

Proceedings of the U.S.- Japan Socioeconomic Policy Research Exchange

The Rise of Telework Under COVID-19 and the
Growth of Cryptocurrency

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About These Conference Proceedings

In both the United States and Japan, teleworking, or working from home, underwent explosive growth during the coronavirus disease 2019 (COVID-19) pandemic, as did the adoption of blockchain and cryptocurrency technologies.

To explore the implications of these two phenomena, in early 2021, the RAND Corporation convened a pair of public, online conferences that brought together leading U.S. and Japanese experts to inform the general public and generate potential insights for policymakers in both countries about how each side is responding to these phenomena.

Noted economist, public intellectual, and former U.S. Secretary of Labor Robert Reich gave the keynote speech at the first conference, “The United States, Japan, and the Rise of Telework During the COVID-19 Pandemic,” on February 4, 2021, discussing the impact of the COVID-19 pandemic and the rise of telework on employment.

At the second conference, “The U.S.-Japan Socioeconomic Policy Exchange, Year II,” on March 24, 2021, S&P Global President and Chief Executive Officer and Chairman of the U.S.-Japan Business Council Douglas Peterson offered his perspective on the importance of and policy challenges facing the U.S.-Japanese economic relationship.

This volume captures insights from the two conferences, reflects some of the exchanges among the participants at those sessions, and is built around the papers that the conference presenters submitted after the conferences concluded. This research was sponsored by the Government of Japan.

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Contents

About These Conference Proceedings	iii
Figures and Tables	vii
CHAPTER ONE	
Introduction	1
Chapter Summaries	2
CHAPTER TWO	
Telework in the United States During the COVID-19 Pandemic	5
Introduction	5
Disparities in the Ability to Work from Home	6
Variation in Work-from-Home Experiences	7
Employer Challenges in the Work-from-Home Transition	10
U.S. Policy Responses	12
Conclusion: Looking to the Future of Work in the United States	13
CHAPTER THREE	
How the Pandemic Is Changing the Way Japan Works	15
Introduction	15
The Benefits of Telework	16
The Prevalence of Telework	17
Conclusion	25
CHAPTER FOUR	
Is More Technology the Solution to Problems with Cryptocurrency and Blockchain?	
A U.S. View	27
Introduction	27
The State of Cryptocurrency in Finance and Policy	27
The Key Concerns Regarding Cryptocurrency, and Blockchain-Based Solutions	30
Illicit and Fraudulent Activity	30
Sanctions Evasion and National Security Concerns	31
Environmental and Social Impacts of Cryptographic Mining	32
Conclusion	34
CHAPTER FIVE	
Blockchain: A Technology with the Potential to Reshape Japan	35
Introduction	35
Background	35
Blockchain in Japan	36
Conclusion	42
CHAPTER SIX	
Conclusion	43

Abbreviations 45

References 47

Figures and Tables

Figures

- 3.1. Direct Effects Expected from Telework..... 17
- 3.2. Influence of the COVID-19 Pandemic on Survey Respondent’s Lifestyle 18
- 3.3. Impact of the COVID-19 Pandemic on the Survey Respondent’s Company’s Work-
from-Home Policies 19
- 3.4. Impact of the COVID-19 Pandemic on Policies Governing Working at the Main Office..... 20
- 3.5. Where People Prefer to Work in Six Global Cities 21
- 4.1. Relative Currency, Cryptocurrency, and Equity Valuations, in U.S. Dollars..... 28
- 5.1. Data Storage Evolution from Effort- to Trust-Based Management 36
- 5.2. Cryptocurrency Traded by Volume Daily (24 hours) in Japan 38
- 5.3. Private Equity Market as a Percentage of Gross Domestic Product 40

Tables

- 4.1. Cryptocurrency Exchanges and Policy Responses of Select G20 Nations 29
- 4.2. Cryptocurrency Challenges and Solutions..... 34
- 5.1. Blockchain Technology by Generation and Usage 36
- 5.2. Digital Asset and Security Token Project Examples 40
- 5.3. Regional Digital Token Project Examples..... 41

Introduction

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As the coronavirus disease 2019 (COVID-19) pandemic spread throughout the world in late 2019 and early 2020, individuals, corporations, organizations, markets, and governments were forced to make rapid adjustments to how the economy and employment functioned, with many firms choosing to shift operations to a work-from-home basis. At the same time, distributed ledger technologies (DLTs)—which had first been introduced in the early 2010s—and their applications to the financial and currency realms gained more-widespread adoption.¹ By early 2021, comedy powerhouse *Saturday Night Live* even carried a skit in which Secretary of the Treasury Janet Yellen was being asked to explain non-fungible tokens and cryptocurrency to a class of high school students.² Although the United States and Japan, two allied advanced industrial democracies, shared some commonalities in how they adapted to the rise of work from home and DLTs, their experiences in some ways also highlighted different underlying assumptions, approaches, and challenges stemming from their unique sociocultural histories and political landscapes.

