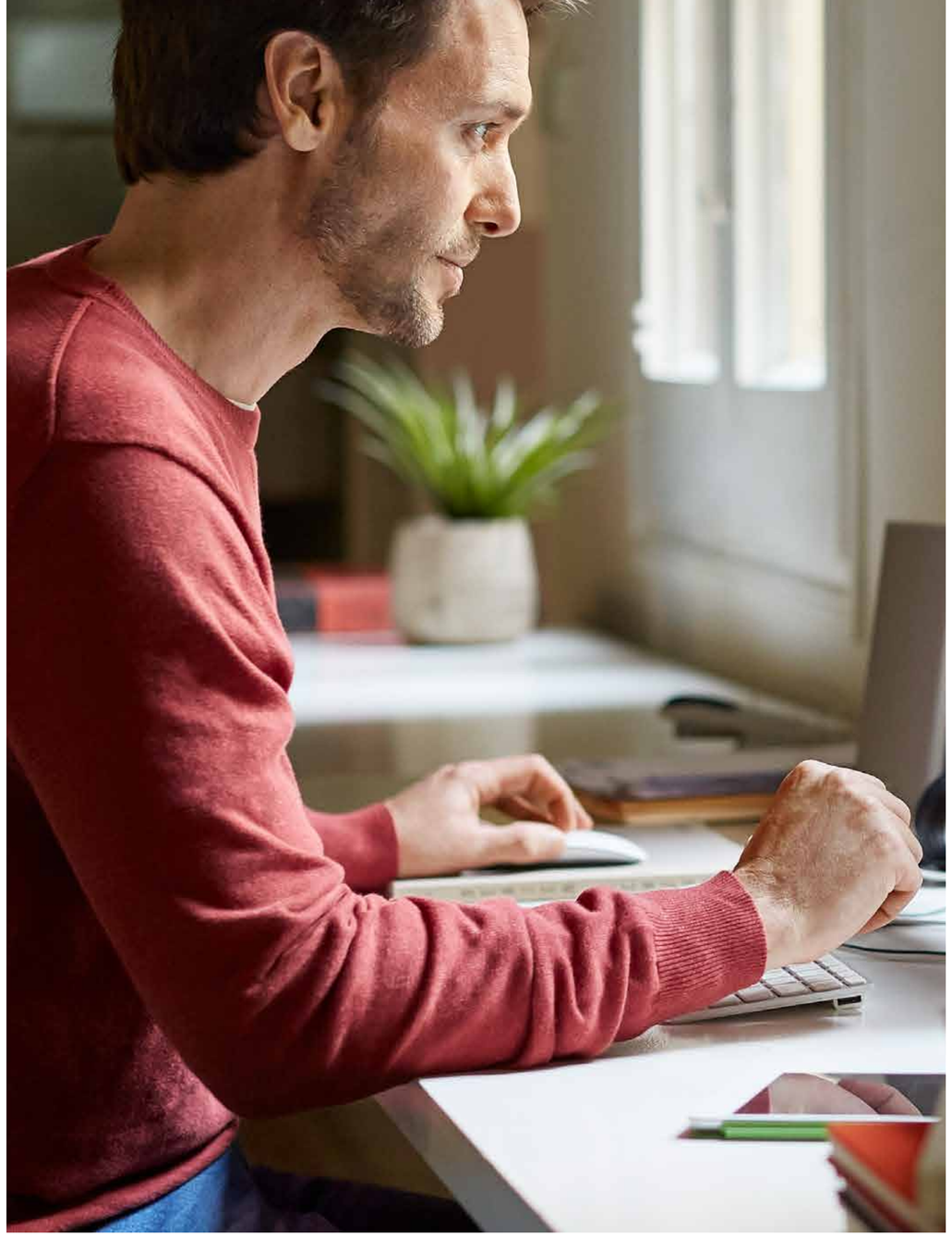
Responding to a COVID-driven need to achieve 100% population broadband coverage, Orange France and TIM Italy have both contracted for service from Eutelsat's KONNECT satellite. Coming online in November 2020, KONNECT has a total capacity of 75 Gbps and can offer speeds up to 100 Mbps per connection for both companies and individuals across Europe and Africa.

Read more

Stratospheric Platforms Ltd and Cambridge Consultants

Creation of low-impact hydrogen-powered autonomous planes that can fly at 20,000 feet delivering coverage to precise areas on the ground, for example, ending at national borders. Backed by Deutsche Telekom since 2016, the project has been tested using 4G in rural Germany with plans for the first commercial 5G launch in 2024.

Read more



How you can capitalize

Like Alphabet's Loon, new HAPS entrants are potential disruptive outliers focused on providing connectivity. CSPs need to make sure they have a viable strategy for bringing access to their rural customers, whether that includes above-terrestrial partners or not.

The need will be filled either way and the opportunities are there. There are two strategies CSPs can consider if they have a need to fill coverage spots and want to consider HAPS:

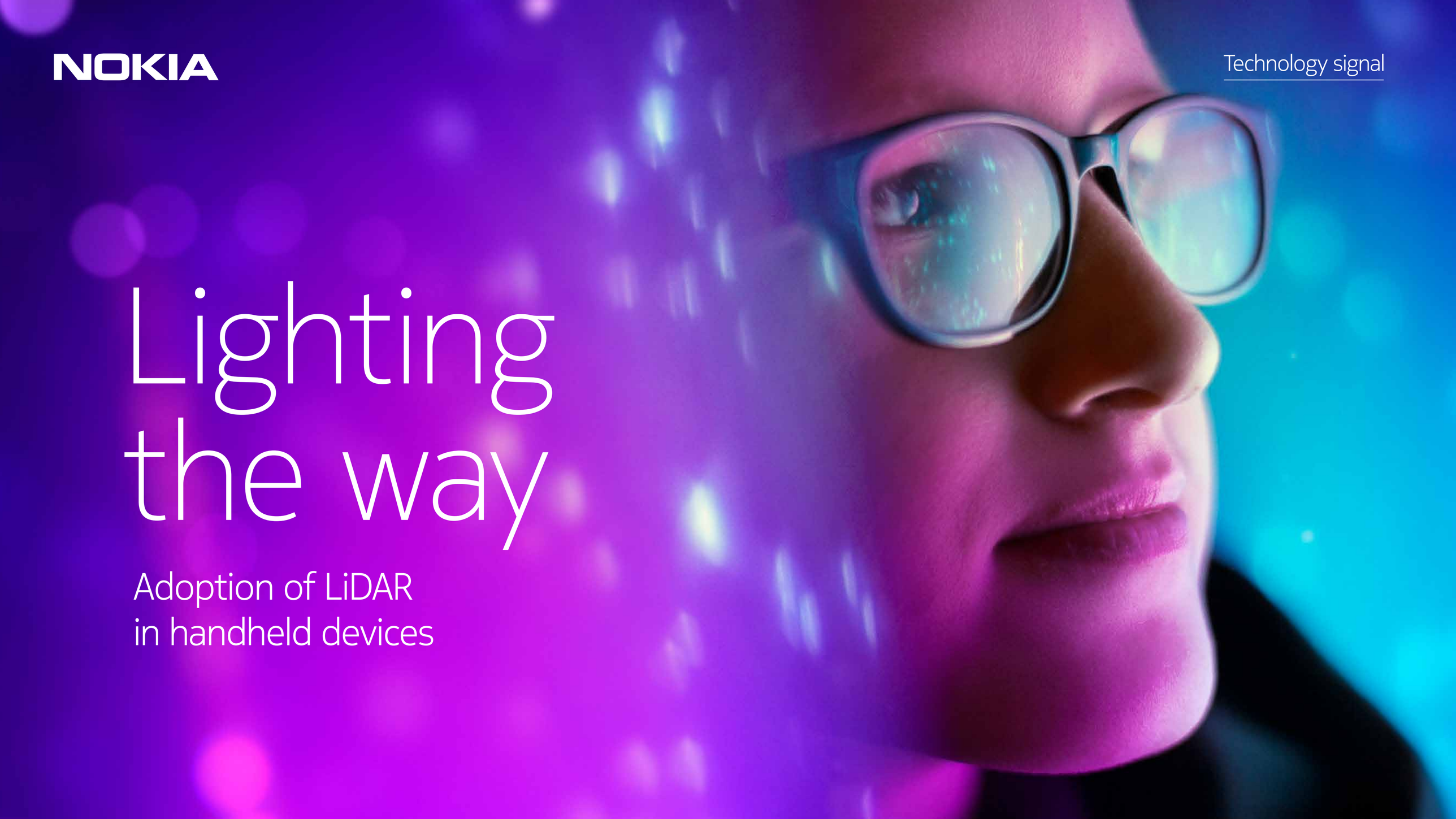
- Source from a HAPS service to deliver coverage to remote areas. Or during times of disaster, when connectivity is down or very limited.
- Expand their business with their own HAPS connectivity solution to other CSPs.

NOKIA

Technology signal

Lighting the way

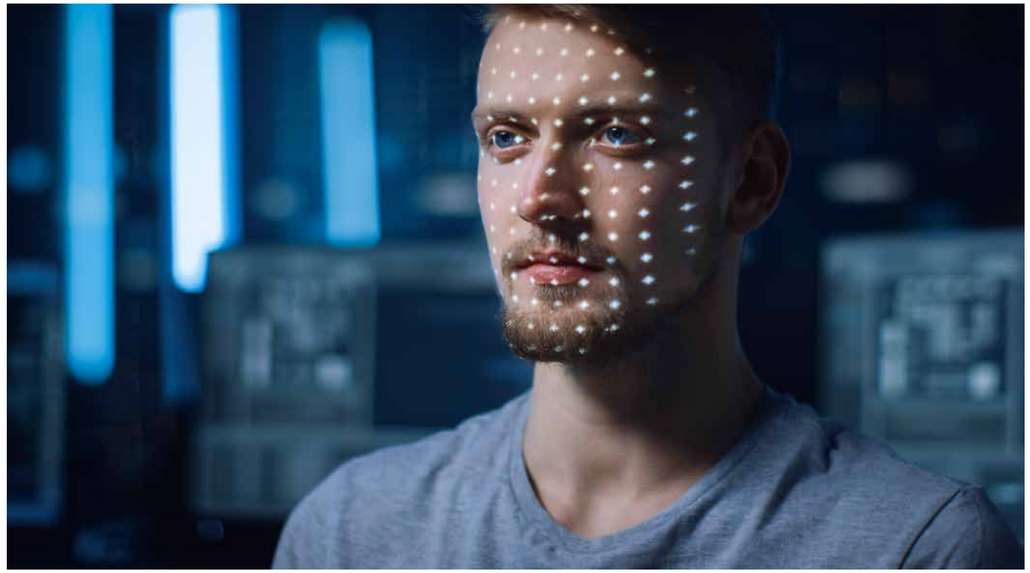
Adoption of LiDAR in handheld devices



What's happening?

Light Detection and Ranging (LiDAR) uses lasers to determine the 3D contours of spaces as well as ranging of objects.

Recently, **Apple filed a patent** for using LiDAR to improve vision in low light. And the iPad Pro 2020 and iPhone 12 Pro are already using a similar system for improved low-light photography. This investment could signal bigger forays into mixed reality, as LiDAR enables mapping abilities for devices.



Why it matters

This early signal could spell a new era for mixed reality content and service creation.

Smartphone-based consumer augmented reality (AR) will be accelerated by the 5-meter range LiDAR scanner in the iPhone 12 Pro.

Smartphone AR experiences in apps like ‘Pokemon Go’ and ‘Snapchat’ use 2D overlays, known as stickers, but do not interact with environments.

Sensing the 3D world around the phone allows the creation of complex, multi-user AR elements that interact with objects and people in the environment.

Users will also be able to scan themselves and their environments, which can be used for browsing new clothes or furniture.

Sensing the 3D world around the phone allows the creation of complex, multi-user AR elements.

