

NEW TECH IN THE WORKPLACE:

Understanding the Psychology of Human–Technology Interactions

CONTRIBUTORS

Gosia Glinska

Associate Director of Research Impact,
Batten Institute, UVA Darden School of
Business | glinskam@darden.virginia.edu

Insights from Darden Expert

Roshni Raveendhran

Assistant Professor of Business Administration
www.roshniraveendhran.com
RaveendhranR@darden.virginia.edu



Raveendhran's research focuses on the future of work: how technological advancements influence organizational actors and business practices,

the integration of novel technologies into the workplace, and how organizations can increase the effectiveness of their leadership practices to address the changing nature of work.

FOR THE PAST DECADE, advances in artificial intelligence (AI), IoT, cloud, and other technologies have been transforming work, the workforce, and the workplace.

The COVID-19 pandemic has dramatically accelerated the adoption of emerging tech, creating new opportunities to further reshape how and where work is done. For example, Google Drive, Slack, Zoom, and other digital platforms enable teams to work across time zones and geographies. Similarly, virtual reality (VR) lets employees interact with each other via avatars in highly immersive environments.

According to Darden Professor Roshni Raveendhran, whose research focuses on understanding and predicting the future of work, growing use of novel technologies in the workplace creates a pressing need to understand how people integrate technology into organizations and how they use technological tools to manage interpersonal relationships.¹

To that end, Raveendhran has been exploring the underlying psychology that drives people's adoption of certain technologies at work. "To receive the full value from AI and other technologies," says Raveendhran, "we need to pay attention to the psychological and behavioral consequences for the individuals using those technologies."

The reality is the pace of new tech's adoption is often so fast that understanding its impact on individuals is an afterthought rather than a core requirement. As Raveendhran puts it, "Companies are deploying novel technologies to make their processes more efficient and to improve their decision-making, but they often forget about their most important stakeholder group—their employees. So, the people get lost in the mix."

This briefing focuses on Raveendhran's research on two emerging technologies that are becoming increasingly pervasive at work and society at large: behavior tracking and VR. It is one in a series of Darden Intelligence Briefings, developed for the Darden Intelligence Initiative, which explores the growing interconnection between human intelligence and AI-powered technologies in business and society.

¹ Roshni Raveendhran and Nathanael J. Fast, "Technology and Social Evaluation: Implications for Individuals and Organizations," *Cambridge Handbook of Technology and Employee Behavior*, ed. Richard N. Landers (Cambridge, UK: Cambridge University Press, 2019), 921–943.

Virtual Reality in the Workplace: How Avatars Can Improve Communication

Virtual Reality (VR)



VR is a technology that replaces physical reality with computer-generated 3D environments. It allows users to experience those environments visually through devices such as VR headsets, in a tactile manner through VR gloves, and in a fully immersive manner through avatars—real-time, graphic representations of humans.

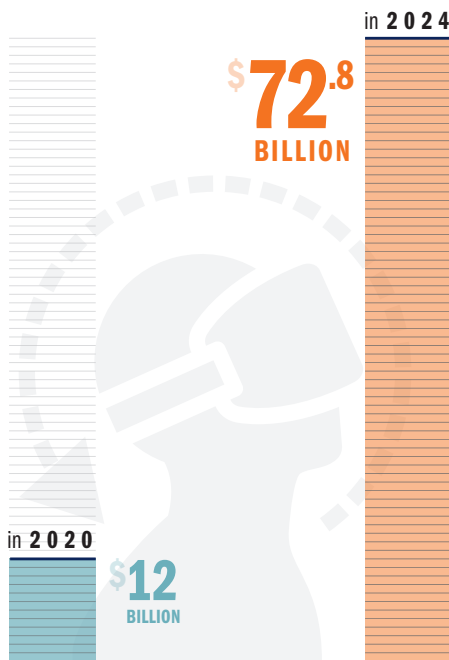
Augmented Reality (AR)



AR is a set of technologies that superimposes digital information and images on the physical world around us, when viewed through a device such as a smartphone camera.

One of the examples of AR technology is the mobile game *Pokémon GO*, which lets players locate and capture Pokémon characters that pop up in the real world—on the sidewalk and in their own homes.

Global Spending on VR and AR



Source: An IDC estimate.

ONE OF THE TECHNOLOGIES poised to be a game-changer for organizations is VR. Though VR has only recently reached a stage at which it can have significant potential for enterprise use, experts tout it as the next major computing and communication platform.

The COVID-19 pandemic has fueled interest in VR and augmented reality (AR) tools. Global spending on VR and AR is expected to hit \$72.8 billion in 2024, a more than a sixfold increase from about 12 billion in 2020.² According to Raveendhran, ever since remote work became a necessity, organizations have been exploring ways to keep employees engaged and connected, and immersive technologies like VR fit the bill.