To inform the general public and generate potential insights for policymakers in both the United States and Japan about how each side is responding to the rise in teleworking and the growth of cryptocurrency and blockchain, the RAND Corporation convened a pair of online conferences in early 2021. The first conference, on February 4, 2021, focused on the rise of remote work during the pandemic. Former U.S. Secretary of Labor (1993–1997) Robert Reich delivered a keynote address on the impact of the pandemic on the U.S. labor market, after which Kathryn Bouskill (then of RAND) and Hiroo Ichikawa of the Mori Memorial Foundation and the Japan Telework Society spoke about how the rise of working from home and teleworking was evolving in the United States and Japan.

Subsequently, on March 24, 2021, RAND convened a second conference that examined the growth of DLT, blockchain, and cryptocurrency in the United States and Japan. The event was keynoted by Douglass Peterson, president and chief executive officer of S&P Global and chairman of the U.S.-Japan Business Council, who spoke about the importance of the overall U.S.-Japanese economic relationship and the advances that the two sides have made in coordinating trading policy to facilitate economic exchange. This was followed by presentations by Sale Lilly of RAND and Ryushi Watanabe (then of Accenture) on the growth of the overall value of cryptocurrency as an asset class and the varying challenges that blockchain and DLTs were encountering in adoption, as well as the ongoing policy debates about how to manage the growing use of such technologies.

¹ Hadar Y. Jabotinsky and Roe Sarel, “How the COVID-19 Pandemic Affected the Cryptocurrency Market,” *CLS Blue Sky Blog*, March 26, 2021.

² “NFTs,” *Saturday Night Live*, YouTube, March 28, 2021.

After the conferences concluded, the presenters submitted papers reflecting the insights from their presentations for inclusion in this volume.

Chapter Summaries

In Chapter Two, Kathryn Bouskill surveys the experiences of Americans during the pandemic, noting that the “ability to work from home throughout the pandemic is a social privilege that has conveyed greater protection from exposure to COVID-19” and that, unfortunately, if perhaps unsurprisingly, women, racial and ethnic minority groups, socioeconomically disadvantaged job classes, and those dwelling in rural areas have tended to face greater obstacles to shifting to working from home. Furthermore, although working from home provided many employees with a reduced risk profile for contracting COVID-19, it was accompanied by substantially elevated levels of stress associated with the challenges of converting homes into offices and, for many parents, the challenge of juggling child care, online schooling, and full-time employment—a challenge that tended to fall disproportionately on mothers. This led some to characterize the economic downturn associated with COVID-19 as a “she-cession” because of the high incidence of working mothers withdrawing from the workforce. In response, U.S. individuals, firms, and policymakers have participated in what Bouskill describes as a large-scale natural experiment that has highlighted underlying challenges of equity in American society and raised calls for treating child care and secure, high-speed internet access as aspects of infrastructure, even as this experiment has also raised questions about where taxation should occur and how claims of on-the-job injury might be treated if they occur in the employee’s home during work from home. The issues raised by the pandemic have not been solved even as the pandemic has shifted to a new phase in mid to late 2021, with many Americans vaccinated and returning to in-person office work, and would likely return to importance should the delta variant or another variant of the coronavirus or some other, future pandemic force a return to large-scale work from home.

Hiroo Ichikawa comes at the question of teleworking from the perspective of Japan’s experience in Chapter Three, noting that, although the pandemic was responsible for sparking greater acceptance of remote work in Japan, the problems that Japanese tended to encounter differed substantially from those that Americans have tended to report. Japan’s work-from-home and teleworking debate, for example, has tended to focus less on issues of inequality and the challenges of access to high-speed internet and more on the question of how to ensure that workers are, in fact, reporting their time accurately, achieving productivity, and achieving greater normative acceptance of working remotely, whether from a satellite office, a mobile spot, or home. He points out that, as a result of population density and the size of many Japanese urban homes, there is often simply not an option to engage in working from home; as a result, many new spaces have been opened up for teleworking, which has grown in popularity and acceptance, especially with younger Japanese, during the pandemic. Although teleworking has faced and continues to face challenges, it has a clear value proposition during a crisis, empowering business continuity and enabling continued economic productivity. For this reason, Ichikawa urges Japanese individuals and firms and the Japanese government to accept and support teleworking as a key component of Japan’s overall approach to labor and employment, including with both modernized legal architectures and improved physical infrastructure for digital work.

