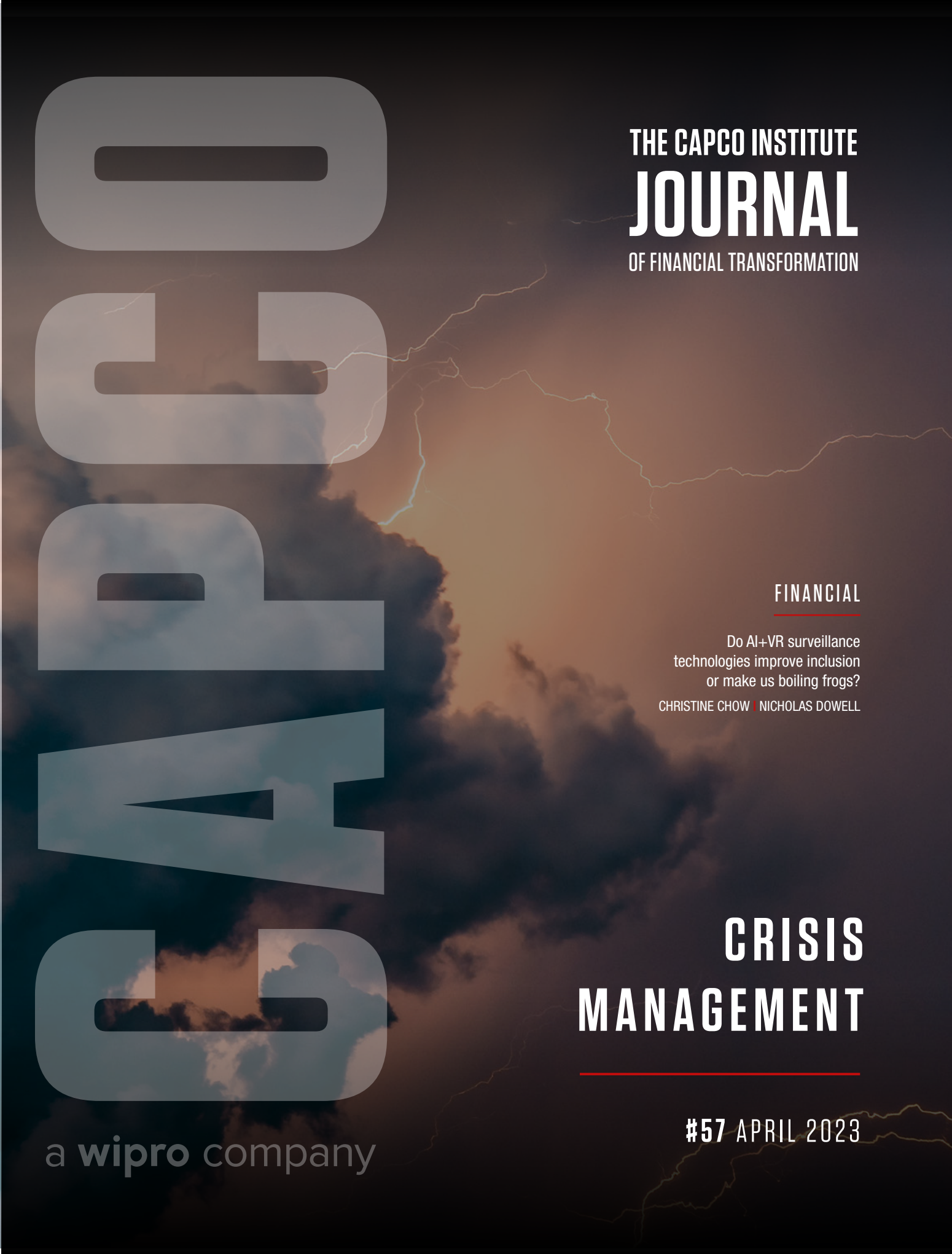

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# JOURNAL

OF FINANCIAL TRANSFORMATION

FINANCIAL

Do AI+VR surveillance technologies improve inclusion or make us boiling frogs?

CHRISTINE CHOW / NICHOLAS DOWELL

# CRISIS MANAGEMENT

#57 APRIL 2023

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## JOURNAL OF FINANCIAL TRANSFORMATION

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# ESG

# DEAR READER,

Recent events in the U.S. banking sector, and broader concerns around instability and contagion within the global financial services industry, have meant that crisis management is once more front of mind for many institutions.

