



THE DECADE OF CHANGE

STARTING THE AGE OF HUMAN
TRANSFORMATION THROUGH
TECHNOLOGY

LAB
13^{by}
MRM

FORWARD

As technological innovations reach new heights, permeating every aspect of daily life, a deeper dialogue is taking place among brands, citizens and consumers alike.

With more insight than ever into the ways in which technology can enhance, beautify, simplify – and complicate – our lives, our collective conversation turns future-forward. The various elements that have become so essential to so many of us – connectivity, interactivity, a curated customer experience – will amplify even further. New questions will arise around privacy, data and surveillance. Smart cities will redefine the distinctions between body, space and mind.

For today's forward-thinking brands, this calls for a new approach to reaching consumers and meeting them where they are, when it matters. By keeping abreast of the latest global tech trends and continuing to put people's wants and needs first, companies and organizations across the world have the power to not only transform the way we do business, but also the way we live.

Over the next decade, we expect the following to serve as the key drivers of change:

- Global recession, which will play a larger role in fiscal policy
- Climate change, which will strain the planet's resources
- Viral pandemics like COVID-19, which provide a greater threat as we are globally more connected than ever before
- Robots, predicted to displace 50% of jobs by 2035
- Moral capitalism, which will favor redistribution over inequality
- Everything becoming "smart" as everything becomes connected

LAB13 designs meaningful people-centered solutions for brands 18 month ahead of market – we simply imagine the future and then build it. As a part of MRM, we grow meaningful relationships between brands and consumers by inventing new products and services – all of which relies heavily on understanding technology trends that will disrupt the status quo.

In this report, we'll examine the top tech trends for the coming decade, breaking up the 10 years ahead into three core categories – 2021-2022, 2022-2025 and 2026-2030 – for a deep dive into the stages of change.

We hope you find it useful as you continue to bring your brand into the future.

DOMINIK HEINRICH
Global Executive Director, LAB13

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CONSUMER-CENTRIC CONNECTIVITY

As unique, curated customer experiences become the expectation rather than the exception, brands will continue to seek new ways to connect with their target audiences in the year ahead. Exciting innovations in entertainment, engagement and inclusivity will offer new opportunities for businesses to stake their place in our ever-evolving digital worlds, reaching customers in their own realms. In this section, we'll explore the following trends reshaping the customer experience:

-  Virtual entertainment domains
-  Product diversity & inclusion
-  Augmented & mixed reality gaming
-  The 5G impact
-  The new face of retail

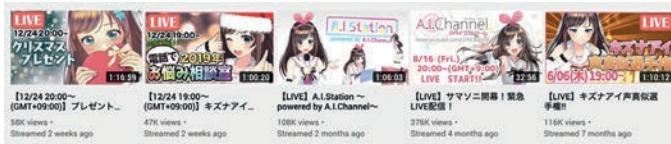
With this digital consumer world ignited, we'll also play specific attention to the effects of recent viral outbreak, and how these technologies can be harnessed to support a more connected, yet socially distant society. The rapid onset of this global pandemic will have us thinking more about the ways we'll need to quickly transition to a digitally-connected yet socially and physically distanced world in order to prevent further viral growth.



VIRTUAL ENTERTAINERS TAKE TO THE WORLD OF VR

Japan's all-digital idols pave the way for exciting branded experiences in immersive digital realms

ALLEN WONG / Tokyo



The continual rise in “virtual youtubers” like Kizuna A.I in Japan has sidestepped and disrupted Japan’s normally fiercely competitive idol and entertainment industries – typically run by talent agencies who rule with an iron fist.

These YouTubers often livestream and produce variety content around gaming, music, collaborate with each other and make occasional appearances (in their virtual forms) on television programs.

While especially popular in Japan, virtual youtubers exist internationally as well. Brands like Mattel have used their characters in the past to create content on YouTube for kids.¹

A study conducted by Sony in 2019 found that over **30% of middle school boys’ first choice in professional goals included “Professional YouTuber”**.

In Japan however, their growing popularity along with the rise of streaming content producers has created a whole new generation of fans as well as

future content creators. A study conducted by Sony in 2019 found that over 30% of middle school boys’ first choice in professional goals included “Professional YouTuber”. For middle school girls, the most popular profession (18%) was Entertainer (singer/actress).²



In the next couple of years the collision of consumer VR via shared spaces (the most recent phenomenon being VR Chat), entertainment, and streaming will come together. YouTube normal video will no longer be enough for fans who want new ways to interact with digital characters.

Companies like Cluster are building VR arenas where virtual performers can hold concerts, conventions, and brand-powered experiences. In a time where viral-induced social distancing has put more people behind their screens held up on their homes, an increase in VR experiences of museums and public places have already been on the rise. With society becoming more comfortable on the internet, VR arenas, platforms, and virtual entertainers may see a rise sooner than we think.³

BRAND TAKE-AWAYS

Many brands will remember the popularity, allure, and straight up confusion brought on by the sudden popularity and complete anarchy of Second Life in the west. The cycle of capitalism is now complete, online chat is no longer the wild west, and savvy consumers are now ready to participate in a wave of entertainment created from communities on the internet itself. The rise of E-sports and other virtually-driven communities only add to this trend. This is an opportunity for digitally native entertainment brands to take another look at persistent digital worlds.



THE BRANDING BOOM IN AR & MIXED REALITY GAMING

Gaming turns our world into a branded consumer playground

ADAM PRENDERGAST / Manchester



The concept of Augmented Reality (AR) gaming allows players to mix digital content with the real world. This could be presented on a mobile device utilising the camera, or with a dedicated AR headset like Hololens and Magic leap. The latter being an area that is likely to develop significantly as the decade unfolds¹. An insight into the future rise of wearable AR headsets can be seen in the increased adoption of Virtual Reality (VR) devices. Last year was an extremely successful one for Facebook's Oculus Quest, where they were selling them as quickly as they could make them².

The success and global explosion of Pokemon Go in 2016³ was in many ways a trend ahead of its time and an insight as to the mass appeal that AR gaming holds - these platforms have the ability to 'go viral' in ways we have not even imagined yet. The AR games of tomorrow will be significantly more advanced and will allow for hyper realistic interactions with the surrounding world. Imagine a city morphing into a fantasy world, the city hall becoming a towering medieval citadel and all roads lead to new and unexplored magical worlds.

AR (mobile AR, smartglasses) could approach three and a half billion installed base, and \$85 billion to \$90 billion revenue within 5 years. At the same time, VR (mobile, standalone, console, PC) might deliver 50 to 60 million installed base and \$10 billion to \$15 billion⁴.