In Chapter Four, Sale Lilly notes that it is perhaps not surprising that U.S. observers have ascribed some serious policy problems to cryptocurrency—an asset class that has expanded “from a new invention with novel use to a trillion-dollar asset class [in the span of a decade].” Policy debate in the United States over the drawbacks of cryptocurrency has tended to center around three issues: its use by criminal actors involved in illicit activities, its role in facilitating sanctions evasion, and the environmental impact of its creation (or “mining”). Lilly then asks whether the solution to such concerns might be contained within the technology itself and concludes that “there has been a great deal of maturation in the actors participating . . . as well as

the laws and policies that touch on cryptocurrency. For each of the major cryptocurrency concerns [identified], there are extant or developing pieces of the blockchain ecosystem that might be used to facilitate redress when cryptocurrency is a source of harm.”

Ryushi Watanabe lays out Japan’s debate over blockchain technologies in Chapter Five, noting the potential for DLTs to free up entire segments of the Japanese economy that were otherwise almost entirely illiquid, such as property deeds, and, in so doing, to facilitate Japan’s “digital transformation.” As with Ichikawa’s discussion of teleworking, which tends to highlight possible positive impacts from increased adoption, Watanabe describes an optimistic future in which Blockchain 1.0 (cryptocurrency), Blockchain 2.0 (financial instruments and central bank digital currencies), and Blockchain 3.0 (supply chain integrity and identity verification) combine to facilitate a shift to a radically more flat, democratic, transparent, accountable, and reliable form of socioeconomic organization, accompanied by substantial gains in efficiency and productivity. Japan, he argues, has a rare opportunity to “reshape and even reboot business fundamentals for a more dynamic future.” Such a prospect should spur “collaborative engagement in blockchain policy discussion [between Japan and the United States] . . . its implementation will enhance and strengthen the interests and well-being of Japan and the United States.”

Chapter Six concludes this volume by reflecting on the presentations at the two conferences and the papers that followed, highlighting important themes for future analysis by policy researchers interested in understanding the questions facing policymakers who seek to ensure that work from home, telework, cryptocurrencies, and blockchain technologies can be used to support fairer, more-dynamic, and more-sustainable future economies in Japan and the United States.

Telework in the United States During the COVID-19 Pandemic

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Introduction

At the onset of the COVID-19 pandemic, nearly every American scrambled to find their footing amid the chaos of the moment, from health care workers conserving personal protective equipment to American study abroad students abruptly returned home.¹ An unprecedented number of Americans filed unemployment insurance claims, while over one-third of American workers who had been working on-site were fortunate enough to retain their employment and protect themselves from potential exposure to COVID-19 by transitioning to working from home.² Through a survey of academic and media publications, this chapter explores emerging trends, advantages, and challenges that this large-scale, forced, and urgent transition to working from home has raised, as well as policy-related issues and potential future directions for American researchers and decisionmakers.

Working from home is a subtype of teleworking in which employees have moved their work into virtual realms and colocated their work with their place of residence. Although *telework*, or the ability to telecommute to one's place of work from any location, has been in existence since the 1970s, it only first gained momentum in the new millennium with the advent of broadband internet, videoconferencing, laptops, and cloud computing.³ Despite the widespread availability of technologies to facilitate telework, American employers and employees had been grappling with its pros and cons, and uptake remained limited prior to the outbreak of COVID-19. In fact, prior to the pandemic, estimates of the percentage of the American workforce that engaged in telework on a regular basis ranged from as high as 15 percent to as low as 3 percent.⁴

¹ Haley Ehrlich, Mark McKenney, and Adel Elkbuli, "Protecting Our Healthcare Workers During the COVID-19 Pandemic," *American Journal of Emergency Medicine*, Vol. 38, No. 7, July 2020.