Who to watch

Apple's continued investment in LiDAR including its patent filings

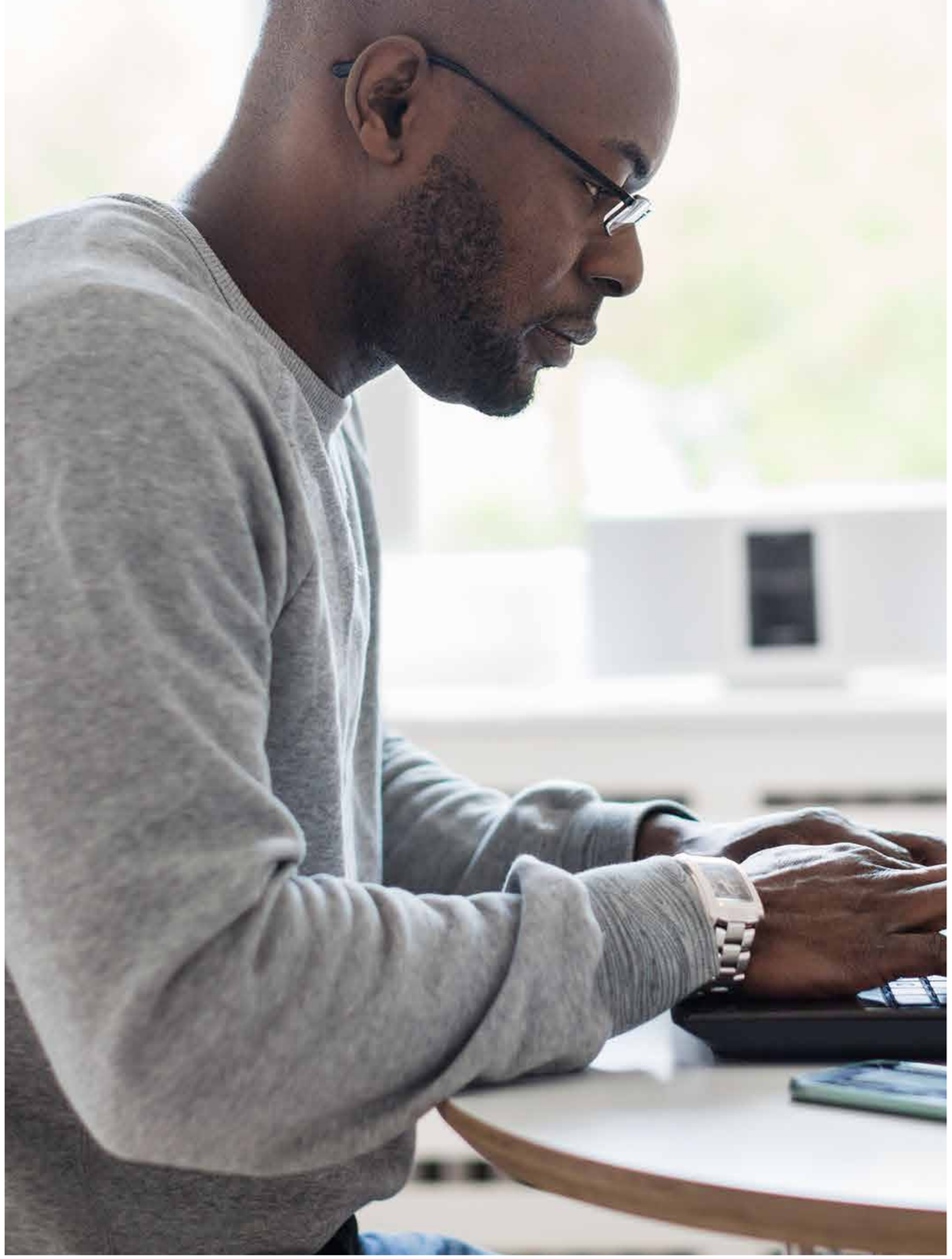
While companies such as Facebook and Microsoft are also looking to bring mixed reality to the world via glasses, goggles, or other headsets, Apple is pursuing a strategy of enabling this ability through the devices people already have – their phones.

Read more

Snapchat making Apple’s LiDAR capabilities available to developers

Snapchat announced it will launch an update to Lens Studio, its free AR creation tool. This will allow any creator or developer to build their own AR experiences for millions of Snapchatters and publish them directly into the app.

Read more



How you can capitalize

Not all Apple tech investments are fruitful, but its ongoing attention is on incorporating LiDAR in its own products – the phones and tablets we're so fond of.

This could lead to an explosion of applications on its platform that haven't happened with AR and VR dedicated devices. Here's what you can do:

- While investment in LiDAR will help bring forward capabilities needed at the device level, mixed reality will require enormous computing power to be successful. Shifting this computing power to the cloud only gets you so far – network bandwidth and latency must also be addressed to maximise capabilities.
- CSPs should consider how they can partner with application developers to bring forward new services or capabilities and be ahead of the game in building an ecosystem for mixed reality content.

Sharing is caring

Community-driven economy

What's happening?

Humans are social creatures; we like to belong and be part of a wider community – which hasn't been easy in 2020.

With global lockdowns forcing brands to explore new ways to engage with their customers, they've turned to creating communities of like-minded advocates.

User engagement with online communities has been growing steadily, increasing from 72 percent in 2017 to 76 percent in 2019, and due to the pandemic, this number has no doubt grown dramatically this year.

The companies finding success are actively creating and curating within these communities to make them compelling and truly 'sticky'.

The companies finding success are actively creating and curating within these communities.

Why it matters

Companies that make the transition from simply selling products to building a community can make substantial gains and be highly competitive.

A Harvard Business Review article on strategy concluded that:

- Enthusiastic members help acquire new members for lower customer acquisition costs.
- Members are loath to abandon the community, resulting in increased retention and improved lifetime value.
- Members support one another, resulting in high gross margins due to a lower cost of service.

> “The results of this are very real network effects: as engagement grows, the community gets smarter, faster to respond, more globally available, and generates more value.”

Reference: Harvard Business Review, 'When Community Becomes Your Competitive Advantage'