Products like MapBox and the Google Maps Gaming Platform will provide us with a digital representation of the real world – a canvas on which games developers can paint extraordinary worlds and narratives.

AR technology will allow for dense digital maps of the real world to be generated in real time at a rate that supports natural human motion such as walking and running. This will allow for a concept called 'occlusion' to be robustly delivered - this is where the digital game assets can appear from behind real world objects like buildings and even people.

These games will even leverage a persistent AR world where you can see the impact of your actions in future play and even help, support or hinder other gamers as part of a multi-player experience. And in a climate of social distancing, such opportunities for social interaction and life beyond confines could provide a great outlet for anyone under a self-quarantine.

BRAND TAKE-AWAYS

The opportunities for brands in this space is huge. Whether it's turning a city or building into a vibrant living brand experience, taking over people's homes with unprecedented product immersion, or hijacking competitors in their own physical space - AR gaming is set to be a playground for creativity, a digital wild west for mischief and a space for innovation in new and unforeseen ways. Brands have the unique opportunity to create a new level of relationships with people at the intersection of reality and virtuality.



REWRITING THE RULES OF RETAIL

Connect with customers through
robots, data, and hyper-personalization

ADAM PRENDERGAST / Manchester

According to the "Truth about Commerce" Study from McCann Truth Central, 46% of people globally say that online shopping is too much of a lonely experience. The opportunity for retail will dramatically evolve and alleviate some of these "lonely" factors as we progress through the next decade: a new era of fully integrated, invisible tech will lead to a hyper-personalized consumer journey and a seismic shift in the 'real world' commerce space powered by robots and data.

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The consumer of the mid-2020's will become accustomed to a highly personalised experience. The user interfaces we have become so accustomed to will yield to the demise of screens as we usher in a 'ZeroUI'¹ world and move towards a post-mobile society. This technology will rely heavily on face and even gait² recognition - an interesting area of debate as we see how consumers trade off privacy with convenience with perks like facial recognition payment.

Personalisation is also likely to become more advanced and transparent. We are already exposed to curated shopping and viewing from the likes of Amazon and Netflix, but expect this to develop into other retail areas. For example, the clothing industry

will evolve to tailor your fashion suggestions with increasing specificity - taking data about past purchases, current trends, interests and even displaying garments on models of your exact size and body shape.

The retail space of tomorrow will be an area powered by data on an unprecedented level. This data that will lead to increased personalisation will also be the fuel for artificial intelligence ERP (Enterprise Retail Planning) systems that will allow for preemptive shipping and stock that is more responsive to consumer trends.

The rise of the machines will also see a shift in the job economy as we see the current reduction in checkout workers grow. Expect to start seeing more robots in shelf stacking, stock management and even taking on surprising roles such as personal shoppers and stylists. With new trends of self-quarantine and social distancing, a highly digitized shopping experience with less humans and more tech-powered interactions is exactly what is missing.

The nature of physical retail, and what Alibaba's founder Jack Ma calls 'real retail', is likely to morph beyond recognition. Stores will become smart, auto stocking with items reactive to social trends and user reviews. Footfall and adaptive lighting will become the norm allowing shoppers to be incentivised to different parts of the store.

BRAND TAKE-AWAYS

For many brands, this changing state of retail will offer new and exciting ways to engage with consumers – be it through seamless interaction and payment, focused personalization powered by AI or data driven pop-ups³ increasing consumer interactivity and engagement. This new retail world will usher in stronger relationship-building and a wealth of opportunity for those that manage to keep up with the changes and innovate, but will also bring risks for those that don't.



DEMANDING DIVERSITY IN NEW TECHNOLOGY

New product development brings inclusivity to the forefront

CAMILLE CAMPBELL / New York

Diversity and Inclusion is the hot topic throughout every aspect of our lives from the political sphere to our office spaces. Technology such as virtual assistants, interactive maps, and virtual doctors will need to be able to be usable by everyone. How will people who cannot hear be able to use a voice activated virtual assistant? Will facial recognition software be able to read faces that are unique to the builders of the software? Is there a way to use technology to help people gain independence?

Companies at the moment are developing creative solutions to insure their product can be usable by everyone and anyone. Google has recently announced their dedication to inclusion by creating a Product Inclusivity team led by Anne Jean Baptiste.¹ "The technology itself isn't racist, it's just that it wasn't tested enough to determine that the product designers themselves weren't unconsciously biased," Baptiste explained. Adobe and Microsoft have also developed their own teams to help tackle product inclusion.²

Inclusive Technology, a UK company, creates catalogs of inclusive technology for school systems around the world. Better inclusive and assistive technology in schools are a growing need to the amount of non-traditional learning offered to students with unique

needs.³ Eye tracking software has been launched called Skyle that can be used on an iPad Pro. This can allow for students to be able to access AAC apps, infra-red products, and social media to connect with friends and family. Concept 3D, a company that created virtual maps, had included audio maps for users with low vision⁴. Sinergia Tech is offer comprehensive data analytics for farmers in South America to help bridge wage gaps.

Retailers such as IKEA, Tesco, Lacoste, BIC Kids, MTV, Patron, Cadbury, Converse, and Kate Spade are all hopping aboard this trend by using AR to connect with all users. ASOS, in collaboration with Zeekit have rolled out a AR feature that allows customers to be able to customize the view of an item. A dress can be viewed on multiple skin colors, heights, and body types to be able to assist users in finding the perfect fit. Not only does this make customers feel these brands have something for them. It can cut down on shipping costs and mistakes.

"If technology does not serve us and amplify our lives, then obviously we are not doing our jobs," said Omar Khan, of Magic Leap, a VR startup.⁵

BRAND TAKE-AWAYS

In 2020, brands need to shift their focus to diversity and inclusion initiatives in order to survive in this new future, and the spotlight will be on companies that are able to adapt to these new specifications. Hiring diverse staff and stress-testing products are examples of ways that brands can promote diversity & inclusion as a part of their ethos. Product diversification and accessibility are also key - brands can also benefit by developing products for underrepresented communities, overall bridging the digital gap while expanding profit.



THE CONNECTED CONSUMER ECO- SYSTEMS OF 5G

High speeds and enhanced network reliability open the door to immersive consumer ecosystems and interactive ads

CHRISTINA ASHTARY / New York

While 5G telecommunications networks debuted in the latter half of 2019, 2020 will witness the first fruits of this technology revolution. With more than 20 million 5G smartphones predicted to be shipped this year¹ and over 50 billion connected devices globally², we will see a new standard of speed and connectivity, estimated to be up to 100 times faster than 4G networks³. Much is promised for the long-term future of 5G, but the first phase of the next technological revolution will focus on smaller consumer gains.

