Flexible Environments for Hybrid Collaboration: Redesigning Virtual Work Through the Four Orders of Design
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1 W. Richard Scott and Gerald F. Davis, *Organizations and Organizing: Rational, Natural, and Open System Perspectives* (Upper Saddle River, NJ: Pearson Prentice Hall, 2007), 159, http://www.worldcat.org/oclc/70839752 (accessed May 12, 2021).

2 See Nathan Rosenberg and L. E Birdzell Jr, *How the West Grew Rich: The Economic Transformation of the Industrial World* (New York: Basic Books, 2008); E. P. Thompson, "Time, Work-Discipline, and Industrial Capitalism," *Past & Present*, no. 38 (1967): 56–97; Scott and Davis, Organizations and Organizing.

3 Jack Nilles, "Telecommunications and Organizational Decentralization," *IEEE Transactions on Communications* 23, no. 10 (October 1975): 1142–47, https://doi.org/10.1109/TCOM.1975.1092687; and Katherine M. Chudoba et al., "How Virtual Are We? Measuring Virtuality and Understanding Its Impact in a Global Organization," *Information Systems Journal* 15, no. 4 (2005): 279–306, https://doi.org/10.1111/j.1365-2575.2005.00200.x.

4 Shoshana Zuboff, In the Age of the Smart Machine: The Future of Work and Power (Oxford: Heinemann Professional, 1988), cited in Chudoba et al., "How Virtual Are We?," 280.

5 Chudoba et al., "How Virtual Are We?"

6 For data on levels of change, see, respectively, Erik Brynjolfsson et al., "COVID-19 and Remote Work: An Early Look at US Data" (National Bureau of Economic Research, June 15, 2020), https://doi.org/10.3386/w27344; and Liam Eagle, "Coronavirus Flash Survey June 2020" (S&P Global Market Intelligence, June 2020), https://pages.marketintelligence.spglobal.com/451-on-COVID19-Request.

Introduction

Since the first industrial revolution, organizations have gathered workers together in common locations in a process called agglomeration.[1] This move allowed organizations to share common energy sources, tools, and goods among their employees, as well as to centralize logistics and increase worker supervision and control.[2] But by the 1970s, the nature of work was evolving. Expanding use of the telephone made "telecommuting" possible, meaning people could collaborate without physically being together.[3] Tasks became "increasingly 'informated,' turning a large proportion of corporate employees at all ranks into 'knowledge workers' whose tasks are computer-mediated."[4] The need to remain competitive drove organizations to acquire the best talent wherever those workers were located, thereby guiding collaboration toward greater "virtuality."[5]

The COVID-19 pandemic conspicuously accelerated this transition, shifting 35 percent of U.S. workers and 80 percent of global corporate remote work policies from primarily co-located and face-to-face interactions to virtual and hybrid forms of collaboration within a few weeks.[6] Nor has this sudden transition been temporary. Nearly two-thirds (64%) of organizations report that "remote working is a permanent change they have made due to COVID-19," with a similar proportion (69%) reporting that at least 75 percent of their workforce works effectively when remote.[7] Such reports are consistent with long-held self-assessments showing the same.[8] Increasingly, individuals and organizations see the "liberating" potentials of distributed work as it grants them newfound flexibility.[9]

Simultaneously, millions of people struggle with "flexible" work arrangements. Even prior to the pandemic, information and communication technology (ICT) adoption frequently yielded unintended or "dual" consequences[10]—the mixed effects of hybrid collaboration that increasing numbers of people now experience. For example, while some people view Slack as a flexible lifeline amidst

html?utm_source=spgisite (accessed October 27, 2020.

7   Liam Eagle, "Coronavirus Flash Survey October 2020" (S&P Global Market Intelligence, October 2020), https://pages.marketintelligence.spglobal.com/rs/565-BDO-100/images/VotE_DigitalPulse-CoronavirusFlashSurveyOct2020-Advisory-FINAL.pdf (accessed October 23, 2020).

8   Chudoba et al., "How Virtual Are We?"

9   Alexander Massey et al., "Location Liberation: Adaptive Workplaces in Government," *Deloitte Insights* (blog), March 4, 2021, https://www2.deloitte.com/us/en/insights/industry/public-sector/government-trends/2021/location-liberation-adaptive-workplaces-government.html (accessed May 18, 2021).

10 Ann Majchrzak et al., "Designing for Digital Transformation: Lessons for Information Systems Research from the Study of ICT and Societal Challenges," *MIS Quarterly* 40, no. 2 (June 2016): 267–77.

11 Rani Molla, "Is Slack Ruining Our Jobs—and Lives?," *Vox*, May 1, 2019, sec. Recode, https://www.vox.com/recode/2019/5/1/18511575/productivity-slack-google-microsoft-facebook (accessed November 11, 2020).

12 Jeremy Bailenson, "Nonverbal Overload: A Theoretical Argument for the Causes of Zoom Fatigue," *Technology, Mind, and Behavior* 2, no. 1 (February 23, 2021), https://doi.org/10.1037/tmb0000030; and Geraldine Fauville et al., "Nonverbal Mechanisms Predict Zoom Fatigue and Explain Why Women Experience Higher Levels than Men," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, April 5, 2021), https://doi.org/10.2139/ssrn.3820035.

13 Paul Leonardi et al., "Multiplex Appropriation in Complex Systems Implementation: The Case of Brazil's Correspondent Banking System," MIS Quarterly 40, no. 2 (June 2016): 462. See, e.g., Paul Leonardi and Stephen Barley, "Materiality and Change: Challenges to Building Better Theory About Technology and Organizing," *Information and Organization* 18, no. 3 (March 10, 2008): 159–76, https://doi.org/10.1016/j.infoandorg.2008.03.001; Gerardine DeSanctis and Marshall Scott Poole, "Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory," *Organization Science* 5, no. 2 (May 1994): 121–47, https://doi.org/10.1287/orsc.5.2.121; and Wanda Orlikowski, "The Duality

remote work isolation, others find its incessant notifications insufferable.[11] People also report experiencing "Zoom fatigue." Although video conferencing certainly has helped people to stay connected with loved ones and colleagues (in some cases the only time people have seen others' faces during the pandemic), spending all day in video meetings can feel particularly exhausting, probably because of increased cognitive load, self-evaluation, sensations of intimacy, and reduced mobility.[12] Of course, both of these examples assume that people have sufficient or consistent enough internet access to collaborate remotely in the first place—a particularly challenging reality in many rural communities and developing nations.