Who to watch

VirZoom selects the Oculus platform for user connectivity

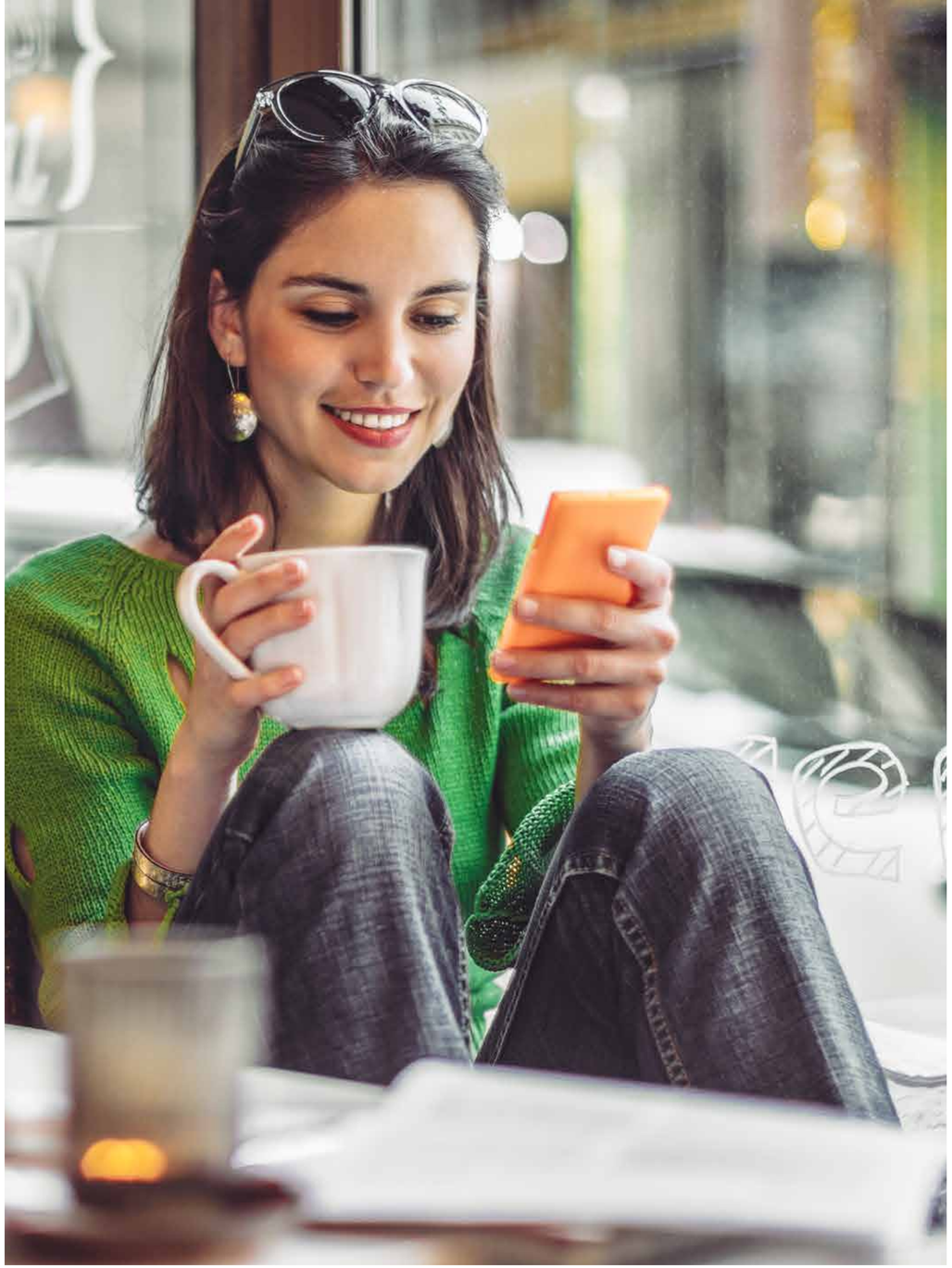
VR biking app VirZoom's Facebook community has a 93 percent member participation rate, justifying their selection of the Oculus VR platform – users can easily post to FB to find and join others on a ride. Investors are seeing this as a critical competitive advantage in the virtual workout space.

Read more

T-Mobile handles 40 percent of support requests on its community

T-Mobile's US online community boasts over four million members, as well as running the largest telecoms community in the Netherlands. With 40 percent of all support requests handled within their community, this not only helps to cut support-related costs, it also boosts customers satisfaction as their issues are dealt with quickly and efficiently.

Read more

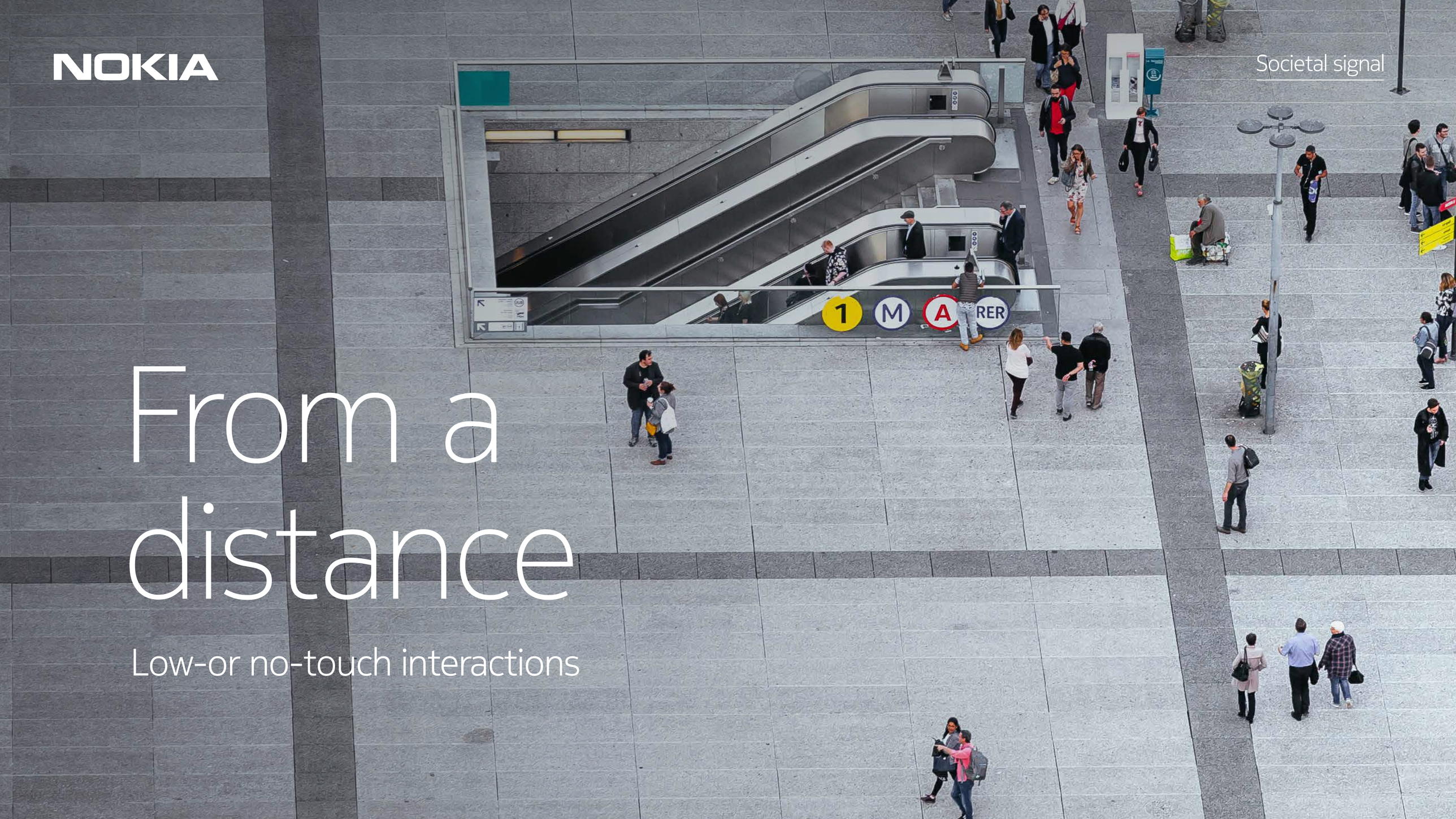


How you can capitalize

CSPs must keep customer experience at the forefront and should look at how to incorporate online communities to keep customers interested and happy with their brand.