A 5G boost in IoT technology will start to impact smart cities and connected devices, with a focus on "micropositioning" small cells to start to enable an ever-connected domain⁴. Intelligent advancements in connected homes, like a central system automatically triggering a chain-of-actions, powering off potentially hazardous devices (oven, fire) in the event of a malfunction will become the norm⁵. The ability for devices to speak to each other and act intelligently will be key.

Increased bandwidth also means consumers will be digesting more, quicker than ever before, and in new forms of content. Video advertising is set to see one of the biggest game-changers with the introduction of 5G, with video-traffic expected to account for 82% of all network traffic by 2022⁶. With the rise in augmented and virtual reality, 5G networks will be much better equipped to handle such forms of content.

The increase in speed and accessibility may most importantly, in a time of increased telecommuting due to self-quarantine and social distancing, launch the next generation of digital workforce. Existing digital services like Zoom and Microsoft Teams facilitating remote meetings team communication and interactive digital work communities, paired with technologies like Vibe, an interactive whiteboard that facilitates virtual collaboration will only see an increase in popularity as once poor connections are replaced by fast and reliable connectivity.¹⁰

BRAND TAKE-AWAYS

AT&T believes 2020 will be pivotal because a solid foundation and infrastructure has been built, and now ecosystems can start to grow to reach new potentials.⁷ Brands will need to think about how to further create a connected world for the consumer, and how they can enable devices and products to connect to a larger, centrally controlled ecosystem. In the advertising + consumer engagement space, brands will also need to up their marketing tactics, focus on video. 5G means more content and increased traffic at faster speeds, where companies like Verizon and Snapchat are already reimagining a brand-new ad experience utilizing AR + VR⁸. Brands will also focus on personalized + interactive advertising, using real-time facial recognition technology with storylines adapting based on viewer's detected emotional response⁹.

2022

2025

THE BLURRING LINES BETWEEN HUMANS AND MACHINES

Having already made a huge impact across a range of industries, the rise of artificial intelligence (AI) will continue gaining speed—and market share. As brands experiment with advanced technologies to better meet their target audiences' wants and needs, we can expect to see heightened interest in AI over the next five years, further blurring the line between humans and machines. In this section, we'll focus on the following trends inching the meaning of "intelligence" further into the future:

-  Health care wearables and AI
-  Voice activation
-  Human augmentation

In this section, we will also point out how the digitization of health and increase in machines will play a role in future viral outbreaks, from an increase in digital detection technology to personal wearables to help prevent viral transmission.



Wearable and AI technologies open up
new opportunities for personalized health

CAMILLE CAMPBELL AND JAEYOUNG LEE / New York

In the next decade, the future of Healthcare will reach new levels of technological advancement with the assistance of AI predictive analytics and connected care. As many patients will utilize wearable, implantable, mobile health, or fitness devices, doctors will be able to predict and prevent issues from hereditary to chronic illness. Patients will be able to use their devices and relationships with their doctors to be able to keep tabs on their health in an increasingly expensive healthcare environment.

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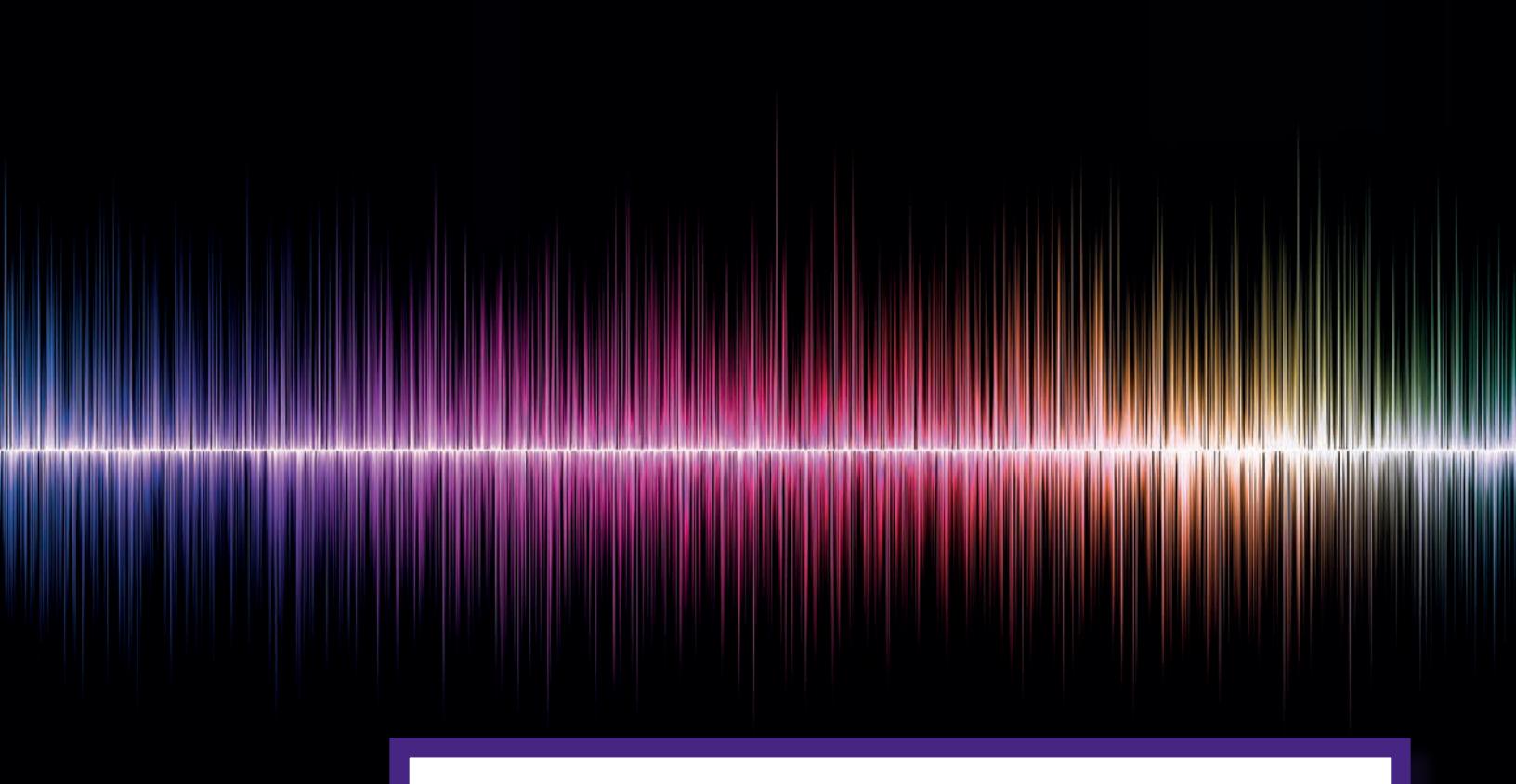
In the current state of healthcare, providers and facilities are seeing a "bottleneck" effect of patients with different levels of ailments. In the wake of the Coronavirus outbreak, companies like Alibaba, Tencent,