Numerous works demonstrate that users "appropriate new technology by adapting it to meet their needs, which may or may not match designers' goals."[13] Such appropriation occurs even in the realms of relationships, the roles of others, and policies.[14] At some level, this process is both efficient and sufficient because users "make things work" for themselves. In fact, "tailoring systems to meet user requirements may prove impossible," according to Leonardi et al.; particularly as problems become increasingly complex and as user populations grow "so diverse as to be incompletely definable," letting those in need appropriate designs in distinct ways that work for them may prove more effective.[15]

That said, universal, inclusive, and feminist design advocates would argue (as we do) for the necessity of at least working to include everyone to mitigate inequity[16]—an outcome more often borne by marginalized groups. Indeed, Buchanan points out that the principle that underlies approaches like design thinking and its growing appeal to organizations is the "quality of experience for all those served by the organization."[17] For this reason and others, many organization scholars call for the redesign of the *work systems* that affect all those who work[18]—the systems of interdependencies between tasks, processes, knowledge, skills, and technologies that organizations require to accomplish their goals.[19] In this case, the challenges of redesigning collaboration "are not problems of action but of reaching a new understanding of the purposes and ends"[20]—namely, of addressing the needs of all stakeholders.

Fortunately, two bodies of work hold potential for addressing the conundrum of hybrid collaboration. The first is Buchanan's work on the *four orders of design*—symbols, things, actions, and environments[21]—which describes a trend long underway of moving beyond the design of objects or tools and into the design of interactions and environments. But for hybrid work specifically, the past 10 years also have seen a consolidation of knowledge by scholars of management, organizational communication, information

of Technology: Rethinking the Concept of Technology in Organizations," *Organization Science* 3, no. 3 (August 1, 1992): 398–427, https://doi.org/10.1287/orsc.3.3.398.

14 Paul M. Leonardi et al., "Multiplex Appropriation in Complex Systems Implementation: The Case of Brazil's Correspondent Banking System," *MIS Quarterly* 40, no. 2 (June 2016): 462.

15 Leonardi et al., 471.

16 Kristin Skeide Fuglerud, "Inclusive Design of ICT: The Challenge of Diversity" (PhD Diss., University of Oslo, 2014), https://nr.no/en/publikasjon/1183013/; Edward Steinfeld and Jordana Maisel, *Universal Design: Creating Inclusive Environments* (Hoboken, NJ: John Wiley & Sons, 2012); P. John Clarkson et al., *Inclusive Design: Design for the Whole Population* (London: Springer-Verlag, 2013); and Catherine D'Ignazio and Lauren F Klein, *Data Feminism* (Cambridge, MA: MIT Press, 2020).

17 Richard Buchanan, "Worlds in the Making: Design, Management, and the Reform of Organizational Culture," *She Ji: The Journal of Design, Economics, and Innovation* 1, no. 1 (Autumn 2015): 17, https://doi.org/10.1016/j.sheji.2015.09.003.

18 Kingshuk K. Sinha and Andrew H. Van de Ven, "Designing Work Within and Between Organizations," *Organization Science* 16, no. 4 (2005): 389–408, https://doi.org/10.1287/orsc.1050.0130.

19 Scott and Davis, *Organizations and Organizing*, 21.

20 Richard Buchanan, "Branzi's Dilemma: Design in Contemporary Culture," *Design Issues* 14, no. 1 (Spring 1998): 16, https://doi.org/10.2307/1511825.

21 Richard Buchanan, "Wicked Problems in Design Thinking," *Design Issues* 8, no. 2 (Spring 1992): 5–21, https://doi.org/10.2307/1511637; Richard Buchanan, "Design Research and the New Learning," *Design Issues* 17, no. 4 (Autumn 2001): 3–23, https://doi.org/10.1162/07479360152681056; and Buchanan, "Worlds in the Making."

22 Buchanan, "Wicked Problems in Design Thinking."

23 Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 1996), 117.

24 Jon Kolko, "Abductive Thinking and Sensemaking: The Drivers of Design Synthesis," *Design Issues* 26, no. 1 (Winter 2010): 15–28, https://doi.org/10.1162/desi.2010.26.1.15.

systems (IS), and psychology about numerous aspects of remote work—from cultural preferences for technologies to classic notions of team performance. Hence, by reviewing the past decade of literature reviews on virtual collaboration through the lens of Buchanan's four orders of design, this article proposes that designing work systems as *flexible collaborative environments* increases the likelihood of producing more equitable outcomes for organizations' stakeholders. To that end, the following sections detail the four orders of design and virtual technology implementations before describing our review methodology. We then present the thematic outcomes of our analysis, discuss them through the lens of the four orders of design, and identify their implications for the future of technologies, physical and virtual workspaces, and even organizational cultures. We find that flexible collaborative environments could leverage the benefits of varying degrees of virtuality to make work systems more satisfying for all those who interact with them.

The Four Orders of Design and Their Intersections
Identifying immutable foundations of design has proven challenging, and consequently, scholars have framed its means and objectives differently over time.[22] Some scholars approach design as a science of considering "possible worlds" and selecting from among the set of alternatives, whether for objects or organizations[23]; others see design as making sense of chaos by distilling simplicity from complexity[24]; others have cast design as efficient communication toward behavior modification[25]; and some see it as a means of effecting change in the world.[26] Of course, all of these views are accurate in different ways and contexts, regardless of their somewhat disjointed perspectives.

Part of the value of denoting the four "orders" of design is in dialectically unifying these framings. Although the names have varied in subtle ways over time, their substance remains largely the same: The first order of design involves *symbols*, the essence of communication. Symbols take many forms: Language, images, and behaviors all convey symbolic meanings.[27] Classically, this order describes disciplines such as graphic design, audio, video, and communication professions. The second order is the order of *things* or *objects*, whether statuary, furnishings, vehicles, electronics, software, etc. Industrial and product design certainly pervade, although the order also comprises the work of engineers and artists of all flavors, craftspeople, and marketers, among others. The first two orders clearly overlap in that objects often serve symbolic purposes, as with a child's favorite toy or a tote bag that advertises support for a local radio station and that potentially conveys an identity the carrier seeks to project. The third order is that of *action* and *interaction*,

which brings us to present notions of the design of user experiences (with technologies and other people), services, and processes. We might consider a business consultant who designs new processes (or streamlines the old). Here, too, the consultant's new process likely involves interacting with some kind of information technology on a designed device, the relevance of which would increase if, for example, the process manipulated customized manufacturing processes or open office workspaces.