- Beyond creating communities that deliver a convenient source for answers and advice, you should also consider incorporating feature-rich communities as integral to new products or services.
- But these communities must also be actively curated and engaged – for example, through virtual events, interactive content, and videos – for your offering to be successful.

NOKIA



From a distance

Low-or no-touch interactions

What's happening?

Just as the global pandemic has rapidly shifted consumer attitudes and behaviors, industry sectors have also had to pivot their operations due to the impact of COVID-19.

While some have boomed, many have struggled. Businesses re-opening their premises are quickly recalibrating operations to become more automated, and contactless.

This has led to enterprise planners being preoccupied with figuring out which new behaviors and attitudes are likely to endure beyond the pandemic. Their next move will be crucial as they pivot business models and hope that their new offerings will help to protect their future.

What is certain is that this low-touch economy into which we have entered is the new normal and is one in which connectivity will play a central and critical role in all spheres of life, work, play, and learning.

Reference: Business Insider South Africa, 'What drives us to be connected?'

Why it matters

Safe distancing and avoiding surface contact and human interaction are elements of COVID-19 that are presenting new business opportunities for operators as no-touch solutions prevail.

And it may be some time before we revert back to face-to-face from the current screen-to-screen meetings.

Delivering reliable broadband connectivity to all residential areas is key to ensuring citizens and businesses have access to digital services, from entertainment to education and healthcare.

And it may be some time before we revert back to face-to-face from the current screen-to-screen meetings.

Who to watch

Telefonica digitizes Silken Hotel Group’s in-room service listing and menus

Now all hotel information is accessible via their guests’ own smartphones, complying with local COVID rules. Touchless digitization of formerly paper-based media such as menus is giving operators new ways to create services for enterprises in many different fields.

Read more

NVIDIA’s "Maxine" improves video conferencing

The technology company’s Cloud AI Video Streaming developer platform "Maxine" uses AI to block background noise, turn faces to point towards camera, perform live simultaneous translation, and more. Maxine can also reduce bandwidth by first taking a face snapshot, then transmitting only data points of change – reducing network traffic by up to 90 percent vs streaming full video.

Read more

Oculus and their ‘Immersed’ way of working

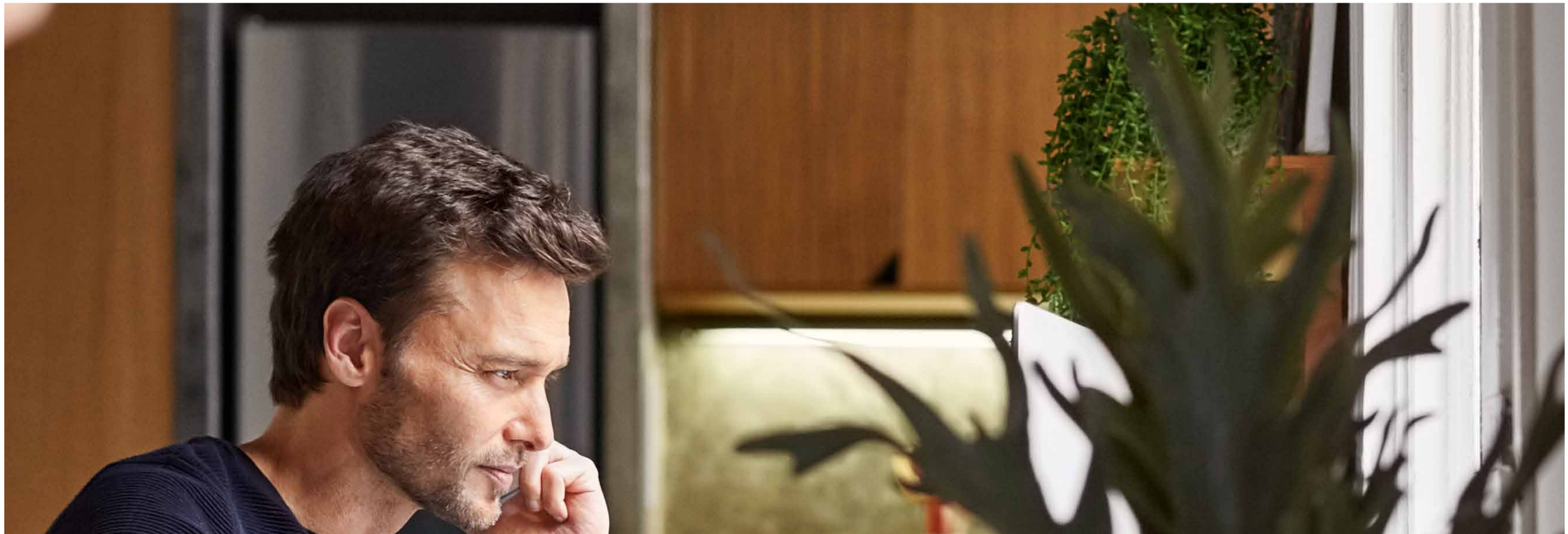
‘Immersed’ from Oculus offers solo or collaborative ways to optimize your workflow with VR. ‘Immersed’ lets users ‘see’ and use their own keyboard in its VR workspace. When connected to the user’s PC, Immersed allows users to view up to five separate screens and see their own hands and keyboard in VR as they work.