and Baidu are ramping up digital medicine efforts - from launching digital diagnostic services, to using cloud computing services and AI algorithms for CT scan reviews, claiming it can "identify the difference of images between the highly suspected coronavirus-infected pneumonia, slightly suspected, and non coronavirus-infected pneumonia within 20 seconds, with (an) accuracy rate up to 96%."⁴ While these newest efforts are being driven by the current viral crisis, telemedicine has actually shown success with current patients, as MedCity news reports "veterans who enrolled in Home Telehealth for chronic care management had a 33 percent and 53 percent decrease in hospital admissions and bed days of care, respectively."²

What does this do for insurance? Insurance is shifting its focus to AI and data analytics of patients by studying wearables, health trackers, and VR. Humana has developed a technology hub called Studio H to focus on leveraging AI, voice recognition, virtual care, and remote monitoring. Buddy, an AI avatar meant to provide care to high risk patients was debuted at 2019 CES.³ Heather Cox, Human's Chief Digital Health and Analytics Officer comments "About 40% of the time it's completely automated with AI, and about 60% of the time it's a human that's engaging with the member through the avatar".

BRAND TAKE-AWAYS

Brands in all aspects of the Health sphere should think about how they can learn from AI and data analytics of wearable technologies from patients. And even those brands who are not grounded in the traditional health space are now having to expand health offerings in order to deliver on inclusion and expand their portfolio. The focus on health will play an important role for people and can create entirely new relationships with brands.



ZERO UI & NEXT-GEN VOICE INTERFACES HIT THEIR STRIDE

Advances in interactivity and personalization open up new conversations in voice activation

Voice interfaces are all around and are becoming more important for society. Within four years Amazon sold 100 million Alexa devices. During the last year alone, this amount has doubled, summing up in a total of 200 million devices¹ (that amount equals to more than half of the population of the US). Amazon is market leader when it comes to dedicated smart speakers.² However, other major players like Google, Apple & Samsung are showing even bigger numbers, making voice interaction additionally available for mobile devices, such as Siri, Google Assistant, etc.³

And this is just the beginning. What has started as a home assistant only a few years ago, is currently evolving to become an "omnipresent assistant". Soon, your preferred voice assistant will be available wherever you are and fit in seamlessly into your daily routines.

What has started as a home assistant only a few years ago, is currently evolving to become an "omnipresent assistant".

They will be found in cars, POS, healthcare, and be integrated more and more in third-party-products. For example, you will be able to pay easily at gas stations with the help of your in-car voice assistant, using only a simple command.⁴

Number of smart speakers in U.S. households alone, grows by 135% every two years.⁶

Beside claiming new territories, voice assistants are also being improved in their functionalities and quality. Coming along with more advanced understanding of the user's situation, voice interfaces will be able to start a conversation pro-actively. For example, they could ask you to adjust your grocery list, when you invite guests over for dinner or let you know that a new episode of your favorite tv-show is available for streaming, just in time for your evening entertainment.

Current research works on better understanding the mood, the user is in.⁵ This will give the assistant new capabilities to react in a more appropriate manner. Your favorite football team lost? Your assistant may take heart.

Also, conversations will become more natural due to enhanced memory capabilities, a kind of "short-term memory", which allows for the assistant to "remember" the dialogue itself. With the help of new AI powered speech synthesizes, pretty soon the new assistants will be equipped with voices, almost impossible to differentiate from real human speakers.

BRAND TAKE-AWAYS

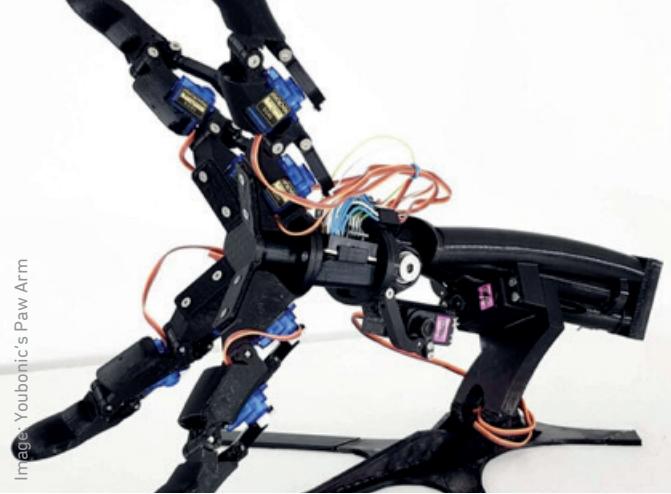
Overall this leads to clever, omni-present assistants. They will be more personalized and interconnected and interaction will become more human-like. A rising amount of interactions with conventional websites, mobile applications and POS will shift to voice. Companies have to discover their role in this evolving infrastructure. Brands need to analyze their existing services and how they can be adapted by meaningful voice solutions to design new relationships with people and simplify their experiences.



ACCELERATING OUTPUT WITH TRANSHUMANISM

Human augmentation heightens the reach of our mental and physical abilities

CAMILLE CAMPBELL AND JAEYOUNG LEE / New York



Gone is the time when the idea of a bionic superhuman would only be seen in science fiction movies. Human Augmentation is here, and it's not just to repair limbs or assist the disabled. Human Augmentation will become our new lifestyle in the next decade. With budding products like Dani Clode's 3D printed extra thumb, Youbonic's Paw Arm, and North Focal AR glasses the ability to advance and protect ourselves will become irresistible and inspiring.

Brands have been creating technology to enhance the human form as far back as 1997. Ottobock developed one of the first microprocessor-controlled prosthetic knees. By using a microprocessor, the knees can bend more life-like and similar to a natural knee. Stanford University has been working on prosthetic skin, since 2015, that can send data to the nervous system resulting in a simulated feeling of touch. Forbes documented at the Wearable Robotics Association Conference "It was revealed that between BMW, Ford, Honda, Nissan, Toyota, and Volkswagen there were 585 devices in use". Delta

is revolutionizing the human ability of airline employees. In collaboration with Sarcos Robotics, Delta has created the Guardian XO, a super-suit that extends the physical capacity of the employee while ensuring their safety and they lift. Companies like AO Air are developing fashionable face masks that provide up to 50x more protection than regular ones - a personal tool that could prove very useful in times of viral epidemics.