² Gregory Acs and Michael Karpman, *Employment, Income, and Unemployment Insurance During the COVID-19 Pandemic: Findings from the May 14–27 Coronavirus Tracking Survey*, Washington, D.C.: Urban Institute, June 2020; and Erik Brynjolfsson, John J. Horton, Adam Ozimek, Daniel Rock, Garima Sharma, and Hong-Yi TuYe, *COVID-19 and Remote Work: An Early Look at US Data*, Cambridge, Mass.: National Bureau of Economic Research, Working Paper No. 27344, June 2020.

³ Prithwiraj Choudhury, "Our Work-from-Anywhere Future," *Harvard Business Review*, Vol. 98, No. 6, November–December 2020.

⁴ Brynjolfsson et al., 2020.

Then, in March 2020, nearly half of the American workforce employed pre-COVID-19 involuntarily and rapidly shifted to working from home.⁵ Toddlers wailed, cats crawled across keyboards, spouses poked fun at one another’s work jargon. Over a year into the pandemic, foregoing commutes and water cooler conversations has become so quotidian that it has raised questions about whether Americans who have transitioned to working from home will ever return to spending five days a week in an office setting.

Working from home enables protection from workplace exposure to COVID-19, as well as expanded opportunities for employers to hire employees regardless of their physical location. Telework, which includes any form of remote work (not merely work done in one’s home), eliminates the need for workers to be physically connected to employers. However, the ability to work from home, and its associated security and flexibility during the pandemic, has hardly been universal across the United States. COVID-19 has cast light on several underlying systemic issues and inequalities in American society that, if left unaddressed, could exacerbate existing economic, technological, and social divides in the United States. This brief overview explores key themes, including social implications, policy opportunities, and future challenges for telework, that have been ushered in through the COVID-19 pandemic.

Disparities in the Ability to Work from Home

Employees of certain industries have been more readily able than others to transition to working from home, and the distribution of the ability to work from home has hardly been uniform. According to a recent Pew Research Center report, the vast majority of employees in banking, finance, accounting, real estate, information and technology, education, and professional, scientific, and technical services reported that their job responsibilities could be performed from home.⁶ Close to half of employees working in government, public administration, and military positions transitioned to working from home, while one-third of those in health care and social assistance were able to work from home.⁷ Less than one-quarter of employees in hospitality, service, arts and entertainment, retail, recreation, mining, manufacturing, and construction could work from home.⁸ As expected, the ability to work from home was even lower for those in retail, trade, transportation, agriculture, forestry, fishing, and hunting.⁹ Former Secretary of Labor Robert Reich has referred to industries that were able to facilitate a smooth transition as those engaged in “symbolic-analytic services,” or those that compute and process information, as opposed to those that manufacture goods.¹⁰

The work-from-home inequalities observed across occupational industries also reflect social disparities in American society and trends observed in the ability to work remotely (i.e., those in symbolic-analytic services) before the onset of COVID-19. Over two-thirds of employees with at least a bachelor’s degree reported being able to work from home, compared with over one-third of those with an associate’s degree or similar and only about one-quarter of those with a high school diploma.¹¹ The ability to work from home is also

⁵ Brynjolfsson et al., 2020.

⁶ Kim Parker, Juliana Menasce Horowitz, and Rachel Minkin, *How the Coronavirus Outbreak Has—and Hasn’t—Changed the Way Americans Work*, Washington, D.C.: Pew Research Center, December 9, 2020; and Matthew Dey, Harley Frazis, Mark A. Loewenstein, and Hugette Sun, “Ability to Work from Home: Evidence from Two Surveys and Implications for the Labor Market in the COVID-19 Pandemic,” *Monthly Labor Review*, June 2020.

⁷ Parker, Horowitz, and Minkin, 2020.

⁸ Parker, Horowitz, and Minkin, 2020.

⁹ Parker, Horowitz, and Minkin, 2020.

¹⁰ Robert B. Reich, *Saving Capitalism: For the Many, Not the Few*, New York: Vintage, Penguin Random House, 2016.

¹¹ Dey et al., 2020.

positively correlated with income level; over three-quarters of lower-income workers reported being unable to complete their job responsibilities at home.¹²

There are striking disparities with respect to the ability to work from home by race. Nearly half of non-Hispanic White workers were able to work from home, while only 39.5 percent of Black workers and 28.9 percent of Hispanic workers were able to work from home.¹³

Among American workers between 25 and 65, the ability to work from home was comparable;¹⁴ however, one in five of American adults aged 65 or older who participated in the workforce before the onset of the pandemic were the least likely age group to be able to telework, and three-quarters of workers in this age group were employed in positions in which working from home has not been a possibility.¹⁵ Hence, older workers who are unable to work from home have been risking their health to earn an income.