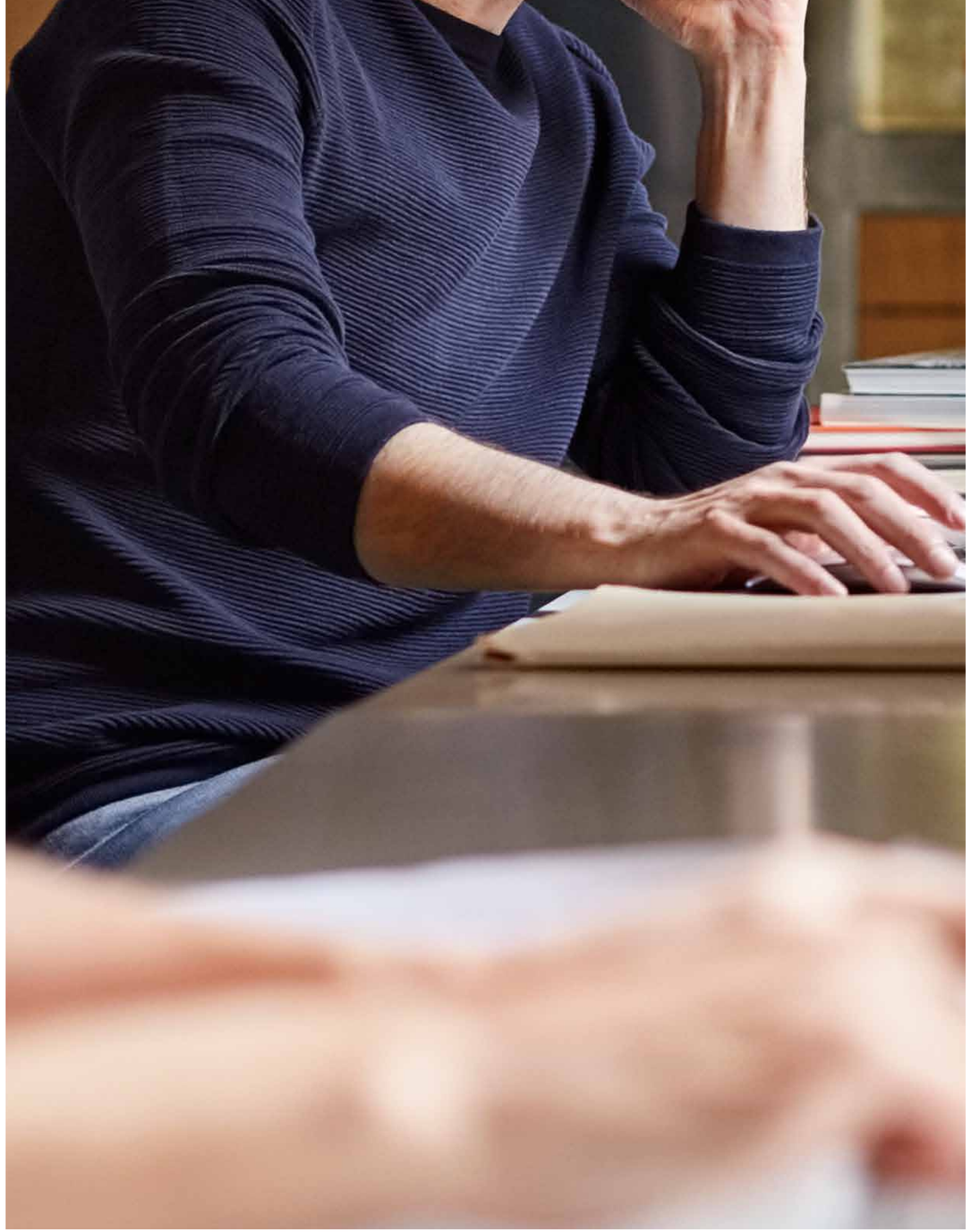
Read more

Ultraleap’s TouchFree retrofitting solution

80 percent of people now feel that touchscreen kiosks are unhygienic. Ultraleap has adapted its mid-air haptic hand-sensing system so that it can be retrofitted to pre-existing touch-only kiosk interfaces. The TouchFree application adds touchless gesture control to interactive kiosks without changing existing user interfaces or writing a single line of code.

Read more





How you can capitalize

Companies to watch have been able to make pivots to their existing products and service to meet changing customer needs or challenges.

How can you make your customers' lives easier and safer in a low-touch economy?

- As an operator you need to meet new needs, like demands in the home due to families spending more time indoors. Uncover how you can move from supporting these cultural and commercial changes to leading them.
- The best way for CSPs to thrive in the new normal is by embracing the new possible, getting inside the fresh thinking and technologies that are set to shape our world. We share five tips you can rapidly act on:

Read more

NOKIA

Business signal

Two's company

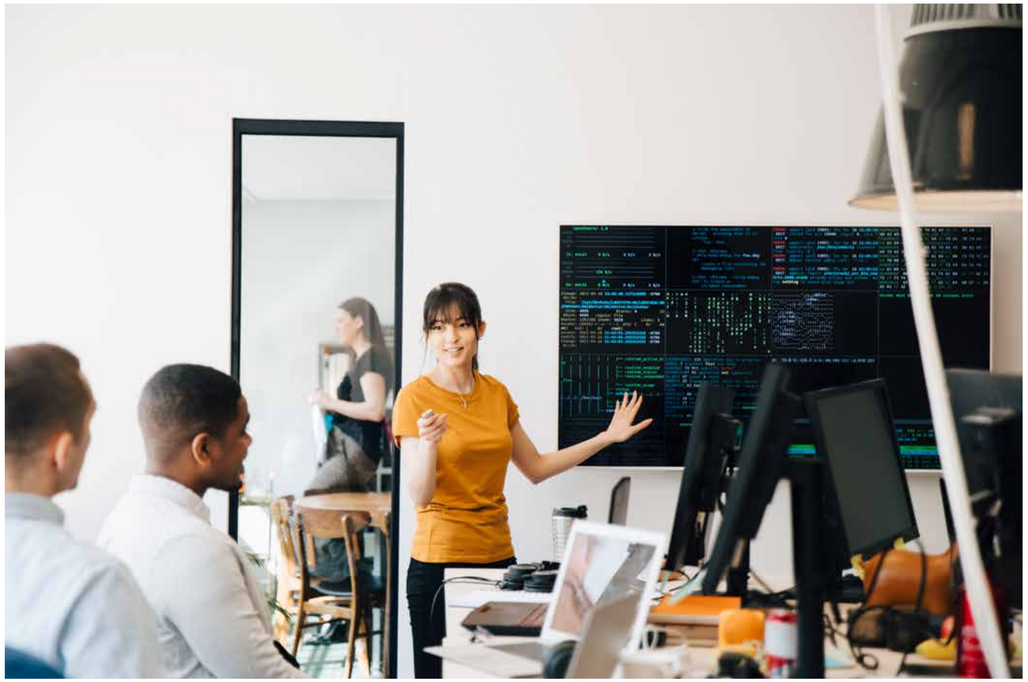
Digital twins becoming mainstream

What's happening?