A revolution is unfolding in operating rooms, labs, artist, and designer studios across the world. It's predicated that with the normalization of human augmentation a subculture is likely to be born as a byproduct. Brands and artists like Geumhyung Jeong, Esmay Wageman, and streetwear brand RFLCTV studios are all tapping into the creative side of human augmentation by challenging the idea of humanism and the machine. "If harnessed, for example, in the military, in retail, the workplace or train stations, they could become the new standard for interactions between people, machines, and products" as mentioned by Dazed Beauty.

BRAND TAKE-AWAYS

Brands are encouraged to tap into Transhumanism in experimental ways. Since most technology is in relatively new phases, brands should feel as though they have creative control over the incorporation of human augmentation to their companies, from safety to artistry. Gone on the days of restricted manual labor. Companies will be able to maximize the productivity of their staff in mental and physical ways. Brands can also improve their lives of their customers by giving them as taste of superhuman ability.

HAWAII



Mixed Reality via the
Microsoft HoloLens
(Photo: Microsoft) ³

BRIDGING THE DIVIDE BETWEEN BODY AND TECH

Moving past the screen, technology
expands the possibilities of connectivity
and consciousness

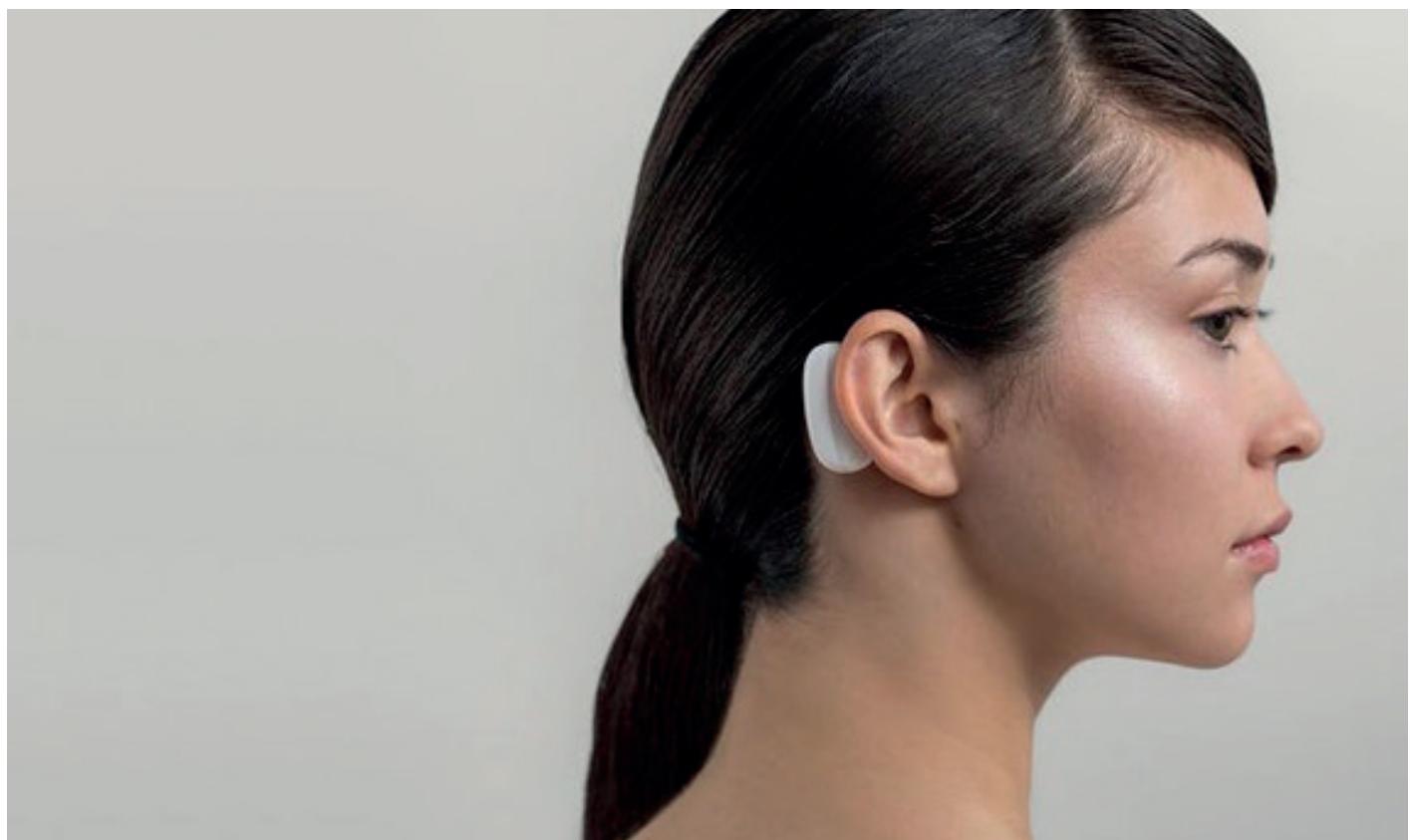
SAIJAN IYER / Frankfurt

Every day, the majority of people connect to the digital sphere through their smartphone or computer. But many experts and companies believe that the smartphone is already on its deathbed. Using a handheld device is just not convenient enough anymore...

Technology will undoubtedly become more seamless, more integrated and even more accessible. In other words: Technology will increasingly become a part of us and our bodies. It will continue to enhance our abilities up to the point where we might call ourselves Humans 2.0. – a buzzword that describes evolution based on scientific advancements rather than natural selection.

The integration of technology in our everyday lives has been taking place for a quite a while, but right now we are on the verge of merging that technology with our bodies. We are already using wearables like smart watches or fitness & health trackers to complement our digital experiences. Most of those wearables are still bound to our smartphones, taking the role of an extension rather than being the main interface themselves.

But not for much longer. According to Bloomberg¹ Apple is currently working on smart glasses, with a planned release in 2023, that could replace the iPhone eventually. The real and the virtual world will become deeply intertwined through



Neuralink receiver sits behind the ear (Photo: Neuralink)⁷

the use of augmented reality, allowing users a more seamless experience by transferring digital content like navigation or messages into their full field of view. According to Alex Kipman, the main investor of HoloLens, Microsoft's holographic headset, the phone is already dead.² He also believes that mixed reality, as utilized in the HoloLens, will be the natural successor to devices with a screen. What might have been too early of a release for Google (referring to Google Glass), could still become the next step in our device journey.