In addition, the world of business and finance is facing broader geopolitical and socioeconomic challenges, ranging from conflict, climate change, inflationary pressures, and precarious energy resources. Factor in heightened regulatory and competitive pressures, and it becomes clear that financial institutions must prioritize risk management, within their own organizations and with their counterparties.

The papers in this edition of the Journal address the theme of crisis management through various lenses, including regulatory compliance and traditional risk management, as well ESG, the low carbon economy, and sustainable finance. Our authors also explore topics such as the impact of social change on the world of finance, the rise of artificial intelligence and virtual reality technologies, and cybersecurity.

Contributions in this edition come from a range of world-class experts across industry and academia, and showcase some of the very best expertise, independent thinking, and strategic insights within the financial services sector.

As ever, I hope that you find the latest edition of the Capco Journal to be engaging and informative. Thank you to all our contributors, and thank you for reading.

Lance Levy, **Capco CEO**

# DO AI+VR SURVEILLANCE TECHNOLOGIES IMPROVE INCLUSION OR MAKE US BOILING FROGS?[1]

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**NICHOLAS DOWELL** | Global Equity Portfolio Manager, HSBC Asset Management

## ABSTRACT

The title of the article references the story of the boiling frog, a metaphor that warns people of the danger of not noticing gradual changes and suffering consequences for it. In both our work and personal life, artificial intelligence (AI) and augmented reality (AR) surveillance is becoming more common at a gradual pace, and less obvious in its intrusive nature due to convenient wearables and lifestyle choices. Without consent, surveillance is a violation of our basic human right to liberty and the right to freedom of opinion and expression. In this article, we explore how to use AI+VR productively, with a neurodiverse and ability inclusive mindset, to benefit people and businesses. Similar to surveillance in the workplace, we advocate that gamers should be informed of the type of surveillance that has been put in place to track them and potentially influencing their behavior. They should have full access to their diagnostics if eye tracking or other motion detection technologies are used in assessing their "health status", and such applications should be based on free, prior, and informed consent (FPIC).

## 1. INTRODUCTION

New technologies demand societal conversations about how they should be used – and how they should not.

In general, no one wants their behavior to be monitored and scored without consent. They certainly do not want to be manipulated. However, whether we like it or not, society will be increasingly exposed to the risk of hidden manipulation through surveillance technologies, often involving artificial intelligence (AI) and/or virtual or augmented reality (VR and AR) or a combination of them.

Without consent, surveillance is a violation of our basic human right to liberty and the right to freedom of opinion and expression. However, with free, prior, and informed consent (FPIC), the story could be completely different. There are many examples. One example is healthcare apps, which when used appropriately, can improve the timeliness, accessibility, and affordability of health advice. Another would be training in a virtual environment – neurodiversity and inclusion improve when individuals can make active decisions on privacy or optimize an environment that best suits their needs.

[1] We would like to thank Karin Halliday, ESG Investment Specialist – Australia, Ida Choy, U.S. national fencing competitor, and Pascal Knowles, student at the University of Chicago, for their comments in this article.

> *"The boiling frog story is often used as a metaphor for the inability of people to react to significant changes that occur gradually or to events that have become commonplace."*

Source: https://bit.ly/3KGPCeK

## 2. IN TECHNOLOGY WE TRUST

Without more information about the surveillance capability that is built into the technologies we use, it would be difficult to decide what type and what level of surveillance is acceptable.

Emerging use cases continue to demand our attention. The purpose of this article is to highlight specific use cases using artificial intelligence (AI) and virtual reality (VR) surveillance at work, in training, and at leisure.

At work, how should employees respond where the digital tools they use have increased surveillance capabilities? What if there is the potential for data to be collected every time employees respond to a Teams chat or give a thumbs up? What should employees or investors expect of companies that use workplace surveillance technologies?

In training, what types of skills can benefit most from AI+VR enabled surveillance?

At leisure, how should we fight virtual reality (VR) and augmented reality (AR) entertainment activities that are prone to making users addicted? Is this a topic that responsible investors should engage with companies? How should we go about it?

## 3. SURVEILLANCE AT WORK

The use of people analytics – defined by Harvard Business Review (HBR)[2] as "statistical insights from employee data to make talent management decisions" – accelerated during COVID-19.

When the pandemic's lockdowns and social distancing measures forced workplace interactions to be conducted remotely, communication became more digital and electronic. While these formats allow for the convenience of recording and re-watching meetings and webinars, it also allows for them to be analyzed by AI algorithms.