VR and Effective Communication

Raveendhran's new study examines when and why leaders might prefer interacting with their subordinates via computer avatars rather than face-to-face. In a paper recently published in *Computers in Human Behavior*, a leading human-computer interaction journal, Raveendhran and her coauthors explore the psychology driving leaders' preference for interacting via avatars in frequent monitoring situations.³

"We're interested in the context of frequent monitoring," says Raveendhran, "because even if the organizational culture gives employees a lot of autonomy, there is often an external need to monitor people closely. And managers might be reluctant to do it, because it comes with the common backlash of being called a micromanager."

Avatars as Psychological Buffers

Raveendhran's research revealed that leaders prefer to monitor their subordinates through avatars rather than face-to-face in situations that can trigger a negative judgment and when they feel socially threatened. "VR and other immersive technologies," says Raveendhran, "may offer a way to be virtually present and experience psychological safety at the same time."

Personality Factors and the Use of Avatars

Raveendhran's study also examined the role of personality in influencing leaders' preference for monitoring via avatars, focusing on Big-Five personality factors: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. "We found that while controlling for the other four personality dimensions," says Raveendhran, "only neuroticism was positively related to leaders' preference for using avatars. Those who are higher on the neuroticism scale are more likely to use avatars, because it allows them to exert control without having to be physically present to take the negative backlash that might come from it."

Once the domain of video games, VR is playing a growing role in the workplace. By simulating real-world interactions, VR can make computer-mediated communication feel more inclusive and engaging. "In addition," says Raveendhran, "we now know that people can adopt VR technologies to psychologically buffer themselves from uncomfortable situations. And this distancing aspect can sometimes be as useful in the workplace as the immersive experiences that VR might offer."

2 International Data Corporation press release, "Worldwide Spending on Augmented and Virtual Reality Forecast to Deliver Strong Growth Through 2024, According to a New IDC Spending Guide," November 7, 2020, <https://tinyurl.com/3eanjs2x> (accessed Jan. 18, 2022).

3 Roshni Raveendhran, Nathanael J. Fast, and Peter J. Carnevale, "Virtual (Freedom From) Reality: Evaluation Apprehension and Leaders' Preference for Communicating Through Avatars," *Computers in Human Behavior* 111 (2020).

Behavior Tracking in the Workplace: How to Motivate, Not Monitor

EVEN BEFORE THE COVID-19 pandemic, which forced many organizations to make a shift to remote work, AI systems designed to track employee behavior and productivity were seeing a significant uptick in use.

According to market research firm Gartner, companies are increasingly embracing AI-enabled tools to analyze worker behavior in the same way they deploy AI to track and understand customer behavior.⁴ Unsurprisingly, the work-from-home reality has only accelerated the adoption of AI-enabled productivity monitoring tools. When the pandemic began in 2020, 30% of large employers adopted new employee-tracking technologies. A year later, that number jumped to 60%.⁵

Compelled to digitally monitor employee productivity, companies are investing in behavior-tracking tools at a breathtaking pace, giving little thought to how employees feel about those practices, notes Raveendhran.

Raveendhran's latest research aims to shed light on the proliferation of behavior-tracking technologies in the workplace and deepen our understanding of the psychological impact those technologies have on employees. In a recent study, Raveendhran and her collaborator, Nathanael J. Fast of the University of Southern California Marshall School of Business, examine the psychological underpinnings of employees' acceptance of behavior tracking in the workplace.⁶

The Rise of Behavior-Tracking Technologies

Most of us are familiar with smart watches, wristbands, and patches aimed at the consumer market that use computer-based algorithms to continuously track information about users and provide feedback. Popular devices like Fitbit, for example, can track blood pressure, exercise, and calorie intake, helping users improve their health.

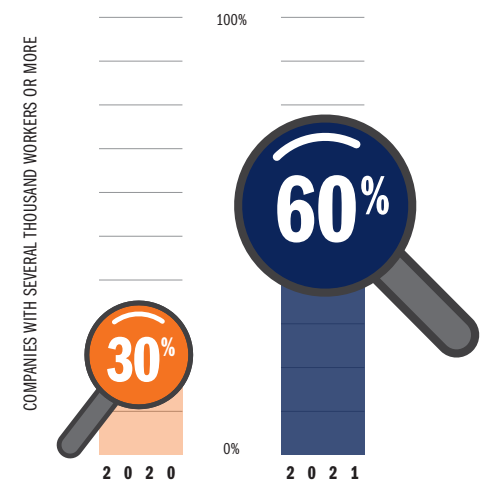
Increasingly, organizations are trying to leverage various behavior-tracking tools—aimed at industrial, enterprise, and institutional markets—to motivate employees and to monitor their performance and productivity. Thanks to new technologies such as geolocation, keystroke logging, screenshots, video recording, and access to webcams installed on remote PCs, employers can now capture terabytes of employee data. Cloud computing enables that data to be stored online, where it can be easily accessed and reviewed by employers.

Widely adopted enterprise applications such as Slack, Zoom, and Google Drive provide employers with granular insights into how individual employees work. Microsoft Office 365, for example, has a “productivity score” feature, which lets employers track worker behaviors across 73 metrics, including whether they turn on their cameras during meetings and how often they contribute to shared documents and group chats.

