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G U I D E P O S T

CONDUCTING PHENOMENON-DRIVEN RESEARCH USING VIRTUAL REALITY AND THE METAVERSE

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We argue and provide evidence that virtual reality (VR) is particularly suited to conduct phenomenon-driven empirical research that theories of management and organizations neither adequately predict nor explain. We focus on four areas. First, we demonstrate the capabilities and accessibility of VR technology. Second, we show how VR can be used as a platform to expand our ability to study poorly understood phenomena in new ways. This includes improving our ability to study phenomena that are either difficult or impossible to examine using more traditional methodological approaches. Third, we discuss opportunities for using VR to conduct research in several illustrative management subfields (i.e., organizational behavior, strategy, entrepreneurship). Further, we discuss how the metaverse opens up almost limitless opportunities for future research. Finally, we provide recommendations and also discuss pitfalls to avoid when using VR as a research platform.

"Virtual reality" (VR) is a type of human–computer interface that allows users to become immersed in a computer-generated environment. In these virtual worlds, users can move in any direction and interact with the environment as well as other users. VR is one implementation of a broader category of "extended reality," which includes technologies such as augmented reality and mixed reality. A more recent development that uses VR is the "metaverse," which comprises multiple persistent and immersive virtual worlds involving high levels of interactivity among users (Ball, 2022). It is predicted that 25% of people will spend at least one hour per day in the metaverse by the year 2026 (Gartner, Inc., 2022).

We argue and provide evidence that VR is particularly suited to conduct phenomenon-driven empirical research that theories of management and organizations neither adequately predict nor explain. As we demonstrate in our article, VR can serve as a methodological platform that complements and augments other methods already in use, such as ethnographic observations, lab and field experiments, field surveys, meta-analyses, construct validation research, and replication studies, among others. Further, the metaverse itself is a new and unique phenomenon that opens up almost limitless opportunities for management research.

VR AS A RESEARCH PLATFORM: THE TECHNOLOGY LANDSCAPE

VR is already used as a research platform in many fields, including medicine (e.g., Dias et al., 2021; Donati et al., 2016; Mahtab & Egorova, 2022; Vlake et al., 2023), psychology (e.g., Brummelman, Grapsas, & van der Kooij, 2022; Caulfield, Karnick, & Capron, 2022; Neyret et al., 2020), psychiatry (e.g., Drori, Bar-Tal, Stern, Zvilichovsky, & Salomon, 2020), and linguistics (e.g., Peeters, 2020), among others. VR's potential as a methodological platform for management research was proposed more than two decades ago (e.g., Aguinis, Henle, & Beaty, 2001; Pierce & Aguinis, 1997). But, its application was not quite

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ready, given practical, logistical, and cost-related challenges. At present, however, VR hardware and software are highly sophisticated and affordable (Pyun, Rogers, & Ko, 2022). The technology landscape for VR continues to grow and change, but one thing is clear: it is becoming more powerful, immersive, affordable, and accessible for researchers in many fields—including management.

Real-time three-dimensional (3D) engines provide researchers the ability to simulate scenarios and phenomena in VR such as job interviews, customer interactions, corporate boardroom meetings, reporter interviews in TV studios, and employees reducing their stress in yoga studios. Figure 1 provides a few illustrations of virtual spaces that can be created using VR. Further, virtual confederates can now be created and animated using intuitive software (Leavitt, Qiu, & Shapiro, 2021). Figure 2 provides examples of virtual confederates that can be deployed in VR. At present, virtual confederates, their behaviors, and their voices have approached, and arguably crossed, the "uncanny valley"—which describes the dip in affinity people feel toward artificial avatars that look almost like, but not exactly like, real humans (Mori, 1970). Advances in technology including artificial intelligence such as ChatGPT will enable virtual confederates to have highly sophisticated conversational capabilities resulting in even more natural interactions.