Companies that use eyeball and gesture tracking technologies to measure attention spans and sentiment may suggest the data will be used to strengthen corporate culture. Everyone with a decent amount of screen time could potentially be given a score. But how does it really work and could scores be contested or validated by those being measured?

There are different types of people analytics. Some are used to strengthen culture by analyzing relationships, measuring the quality and intensity of interactions between individuals and groups. Some measure silos within an organization. They identify clusters of closed loop interactions. Others measure productivity and efficiencies, which are increasingly being used as an input factor to determine employee compensation. Unsurprisingly, the big bosses are identified as key "influencers" as many employees flocked to "like" any posts from their top executives. This is one example where "what gets measured gets managed" fails as the only thing that seems to be managed here is the ego of the influencer.

A recent U.K. government inquiry into artificial intelligence (AI) at work led to the publication of the report in November 2021, entitled: The New Frontier: Artificial Intelligence at Work.[3] The report finds that AI offers invaluable opportunities to create new work and improve the quality of work if it is designed and deployed with this as an objective. However, we find that this potential has not as yet been fully utilized. Instead, a growing body of evidence points to significant negative impacts on the conditions and quality of work across the U.K.

[2] https://bit.ly/2RjLKB6
[3] https://bit.ly/3k5CuVe

Pervasive monitoring and target setting technologies, in particular, are associated with pronounced negative impacts on mental and physical wellbeing as workers experience the extreme pressure of constant, real-time micro-management and automated assessment. A core source of anxiety is a pronounced sense of unfairness and lack of agency around automated decisions that determine access or fundamental aspects of work. The challenges identified lie between data protection, labor, and equality laws. Even with best intentions, such as surveillance aimed at safeguarding mental health and safety, with early identification of suicidal inclination, the approach could still be criticized for violating privacy.[4]

Taking an empirical approach, the Workforce Disclosure Initiative (WDI) of ShareAction, a non-governmental organization that promotes responsible investment, introduced a new question in the 2021 version of its workforce survey, asking companies to "describe any workforce surveillance measures used to monitor workers, and how the company ensures this does not have a disproportionate impact on workers' right to privacy." The results are shared in the "Investors' expectations on ethical AI in human capital management" white paper.[5]

Some interesting facts:

1. 60 percent of the 173 companies that responded to the survey answered this newly added question in 2021.
2. Companies did not use the most intrusive forms of surveillance, such as home video surveillance and screen recording, potentially suggesting some level of consideration for the privacy impacts of these measures.
3. Lack of free, prior, and informed (FPIC) consent: however, too few companies are involving workers in their surveillance measures. Levels of worker engagement were considerably lower than general considerations around data protections and workers' right to privacy, with just 11 percent of companies providing data on this. Without free, prior, and informed consent (FPIC), workplace surveillance does not meet investors' expectations on situations where basic human rights need to be protected.

### Addressing human rights risks in the supply chain

The nature of online-offline jobs may at times require human rights impact assessments. For example, it has long been recognized that social media content moderators who may be able to work from home and work flexible hours are prone to mental health risks.[6] In such circumstances, companies should have in place proper monitoring of its supply chain to ensure that adequate support is provided for contractors and employees up the chain. This is aligned with the compliance of the U.K. Modern Slavery Act, French Duty of Vigilance, German Supply Chain Law, Hong Kong Modern Slavery Bill, and California Transparency in Supply Chain Act, amongst others.

Investors should expect companies to have in place programs that measure and disclose the effectiveness of grievance mechanisms. Access to remedy programs should also be put in place so that investors can evaluate if salient human rights risks are adequately addressed according to the three-pillar model of the U.N. Guiding Principles for Business and Human Rights.

Despite potential risks, there are potential benefits, such as:

1. **Improve work access:** online chat customer services open up the economy, creating jobs. Many websites now have a surveillance function that measures response time for tasks, such as filling in a form. Technologies are able to identify situations where users get stuck and prompt the use of live chat functions for help.
2. **Improve inclusion:** virtual on-boarding and virtual reality (VR) technologies help to mask certain characteristics by choice of the employee and make the experience more positive for the individual. There are hardware issues that need to be overcome for VR to be inclusive for everyone.