Buchanan's fourth order comprises *environments* or *systems*. Interestingly, Buchanan further specifies that these environments are "for living, working, playing, and learning," which underscores the unity of purpose or *thought* that guides a particular environment's design.[28] This order naturally lends itself to professions of built environments—architecture, urban planning, interior design—but also to professions of designed missions that draw more from the systems metaphor—systems engineering, organization design, and public policy, among others.[29] As with the other orders, the fourth often integrates the first three and, likewise, can be integrated into them. For example, a public health initiative may involve the development of recognizable symbols, the construction of personal protective equipment, and the administration of vaccines, all oriented toward a unified mission of community well-being—or the initiative might serve as a symbol of worthiness for re-election—or both, depending on the "possible world" each individual inhabits.[30]

Similarly, we can apply this logic to systems of virtual work. Before we delve into this logic, we need to explain a language for discussing some attributes of virtual work.

Terminology of Virtual Collaboration
Whether our teams are co-located in the same office, are distributed around the globe, or involve a hybrid mix of the two varying by the day, information and communication technologies (ICTs) play substantive roles in most present-day work designs.[31] ICTs have significantly evolved in recent years, with the addition of team chats, blogs, wikis, and, more recently, video calling, audio processing, computer vision, and natural language processing among many others. Technologies result in differing amounts of *team virtuality*—"the extent and value of utilizing information and communication technologies within work teams."[32] Here, *value* refers to the richness of the informational content provided by ICTs, whether through its synchronicity or asynchronicity. For example, integrating video-conferencing into team interactions tends to result in lower team virtuality because of its communication synchronicity and relatively rich content; meanwhile, email tends toward higher asynchronicity and lower informational quality. Virtuality produces mixed results

25   Jorge Frascara, "Graphic Design: Fine Art or Social Science?," *Design Issues* 5, no. 1 (Autumn 1988): 18–29, https://doi.org/10.2307/1511556.

26   Ilse Oosterlaken, "Design for Development: A Capability Approach," *Design Issues* 25, no. 4 (Autumn 2009): 91–102, https://doi.org/10.1162/desi.2009.25.4.91.

27   Eric Eisenberg and Patricia Riley, "Organizational Culture," in *The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods*, ed. Fredric M. Jablin and Linda L. Putnam (Thousand Oaks, CA: Sage Publications, 2001), 291–322, https://doi.org/10.4135/9781412986243.

28   Buchanan, "Wicked Problems in Design Thinking," 10.

29   Buchanan, "Worlds in the Making"; Buchanan, "Design Research and the New Learning."

30   The "system" metaphor makes an important contribution even as it is interchangeable with the "environment" metaphor because it allows us to move beyond a grounding in material space and into a grounding in relationships between artifacts of any kind, material or not.

31   C. Marlene Fiol and Edward J. O'Connor, "Identification in Face-to-Face, Hybrid, and Pure Virtual Teams: Untangling the Contradictions," *Organization Science* 16, no. 1 (2005): 19–32, https://doi.org/10.1287/orsc.1040.0101.

32   John Schaubroeck and Andrew Yu, "When Does Virtuality Help or Hinder Teams? Core Team Characteristics as Contingency Factors," *Human Resource Management Review* 27, no. 4 (December 2017): 636, https://doi.org/10.1016/j.hrmr.2016.12.009.

for team performance, learning, adaptation, satisfaction, trust, and identity, depending on factors such as team member skills, authority structure, and how long the team has been together.[33] Furthermore, the continual evolution of teams through varying configurations of remote work yields different experiences for different teams at different times.

IS research also examines how teams accomplish outcomes *with* technology by understanding the interrelated contributions of the technical artifact and the social behaviors of people. This theoretical lens, known as *materiality*, asserts that while users of technologies exercise some discretion over how technologies affect their work, technologies both promote and constrain certain activities, based on the properties of the designed artifact.[34] (Here, an object shapes interaction, and perhaps interactions shape interactions.) Rice and Leonardi summarize how organizations adopt, use, and benefit from ICTs: Increased adoption may arise out of "individual (e.g., innovativeness and self-efficacy), social (e.g., influence), and institutional (e.g., top management commitment) contexts."[35]

Materiality may resonate with many people who have found themselves working remotely during the pandemic because specific technologies, their implementations, and social uses often shape such experiences—for better *and* worse. In general, a team's or organization's network may expand from ICT use—for example, through connections made via professional social media sites; still, information overload can dampen the benefits of this outcome. As the pandemic has made clear, the flexibility of "working from anywhere" juxtaposes challenges that may result from disruption of organizational structures, work processes, differences in geography, culture, professionalism, and interaction frequency. Readers can likely recall similar tensions in their own careers.

Such mixed experiences bring us back to Buchanan. Our designed work systems *do* yield outcomes of both individual and collective good; neither individuals nor organizations would hail their benefits otherwise! And yet, "if the purpose of design thinking is to create the environments within which we live [and work], the purpose is also to make possible the unity of the individual with the environments that human beings create." Many work systems do not facilitate *unity*: seamless alignment between each worker's intentions and their means of fulfilling those intentions through their work environments. Whether caused by "practical," "intellectual," or "emotional" dissatisfaction, workers often find that "the felt unity of an experience is broken, trust and confidence are diminished, and human satisfaction in the fulfillment of reaching a goal is lost."[36] Hence, much of work as we know it only partially "works." To understand why, the remainder of this piece reviews the established knowledge on virtual collaboration through the four

33   Chudoba et al., "How Virtual Are We?"; Mei Lu et al., "Virtuality and Team Performance: Understanding the Impact of Variety of Practices," *Journal of Global Information Technology Management* 9, no. 1 (2006): 4–23, https://doi.org/10.108 0/1097198X.2006.10856412; and Schaubroeck and Yu, "When Does Virtuality Help or Hinder Teams?"

34   Ronald Rice and Paul Leonardi, "Information and Communication Technologies in Organizations," *The SAGE Handbook of Organizational Communication: Advances in Theory, Research, and Methods* (2014), 425–48.

35   Rice and Leonardi, 430.

36   Buchanan, "Worlds in the Making," 19.

orders. As our review shows, hybrid work systems need to accommodate individuals and teams alike, flexibly and simultaneously, to fully facilitate unity. And in doing so, they may also create opportunities not currently afforded to existing work systems.