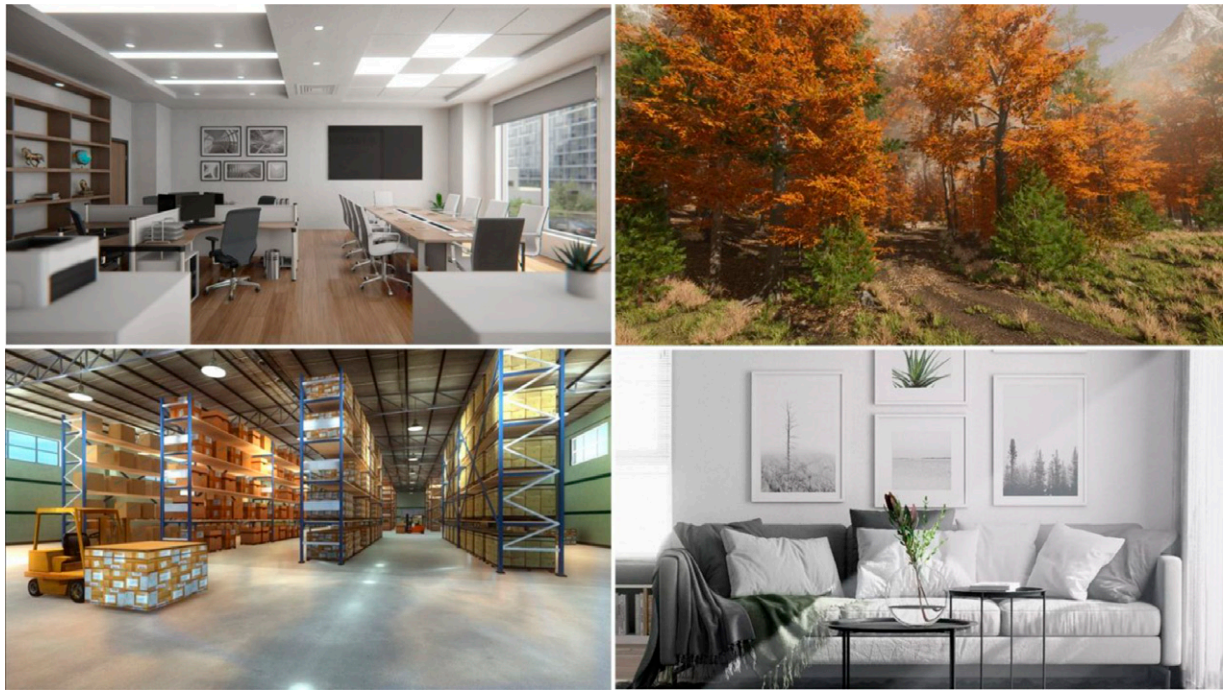
Beyond headsets and software, other equipment is available to enable the use of VR as a research platform. For example, affordable 360° treadmills allow participants to walk great distances in virtual worlds. Haptic suits and gloves enable users to physically feel virtual objects. Also, users can now smell specific scents at specific times as they move through virtual worlds. Many headsets can be equipped with both eye and face tracking, which can be used for avatar animation, data collection, software optimization, and user interaction.

When all these enablements are combined, VR allows a person to walk through a virtual factory, feel the rumble of the machinery, smell oil in the air, and hold conversations with workers who look realistic. VR also allows participants to wander through a virtual forest, feel the gentle breeze, hear the sound of dried leaves crunching beneath their feet, and smell the distinct scent of pine trees. While not all these modalities are needed in every empirical study, we hope that these illustrations will unleash the imagination of management researchers in terms of VR's capabilities and how to use it to conduct phenomenon-driven research.

BENEFITS OF USING VR AS A METHODOLOGICAL PLATFORM

VR is a useful addition to the methodological toolkit of management researchers, and particularly

FIGURE 1
Examples of Virtual Environments from the *Unity Asset Store*



Note: These assets can be purchased at https://assetstore.unity.com.

FIGURE 2
Examples of Virtual Confederates Created with Unreal Engine's *MetaHuman Creator*

Note: This tool can be accessed at https://metahuman.unrealengine.com.

valuable for examining phenomena that are poorly understood. The reason is straightforward: research that uses VR can mimic real-world phenomena in a standardized and controlled environment. For example, instead of asking participants to read vignettes and imagine a hypothetical situation, VR allows researchers to insert participants into the situation and then observe how they *actually behave*, instead of collecting data on how participants report they *might behave* (Aguinis & Bradley, 2014). Moreover, the realism and abilities of virtual confederates is now sufficiently advanced, capable of embodying life-like avatars with accurate animations (Llobera, Jacquat, Calabrese, & Charbonnier, 2022) and voices that closely match reality. Virtual confederates behave in the same way from participant to participant, while the bodies of virtual confederates can be swapped out while still retaining the exact behaviors of the prior confederate. These advantages regarding standardization and manipulation of independent variables offer benefits in terms of internal validity (i.e., causal inferences) as well as external validity (i.e., generalizability).