[4] Apple Podcasts, 2022, "Who watches AI watching students?" In machines we trust, https://apple.co/3W1aTBv
[5] https://bit.ly/3Iz6bYD; page 41
[6] https://bit.ly/2GzT2Lf

The most obvious one being supporting users who are blind, visually impaired, or have speech difficulties. The questions we ask companies include: how will Braille be incorporated? Or maybe a talk back functionality?

3. **Level the playing field:** the use of VR in a work setting can be used as a tool to level the playing field and remove bias. It should foster equality where people will be judged more by actions rather than by physical appearance.

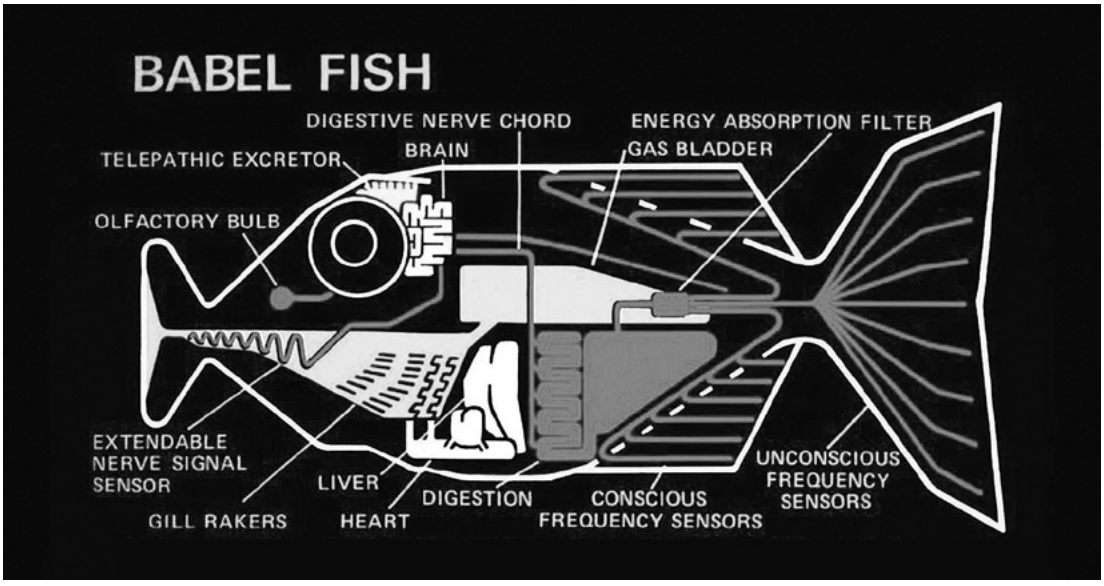
4. **Customization to optimize personal environment:** augmented reality (AR) full immersion – companies could offer hybrid workers more choices in environments that they work in. If the office lights and noises are too loud and bright, with AR these environmental settings can be adjusted to the users' own preferences based on how they work best.

5. **Break down language barriers:** conversing with colleagues in overseas offices is often conducted in one shared language, but that can exclude others and hinder progress. With advancements in VR and AR, translation can be done in real-time, such as using Google's AR glasses[7] – similar to the Babel Fish, the universal translator from Douglas Adams's 1979 novel, The Hitchhiker's Guide to the Galaxy (Figure 1).

## 4. THE BENEFITS OF VR AND NEURODIVERSITY

As we learn more about neurodiversity and embrace the valuable benefits that thinking differently can bring to an organization, the role of VR could make it easier to create a more equitable working environment. Those who are neurodiverse continue to be largely misunderstood, misdiagnosed, and misrepresented and yet neurodiversity is more common than you might think. Estimates vary across geographies and age groups, but a recent study by Deloitte, suggest that roughly 10 to 20 percent of the global population is considered to be neurodivergent.[8] VR can provide a greater immersive experience and allow the workplace to address the different needs that many neurodiverse individuals require. This could be addressing the issues around sensory overload, for example, that workplaces can often bring. These new

**Figure 1:** The Babel fish, the universal translator




Source: https://bit.ly/3mbdJld

[7] https://futureiot.tech/googles-new-ar-glasses-translate-language-in-real-time/
[8] Mahto, M., S. Hatfield, B. Sniderman, and S. K. Hogan, 2022, "A rising tide lifts all boats: Creating a better work environment for all by embracing neurodiversity, Deloitte Insights, https://bit.ly/3QrhNPx

immersive environments bring together colleagues, whether they are neurotypical or not, to operate at their best and be as productive as they can.

