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Rethinking the Workplace

The COVID-19 pandemic has accelerated the trend of technologists working remotely at the same time that a suite of powerful software tools allows them to collaborate more effectively.

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SINCE THE BEGINNING OF 2020, THE SARS-COV-2 CORONAVIRUS, which causes COVID-19, has forced people around the world to rapidly adjust to remote work. While scientists continue to study the novel coronavirus, businesses have needed to adapt to continue their operations and protect the health of their employees. Some, such as restaurants, hotels and other hospitality providers, have had to close or limit service. Others, in industries like education, finance, law and publishing, have transitioned to a remote model, with varying degrees of success. Even in the technology industry — which arguably should have been the most prepared to work off-site — remote work has led to employees reporting technical issues, among other challenges, such as teams spread across different time zones and countries with different holidays, languages and cultures. Evidence is mounting, however, that remote technology teams can work effectively and collaboratively during the COVID-19 pandemic or any global crisis that requires remote work.

Technology companies have long grappled with the choice between building local development teams and using offshore resources. Well before the current crisis, the entire industry was at odds over which model worked better. Fans of the traditional model have long extolled the value of having engineers, developers and other technologists working side by side. In recent years, as the focus has shifted from hardware to software, the need for employees to work together in the same physical location may even have increased. At the same time, proponents of the distributed model contend that it provides flexibility and speed, and allows companies to access a global talent pool. In the past decade, the distributed model has benefited from advances in open-source software, cloud computing, video conferencing and high-speed internet that have made it possible for technologists to collaborate remotely in real time.

The COVID-19 pandemic has materially increased the adoption of collaboration tools to keep businesses functioning — and, in some cases, performing more efficiently than before. With high-speed internet, employers now have greater flexibility in how and where their employees work. A proliferation of tech companies have invested significant time and capital in data centers to enable cloud-based storage and keep up with demand. These actions have spawned a range of tools addressing things like productivity,

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project and knowledge management, digital product design, product management, reporting, screen sharing, network security and version control — allowing development teams to practice agile software development and enabling a constant feedback loop with end users whether colleagues are in the same room or working all over the globe.

IN-PERSON CONNECTIONS

There is an ongoing and protracted debate in the tech industry between those who think technologists need to be in close proximity and those who champion the benefits of working remotely.¹ In 2013, then-Yahoo! CEO Marissa Mayer, unhappy with the number of company employees who were working remotely, wrote in an email: “Speed and quality are often sacrificed when we work from home. We need to be one Yahoo!, and that starts with physically being together.”² Microsoft CEO Satya Nadella recently echoed a similar sentiment during an interview with the *New York Times* about managing through the pandemic: “What I miss is when you walk into a physical meeting, you are talking to the person that is next to you, you’re able to connect with them for the two minutes before and after.”³ Nadella believes such in-person interactions are crucial to spark creativity and innovation. Netflix co-CEO Reed Hastings has also been critical of working remotely, even though he has said the company’s 8,600 employees will not have to return to the office until there is a COVID-19 vaccine. “I don’t see any positives,” Hastings told the *Wall Street Journal* during a video interview from his home in California. “Not being able to get together in person, particularly internationally, is a pure negative.”⁴

By contrast, Facebook and Google have embraced remote work during the COVID-19 pandemic.⁵ In August, Google announced that employees would be able to continue to work from home through June 2021. Facebook is allowing its employees to work remotely through July 2021 and is providing them with an additional \$1,000 for home office needs; CEO Mark Zuckerberg has said the tech giant could have half of its people working remotely over the next five to ten years. Twitter and Square CEO Jack Dorsey has taken the remote initiative even further: In May, he announced that employees of both companies could work from home indefinitely.⁶

Researchers are studying how the global workforce is coping with the shift away from traditional office work. London Business School professor Lynda Gratton found that 47 percent of the executives she polled thought “collaboration seemed stronger than before the pandemic.” Gratton conducted the survey in May during a webinar with executives from 42 companies spanning 19 countries. “They talked about the positive impact of dismantling bureaucratic processes, using newfound digital skills and unleashing the energy of shared goals,” she wrote in a column for *MIT Sloan Management Review*. But, Gratton added, “it may not be sustainable in the months to come as fatigue sets in,

uncertainty continues, and the all-new challenges of remote work become the norm.”⁷