Review Methodology

For this work, we conducted a "review of reviews," known in the IS literature as an umbrella review or an overview of reviews, following the procedure outlined by Templier and Paré.[37] We searched all 41 databases included in ABI/INFORM on ProQuest for reviews of accepted knowledge about virtual work. In this search, we looked for explicit review articles, meaning works that self-identified as a review or meta-analysis of virtual, hybrid, distributed, or remote aspects of work, collaboration, teams, or groups.[38]

We screened for article quality by performing this search within the Association of Information Systems' "basket of eight" journals (i.e., *European Journal of Information Systems*, *Information Systems Journal*, *Information Systems Research*, *Journal of AIS*, *Journal of Information Technology*, *Journal of MIS*, *Journal of Strategic Information Systems*, and *MIS Quarterly*), in addition to eight top management journals (i.e., *Academy of Management Review*, *Academy of Management Journal*, *Organization Science*, *Management Science*, *Organizational Behavior and Human Decision Processes*, *Administrative Science Quarterly*, *Human Resource Management Review*, and *Journal of Management*) and two relevant organizational psychology journals (*Journal of Applied Psychology* and *Small Group Research*). We also limited the search to the years 2010–2020 to ensure that our findings represented the most up-to-date knowledge from the field, while allowing time for studies of different perspectives to accrue. Collectively, these searches returned 30 unique articles. We then excluded articles that did not self-identify as reviews or meta-analyses (e.g., *Human Resource Management Review* yielded several false positives because of the journal name) or that reviewed an adjacent topic.[39] Of the 13 studies that remained (see Table 1), 8 came from a *Human Resources Management Review* special issue on virtual teams from 2017. Finally, given our interest in the design of hybrid work arrangements, we excluded any findings from purely co-located settings.[40]

For the final sample of 13 studies, we recorded the theme identified by the authors; associated the factors of each finding as inputs, moderators, mediators, or outputs; noted their association with individuals, leaders, teams, or organizations; and identified the relationship between factors as positively related, as negatively related, as having mixed effects, or as having no effect. Many of the inductive thematic reviews cited findings for which only one study supported the finding, so we included only findings with multiple supporting studies to ensure claim validation. For instances in

37 Mathieu Templier and Guy Paré, "A Framework for Guiding and Evaluating Literature Reviews," *Communications of the Association for Information Systems* 37, no. 1 (August 2015), https://doi.org/10.17705/1CAIS.03706.

38 The logical expression for this search is "noft(virtual OR hybrid OR distributed OR remote) AND noft(work OR collaboration OR teams OR groups) AND noft(review)" where "noft" means no full text.

39 Specifically, Stefan Jooss, Anthony McDonnell, and Kieran Conroy, "Flexible Global Working Arrangements: An Integrative Review and Future Research Agenda," *Human Resource Management Review* (August 27, 2020), 100780, https://doi.org/10.1016/j.hrmr.2020.100780 which deals with location rather than virtuality.

40 Several articles distinguish between professional- and student-derived knowledge (e.g., Jennifer Gibbs, Anu Sivunen, and Maggie Boyraz, "Investigating the Impacts of Team Type and Design on Virtual Team Processes," *Human Resource Management Review* 27, no. 4 (December 2017): 590–603, https://doi.org/10.1016/j.hrmr.2016.12.006).

Table 1 | **The 13 Review Articles Included in the Umbrella Review**

Authors	Year	Review Title	Publication	Review Type	Terminology
Breuer, Christina; Hüffmeier, Joachim; Hertel, Guido	2016	Does trust matter more in virtual teams? A meta-analysis of trust and team effectiveness considering virtuality and documentation as moderators	*Journal of Applied Psychology*	Meta-analysis	Virtual teams
Gibbs, Jennifer L.; Sivunen, Anu; Boyraz, Maggie	2017	Investigating the impacts of team type and design on virtual team processes	*Human Resource Management Review*	Thematic inductive	Virtual teams
Gilson, Lucy L.; Maynard, M. Travis; Young, Nicole C. Jones; Vartiainen, Matti; Hakonen, Marko	2015	Virtual teams research: 10 years, 10 themes, and 10 opportunities	*Journal of Management*	Thematic inductive	Virtual teams
Han, Soo Jeoung; Beyerlein, Michael	2016	Framing the effects of multinational cultural diversity on virtual team processes	*Small Group Research*	Thematic inductive	Multinational virtual teams
Handke, Lisa; Klonek, Florian E.; Parker, Sharon K.; Kauffeld, Simone	2020	Interactive effects of team virtuality and work design on team functioning	*Small Group Research*	Thematic inductive	Virtual teams
Hoch, Julia E.; Dulebohn, James H.	2017	Team personality composition, emergent leadership and shared leadership in virtual teams: A theoretical framework	*Human Resource Management Review*	Thematic inductive	Virtual teams
Kramer, William S.; Shuffler, Marissa L.; Feitosa, Jennifer	2017	The world is not flat: Examining the interactive multidimensionality of culture and virtuality in teams	*Human Resource Management Review*	Thematic inductive	Virtual teams
Liao, Chenwei	2017	Leadership in virtual teams: A multilevel perspective	*Human Resource Management Review*	Thematic inductive	Virtual teams
Marlow, Shannon L.; Lacerenza, Christina N.; Salas, Eduardo	2017	Communication in virtual teams: A conceptual framework and research agenda	*Human Resource Management Review*	Thematic inductive	Virtual teams
Mesmer-Magnus, Jessica R.; DeChurch, Leslie A.; Jimenez-Rodriguez, Miliani; Wildman, Jessica; Shuffler, Marissa	2011	A meta-analytic investigation of virtuality and information sharing in teams	*Organizational Behavior and Human Decision Processes*	Meta-analysis	Virtual teams
Roehling, Mark	2017	The important but neglected legal context of virtual teams: Research implications and opportunities	*Human Resource Management Review*	Thematic inductive	Virtual teams
Schaubroeck, John M.; Yu, Andrew	2017	When does virtuality help or hinder teams? Core team characteristics as contingency factors	*Human Resource Management Review*	Thematic inductive	Virtual teams
Schmidtke, James M.; Cummings, Anne	2017	The effects of virtualness on teamwork behavioral components: The role of shared mental models	*Human Resource Management Review*	Thematic inductive	Virtual teams

which the object of study was not specified, the party enacting or affected by a given practice was inferred from context. Furthermore, statements about generic "effects" were designated as having "mixed effects" on a generic "outcomes" specification. Following the compilation of these findings, we inductively coded the findings from each study, partially informed by the author-identified thematic categories. Our work shows that a significant majority of the findings involve preferences and attributes that, in Buchanan's framework, we might classify as third order and fourth order, but the findings vary significantly within most topics.