Hutson (2022)[9] looked at how VR could be used to level the proverbial "playing field" and allow an equal footing for a more inclusive audience when it came to training and education. How those that are considered to be unable to operate within social norms could leverage the technology of VR. On a practical level, using VR could open a talent pool that is under-utilized and underrepresented in today's workforce. In the U.S., for example, it is estimated that 85 percent of people on the autism spectrum are unemployed, compared to 4.2 percent of the overall population.[10]

## 4.1 Surveillance in training

Another use case is training – with FPIC, it is aimed at improving performance of those knowingly being measured. What types of skills would benefit most from virtual environment training? Some training can be difficult to organize, logistically complicated, and costly, such as medical surgery. VR training is scalable, provides a greater degree of freedom to create and control virtual environments, isolating factors of influence for targeted improvement.

In an early study, surgeons who received Minimally Invasive Surgical Trainer – Virtual Reality (MIST-VR) training on laparoscopic procedures performed surgery significantly faster than the control group, which received traditional training without the VR component. The study concludes that VR training allows repeated practice of realistically complicated maneuvers, and hence improves psychomotor skills. However, it does not necessarily improve specific procedural knowledge, anatomy and decision-making abilities, and performance may plateau when it achieves maximum efficiency.[11]

This suggests that there may be limits to VR training for "open" skills – defined as skills performing in a variable environment – compared to "closed"' skills, which occur in a stable and predictable environment, where the timing of the skill is self-paced and, to a large extent, the performer determines the place where the skill will be performed.

## 4.2 Surveillance in leisure

According to Fortune Business Insights, the global gaming market is projected to grow from U.S.$229.16 billion in 2021 to U.S.$545.98 billion in 2028.[12] Metaverse, defined as a collective virtual open space, created by the convergence of virtually enhanced physical and digital reality,[13] is expected to not only make games more engaging through AR and VR, but also lead to a more personalized experience and monetization.

The metaverse is to be powered by AI, including the use of Generative Pre-trained Transformer (GPT) for machine storytelling, e.g., Promethean AI; gesture recognition to improve real life and computer interface; and natural language processing (NLP), including real-time sentiment analysis, emotion analysis, and text classification to enhance user-directed experience. Algorithms are expected to become more accurate at predicting outcomes based on user responses without being explicitly programmed to do so.

Many observers expect the role of the metaverse to move beyond just gaming and to impact many parts of society and the global economy. From industrial use cases of creating digital twins to healthcare settings, the metaverse is creating new channels for the delivery of healthcare. Just recently, the government of Dubai presented more detail about its own metaverse strategy and how it envisions the sector supporting as many as 40,000 additional virtual jobs and adding U.S.$4billion to the city's GDP in five years.[14]

[9] Hutson, J., 2022, "Social virtual reality: neurodivergence and inclusivity in the metaverse," Societies, https://bit.ly/3CxTN7w

[10] Deloitte analysis; Centers for Disease Control and Prevention, "Data & statistics on Autism Spectrum Disorder," https://bit.ly/3QnGPz5; The Yale Center for Dyslexia & Creativity, "Dyslexia FAQ," https://bit.ly/3Gq7kiE; Dyslexia Association of India, "Dyslexia," https://bit.ly/3lziLHr; Gov.uk, "Research and analysis: Simone: dyslexic user," https://bit.ly/3GOUYIt; Pesce, N. L., 2019, "Most college grads with autism can't find jobs. This group is fixing that," MarketWatch, April 2, https://on.mktw.net/2NdCaCW

[11] Grantcharov, T. P., V. B. Kristiansen, J. Bendix, J. Bardram, J. Rosenberg, and P. Funch-Jensen, 2003, "Randomized clinical trial of virtual reality simulation for laparoscopic skills training," British Journal of Surgery 91:2, 146–150

[12] https://bit.ly/3ZkWAuE

[13] https://gtnr.it/3Zn4Mub

[14] https://bit.ly/3WYbPYI

Whatever it will be used for, issues around human rights need to be grappled with just like the physical world.