In addition to investigating phenomena that are poorly understood and not sufficiently explained by existing theories, VR can be used to simulate phenomena that may otherwise be practically and ethically challenging or even impossible to study (see King, Hebl, Morgan, & Ahmad, 2013). These could include dangerous scenarios, unique locations, or protocols that would require a mass of confederates. For example, active-shooter situations in the workplace can be studied safely in VR. Researchers are already using VR to implement the Trier Social Stress Test (Zimmer, Buttlar, Halbeisen, Walther, & Domes, 2019) and the Milgram Obedience Scenario (Neyret et al., 2020). Research occurring in unique locations is also implementable in VR. For example, if a researcher wanted to study why some executives respond differently to questions from members of the U.S. Congress, one could simulate a congressional hearing in VR instead of bringing participants to Washington, DC.

In addition to the aforementioned benefits regarding research design and measurement, VR also has data-gathering advantages. For example, researchers employing VR can unobtrusively collect a vast amount of data based on participants' facial expressions, eye gaze, and hand movements. Real-time 3D engines can record data using any of the devices being employed

in the simulation, such as headsets and controllers. Researchers can also incorporate other hardware to measure electrodermal activity, heart rate, and respiration. In addition, surveys can be administered inside the headset, participant speech can be recorded, and participant decisions can be logged. In sum, VR has many enablements and benefits as a complement and enhancement for existing methods.

VR AND PHENOMENON-DRIVEN RESEARCH

Given the technological advancements and benefits of using VR as a methodological platform described in the previous sections, VR is particularly suited for phenomenon-driven research. As illustrations, Table 1 includes examples of several possibilities in the subfields of organizational behavior (e.g., team meetings, negotiation, customer interactions), strategy (e.g., board meetings, CEO media interviews, mergers and acquisitions decisions), and entrepreneurship (e.g., pitch presentations, design meetings, non-work situations). Moreover, Table 1 also includes illustrations of independent variables (IV) that can be manipulated and dependent variables (DV) that can be measured. VR is also versatile in that the roles of these variables can be reversed from IV to DV and vice versa based on a particular study's goals. Examples of variables include abusive supervision, employee motivation, boardroom diversity, CEO dismissal, entrepreneurial success and failure, and innovation.

In addition to investigating novel phenomena, VR can also be used as a platform to revisit and extend previously published studies. As illustrated in Table 2, VR can be used to study gender and ethnic diversity in corporate boardrooms. Researchers currently use many techniques to understand the processes happening within boardrooms. For example,

TABLE 1
Illustrations of Phenomena and Variables to Investigate Using Virtual Reality as a Research Platform

Management field	Situations and phenomena to simulate	Possible IVs to manipulate	Possible DVs to measure
Organizational behaviour	• Customer interactions • Employee interviews • Employee training • Impression management • Job tasks • Negotiation • Supervisor–employee meetings • Team meetings • Yoga and meditation	• Abusive supervision • Conflict • Expressed personality • Gender and ethnic diversity • Job characteristics and work design • Religiosity • Team sleepiness • Unethical behavior • Workplace romance and sexual harassment	• Cognition and decision-making • Counterproductive work behaviors • Employee motivation • Job performance • Mood, affect, and emotions • Organizational citizenship behavior • Stress, strain, and burnout • Trust • Turnover
Strategic management	• All-employee meetings • Board meetings • CEO media interviews • CEO–TMT meetings • Mergers and acquisitions decisions • Post-merger meetings • Tours of company operations	• Boardroom characteristics • CEO and TMT incentives • CEO dismissal • Competitive dynamics • Gender and ethnic diversity	• Analyst ratings • Board effectiveness • CEO media statements • ESG or CSR decisions • Exploration versus exploitation • Internationalization • Resource allocation decisions • Strategic change
Entrepreneurship	• Design meetings • Investor meetings • Non-work situations • Pitch presentations • Team meetings	• Building and losing legitimacy • Entrepreneurial success and failure • Firm-level accomplishments • Gender and ethnic diversity • Positive and negative funding decisions	• Creativity • Entrepreneurial cognition, intentions, and motivation • Entrepreneurial commitment • Exploration versus exploitation • Feelings of grief • Innovation • Market entry decisions • Positive and negative affect • Resource investment • Talent management decisions