The ability to work from home throughout the pandemic is a social privilege that has conveyed greater protection from exposure to COVID-19. Unfortunately, the socioeconomic and racial disparities observed in the ability to transpose one's work to one's home overlay onto worsened COVID-19 incidence and outcomes.¹⁶

Variation in Work-from-Home Experiences

The experiences of American employees have differed widely among those who were able to work from home throughout the pandemic and those who were not. But even among the “symbolic-analytic services” workers who have had the ability to work from home throughout the pandemic, experiences have differed widely. The transition to working from home has been a particular challenge for rural workers, parents, women, and older workers, and whether one has fared better or worse is heavily shaped by demographics.¹⁷

Although workers have reported advantages to working from home, such as the lack of a commute, others have been hampered by systemic issues, such as a lack of access to technology that is necessary for the seamless functioning of a work-from-home environment. Approximately one-quarter of rural adults reported that access to high-speed internet is a “major problem in their local community.”¹⁸ Although the concept of work from home could be an important means of mitigating brain drain, or out-migration of educated and skilled workers from rural regions, access to high-speed internet remains a critical limiting factor. In addition, workers with annual salaries of less than \$100,000 reported having significantly more physical and mental health issues while working from home during the pandemic than those with higher incomes; this

¹² Parker, Horowitz, and Minkin, 2020.

¹³ Dey et al., 2020.

¹⁴ Dey et al., 2020.

¹⁵ Ruth Kanfer, Sibley F. Lyndgaard, and Corey E. Tatel, “For Whom the Pandemic Tolls: A Person-Centric Analysis of Older Workers,” *Work, Aging and Retirement*, Vol. 6, No. 4, October 2020.

¹⁶ Adjoa Anyane-Yeboah, Toshiro Sato, and Atsushi Sakuraba, “Racial Disparities in COVID-19 Deaths Reveal Harsh Truths About Structural Inequality in America,” *Journal of Internal Medicine*, Vol. 288, No. 4, October 2020; and L. Silvia Muñoz-Price, Ann B. Nattinger, Frida Rivera, Ryan Hanson, Cameron G. Gmehlin, Adriana Perez, Siddhartha Singh, Blake W. Buchan, Nathan A. Ledebauer, and Liliana E. Pezzin, “Racial Disparities in Incidence and Outcomes Among Patients with COVID-19,” *JAMA Network Open*, Vol. 3, No. 9, September 25, 2020.

¹⁷ Brynjolfsson et al., 2020; and Kristen Shockley, Malissa A. Clark, Hope Dodd, and Eden B. King, “Work-Family Strategies During COVID-19: Examining Gender Dynamics Among Dual-Earner Couples with Young Children,” *Journal of Applied Psychology*, Vol. 106, No. 1, 2021.

¹⁸ Monica Anderson, “About a Quarter of Rural Americans Say Access to High-Speed Internet Is a Major Problem,” Pew Research Center, September 10, 2018.

might be the result of a lack of job security coupled with the increased pressures of a precarious economy during the pandemic.¹⁹

Gender has also played a significant role in the professional lives of those working from home. For instance, men were twice as likely as women to report that working from home throughout the pandemic has made a positive impact on their career.²⁰ Both men and women reported developing new mental health issues during the transition to working from home, but women workers had a higher risk of developing new mental health issues, such as depression, while working from home throughout the pandemic.²¹ A nationwide survey among technology sector workers found that nearly one-third of respondents reported facing gender-based hostility, and nearly half of Black women reported race-based hostility (i.e., “forms of harm that are less abusive than harassment and may not be considered abuse or against company rules, but are still toxic or harmful in nature”) in remote work contexts over the course of the pandemic.²²