AGILE DEVELOPMENT – WELL SUITED FOR INNOVATION

In practical terms, the agile framework works well in a globally distributed environment. This iterative approach to software development, which was codified in 2001 by a group of engineers in the “Agile Manifesto,” is used by the vast majority of programmers around the world.⁸ Agile development is well suited for innovation. “Confronted with a large, complex problem, [agile teams] break it into modules, develop solutions to each component through rapid prototyping and tight feedback loops, and integrate the solutions into a coherent whole,” according to a 2018 *Harvard Business Review* article.⁹ Agile teams are typically small, multidisciplinary and self-governing. As the *HBR* article explains: “Senior leaders tell team members where to innovate but not how. And the teams work closely with customers, both external and internal. Ideally, this puts responsibility for innovation in the hands of those who are closest to customers.”

Is agile development more productive when it’s done in person or remotely? In the tech industry, collaboration started in person and gradually shifted as tools improved. The modern tech industry grew up with founders and engineers working closely together, often huddled in a small room or office, trying to solve difficult hardware and software problems. When we think of some of the greatest companies to come out of Silicon Valley, such as Apple and Google, it is easy to remember the close-knit founding teams that worked day and night to develop products that would forever change the world.

One of the greatest examples of product collaboration is the relationship between Apple co-founder and CEO Steve Jobs and designer Jony Ive. In many ways, the two were inseparable following Jobs’s return to the company in 1997. According to former Apple engineer Jon Rubinstein, “Ive and Jobs would regularly get lunch together, and Jobs would finish his day by dropping by the design studio to talk with Ive.” Physical proximity in the design process mattered deeply to Ive. In 2018, he said: “One of the key characteristics of how we work is that we’re very involved in how you make something: You can’t just design in abstract and then tell someone else to make it. You know that from the fashion designers whose work you love: They are there for every step. I’ve stayed for months in places where we make products. I don’t know how you can be an effective designer and not do that.”¹⁰

In a similar vein, Google, co-founded in 1998 by Sergey Brin and Larry Page, aimed for a university-like culture in its early days, packing employees into small offices to encourage collaboration. When Eric Schmidt arrived at the company in 2001 as its new

CEO, he found that several software engineers already occupied his office, so he relocated to a tiny office next door.¹¹ A few weeks later, Schmidt had a new office mate, Amit Patel, the engineer credited with coining the Google motto “Don’t Be Evil,” who had been sharing an office with several other engineers.¹² In a podcast interview with Schmidt, host Reid Hoffman explained that “ideas emerge organically through conversations like the one Eric and Amit had in their cramped executive suite.”

THE EMERGENCE OF OPEN SOURCE

Google continued to grow exponentially off of a business model that embraced collaboration, thanks in part to the open-source software movement. Developers started to shift to open-source code sharing in the 1990s, with the goal of eliminating vastly redundant code and its associated maintenance costs, allowing new tech companies to form quickly by ending the need to purchase costly closed-source licenses or build everything from scratch. This code sharing has enabled programmers to give back to the open-source community by helping to improve code quality and global standards. Although there was some initial resistance in the industry to adopting open-source technology, opinion has changed significantly in the past several years as the growth of the open-source community has allowed greater collaboration and bleeding-edge software innovation.¹³

One of the key developments of the open-source project is the Linux operating system, created in 1991 by Linus Torvalds when he was a student at the University of Helsinki. Torvalds, an avid programmer, initially built Linux as a free alternative to Minix, itself an alternative to the Unix operating system developed by Bell Labs in the 1960s and ’70s. The Linux kernel, which Torvalds designed to run on a personal computer using an Intel CPU, would go on to power Android, Chrome and other operating systems. According to a 2017 report by the Linux Foundation, 15,600 developers have contributed to the Linux kernel since 2005.¹⁴ Today more than 95 percent of the world’s top 1 million internet servers run on Linux.¹⁵

In 2005, Torvalds created a source code management tool called Git to track developers’ work on the Linux kernel. Git is the distributed version control system that powers nearly all modern-day software

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development and collaboration. It allows technologists to work more effectively: Code versions are automatically tracked on the local computer system and can be pushed remotely to a globally shared master branch. It also allows software developers to track their changes to code in a more automated and programmatic way. Major companies have grown out of Git, such as GitHub and GitLab, providing developers with easy-to-use interfaces for version control management.

