The Hybrid Work Era Will Be Defined by the Interaction of Digital Technology with Physical Space

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ABSTRACT

We are in the middle of the most significant change to work practices in generations. For hundreds of years, physical space was the most important technology people used to get things done. In the coming Hybrid Work Era, however, digital technologies will play a central role. Many types of work interactions that used to occur in shared physical space are shifting to the digital realm, and there is an opportunity for new tools to merge the digital and physical in ways that make people more productive. Three types of remote work technologies are needed to make the Hybrid Work Era successful: Technologies that help people and organizations understand changes in how physical space is used, technologies that completely substitute for physical space, and technologies that complement physical space and create valuable new experiences that would not be possible with space or software alone. By innovating in these areas, the UIST community can help create a new – and better – future of work.

CCS Concepts/ACM Classifiers

• Human-centered computing ~ Human computer interaction (HCI)

Author Keywords

Future of work; hybrid work; productivity; remote work; physical space

THE HYBRID WORK ERA

The rapid shift to remote work at the start of the COVID-19 pandemic accelerated the digital transformation already underway at many organizations. As a result, work that used to happen without technological support is now often digitally mediated, and new types of work-related data are being generated at an unprecedented rate. For example, the average Microsoft Teams user spends 252% more time in

the application now than they did in February 2020. During the early stages of the pandemic, we saw the direct impact of digital technology on work in its ability to help sustain collaboration across time and space. Looking forward, the new digital knowledge being captured as a result of technological mediation will allow us to reimagine work at an even more fundamental level.

As hybrid work becomes the norm, digital technologies like video conferencing software and cloud-based collaboration tools will redefine the landscape of work as much as skyscrapers, cars, and the steam engine did in the past. It is hard to overstate the scale of the current transformation – we believe the emerging *Hybrid Work Era* to be only the sixth such era in US History [4]. See Figure 1 for more.

Three types of digital work technologies will be needed to support the coming Hybrid Work Era: Technologies that help people and organizations *understand* changes in how physical space is used, technologies that completely *substitute* for physical space to make space irrelevant, and technologies that *complement* physical space to create new ways for people to use space to get things done.

Understand

As work practices are increasingly digitized, there is an opportunity to use the resulting data to understand and improve work by enabling people to plan, build, and use space more productively. For example, new sensor capabilities can detect usage patterns in offices, allowing for smarter space planning using digital twin software. Further, as AI models continue to mature, our ability to make use of this data will become increasingly sophisticated. Once the conversations people have in meetings are digitized, for example, ephemeral knowledge can become re-usable, and it becomes possible to start to learn what makes a conversation successful so that our tools can help drive more productive collaboration. This must, of course, be done in a way that centers employee privacy concerns, but the opportunity when done right is real.

Substitute

There is also an opportunity to continue to improve the technologies that substitute for space. These technologies
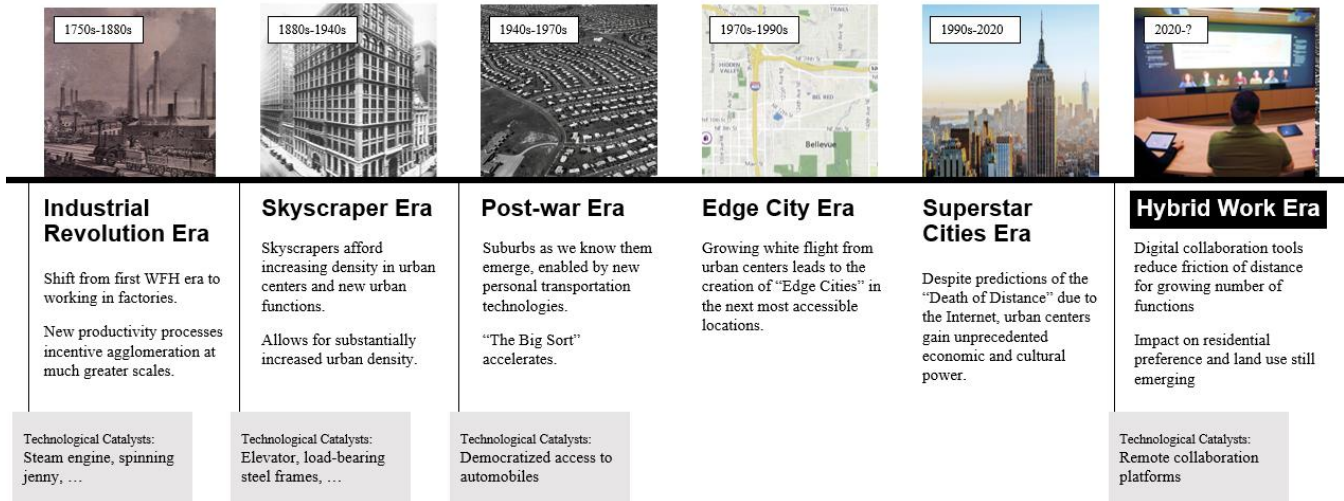
Figure 1: There have been roughly five eras in the geography of work in the history of the United States. There is evidence we are now beginning a sixth: *the Hybrid Work Era*.