Notes: IV = independent variable; DV = dependent variable, CEO = chief executive officer; TMT = top management team; ESG = environmental, social, and governance; CSR = corporate social responsibility. Many of the illustrative IVs can serve the role of DVs (and vice versa) depending on a particular study's goals.

TABLE 2
Illustrations of Published Studies That Can Be Revisited and Expanded Using Virtual Reality as a Research Platform

Management field	Referent paper	Research question and study design	Main conclusions	Illustrative expansion using VR
Organizational behavior	Miron-Spektor, Bear, and Eliav (2022)	RQ: Can women close the influence gap through humor expression? Design: Analyzed 2,407 TED Talks	Results "revealed that using humor increased influence, especially for female speakers" (Miron-Spektor et al., 2022: 1)	Create the TED auditorium space with a crowd of virtual confederates. A virtual speaker could give a short TED Talk on a particular topic using the same language, voice, body language, and tone while the gender and level of humor differ. Participants could attend the talk while their facial expressions and audio are recorded to assess expressed emotions such as smiles and laughter.
Strategic management	Harvey et al. (2017)	RQ: How does changing team composition affect team dynamics and decision-making processes? Design: Analyzed five years of corporate boardroom meeting minutes	A change in team composition was followed by a "dysfunctional process in which the team replaced its goal of effective task performance with negotiating the interests of subgroup members" (Harvey et al., 2017: 358)	Create a series of boardroom meetings where the board members change. The ethnicity or gender of the incoming or outgoing director could then be experimentally assigned. Researchers could observe how participants react as a function of their ethnicity or gender.
Entrepreneurship	Suárez, White, Parker, and Jiménez-Mavillard (2021)	RQ: Does the mass media promote entrepreneurship? Design: Examined text from over a decade of *New York Times* and *Financial Times* for content and sentiment	Articles "containing the words 'entrepreneur' and 'founder' were found to have much more positive sentiment than did excerpts with the words 'manager' and 'executive'" (Suárez et al., 2021: 247)	Investigate whether there are differences—and why—in the way entrepreneurs and executives answer questions from reporters. Create a news set and have a virtual confederate act as a reporter doing a live interview. Participants could answer the same set of questions, which could then be analyzed later.

Harvey, Currall, and Helland Hammer (2017) used boardroom meeting minutes from a single firm for over five years to better understand the microprocesses that occur as board composition changes. Their observational approach benefited from examining real boardroom interactions, but, as they noted, there were limitations because they were "not able to disentangle the effects of external context, informational dynamics, and status dynamics from compositional effects in [their] data; [they] can only describe the processes [they] observed in the presence of these dynamics" (Harvey et al., 2017: 375). Using VR, a researcher could simulate boardroom meetings that replicate the important phenomena Harvey and colleagues were examining—boardroom conflict, issue negotiation, and information analysis—under these different conditions. Such a constructive replication would have the advantage of an exogenous manipulation of boardroom composition with the additional benefit of high realism and ecological validity.

THE METAVERSE AS AN UNDERINVESTIGATED MANAGEMENT PHENOMENON

In the near future, the metaverse will be the launching point for virtual experiences and virtual worlds. As noted earlier, it is anticipated that 25% of people will spend at least one hour per day in the metaverse by the year 2026 (Gartner, Inc., 2022). The metaverse is a set of interconnected virtual worlds where people meet, work, and play. People can adopt different

identities and exchange digital goods. Employees, shareholders, and stakeholders can engage with organizations in the metaverse in different ways. Examples are innumerable; investors can attend shareholder meetings, employees can participate in workshops, and consumers are able to buy goods—all in the metaverse. Management scholars have an important role to play, as we can proactively work to understand the benefits and concerns of engaging in virtual worlds. That is, our current theories and understanding are insufficient to explain the impact of the metaverse on employees, teams, organizations, and their stakeholders, and, thus, the metaverse is an ideal domain for exploratory research.