KEY AREAS FOR COLLABORATION

Remote work depends on having collaboration tools like Git, GitHub or GitLab that allow employees to be as productive as they would be in a physically shared office. Other key areas for collaboration include cloud storage, digital product design, knowledge management, messaging, productivity, product and project management, reporting, screen sharing, integrated cloud-based platforms and video calls. Let's take a closer look at some of the cool tools and services available in each of those areas.

Cloud Storage. The recent IPO of data platform provider Snowflake illustrates the allure of cloud computing and storage, a market dominated by Amazon Web Services (AWS), Google Cloud Platform and Microsoft Azure. Before the cloud, companies had to store their data and software in on-premises data centers. Thanks to the cloud, the entire development pipeline can be significantly streamlined and improved. All different sorts of difficult computational and storage problems can be solved, with developers leveraging this infrastructure from anywhere in the world. What used to take hours or even days for a developer to set up on premises now can take just minutes.

Digital Product Design. When product designers want a rapid website or mobile prototype to iterate and test, they may turn to software like InVision or Balsamiq Wireframes. Remote teams can use these products to interact and collaborate on a design very early in the product-building process without waiting for wireframes to be translated into code. Rapid feedback allows for continuous product improvement and greater end-user satisfaction. A designer might turn to Balsamiq for a low-fidelity design that is very early in the product development cycle; InVision and other digital product design software also allow for faster user experience (UX) and user interface (UI) testing.

Integrated Workflow Management. Both the Google G Suite of Gmail, Google Drive, Google Calendar, Google Docs and Google Sheets (among a plethora of other Google integrations) and the Microsoft Teams platform are extremely useful for team productivity and collaboration. Because they are cloud-first, these software products make collaboration easier than ever before. The Google G Suite of intelligent apps lets employees work on the same documents simultaneously, with changes saved in real time in the

cloud. Microsoft Teams brings together employees in a shared workspace where they can chat and work on files together using Word, Excel and PowerPoint. Like Google G Suite, Microsoft Teams saves everything to the cloud in real time, allowing innovation to happen in one environment rather than many.

Knowledge Management. Proper knowledge management software can greatly increase transparency throughout an organization. A product like Atlassian's Confluence, which provides a centralized remote-friendly team workspace, can serve a wide assortment of employees and be a game changer for all facets of technology product development. With a centralized knowledge store, remote and globally distributed employees can avoid duplication of work and tap the trove of knowledge that exists in any organization.

Network Security. As employees continue to work remotely, network security plays an even greater role. Okta and Palo Alto Networks have emerged as vitally important companies that provide identity and access management and enterprise-grade cybersecurity for businesses, especially for organizations with remote workforces. Both Okta and Palo Alto Networks have a vast suite of products to protect a company's security and intellectual property.

Product Management. To build the strategies, road maps and features that users care about, product managers rely on software like Aha!, Asana and Pivotal Tracker to capture user feedback and allow agile development teams to work effectively.¹⁶ These planning tools also provide senior management and end users with a lens into the overall direction of a product. For product managers — who are directly responsible for a product's success or failure and need the ability to pivot at a moment's notice — these tools allow them to fail fast and quickly move on so that they may eventually succeed.

Project Management. Atlassian's Jira Software has become ubiquitous for tracking tasks, bugs and projects in software development. Jira's ability to report and assign tasks allows managers to keep better track of agile development teams and the sprint planning process (as well as of Kanban, a visual workflow management system used for looking at the full software development life cycle). At the same time, Jira provides developers with a clear idea of what they have to do and forces them to provide estimates for deliverables. Although many competitors have emerged over

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the years, including Asana and Basecamp, Jira remains a reliable project management tool for software development teams.

Productivity. Messaging platforms like Slack and Microsoft Teams have quickly become the primary communication mechanisms for many technology teams. Both products have strong mobile applications that people on the road or away from their desks can use to participate in conversations. Messaging apps are particularly helpful for letting remote technology teams provide quick feedback on urgent issues or brainstorm unique ideas.