Results: Hybrid Collaborations as Environments

Following the procedure described in the previous section, we identified a total of 243 claims made across the reviews that satisfied the specified criteria. An inductive coding process distilled these findings into 14 themes, which we gathered into 4 categories, as summarized in Table 2. The number of articles and the total number of claims are displayed for each category and theme. Of course, many of these claims are redundant because different reviews frequently refer to the same articles; hence, these quantities metaphorically represent the relative attention paid to each topic (within and across disciplines) and the extent of nuance within each category, rather than the importance of each. Also, although themes can and do apply to multiple categories, we organized the themes into personality traits, task expectations, task resources, and team interaction because this sequence parallels both the progression of a project and the categories' demonstration of the four orders. Table 2 further describes the percentage of claims in which the factors were positively or negatively related, in which there were no effects or mixed effects, and in which a factor was identified as mediating two other factors.

The findings of these studies are too numerous to recount here in full. Instead, we briefly summarize the claims that fall within each category and theme to contextualize their subsequent consideration through the four orders.

Personality Traits and Virtuality

Projects often start by constructing teams. A review by Hoch and Dulebohn provides, to the best of our knowledge, a unique synthesis of organizational psychology literature.[41] They describe the relationships between the "big five" personality dimensions (extraversion, agreeableness, conscientiousness, openness, and emotional stability) and leadership in virtual teams.

With respect to individuals, all five traits correlate with an increased likelihood of that person emerging as a leader, and individual leadership emergence correlates with team performance.

41   Julia Hoch and James Dulebohn, "Team Personality Composition, Emergent Leadership and Shared Leadership in Virtual Teams: A Theoretical Framework," *Human Resource Management Review* 27, no. 4 (December 2017): 678–93, https://doi.org/10.1016/j.hrmr.2016.12.012.

Table 2 | A Statistical Summary of the Claims Identified in the Review Articles

Catagory	Inductive Theme	# of Reviews Theme Appears in	# of Claims	Relationship				
				Positive	Negative	No Effect	Mixed Effects	Mediates
Personality Traits	Personality Traits	1	25	80.0%			12.0%	8.0%
Personality Traits Total		**1**	**25**	**80.0%**			**12.0%**	**8.0%**
Task Expectations	Job Demands	2	8	25.0%	37.5%		37.5%	
	Legal Frameworks	1	8				100.0%	
Task Expectations Total		**3**	**16**	**12.5%**	**18.8%**		**68.8%**	
Task Resources	Information	2	4	50.0%	25.0%		25.0%	
	Technology	3	7	14.3%	14.3%		71.4%	
	Virtuality	1	6	50.0%	50.0%			
Task Resources Total		**4**	**17**	**35.3%**	**29.4%**		**35.3%**	
Team Interaction	Communication	5	50	50.0%	32.0%			18.0%
	Conflict	1	2	50.0%			50.0%	
	Culture	6	67	70.1%	17.9%	1.5%	7.5%	3.0%
	Leadership	5	34	52.9%	2.9%			44.1%
	Task Interdependence	1	7	71.4%	14.3%		14.3%	
	Team Building	1	4	50.0%			50.0%	
	Team Cognition	1	11	36.4%	54.5%			9.1%
	Trust	4	10	70.0%	10.0%		10.0%	10.0%
Team Interaction Total		**13**	**185**	**58.9%**	**20.0%**	**0.5%**	**5.4%**	**15.1%**
Grand Total		**13**	**243**	**56.4%**	**18.5%**	**0.4%**	**12.3%**	**12.3%**

With respect to team composition, relationships become more mixed. Several qualities (i.e., conscientiousness, agreeableness, and emotional stability) are positively correlated with shared leadership and team performance. Other qualities (i.e., extraversion and openness) have mixed effects on both shared leadership and team performance. For the most part, as virtuality increases, so do both the likelihoods that leaders will emerge and that the team will share leadership. That said, in cases where the team scores highly on agreeableness, shared leadership tends to emerge more often.

In designing a team, managers might approach its formation with a unifying thought of how to pursue a goal. We can assume managers and organizations may have some control over the personality composition of their teams, contingent on other constraints—but only *some* control. People have unique identities

with varying degrees of each quality (if people are even reducible to the five traits), so we cannot assume that every manager (or any manager) can form "optimal" team compositions. Nevertheless, the result of forming a team is the design of a human system—an environment of interacting *identities*.[42] These identities contribute unique values and interests to the system, embodied in the people we work with toward goal-attainment.

Task Expectations

Gradually, teams construct both explicit and tacit expectations.[43] In virtual teams, these expectations can include anything from roles and responsibilities, to social norms, to government regulations. The several reviews that discuss this topic tend to describe what we might call incentives or job demands and how their limitations and subsequent rewards shape outcomes.[44] The majority of the findings relate to teams, but the reviews also consider individual well-being and organizational outcomes.

Beginning with individuals, constraints on a person's job (e.g., time, role ambiguity) tend to somewhat decrease functioning, but they yield mixed effects depending on the kind of constraint. For example, virtuality is more constraining with short-term projects than long-term projects. Mixed effects also exist with respect to well-being and varying amounts of virtuality.[45] In terms of team constructs, such as task non-routineness and rewards, mixed incentives (i.e., rewards at both the individual and group levels) are positively related to individual well-being and also improve team performance.[46] Problem-solving demands (e.g., difficulty) yield mixed results for performance, especially when they are moderated by virtuality. These demands, on average, decrease both performance and trust. Perhaps a surprising finding is that the degree to which a task is unique or non-routine can decrease trust in a team.[47]

Legal frameworks increasingly prove relevant as teams become more global, often resulting in uncertainty for virtual teams because of the relative newness of virtual collaboration compared to legal timescales.[48] COVID-19 brought this issue to the fore as workers who previously commuted across borders began working full time in different tax jurisdictions. National and transnational laws shape labor standards, safety, compensation, freedom from discrimination, and other work aspects. Organizations also establish "private law" that can affect workers' rights and obligations (e.g., through contracts and adoption of international standards). Such practices raise questions about the legal status of virtual and hybrid employees and employers, depending on the borders crossed. Thus far, "countries have not significantly adapted their approach to determining the legal status of a [hybrid] worker as an employee," resulting in "significant ambiguity."[49]

42 Fiol and O'Connor, "Identification in Face-to-Face, Hybrid, and Pure Virtual Teams."

43 Gilad Chen and Richard Klimoski, "The Impact of Expectations on Newcomer Performance in Teams as Mediated by Work Characteristics, Social Exchanges, and Empowerment," *Academy of Management Journal* 46, no. 5 (October 1, 2003): 591–607, https://doi.org/10.5465/30040651.