Employee-Monitoring Technologies

When the pandemic began in 2020, 30% of companies with several thousand workers adopted new employee-tracking technologies. A year later, that number jumped to 60%.

Adoption of New Employee-Tracking Technologies



Gartner research found that less than 50% of employees trust their organization with their data, and 44% don't receive any information regarding the data collected about them.⁷

Gartner also predicts that by 2023, more than 1 in 10 workers will attempt to trick AI systems used to measure their behavior and productivity.⁸

4 Gartner press release, “Gartner Says 10% of Workers Will Seek to Trick AI-Driven Tracking Systems by 2023,” February 8, 2021, <https://tinyurl.com/2p96d28p> (accessed Jan. 18, 2022).

5 Drew Harwell, “Surveillance of Workers at Home Likely to Outlast Covid,” *The Washington Post*, September 27, 2021.

6 Roshni Raveendhran and Nathanael J. Fast, “Humans Judge, Algorithms Nudge: The Psychology of Behavior Tracking Acceptance,” *Organizational Behavior and Human Decision Processes* 164, no. 3 (2021): 11–26.

7 Brian Kropp, “Nine Work Trends that HR Leaders Can't Ignore in 2021,” Gartner, January 21, 2021, <https://tinyurl.com/mpe74u6> (accessed Jan. 18, 2022).

8 Gartner press release.

Featured Academic Research

Roshni Raveendhran and Nathanael J. Fast, "Technology and Social Evaluation: Implications for Individuals and Organizations." *Cambridge Handbook of Technology and Employee Behavior*, ed. Richard N. Landers (Cambridge, UK: Cambridge University Press, 2019), 921-943. Cambridge Handbooks in Psychology.

Roshni Raveendhran, Nathanael J. Fast, and Peter J. Carnevale, "Virtual (Freedom From) Reality: Evaluation Apprehension and Leaders' Preference for Communicating Through Avatars," *Computers in Human Behavior* 111 (2020).

Roshni Raveendhran and Nathanael J. Fast, "Humans Judge, Algorithms Nudge: The Psychology of Behavior Tracking Acceptance," *Organizational Behavior and Human Decision Processes* 164, no. 3 (2021): 11-26.

The Darden Intelligence Initiative is a joint effort between Darden's Batten Institute and the Institute for Business and Society. It will explore the challenges and opportunities of AI in more depth through executive roundtables, webinars, and articles as well as in MBA, EMBA, and Executive Education coursework. More information about those events and learning opportunities can be found at the Darden Intelligence Initiative website: www.darden.virginia.edu/intelligence.

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batten@arden.virginia.edu

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Changing Attitudes to Behavior Tracking

Historically, workers have been averse to tracking and monitoring, expressing concerns about a Big Brother level of omnipresent surveillance that can lead to the loss of trust and motivation. But recent research shows that people are becoming more accepting of technological monitoring, especially if they understand its purpose.

According to one study, in 2015 only 10% of employees were willing to accept their employers' monitoring their email. In 2018, that number increased to 30% and jumped to 50% if employers were transparent about the reasons for the monitoring.⁹

Intrigued by those trends, Raveendhran and her collaborator Fast set out to examine how technological tracking that's fully automated differs from tracking that has some form of human involvement.

The study found that people are more willing to accept behavior tracking at work when it is conducted solely by technology—that is, computer algorithms—rather than by humans. What drives that acceptance? "When people are tracked by technology only," says Raveendhran, "they are less concerned about potential negative judgment, which increases their subjective sense of autonomy."

Findings from Raveendhran's study have important implications for both employees and employers. As organizations increasingly use technology to monitor employees, to do it effectively, they might consider fully automating tracking, says Raveendhran.

"If the whole purpose of tracking is to motivate people to behave in certain ways," says Raveendhran, "our research suggests that if we eliminate the human involvement, then we can make tracking an informational rather than an evaluative experience. The key question organizational leaders should be asking is, 'How can I use those new behavior-tracking technologies to enhance informational outcomes for my employees?' rather than, 'How can I use those tracking technologies to keep monitoring my employees more?'"

People First: How to Succeed at Human–Technology Collaborations

The modern workplace is increasingly driven by and dependent on technology. But when it comes to getting the work done, technology is only part of the story. "We can't think of technology as being separate from the people who interact with it," says Raveendhran. "Instead, we should put people first and think about how novel technologies can help employees be more effective at delivering lasting business outcomes."

Raveendhran's research has broad implications for companies in every industry. It demonstrates the importance of being mindful of how employees react to AI-enabled technologies that organizations are racing to adopt. In the long term, it seeks to answer an important question: How can organizations ensure that humans and AI-powered machines do what they do best independently and in collaboration with each other?

As companies ramp up their investments in AI-enabled systems, understanding the psychological factors that influence people's attitudes and behaviors toward those technologies is more critical than ever. Only then, says Raveendhran, can we glean practical insights into how to leverage novel technologies to create positive impact and deliver long-term value to the enterprise.

9 Brian Kropp, "The Future of Employee Monitoring," Gartner, May 3, 2019, <https://tinyurl.com/y9wwakm3> (accessed Jan. 18, 2022).