Reporting. Some of the best reporting tools in the marketplace include Microsoft's Power BI and Tableau Software, which was acquired by Salesforce in 2019.¹⁷ As the world continues to build business intelligence using ever-increasing data, remote development teams can quickly iterate and develop on top of these visual analytics platforms. At a time when many development teams may have fewer resources available to build bespoke visualizations and applications, products like Power BI and Tableau provide a responsive and fast off-the-shelf solution.

Version Control for Developers. GitHub, which Microsoft acquired for \$7.5 billion in 2018, offers developers an easy-to-use interface that provides hosting and software development version control using Git.¹⁸ By allowing developers to perform code reviews in a seamless manner, new code can be written and improved with ever-greater efficiency. GitHub allows remote teams to work on the same code as if they were in the same room. Companies that embrace products like GitHub and GitLab are likely to be attractive to developers who care about the open-source community.

Video Calls and Screen Sharing. During the COVID-19 pandemic, organizations ranging from start-ups and nonprofits to universities and Fortune 500 companies have had to turn to video conferencing platforms like Zoom and Cisco Webex. These platforms allow for clear video and audio along with many other built-in features to enhance virtual meetings. They help tech teams feel connected and handle important tasks like interviews, code reviews and stand-up meetings.

Cloud storage, video conferencing and other collaboration tools have received a significant boost from the pandemic and the shift to working from home. But for the development community, the experience has been mixed. While some technologists

have embraced working remotely and have shown little interest in returning to their cubicles, others miss the camaraderie of the office and the ability to whiteboard ideas with their colleagues in person. Of course, the isolation that people have experienced during this pandemic has tested even the most introverted among us. Continuous engagement by remote technology teams can be challenging in the current environment, but using collaboration tools — and practicing discipline — can mean the difference between finding a bug in one's code base early on and discovering a costly mistake later in production.

CONCLUSION

According to a 2017 MIT study, proximity matters when it comes to collaboration in academic research, and the same principle could be applied to technology development.¹⁹ The study used network analysis and examined 40,358 published papers and 2,350 patents from MIT research between 2004 and 2014. "Intuitively, there is a connection between space and collaboration," the lead author of the paper says. "That is, you have a better chance of meeting someone, connecting and working together if you are close by spatially."

So what does the future of the workplace look like for technologists? Will they continue to work remotely after there's a COVID-19 vaccine and it's safe to go back to the office? Or will tech companies revert to their roots and require most employees to work physically together again?

Mark Zuckerberg envisions a hybrid model. On May 21, the Facebook CEO wrote to staffers about prioritizing remote hiring, focusing on hiring engineers within four hours of a city where the company has an engineering office.²⁰ "Eventually we want to enable many existing employees to become long term remote workers if they want," Zuckerberg went on to say. "But we're going to roll this out in a measured way so we can learn as we go."

Sundar Pichai, CEO of Google parent Alphabet, is also working on a hybrid model that includes long-term remote work options.²¹ In a July survey of Google employees, 62 percent said they would prefer to return to the office on a part-time basis post-COVID-19, while only 8 percent said they would need to be in the office every day to do their job well. "I see the future as being more flexible," Pichai says. "We firmly believe that in-person, being together, having a sense of community is super important when you have to solve hard problems and create something new, so we don't see that changing. But we do think we need to create more flexibility and more hybrid models."

For his part, Apple CEO Tim Cook has been impressed by his employees' ability to work remotely during the pandemic, he told an online audience in a September 21 interview at the all-virtual Atlantic Festival, citing the on-time launch of a new line of

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Apple Watches and iPads earlier in the month.²² Like Zuckerberg and Pichai, Cook believes his company's recent experience will have a longer-term impact on the way Apple operates "because we've found that there are some things that actually work really well virtually." Still, he added, working remotely is "not like being together physically." There is a certain amount of creativity during impromptu meetings that's lost when people are not in the office, and not even the best collaboration tools can replace it.

Facebook, Google and Apple are likely harbingers of a hybrid future that will provide more optionality in where employees work but not necessarily when they work. Companies will need staff to

stay engaged, and that is likely to be achieved through a mixture of office time, company off-sites and optional remote days. Collaboration and productivity tools such as videoconferencing, file version control management and messaging apps will help technologists thrive in this hybrid world. With rapid change come both opportunity and risk, but by staying flexible and adapting to the ever-changing landscape, companies can build better products and better serve their customers. ■

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