As users, how do we address the issue that when we enter these virtual worlds, we do not really have autonomy of what we do? Every time we do anything it can be at the discretion of the corporation that has created that environment. The software will know everything we do and can analyze our movements. By knowing what we do, where we look, what we say, we will be under constant surveillance. Just like how our clicks on websites are tracked and analyzed, will our interactions be recorded and analyzed in these virtual environments? Moreover, the identities we create in there are often pre-ordained by the host on the environment. Users select their features, the items they wear, and all stored on a central database, tracked and controlled by the host. These are the issues that many people associate with the Web 2.0. For many believers, Web3 potentially partially solves some of these issues, as our identities are removed from these hosts and instead kept and controlled by the user as we move around these different virtual worlds.

However, being analyzed and tracked is not limited to being in these virtual worlds, we need to think about the devices that we will be using in both the physical and the virtual worlds. Devices such as glasses, headsets, hand-held and other haptic devices, and finally brain connected devices. In many instances, one can imagine them being used to track our eye movements, how our pulse quickens, the changes in our gait, or how our brain waves change as we note something of interest. All of these can offer valuable data to relevant organizations – advertisers, retailers, and insurance companies, to name a few.

A question we need to ask ourselves is whether society will tolerate forward facing cameras being fitted in augmented reality glasses, giving them the ability to watch our every move. Certainly, this was an issue with the early endeavors of Google Glass,[15] to the point where a bar in Seattle banned their use due to privacy issues.[16] What information is recorded by these devices needs to be understood and clear boundaries set. More sinister activities can be imagined through the hijacking of these devices by nefarious actors. Security will, therefore, be paramount, as it is with all internet of things (IoT) devices.

Some of these are surveillance technologies, which have been retired due to privacy concerns. For example, Microsoft recently decided to retire emotion recognition, an outcome of adhering to their own updated responsible AI standards.[17] Would blocking the use of detected emotional states make it harder to learn about gaming addiction warning signs? If so, it would be harder to learn users' patterns and know when to intervene. More broadly, should all types of emotion detections be retired?

Studies of eye movement have become an essential tool for basic neuroscience research. It is built on over a decade of scientific research into how eye tracing could detect anxiety and depression,[18] because eye movements of patients with mental disorders differ from those with healthy controls.[19]

Research into gaming disorder[20] and the user-avatar relationship suggest that idealized avatars increase avatar identification, which increases the risk of gaming addiction.[21] If eye tracking technologies can be used in parallel to identify early addiction, anxiety, and mental health issues, companies have an opportunity to amplify the opportunities of responsible gaming and manage the downside risks.

The World Health Organization (WHO) added "gaming disorder" to its medical reference book, International Classification of Diseases. The American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5) lists

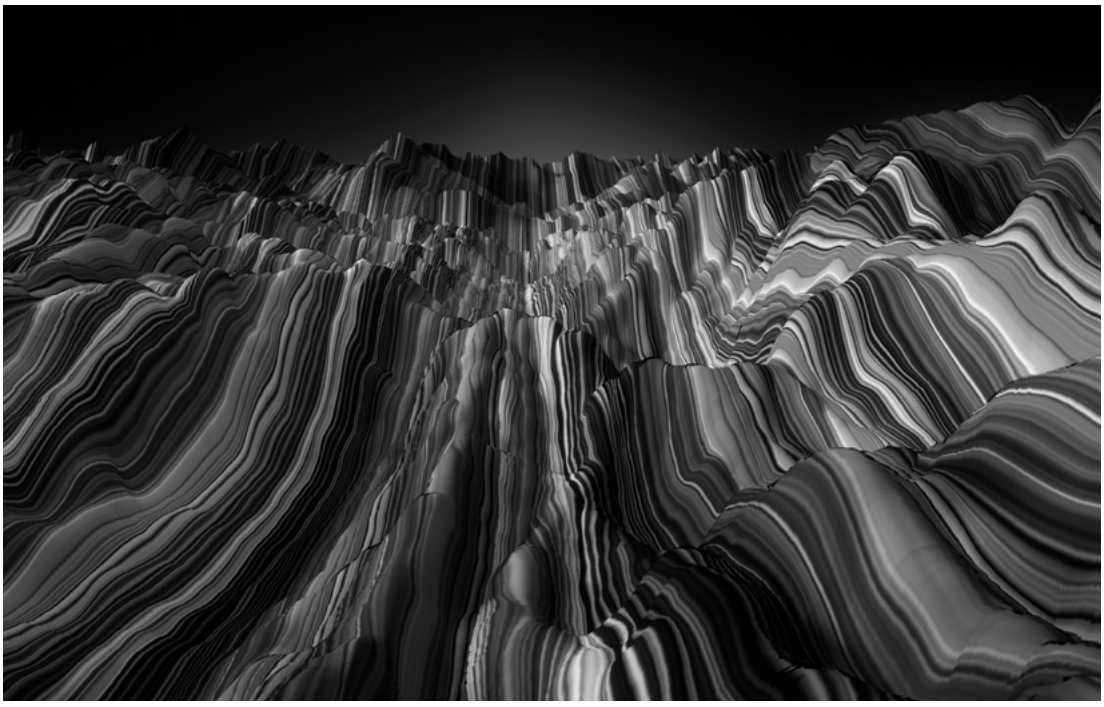
[15] https://bit.ly/2RYXXvN
[16] https://bit.ly/3ZjsHL7
[17] https://bit.ly/3GsPviS
[18] Armstrong, T., and B. Olatunji, 2012, "Eye tracking of attention in the affective disorders: a meta-analytic review and synthesis," Clinical Psychology Review 32:8, 704-723
[19] Shishido, E., S. Ogawa, S. Miyata, M. Yamamoto, T. Inada, and N. Ozaki, 2019, "Application of eye trackers for understanding mental disorders: cases for schizophrenia and autism spectrum disorder," Neuropsychopharmacology Reports 2019; 39: 72-77
[20] Gaming disorder is defined in the 11th Revision of the International Classification of Diseases (ICD-11) as a pattern of gaming behavior ("digital-gaming" or "video-gaming") characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences. https://bit.ly/3GpRdBS
[21] Tiziana, M., C. Imperato, and F. Sibilla, 2019, "Does avatar's character and emotional bond expose to gaming addiction? Two studies on virtual self-discrepancy, avatar identification and gaming addiction in massively multiplayer online role-playing game player," Computers in Human Behaviour 92, 297-395. Szolin, K., D. Kuss, F. Nuyens, and M. Griffiths, 2022, "Gaming disorder: a systematic review exploring the user-avatar relationship in videogames," Computers in Human Behaviour 128, 107-124.
[22] https://bit.ly/2HTDL8V