Last year, Gartner Research revealed that digital twins are entering mainstream use as organizations implement IoT.

However, no one predicted a global pandemic-induced investment in IoT. Now, Gartner has predicted that by 2023, one-third of mid-to-large-size companies that implemented IoT will have launched at least one digital twin associated with a COVID-19-motivated use case.

Many industries are exploring a plethora of digital twin use cases including those that improve business operations, increase safety of employees, or even to unlock new business opportunities such as new service opportunities.



Gartner has predicted that by 2023, one-third of mid-to-large-size companies that implemented IoT will have launched at least one digital twin associated with a COVID-19-motivated use case.

Reference: Gartner, 'Survey Analysis: IoT Digital Twin Adoption Proliferates Across Many Sourcing Options'

Why it matters

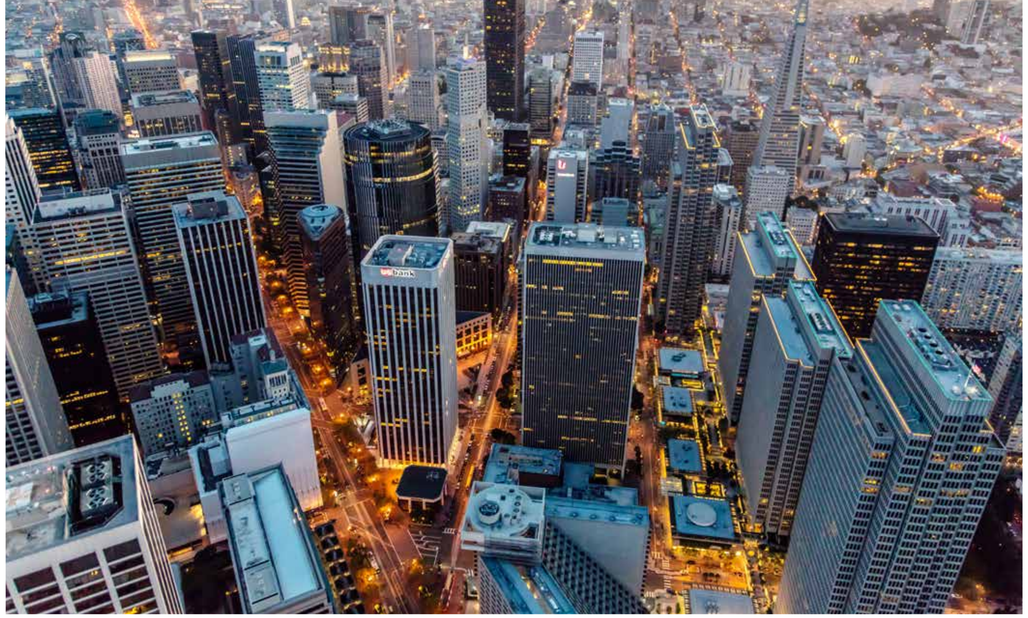
The rising adoption of digital twins highlights the importance of virtualized everything.

Being able to simulate, explore, and test without disruption to a real-world object has high appeal and application to a broad set of use cases.

Having a software-designed pattern that allows you to access hard-to-reach spaces, understand the state of those spaces, build products and services that link to those spaces, and quickly respond to any changes, rapidly improves business operations and adds value.

Being able to simulate, explore, and test without disruption to a real-world object has high appeal.

Who to watch



The city of Helsinki

Using digital twins, Helsinki made two city models available to companies that contain public data about individual buildings, including construction type and energy consumption and offered an open invitation to create services using these models. This award-winning project showed the power of digital twins for both infrastructure innovation and collaboration.

Read more

KDDI and their city overlay

Over the five days leading up to Halloween, KDDI hosted celebrity performances, concerts and other gatherings in a `Virtual Shibuya' digital twin. People could enjoy safely, rather than in person in the Shibuya.

Read more

Arvizio’s XR Director Platform

Arvizio’s XR Director Platform combines live IoT data with enterprise digital twins for factory insight and control. LiDAR scans are used to build an AR digital twin, using edge cloud compute that integrates key information such as project data. As managers ‘move’ through the AR scan, real time updates on actual machine performance become visible via Verizon’s IoT service.

Read more

How you can capitalize

CSPs need to start thinking about digital twins in two ways. First, how can they be part of the digital twins' value chain, and who do they need to partner with to provide digital twin services for enterprise customers?

- Look at expanding capacity to offer digital twins mapping to your customers as it is a fruitful gateway to new services.
- Adopt digital twins for your own business. Creating a digital twin of your own network would allow you to simulate network events, changes, and upgrades to understand their impact on services. Could digital twins be used to delight your customers via new marketing initiatives, or improve customer experience?

NOKIA

Business signal

Virtual sanity

Spatial web

What's happening?

5G use case research conducted by Nokia showed that there are two main commercial uses for AR and VR – information and entertainment.

However, they take on new value in light of social isolation and remote work. Although AR and VR technology and devices are not new, the players in the augmented/mixed reality space realize it won't work well without 5G. So they're starting to partner with CSPs to accelerate the process.

This acceleration, combined with AI, IoT devices, and AR and VR, is bringing us closer to realizing the spatial internet – the mapping of our physical world into virtual spaces, combined with the ability to superimpose a digital layer onto our physical environments.

Why it matters

Mixed reality is still a niche play today, but as the underlying technology improves, costs of devices come down, and 5G becomes more widespread, the stage will be set for AR and VR to reach its potential.

Worldwide spending on AR and VR is forecasted to grow to $72.8 billion in 2024 according to IDC, accelerated out of the pandemic, with much of the growth driven by investments from the commercial and public sectors.

How large a share of this spending can CSPs capture?

Worldwide spending on AR and VR is forecasted to grow to $72.8 billion in 2024.

Reference: IDC, 'Worldwide Spending on Augmented and Virtual Reality Forecast to Deliver Strong Growth Through 2024, According to a New IDC Spending Guide'

Who to watch

Niantic indicates importance of 5G to AR with global operator alliance

The company behind the popular AR game Pokemon Go! announced their Niantic Planet-Scale AR Alliance to "make available exclusive 5G-ready AR content, and demonstrate consumer AR experiences that set the standard for what innovation means in a 5G world..." This alliance includes CSPs such as Verizon, Softbank, T-Mobile, Orange, Telus, Globe Telecom, SKT, and EE.