44 Lisa Handke et al., "Interactive Effects of Team Virtuality and Work Design on Team Functioning," *Small Group Research* 51, no. 1 (February 1, 2020): 3–47, https://doi.org/10.1177/1046496419863490; Lucy Gilson et al., "Virtual Teams Research: 10 Years, 10 Themes, and 10 Opportunities," *Journal of Management* 41, no. 5 (July 2015): 1313–37, https://doi.org/10.1177/0149206314559946; and Mark Roehling, "The Important but Neglected Legal Context of Virtual Teams: Research Implications and Opportunities," *Human Resource Management Review*, Virtual Teams in Organizations 27, no. 4 (December 2017): 621–34, https://doi.org/10.1016/j.hrmr.2016.12.008.

45 Handke et al., "Interactive Effects of Team Virtuality."

46 Gilson et al., "Virtual Teams Research."

47 Handke et al., "Interactive Effects of Team Virtuality."

48 Roehling, "The Important but Neglected Legal Context of Virtual Teams."

49 Ibid., 625.

We can think of incentives as objects to achieve or to avoid that shape the processes (i.e., the actions and interactions) that individuals and teams design toward goal attainment. They also can serve symbolic purposes for organizations. Likewise, legal constructs serve symbolic, objective, and procedural purposes. How effectively these objects of achievement draw in—and how effectively the objects of avoidance deter—depends on the alignment between the *incentive* environments of teams,[50] and also of the individuals, organizations, and governments that construct or participate in environments both internal and external to a team.

Task Resources

Teams draw on resources to perform tasks and achieve their goals. Resources are "aspects of the job that help achieve work goals, reduce demands, or promote growth from the job demands–resources model of work design."[51] Although materials qualify as resources, teams also make use of information, social networks, skills, and tools.

Perhaps the most (superficially) intuitive resource in virtual work is technology. Alluding back to materiality, different technologies have different effects on both individual and team outcomes, depending on the context in which the tool is used and the user's experience with the tool.[52] (Though, organizations sometimes supplement experience with training to address inexperience.) ICTs are related to numerous individual-level outcomes, including some improvements (e.g., reduced social loafing, increased perceptions of leader competence, and satisfaction) and some degradations (e.g., decreased perceptions of productivity, decreased extra-role activity, and increased decision time).[53] Again, these outcomes vary widely because many other factors moderate the effects of ICTs.

Information also plays important roles, with various effects. Having access to more information can produce both positive and negative outcomes. For example, certain kinds of information, such as feedback about processes and outcomes, tend to correlate with improved team functioning[54]; meanwhile, other information, such as a person's knowledge-sharing abilities, correlate with decreased social network development.[55]

In combination, resources tell increasingly nuanced tales through concepts like materiality. The choices involved in constructing a team's virtuality extend beyond the second order; they predicate team processes through which people exchange information in a web of exchanges that leave us with a combined virtual–material, *informated* environment. This web encompasses all of our genres of communication in hybrid configurations, along with the tools of knowledge work.

50 These incentive environments might rhyme with utility functions from game theory or constraint functions in optimization.

51 Handke et al., "Interactive Effects of Team Virtuality," 12.

52 Gibbs et al., "Investigating the Impacts of Team Type and Design"; Soo Jeoung Han and Michael Beyerlein, "Framing the Effects of Multinational Cultural Diversity on Virtual Team Processes," *Small Group Research* 47, no. 4 (August 1, 2016): 351–83, https://doi.org/10.1177/1046496416653480; and Gilson et al., "Virtual Teams Research."

53 Gilson et al., "Virtual Teams Research."

54 Handke et al., "Interactive Effects of Team Virtuality."

55 Han and Beyerlein, "Framing the Effects of Multinational Cultural Diversity."

56   Holly Arrow et al., *Small Groups as Complex Systems: Formation, Coordination, Development, and Adaptation* (Thousand Oaks, CA: Sage Publications, 2000), https://doi.org/10.4135/9781452204666.

57   Han and Beyerlein, "Framing the Effects of Multinational Cultural Diversity"; Shannon Marlow et al., "Communication in Virtual Teams: A Conceptual Framework and Research Agenda," *Human Resource Management Review* 27, no. 4 (December 2017): 575–89, https://doi.org/10.1016/j.hrmr.2016.12.005; Jessica Mesmer-Magnus and Leslie DeChurch, "Information Sharing and Team Performance: A Meta-Analysis," *Journal of Applied Psychology* 94, no. 2 (2009): 535–46, https://doi.org/10.1037/a0013773; Roehling, "The Important but Neglected Legal Context of Virtual Teams"; Schaubroeck and Yu, "When Does Virtuality Help or Hinder Teams?"

58   Gibbs et al., "Investigating the Impacts of Team Type and Design"; Gilson et al., "Virtual Teams Research"; and Han and Beyerlein, "Framing the Effects of Multinational Cultural Diversity."

59   William Kramer et al., "The World Is Not Flat: Examining the Interactive Multidimensionality of Culture and Virtuality in Teams," *Human Resource Management Review*, Virtual Teams in Organizations, 27, no. 4 (December 2017): 604–20, https://doi.org/10.1016/j.hrmr.2016.12.007.

60   Gibbs et al., "Investigating the Impacts of Team Type and Design"; Gilson et al., "Virtual Teams Research"; Roehling, "The Important but Neglected Legal Context of Virtual Teams."

61   Christina Breuer, Joachim Hüffmeier, and Guido Hertel, "Does Trust Matter More in Virtual Teams? A Meta-Analysis of Trust and Team Effectiveness Considering Virtuality and Documentation as Moderators," *Journal of Applied Psychology* 101, no. 8 (2016): 1151–77, https://doi.org/10.1037/apl0000113; Gilson et al., "Virtual Teams Research"; Han and Beyerlein, "Framing the Effects of Multinational Cultural Diversity"; Roehling, "The Important but Neglected Legal Context of Virtual Teams."

One major resource obviously is missing here: "The team" also serves as a resource. We consider its myriad interactions next.

Team Interaction

Teams play such important roles in current work designs that we practically take their existence for granted. Unequivocally, they are incredibly complex.[56] Our review identified eight themes that naturally arise in literature on virtual team interactions: communication, conflict, culture, leadership, task interdependence, team building, team cognition, and trust. Here, we address three of the themes briefly because, in most cases, each theme carries a mix of positive and negative relationships, mediators, and moderators, as demonstrated by the relationship percentages shown in Table 2.