However, smart glasses will definitely not be the end of this journey. Scientists are already working on smart contact lenses which could not only monitor the user's health, but eventually might also be able to detect eye movements or display content via an inbuilt screen.⁴

Still, some companies are even thinking further ahead. To achieve real symbiosis between humans and technology, we need to be able to control it with our minds. That could be made possible by so called BCIs – brain-computer interfaces that connect directly to our brain activity. Next to a wave of startups, there are also some big players like Facebook or Elon Musk's Neuralink working on this technology.

Facebook's R&D Division Building 8 is working on such an interface with the goal to enable people to type text at 100 words a minute with just their minds.⁵

That's 5 times faster than typing on your phone. Simultaneously, Neuralink, founded by Elon Musk, is working on an actual brain implant.⁶ Possible applications include complete mind control over all kinds of technology or giving robotic limb prosthetics the feeling of touch and haptic feedback. However, Musk's long-term vision is to use Neuralink to connect artificial intelligence (AI) with the human mind to facilitate the augmentation of human consciousness even further.

BRAND TAKE-AWAYS

Shifting information from a screen into our field of view sets new ground rules on how brand communication can and should be executed. Content will integrate seamlessly into our perceived environment and offer a variety of possibilities for direct user interaction. Therefore, the continuous technologization of humans offers great chances for brands, but also comes with a variety of challenges. Brands will have to navigate an even finer line between creating real customer value or causing information overload.



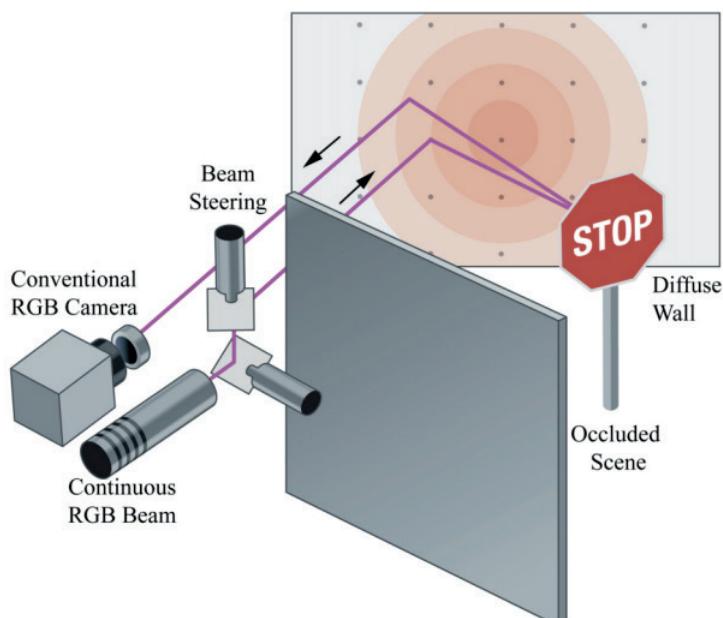
PREDICTIVE AI FOR PERSONAL HEALTH CARE

AI and combined biometrics offer portable, non-invasive, live health updates at one's fingertips

ALLEN WONG / Tokyo

As AI and Deep Learning technologies and methods continues to improve and expand, we're seeing the exploitation of imaging, physics, and material sciences as a means to predict, infer and detect information in ways that no human or conventional imaging processing can hope to do.

In 2019, a team at Princeton University published a white paper detailing a method of imaging objects out of line of sight, in other words, around corners.¹ What this accomplished using a laser and the resulting light scatter is the ability to image objects hidden from the human (or camera) eye.



Such a method highlights the ability of deep learning to make extremely powerful and effective inferences with very little information. Highly inferential techniques have already made headways in the medical fields, with AIs that can more accurately predict diagnoses of breast cancer² for example. This has not been lost to consumer electronics makers – FitBit, along with Apple, have integrated green LEDs into their smart watch offerings, allowing for the direct measurement of heart rates. However, ahead of Apple, FitBit has expanded that offering by now allowing its wearers the ability to see their estimated blood oxygen levels on certain devices – leveraging the ability to measure inferred data with the same LED sensor with the power of its software.³

Wearable health trackers are already popular with millennials, whose data driven fitness is already becoming the norm. As casual fitness makes way for prevention of full blown lifestyle disease for millennials they'll be looking for the next step in data driven health faster than you can say: "okay Boomer".

And such devices are already on the horizon. The LibreCare Free device, consisting of a thin wire filament inserted into the arm to measure the blood sugar of diabetes patients has been on the market for years – but two points are preventing its widespread use: invasiveness and cost.

In 5 years' time we should start to see the gaps close in reducing these two points due to the combination of smaller sensors, and using more inferential data thanks to AI – paving the way for a more data-driven health market.



2026 -
2030

THE ERA OF THE EVER-CONNECTED SOCIETY

As we dive deeper into the decade ahead, the advanced technologies redefining business, branding and the consumer experience will increasingly become part of the everyday, creating a constantly connected consumer ecosystem. Encompassing every aspect of human life, the ever-connected communities we form will define the way we move above the world—whether at work, at home or in social spaces. This final section centers on the following key trends:

-  Smart and connected cities
-  China's social surveillance system
-  A greener, more connected China
-  Data privacy



'Masdar City' Image
Source: Foster &
Partners¹

A SOCIETY BOUND BY SMART CONNECTIVITY

Smart cities take shape through continual communication and constant connectivity

SOFIA PAZ VIVO / Frankfurt

As terms such as AI, IoT, 5G, and electric or autonomous driving are all becoming more ubiquitous, we observe a trend of a new world coming about, with smart connectivity at its zenith. With technology leading the future, and everyday products and services becoming increasingly intelligent and connected, the predictive maintenance pipedream, is now a Japanese reality.

With a timeframe challenged by geographical locations, we have seen early examples and future promises appearing all over the world. Designed by Foster & Partners², the 'Masdar City' project pioneered in 2007, a planned city in Dubai relying solely on solar power and other renewable energies. Las Vegas was the first city in the U.S, to deploy a completely autonomous, fully electric shuttle on public streets start of 2017, followed by several other cities³. In France, the Wattway was patent as the first photovoltaic road surface to power gates and payment machines. Not much later that year, China, used the same road technology to power streetlights containing a snow-melting system⁴. More and more apparent, are technologies aiming to create an optimized, connected and intelligent 'haven' for consumers.