Read more

British Telecom's Augmented Reality enhancement of BT Sport TV broadcasts

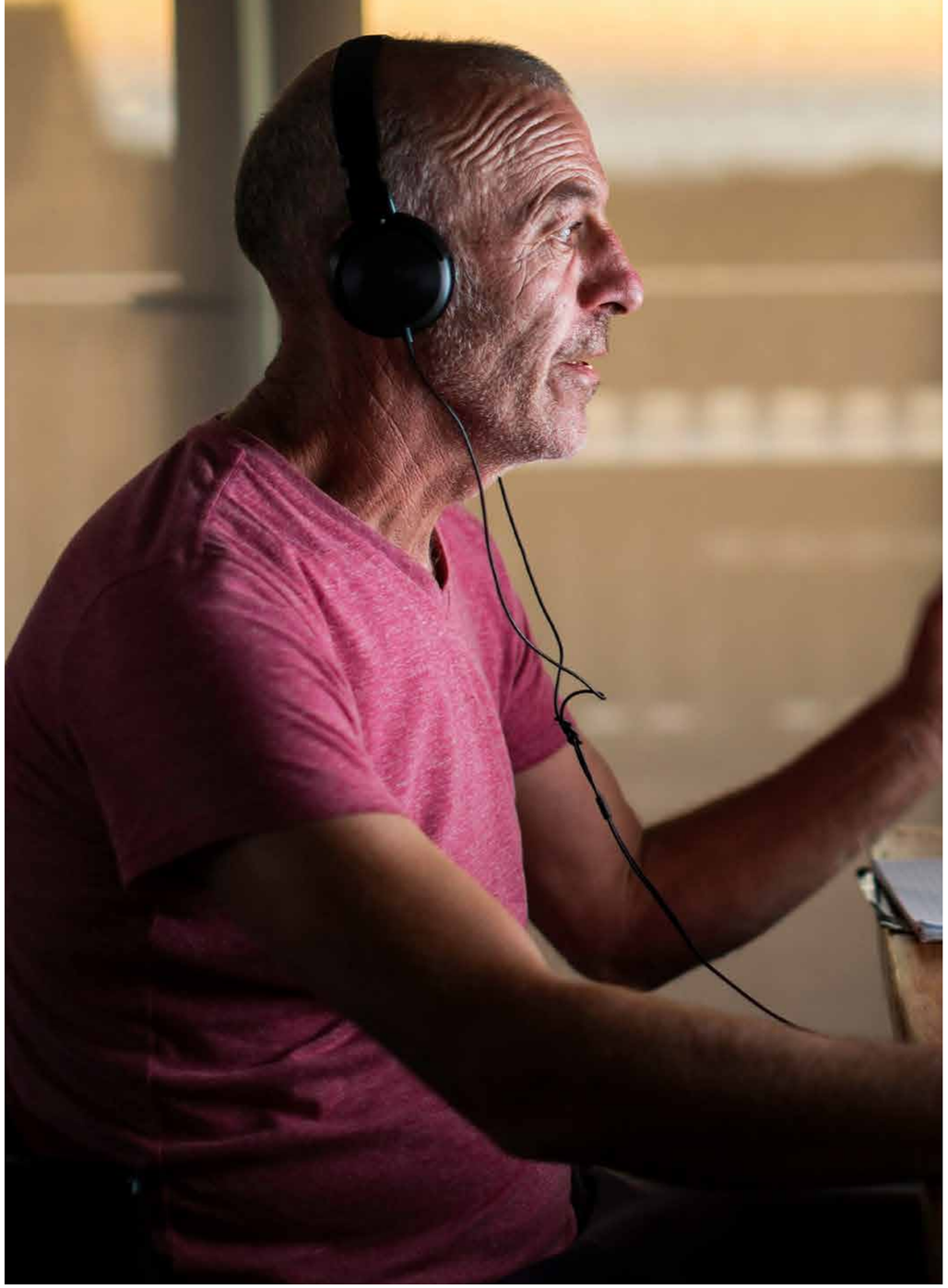
With a government grant, BT is at the head of a consortium named 5G Edge-XR, which is launching a 20-month project to develop concepts such as broadcast-linked live holographic tabletop images of multiple sports, bringing immersive stadium experiences into viewer homes.

Read more

Qualcomm joins Global XR Content Telco Alliance to create AR/VR content

Led by LG U+ South Korea, this group includes both key global 5G operators as well as content studios Atlas V from France, and Felix & Paul from Canada. Qualcomm's presence indicates its commitment to 5G-enabled XR and its long-term interest in new XR devices, though initial group content will be released through smartphone apps.

Read more



How you can capitalize

Although AR and VR could still be viewed as niche now, CSPs need to be prepared with a strategy and start thinking about partnerships.

- Mixed reality relies on an ecosystem of partners in three main areas; devices, platforms and content. The value here will be in linking brands to fans to create compelling experiences that serve as another channel for digital engagement.
- If you want to move beyond connectivity, you need to quickly understand this space, decide on your strategy and find suitable partners with the right expertise.

The telecom industry operates on the cusp of technology advancements and is under constant pressure to expand its business.

Staying abreast of early signals is one thing, understanding how they impact business and deciding if, when, and how to act will be critical. Nokia helps its CSP customers with critical strategic issues to design, deploy, and operate fixed and mobile networks, to form and activate digital transformation strategies, to launch new services faster and expand their opportunities with enterprises.

Invite a member of our team to present an overview of these latest trends and what they mean for your business:

Contact us

Discover more insights around the three themes that offer opportunity for CSPs:

1. Scaling for performance and resilience
2. Unlocking business potential
3. Building a better world

NOKIA

Nokia OYJ
Karakaari 7
02610 Espoo
Finland

Document code: CID210258

About Nokia

We create the critical networks and technologies to bring together the world's intelligence, across businesses, cities, supply chains and societies.

With our commitment to innovation and technology leadership, driven by the award-winning Nokia Bell Labs, we deliver networks at the limits of science across mobile, infrastructure, cloud, and enabling technologies.

Adhering to the highest standards of integrity and security, we help build the capabilities we need for a more productive, sustainable and inclusive world.

For our latest updates, please visit us online www.nokia.com and follow us on Twitter @nokia.