The research on communication primarily describes relationships that connect either individual- or team-level inputs (e.g., frequency, timeliness, virtuality, skill level) to individual- or team-level outputs (e.g., performance, trust, satisfaction, innovation, identity). These relationships are often mediated (e.g., by uniqueness, openness, privacy, temporal stability, authority, virtuality) or moderated (e.g., by virtuality, task complexity, skill) by other constructs.[57] In our analysis, 50% of the claims identify positive relationships between the input and output, 32% identify negative relationships, and 18% identify nuance in how relationships are mediated.

Much of the culture-related research considers diversity based on geographic dispersion or national origin.[58] Kramer et al. conduct a unique review of cultural typologies, including Hofstede's cultural dimensions, Triandis's cultural typology, Trompenaars's cultural differences, high–low context cultures, and tight vs. loose cultures.[59] Several studies also consider topics of subgroup formation, language barriers, and workplace harassment.[60] Each of these cultures are then related to greatly varied outcomes, including more pervasive constructs (e.g., team performance) as well as more culture-related outcomes (e.g., team identification, tool preference by culture, coordination difficulty, subgroup formation, conflict). Here, 70% of the findings describe positive relationships between the input and output, 18% report negative relationships, and 8% report mixed effects. Many of the positive items describe cultural preferences for high or low tool synchronicity, compliance with the authoritative figure's choices, and reliance on virtual tools. Collectively, these findings demonstrate that a "one size fits all" work design is unlikely to prove fruitful.

Finally, we consider trust, which is one of the most widely studied topics in virtual teams and consistently results in mixed findings.[61] Initially, many of the findings seem intuitive: Team trust is positively correlated with performance, as is individual trust with increased communication. However, particular communicative behaviors reveal mixed relations to team trust, thus adding nuance,

62 Buchanan, "Worlds in the Making," 20.

63 Lisa H. Nishii, "The Benefits of Climate for Inclusion for Gender-Diverse Groups," *Academy of Management Journal* 56, no. 6 (October 9, 2012): 1754, https://doi.org/10.5465/amj.2009.0823.

64 See, respectively, Seyed M. Iravani et al., "Structural Flexibility: A New Perspective on the Design of Manufacturing and Service Operations," *Management Science* 51, no. 2 (February 2005): 151–66, https://doi.org/10.1287/mnsc.1040.0333; Rajiv Kohli and Nigel Melville, "Digital Innovation: A Review and Synthesis," *Information Systems Journal* 29, no. 1 (January 2019): 200–23, https://doi.org/10.1111/isj.12193; Paul Leonardi, "When Flexible Routines Meet Flexible Technologies: Affordance, Constraint, and the Imbrication of Human and Material Agencies," *MIS Quarterly* 35, no. 1 (March 2011): 147–67, https://doi.org/10.2307/23043493; and Saras Sarasvathy et al., "Designing Organizations That Design Environments: Lessons from Entrepreneurial Expertise," *Organization Studies* 29, no. 3 (March 1, 2008): 331–50, https://doi.org/10.1177/0170840607088017. Additional sources include Jason Robbins et al., "Extending Design Environments to Software Architecture Design," *Automated Software Engineering* 5, no. 3 (July 1998): 261–90, https://doi.org/10.1023/A:1008652607643; Thomas Ludwig et al., "Designing for Collaborative Infrastructuring: Supporting Resonance Activities," *Proceedings of the ACM on Human-Computer Interaction* 2, no. CSCW (November 2018): 1–29, https://doi.org/10.1145/3274382; M. Cecília Baranauskas and Vania Paula de Almeida Neris, "Using Patterns to Support the Design of Flexible User Interaction," in *Human-Computer Interaction: Interaction Design and Usability*, ed. Julie Jacko, Lecture Notes in Computer Science (Berlin: Springer, 2007), 1033–42, https://doi.org/10.1007/978-3-540-73105-4_113; Wendy Mackay, "Triggers and Barriers to Customizing Software," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York: ACM, 1991), 153–60, https://doi.org/10.1145/108844.108867; and Joanna McGrenere et al., "A Field Evaluation of an Adaptable Two-Interface Design for Feature-Rich Software," *ACM Transactions on Computer-Human Interaction* 14, no. 1 (May 2007): 3-es, https://doi.org/10.1145/1229855.1229858..

even as qualities such as building trust early, using a positive tone, and knowledge sharing are positively related to building "swift trust" in shorter term teams.

These samples from communication, culture, and trust provide a subset of the complexity imbuing team interaction. Concurrently, they call into question the notion of a singular design because team environments—human systems of *interaction*—necessarily involve heterogeneous identities, incentives, and information. Next, we address the challenge of advancing toward work systems that achieve unity between their environments.

Discussion

Multiple systems of work artifacts underlie virtual collaboration. Our understanding of work systems grows more complex as we frame environments of identities, incentives, information, and others as interacting, "nested within another and another, stretching all of the way from the goods and services provided to the customer to the top of organizational leadership," says Buchanan.[62] (Appropriately, Buchanan is describing organizational culture in this quote, which itself is a socially constructed environment.) In this work, we have described hybrid collaboration as overlapping, sociotechnical, co-constructed environments that collectively form a hybrid work environment in which humans shape humans, who shape technology, that shapes humans.

Work environments cannot be static, singular constructs if we seek to achieve unity between heterogeneous stakeholders. That said, adopting "plural" designs likely would expect minorities of all kinds to assimilate into dominant norms and would not create unity either. Instead, according to Nishii, "the key to moving from a plural organization to an inclusive one is to alter the sociorelational context[, the environment] within which heterogeneous individuals interact."[63] We must strive for work systems that are *flexible* enough to facilitate personalization, purposefully *designing in* ways by which workers can "appropriate" work designs. This reorientation is a logical outgrowth of various research streams on structural flexibility, digital innovation, flexible technologies, and organization design, among others.[64] Therefore, we propose that work systems designed as *flexible collaborative environments* are more likely to approach unity among work, worker, team, and organization.

Designing flexible environments requires more than technical acumen alone. Note that all 13 review articles appeared in *management* journals.[65] Such reviews "highlight the need for theory and research to inform organizations in designing, structuring, and managing virtual teams."[66] This vantage point clarifies that although flexible collaborative environments likely will involve technology, managers play pivotal roles as environmental designers of tasks, team interactions, and (hopefully, more inclusive) organizational

65 Thanks to an anonymous reviewer for this observation.

66 James Dulebohn and Julia Hoch, "Virtual Teams in Organizations," *Human Resource Management Review* 27, no. 4 (2017): 569, https://doi.org/10.1016/j.hrmr.2016.12.004.