It was predicted that by 2020, the world would have over 26 billion connected devices, and this number is only expected to increase to 125 billion by 2030⁵. In this competitive ocean of emerging technological trends, Japanese automaker Toyota stole the spotlight with its recent, yet promising project called 'Woven City'. Announced at CES 2020 in Las Vegas, Toyota revealed plans to build a prototype 'city of the future' where everything and everyone are connected, everywhere, all of the time. "With people, buildings and vehicles all connected and communicating with each other through data and sensors, we will be able to test connected AI technology... in both the virtual and the physical realms..."



By 2030, it is predicted we will have over **125 billion** connected devices around the world. That is more than **16 devices per person**.

"The city is planned to be fully sustainable, with buildings made mostly of wood to minimize the carbon footprint, using traditional Japanese wood joinery, combined with robotic production methods. The rooftops will be covered in photo-voltaic panels to generate solar power in addition to power generated by hydrogen fuel cells" Toyota. Source: Aamir, H. The Tech Spot News⁶



Aamir, H. The Tech Spot News⁶

maximizing its potential," said Toyota president Akio Toyoda⁷. Aimed for the development and testing of new technologies, 'Woven City' is being led by Danish designer, Bjarke Ingels, and will be located at the base of Mt. Fuji in Japan.

An increase in interconnectivity for societies living in "Woven City" could also provide long-term solutions for any future viral outbreaks, from reading personal vitals from wearables, to detecting temperatures and other illness identifiers through a myriad of citywide sensors.

The internet once gave us a voice, now IoT will give everything else a voice of its own too. This fully connected ecosystem powered by hydrogen fuel cells, could indeed be very prominent in making Urban Mobility an innovative and largely interconnected Lifestyle for everyone. Connected, autonomous, emission-free and shared mobility solutions are bound to unleash a world of opportunities not just for Toyota, but for all brands.

BRAND TAKE-AWAYS

The unavoidable progress of a 'smart' world is not a new topic - from the literature of Ray Bradbury and George Orwell, to pure science, like Moore's Law theory, have all predicted a similar, yet downhearted future. Brands can become leaders in developing technologies and master concepts to reinvent the streets & cities by experimenting early on to create and assess the growing needs of smart cities. Connecting cities, people, things and devices with objects, experiences, and brands will be the key of the next decade.



THE BEHAVIORAL ENGINEERING OF 1 BILLION PEOPLE

China's national reputation system and
the sweeping potential of social credit
scoring

CHRIS CALLAGHAN / Manchester

With trials beginning in 2014, China's planning phase of its national Social Credit System (SCS) will come to an end, and by 2020 the system will be operational.² Aiming to quadruple its 176 million surveillance cameras by 2020, China is building a network that is "omnipresent, completely connected, always on and fully controllable."³

With facial recognition and data sharing between government and private organisations, the social credit system will be used to both reward and punish citizens based on their economic and personal behaviour. Good behaviour such as blood donation and charity work will be rewarded, while inappropriate behaviour such as playing loud music on public transport and violating traffic rules could result in flight bans, exclusion from private schools, internet throttling and registration on a public blacklist.⁴

In the city of Shenzhen, Chinese authorities have already demonstrated how a surveillance system loaded with facial recognition, artificial intelligence and public shaming can crack down on jaywalking and other crimes by displaying the names and photos of offenders on nearby LED screens.⁵

26 million train and plane tickets have already been blocked and flagged as untrustworthy.

Just imagine how such social surveillance systems could also be deployed to prevent future pandemics, be it a public cough without covering, or non-essential

				
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public activity with a reading of high body temperature in time of an outbreak.

Outside of camera surveillance, private companies in China have run pilot programs using complex analytical systems to profile their customers, further advancing various technologies that could be used with official 2020 rollouts. For example, Sesame Credit, developed by the Alibaba-affiliated company Ant Financial uses algorithms and data from Alibaba's massively popular payment platform Alipay to rate people by their consumption behaviour and preference among other factors.⁶

In addition to monitoring and scoring citizens, 33 million business have already been added to the system. The repercussions of disobedience? 26 million train and plane tickets have already been blocked and flagged as untrustworthy⁷, and it is clear that both citizens and corporations have a vested interest in complying with the social credit system.

In 2018, three of the US' biggest airlines bowed to compliance with Chinese demands to refer to Taiwan not as a nation but as a Chinese territory⁸. The government also challenged the Marriott hotel group

over listing Tibet as a nation on an online form – blocking its booking website from the Chinese internet for over a week⁹. In 2019, Versace had to apologize for releasing a T-shirt that suggested Hong Kong and Macau were separate nations¹⁰. GAP has previously made an apology for an incorrect map of China¹¹ while Muji was fined for listing Taiwan as a country¹².

"This is where the corporate social credit system comes in. It allows government to enforce compliance, not only on obvious metrics like tax, pollution and quality controls, but also to ensure companies toe the political line."¹³

Luxury brands (nearly all of which depend significantly on the \$285 billion-plus luxury spending power in China) may be the first to feel the impact of the social credit system. By 2025, Chinese consumers are expected to be behind nearly 50 percent of all personal luxury goods purchases in the world.

However, these brands stand to be impacted in a big way when the country formerly unveils the system to its 1.4 billion population and begins sanctioning wrong-doers by way of punishments, such as strict shopping limits and blockers on luxurious purchases¹⁴.

BRAND TAKE-AWAYS

From a consumer's perspective, there are a myriad of aspects to consider from civil rights and data privacy to free choice and the product and service options available to them. However take-away for brands can be informed by this as well. As consumers become more conscious of luxurious purchases so as not to damage their social credit score, brands will need to start offerings products and prices that support this social system.

Creating products that also target the socially-responsible consumer will be key, and corporations meeting legal and regulatory requirements and corporate social responsibilities will greatly benefit. Similarly, a focus on meeting product quality standards, paying taxes on time, and fulfilling environmental protection requirements will be a must for brands of the future, at least in China.



THE ZERO CONCEPT WORLD

Transforming the country into a smart city, China increases connectivity to combat micro-urbanization

CAMILLE CAMPBELL AND JAEYOUNG LEE / New York

66 In 1978, less than a fifth of China's population resided in cities; by 2009, urban residents made up close to half the population; and by 2030, the share is expected to swell to near two-thirds" according to a 2019 World Bank Report. China's population drastically increasing to the point where the country has chosen to implement a top down approach to a better quality of urban life. The people of China are currently demanding equality for all, environmental protection, and safety. China's solution to this problem is creating zero concept world. Zero Carbon, Zero Crime, and Zero Email.