The metaverse has fascinating implications for many domains across management subfields such as diversity and inclusion. For example, in the metaverse, people can choose or modify their avatars. A person of one ethnicity could use the avatar of another ethnicity. These possibilities open up numerous opportunities for exploratory management research. For example, does the choice of different avatar manifest as deep or surface acting (Grandey, 2003)? How do semi-anonymous interactions shape group affiliation and psychological attachment?

USING VR AS A RESEARCH PLATFORM: NEXT STEPS

To incorporate VR into phenomenon-driven research, including the metaverse, we need to view VR as an expansive platform, and not as just a specific and narrow methodological technique. VR is much more than just a "methodological curiosity." VR can be readily used for conducting laboratory and field experiments, passive observation studies, ethnographic research, multilevel research, mixed methods, experience sampling methodology research, and more. VR is a platform that can be adapted to implement all these methods, ranging from quantitative to qualitative and to mixed methods.

As next steps, we encourage *researchers* to consider how they can incorporate VR into their existing work. The technology—hardware and software—is now accessible. Studies can be conducted in university VR laboratories, in headsets sent to users' homes or workplaces, and in headsets already owned by participants on platforms such as Prolific. Researchers intrigued by VR's potential might consider learning to develop VR applications using real-time 3D engines. This might also present an opportunity for business schools to provide additional training to doctoral students.

In addition, *journal editors and reviewers* can play a critical role in helping high-quality VR studies become a part of the management literature. As editors assign manuscripts for review, they may consider reviewers who have a specialty in VR, just as one might add an experimentalist to review a laboratory experiment. These reviewers need to have experience using VR in their own work, try demos at conferences, and stay current in the VR literature. VR often suffers from undue criticism from reviewers around insufficient realism, fidelity, and immersion. When these concerns exist on a review team, editors may want to find innovative ways to provide reviewers with study materials. VR needs to be experienced; watching a video of a VR study isn't sufficient. Addressing this issue might even include sending headsets to reviewers with the software pre-loaded. If we are purposeful, we can find a way to maintain the double-blind feature of the review process.

MINIMIZING PITFALLS IN VR STUDIES

We have provided evidence about the potential of VR as a methodological platform—but we do not think it is a perfect solution for every research situation. We also do not believe that VR is the silver bullet that will solve all methodological challenges (Aguinis, Bergh, & Molina-Azorin, 2023). So, scholars need to anticipate several potential pitfalls. First, studies usually take longer to develop on the front end, compared to using other research approaches, because the software for the study needs to be created. This can present a risk, especially for junior scholars who have pressures to publish quickly. But, if viewed as building a tool to conduct multiple studies about a particular phenomenon, this investment in time and resources can be worthwhile. Second, VR data collection can take longer as it requires participants in headsets. Data collection can be sped up using platforms like Prolific, but sample composition and statistical power concerns must be considered. Finally, given that it is a new development, especially in the field of management, researchers must be prepared to contend with reviewer skepticism. But, as more journals, including *Academy of Management Discoveries*, entertain registered reports—where researchers propose a study that goes through peer review before data are collected—this risk is likely to be mitigated.

CONCLUSIONS

We have described how VR has great potential to serve as a research platform to conduct phenomenon-driven research in areas that are poorly understood and explained by existing theories. We provided a brief summary of technical and logistical considerations including hardware and software to show that using VR is now practically feasible. We also offered

illustrative topics as well as IVs and DVs that can be included in VR research across management subfields (i.e., organizational behavior, strategy, entrepreneurship). We have also discussed the metaverse as an emerging phenomenon that will open up almost limitless opportunities to conduct exploratory research. Finally, we also offered some caveats and potential limitations of using VR as a research platform. Our closing words are as follows:

> Put on a headset and immerse yourself in a virtual world. Unleash your imagination about the innumerable opportunities and benefits that VR offers as a research platform to conduct phenomenon-driven research.

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