"internet gaming disorder" as a proposed condition.[22] Gaming disorder or addiction is, therefore, considered a possible mental health issue[23] and requires the attention of those concerned about the right to health, or SDG3: good health and wellbeing.

According to U.K. Rehab[24] – part of an international non-profit organization providing health and social care, training and education, rehabilitation, employment, and commercial services – diagnoses of gaming addiction identify the compulsive playing of video games to the extent to which such behavior causes physical and/or mental harm, or other detrimental effects, to the gamer.

Although a survey, which leveraged the Reddit and Amazon platforms, conducted in December 2021 shows that 77 percent respondents believe that the Metaverse could cause harm to modern society due to addiction to a simulated reality, the survey also highlighted that we should not rule out the potential benefits, such as new business opportunities, increasing creativity and imagination, and introducing new experiences and improving experiences without taking extreme risks.[25]

Similar to surveillance in the workplace, gamers should be informed of the type of surveillance that has been put in place to track them and potentially influencing their behavior. Gamers should have full access to their diagnostics if eye tracking or other motion detection technologies are used in assessing their "health status", and such applications should be based on FPIC.



[23] Gkasionis, I., D. J. Kuss, M. D. Griffiths, 2021, "Where does the field of gaming addiction studies need to go next?" Journal of Concurrent Disorders 3:3, 187-192
[24] https://bit.ly/3GRf9Q3
[25] https://bit.ly/3lAkOLA

## 5. CONCLUSION

The title of the article references the story of the boiling frog, a metaphor that warns people of the danger of not noticing gradual changes and suffering consequences for it. In both our work and personal lives, AI+VR surveillance is becoming more common at a gradual pace, and less obvious in its intrusive nature due to convenient wearables and lifestyle choices.

Our eyes can be blinded by the benefits that come with convenience without adequately considering the risks. However, we should be careful not to discount these benefits without considering the alternative outcomes without them.

There are no good or bad technologies, it depends on how they are used. Besides assessing the business model, product quality, and use cases, investors should also consider product governance, the quality and thoughtfulness of business implementation, and how human impacts are measured when making decisions.

Investors should also engage with companies to ensure accountability and transparency of technology, for without appropriate disclosure and explanation, subjects being "measured", such as employees and gamers, could become victims of rapidly advancing technology by suffering from lacking in agency. This will not be considered as good governance from the company's perspective or adequate stewardship from an investor's perspective.

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