China plans to build 1.5-2.5 billion square meters of zero carbon buildings, thanks to the newly formed Zero Carbon Green Building Design Committee. It is recommended that China begins creating clean energy solutions to heavy carbon emitting industries such as steel, cement, and chemicals. "Green development is being driven by harsh economic realities, changing global priorities, and growing technological possibilities China is uniquely positioned to lead the global energy transition and to decarbonize its economy completely by 2050," said Adair Turner, chair of the Energy Transition Commission.

In an effort to lower crime, the Chinese government will focus on childhood nutrition, accessible edu-

By 2030, the share of urban residents of China's population is expected to swell to near two thirds.

tion, and affordable healthcare system. This way each Chinese resident will start off with the same resources as well as be able to catch up later in life. To prevent a saturated job market there will be more laws around pension to discourage senior employees from leaving the work force too early. With these investments in the quality of life, Chinese residents are expected to reach high-income status by 2030.

"In 2015, the Beijing authorities announced that every corner of the city was covered by police cameras. By 2020...the country will have completed its nationwide surveillance network using facial recognition technology"-BBC News.

On the theme of keeping Chinese residents connected, Beijing's publicity stunt of rolling out 5g a few years back. It's projected that China will invest \$12 billion in cellular equipment. Goodbye email, Hello Whatsapp!

BRAND TAKE-AWAYS

Brands looking to engage with China will need to focus on the "zero carbon, zero crime, zero email" concept in both product development and brand messaging. Being environmentally friendly, promoting good economics, and keeping digital. Specifically in relation to zero carbon, each brand should hold green standard to the utmost importance when marketing to China.

Brands can create "zero" or cleaner versions of their products to be able to appeal to the new Chinese consumer.



PRIVACY IN THE NEW PANOPTICON

Cyberattacks and data breaches spur new data privacy policies, cybersecurity restructuring

Based on Jeremy Bentham's original 1780s architectural idea of a 'Panoptic' building (Greek origin, pan 'all' + optikos 'seeing'), Michel Foucault (1975)¹ first posited the move from timeworn civilizations with spectacles of criminal justice where 'many' saw the 'few' to more modern civilizations in which the 'few' saw the many. Although applied mostly to prisoners, his century old theory lingered and can be related to now-a-days practices of privacy and security in the realms of technology.

As AI, IoT and 5G technology come of age, we stand to benefit from having smart and connected technologies. With clear examples that facilitate our everyday lives, but like everything, at a cost; thus, we ought to understand what is at stake and what we are really agreeing to as indeed knowledge is power.

In today's connected and smart world, personal data about the 'many' is being collected at an incredible rate and amount, by the 'few', though the digital footprint and patters we live behind. But the prisoners of today, revolt with breaches and cyber-attacks that are ever so frequent. According to Das, P. (2019),²

"in the first half of 2019 alone, more than 4.1 billion data records were exposed in known data breaches" so it is understandable if and why concepts such as privacy and security are highly connected to fear and mistrust.

In the first half of 2019 alone, more than 4.1 billion data records were exposed in known data breaches.

Fear ultimately influences behavior, not just from a consumer perspective, but also for companies and organizations. This is where policies such as the EU General Data Protection Regulation, or the California Consumer Privacy Act (CCPA), come in, trying to leverage the advantages and disadvantages for both parties. Dave Wallen³ (2020) argues how putting privacy regulation acts in effect, pushing business -and supposedly Government agencies- to restructure their cybersecurity and invest a lot more budget on the matter. Fear will drive cybersecurity spending even further, especially as part of the GDPR 2020 policy updates, demand an upward of 20 million Euros or 4% of global revenue.

BRAND TAKE-AWAYS

What this means for Brands and consumers, is a greater need to adapt to such technologies, therefore putting more importance on cybersecurity. Whilst brands need to communicate transparently what they are tracking, people also need to know what they are getting by providing their data. Automation, integration and personalisation, become a greater need, presenting an opportunity for new talents and more roles opening up in the fields of data collection and cybersecurity. It's been projected by Cybersecurity Ventures⁴, as stated by Wallen, D. (2020), that there will be 3.5 million unfilled cybersecurity jobs globally by 2021. Moreover, as we become more dependent on cloud technology, there will be a clear brand opportunity to develop cloud-based security platforms and services. Brands should make clear the value exchange and the consumer-facing benefit that arises from data collection and focus on educating the consumers of its usage. These platforms will capture very rich data about how customers speak and interact, which brands can then leverage to feed into their customer insights and marketing activities. 5G architecture is still new and complex, which requires high levels of security for vendors to provide.

TAKE-AWAYS

01

Voice-first applications will grow at a rapid scale, and open up new opportunities for a wide range of industries such as retail, commerce, health-care, education, and more. Scale in usage will come as more devices get connected, including non-computer objects.

02

The new face of retail- data that will lead to increased personalisation will also be the fuel for artificial intelligence systems that will allow for preemptive shipping and stock that is more responsive to consumer trends. Focused personalisation powered by AI or data driven pop-ups will increase consumer interactivity and engagement.

03

Data collection should become even more transparent and understandable for the consumer. Whilst brands need to communicate transparently what they are tracking, people also need to know what they are getting by providing their data.

04

Automation, integration and personalisation become a greater need, presenting an opportunity for brands new talents in the fields of data collection and cybersecurity.

05

The exchange value and consumer-facing benefit that arises from data collection becomes more evident, as brands then leverage this information to feed into their customer insights and marketing activities. This way consumers will have a more personalised offering of products and services.

06

The unavoidable progress of a 'smart' and connected world, led by the development of IoT and AI will grow beyond home automation and towards creating fully smart cities.

07

The 5G impact on advertising will create more content at a faster speed and a lot more traffic.

08

Human Augmentation will irresistibly become our new lifestyle enabling us to advance and protect ourselves by technological enhancement.

09

Human and Machine working closer together in the health field with AI predictive analytics and connected care. Doctors will be able to predict and prevent issues from hereditary to chronic illness.

10

There will be a great importance placed on Diversity and Inclusion, therefore promoting creative solutions to insure products are usable by everyone and anyone. Better inclusive and assistive technology in schools are a growing need.

11

The real and the virtual world will become deeply intertwined through the use of augmented reality. Mixed reality will be the natural successor to devices with a screen.

12

Augmented & mixed reality gaming is taking over people's homes with unprecedented product immersion, or hijacking competitors in their own physical space - AR gaming is set to be a playground for creativity, a digital wild west for mischief and a space for innovation in new and unforeseen ways.

13

In the next couple of years the collision of consumer VR via shared spaces entertainment, and streaming will come together. YouTube normal video will no longer be enough for fans who want new ways to interact with digital characters or idols.

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