have been the primary focus of innovation since March 2020. From the ability for a person to virtually raise their hand or provide emoji reactions to the ability to superimpose video streams from different people onto a shared background, collaboration platforms like Teams and Zoom have been steadily replicating things that people previously relied on conference rooms and hallways for.

However, digital technology is not yet able to fully substitute all of the ways people use space to get work done, and there is a need to continue innovating in order to be able to replace more of the affordances people have lost with remote work. For example, digital technology can do a better job supporting people's ability to build common ground when not co-located (i.e., addressing the "Leaf Blower Problem" [1]). Further, although substitutional technologies have removed many of the obstacles related to spatial coordination, they have created an increasing need to coordinate work across temporal boundaries. Technologies that support the transition of attention (e.g., SwitchBot [5]) and asynchronous collaboration (e.g., the Time Travel Proxy [3]) are likely to become increasingly important going forward.

Complement

Finally, there is an opportunity to build digital technologies that actually help people use physical space better. While technology can often substitute for space, the scientific literature suggests this likely will not always be possible. Space is an incredibly powerful productivity tool – likely one of the most powerful that exists. For example, research shows that locating two people in physical proximity is one of the most effective ways to encourage collaboration. The literature also shows that one's immediate environment

plays a huge role in their ability to focus and be productive. Recent research confirms that relying on substitutional technologies alone may have some limits, at least in the short term. For instance, we recently published a paper that found that weak ties, which are an important foundation of productivity in an organization, suffer during full-time, firm-wide remote work [6].

Rather than merely attempting to replicate these powerful capabilities, digital technology can also complement them and make space an even more powerful tool than it was prior to the pandemic. For example, new hybrid meeting technologies are working to combine in-person and remote meetings in ways that make the experience better for all involved. Digital technologies can also optimize floorplans to help people collaborate more effectively and can help people automatically schedule the right space for a given activity, from focus time to brainstorming with colleagues.

One example of a complementary technology developed by Microsoft Research is Project Malta [2], which is a meeting platform that allows collocated and remote participants to appear as if everyone is seated around the same table. Researchers at Microsoft are also working on software that will help foster weak ties by optimizing where people sit when they do come into the office, making space more impactful even with the shrinking office real estate footprint that many companies now report they expect to have.

LOOKING FORWARD

Due to the "Great Remote Work Experiment" that began in March 2020 when workplaces around the world rapidly shut down, work is changing faster right now than it has in decades. As many people now return to the workplace and begin to experiment with hybrid work, a range of different

outcomes is possible. By exploring technologies that substitute, complement, and help people understand the use of space, the UIST community has the opportunity to play a significant role in shaping the coming Hybrid Work Era.

New eras in the geography of work generally bring many large benefits (e.g., better living standards), but also new challenges (e.g., uneven distribution of those standards). New research is needed to ensure we do not repeat past mistakes by ensuring that the benefits are not limited to some groups of people and other challenges are minimized. Never before has there been such an opportunity to actively shape the future of work. With research and careful study, we can create a new future of work that is more meaningful, productive, and equitable.

BIOGRAPHY

Jaime Teevan is Chief Scientist and Technical Fellow at Microsoft, where she is responsible for driving research-backed innovation in the company's core products. She leads Microsoft's future of work initiative, which brings researchers from Microsoft, LinkedIn, and GitHub together to study how the pandemic has changed work practices. Previously she was Technical Advisor to CEO Satya Nadella and led the Productivity team at Microsoft Research. Jaime was recently inducted into the SIGIR and SIGCHI Academies, and has received numerous awards for her research, including the TR35, Borg Early Career, Karen Spärck Jones, and SIGIR Test of Time awards. She holds a Ph.D. in AI from MIT and a B.S. from Yale, and is an Affiliate Professor at the University of Washington.

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