67 See, e.g., Thompson, "Time, Work-Discipline, and Industrial Capitalism"; and D'Ignazio and Klein, *Data Feminism*.

68 See, e.g., Jeremias Prassl, *Humans as a Service: The Promise and Perils of Work in the Gig Economy* (New York: Oxford University Press, 2018); M. Graham et al., "The Risks and Rewards of Online Gig Work at the Global Margins," 2017, https://ora.ox.ac.uk/objects/uuid:8c791d5a-e3a5-4a59-9b93-fbabea881554; and Thomas Kohler et al., "Co-Creation in Virtual Worlds: The Design of the User Experience," *MIS Quarterly* 35, no. 3 (September 2011): 773–88, https://doi.org/10.2307/23042808.

69 See, e.g., Kohli and Melville, "Digital Innovation."

70 Much of face-to-face communication also favors extraversion, but abilities to move and choose who or what we focus on alleviate this favoritism to some degree. There is a need to recognize that even face-to-face interaction, as constructed today, can leave introverts with few comfortable ways to engage. Bailenson, "Nonverbal Overload."

71 See, e.g., Kohler et al., "Co-Creation in Virtual Worlds"; Akshay Bhagwatwar et al., "Contextual Priming and the Design of 3D Virtual Environments to Improve Group Ideation," *Information Systems Research* 29, no. 1 (March 2018): 169–85, https://doi.org/10.1287/isre.2017.0721; and Andreas Schmeil et al., "A Structured Approach for Designing Collaboration Experiences for Virtual Worlds," *Journal of the Association for Information Systems* 13, no. 10 (October 2012): 836–60.

72 Stacey Vanek Smith and Cardiff Garcia, "The Virtual Office," Podcast, *The Indicator from Planet Money*, March 31, 2021, https://www.npr.org/2021/03/31/983097569/the-virtual-office (accessed March 31, 2021).

73 Ron Amadeo, "Google Meet Takes on Zoom with AI-Powered Noise Cancellation," Ars Technica, June 9, 2020, https://arstechnica.com/gadgets/2020/06/google-meet-takes-on-zoom-with-ai-powered-noise-cancellation/ (accessed June 27, 2020).

cultures. Novel managerial designs should consider identities, incentives, information, and their interactions as organizations pursue productivity, innovation, and talent retention. Crucially, work design processes are more likely to create unity if they involve participatory co-creation *with* workers instead of merely designing *for* them. "Imposed" work designs are likely to foster dissent, rather than the unity that can be derived from co-creation with employees.[67] Consider how the increasing pervasiveness of "gig work" tends to achieve organizational flexibility, but it comes at the expense of workers, rather than by empowering workers to substantively co-create customized work environments that benefit everyone.[68]

To some extent, we already see organizations trending toward "unifying" environments: Products like Slack, Microsoft Teams, and GSuite tout their abilities to streamline team processes through a central hub often located "in the cloud." But even purpose-built platforms often fail to address objectives of unity.[69] These largely normative platforms' singular and plural designs evidently yield mixed results and hence less unity, thereby sustaining a need for more flexible environments.

Given our review, designers and researchers can prioritize the need to identify ways in which they can construct flexibility, using the themes we identify in Table 2 as a starting point. For example, consider the intersection of communication, virtuality, and technology. Many of today's video technologies visually and auditorily place speakers and non-speakers in ways that prioritize extraversion and likely yield Zoom fatigue.[70] Some research explores constructing entirely virtual three-dimensional environments as solutions,[71] although these experiences at present are bandwidth-intensive and still buggy.[72]

Despite its relatively low virtuality, even video communication involves numerous forms of "noise" that materially shape the symbolic meanings we glean from one another. Are there ways to use computer vision, audio processing, and natural language processing to build in additional flexibility for both co-located and remote workers? Videoconferencing software has already begun to address background noise in real time, which grants more flexibility to working parents with children at home.[73] Meanwhile, live speech synthesis may provide transcription that facilitates greater accessibility, as well as possibilities for overcoming audio and video garbling through reduced bandwidth requirements; for inferring employee satisfaction; and for collecting data that describes work patterns as social networks. These relatively novel forms of data collection could help managers identify network connections that are beneficial to individuals and teams (as social network sites do), and perhaps new organizational structures.

On a cautionary note, we are not saying that any of these features is necessarily "better." Materiality acknowledges trade-offs, along with potential benefits; trade-offs in this case might include automating away historically devalued actions, such as re-cordkeeping, increased computing needs, and privacy concerns. Nevertheless, by designing work environments *for* flexible interaction—and in doing so, integrating symbols, objects, and actions—we still may provide workers with the customizability they need to experiment with solutions that appeal to their unique social, technical, and legal positionalities.

To be clear, this opportunity extends beyond recreating yesterday's work systems. Instead, designers can provide the greatest value by working in interdisciplinary ways with researchers and practitioners, managers and gig workers, to understand the underlying fundamental objectives of work and by thinking broadly about how to achieve these objectives—from creating psychologically safe and inclusive cultures to promoting innovation.[74] Pandemic lockdowns revealed that many people actually value the opportunity to build relationships with colleagues and develop shared culture. People often find fundamental value in the depths and breadths of human connection afforded by the action of doing work with others. Incorporating the situated knowledge of individuals and collectives will prove necessary for our new work systems to stand the test of time. Even better, it may capitalize on a plethora of novel hybrid capabilities toward greater flexibility for all.

Countless possibilities remain. Reading this article may have brought to mind experiences of the reader's own that went surprisingly poorly, or surprisingly well. Growing accustomed to the challenges of hybrid work does not innately justify its perpetuation. But with all their liberations and frustrations, pandemic-necessitated changes generated an impetus to develop prototypes of flexible environments for hybrid collaboration. Informed by the pandemic, we can proceed intentionally toward a thought of unity between heterogeneous work, workers, teams, and organizations, and toward a more satisfying future for all.

Funding

74 Markus Baer and Michael Frese, "Innovation Is Not Enough: Climates for Initiative and Psychological Safety, Process Innovations, and Firm Performance," *Journal of Organizational Behavior* 24, no. 1 (2003): 45–68, https://doi.org/10.1002/job.179; and Nishii, "The Benefits of Climate for Inclusion for Gender-Diverse Groups."