Parents who are working from home have experienced more stress than adults without children.²³ The relationship between parenting and stress likely existed before the pandemic, and some have hypothesized that working from home might provide increased flexibility to manage work, housework, and child care, in turn mitigating the burden on parents to navigate carpools, school drop-offs, et cetera; however, a study that compared fathers and mothers showed that, although both fathers and mothers are adjusting to the unexpected tasks at hand, the burden of housework is disproportionately falling on mothers, who tend to spend more hours in their work-from-home days with their children present than fathers do.²⁴ Additionally, mothers are often managing more of the “unexpected and ongoing childcare responsibilities” than fathers.²⁵ Interestingly, fathers reported greater positive effects on their careers as a result of working from home than mothers, even though fathers reported being more stressed than mothers.²⁶ As one working mother lamented, “Remote work is great. It’s the home-schooling and child care that ruins any chances of having a sane, normal workday.”²⁷ The divides among women and men, and particularly among women with children and men, have contributed to women dropping out of the labor force at disproportionately greater rates than their male counterparts, leading to what one observer has termed a “she-cession.”²⁸ In fact, there were 2.2 million fewer women in the labor force in late 2020 than just one year before, a trend that has yet to rebound as of early 2021.²⁹

¹⁹ Yijing Xiao, Burcin Becerik-Gerber, Gale Lucas, and Shawn C. Roll, “Impacts of Working from Home During COVID-19 Pandemic on Physical and Mental Well-Being of Office Workstation Users,” *Journal of Occupational and Environmental Medicine*, Vol. 63, No. 3, March 2021.

²⁰ Ben Rogers, “Not in the Same Boat: Career Progression in the Pandemic,” Qualtrics, August 26, 2020.

²¹ Brynjolfsson et al., 2020; Shockley et al., 2021.

²² Project Include, *Remote Work Since COVID-19 Is Exacerbating Harm: What Companies Need to Know and Do*, San Francisco, Calif., March 2021, p. 8.

²³ Valerie A. Canady, “APA Stress Report amid COVID-19 Points to Parental Challenges,” *Mental Health Weekly*, Vol. 30, No. 22, June 2020.

²⁴ Thomas Lyttelton, Emma Zang, and Kelly Musick, *Gender Differences in Telecommuting and Implications for Inequality at Home and Work*, SSRN, July 8, 2020.

²⁵ Shockley et al., 2021, p. 26.

²⁶ Shockley et al., 2021.

²⁷ Lauren Weber and Vanessa Fuhrmans, “Women in the Workplace (A Special Report)—The Coronavirus Setback: How the Pandemic Threatens to Wipe Out Women’s Recent Gains in the Workplace,” *Wall Street Journal*, September 30, 2020.

²⁸ Kathryn A. Edwards, “Women Are Leaving the Labor Force in Record Numbers,” *RAND Blog*, November 24, 2020.

²⁹ U.S. Bureau of Labor Statistics, “Table A-1. Employment Status of the Civilian Population by Sex and Age,” economic news release, last updated July 2, 2021.

Some observers have raised concerns about the representation and visibility of Black and Hispanic workers in the virtual workspace.³⁰ Among Black employees, the pressures of *code-switching*, or “adjusting [one’s] speech, appearance, and behaviors to optimize the comfort of others with the hopes of receiving fair treatment, quality service, and opportunities” have proven to be an extra burden for those working from home.³¹ Feelings of isolation and concerns over bias against minority workers are rising and are not being widely addressed.³²

Aging workers, who face a greater risk of COVID-19-related complications than their younger counterparts, ostensibly benefit from the added protection of a work-from-home environment if it is available to them. However, initial data suggest that aging workers might also be facing additional challenges related to the need for technological fluency and agility and that working from home could be compromising a sense of belonging that is felt more strongly among older workers than among younger workers.³³ This can lead to less engagement with one’s work and, potentially, to reduced performance. This reduced performance can reinforce a stereotype that older workers are more technologically challenged,³⁴ and this stereotype can cause coworkers to act out on biases against older workers, fueling negative organizational performance outcomes.³⁵ Among workers in the technology sector, nearly one-quarter of workers over 50 reported an increase in age-based harassment and hostility since the start of the pandemic.³⁶

Employees have reported a host of other issues that are detrimental to working from home, including technological issues, increased distractions at home, reduced team organization and cohesion, difficulties in communication, and reduced productivity.³⁷ The use of work-related technologies, coupled with the conflation of work and home, is also leading some workers to feel constantly connected, if not addicted, to their work—and unable to escape from it.³⁸ Workers describe experiencing burnout from the stress of work demands, grieving losses from the pandemic, and lacking the social support that one might otherwise receive in the office.³⁹ It is also important to note that the stressful adjustment to working from home coincided with other momentous and tumultuous events in the United States, including the reckoning with the nation’s long-standing history of structural and interpersonal racism and turmoil from political insurrections. Disentangling the stress of these existential crises from work-related stress is difficult to achieve, and it is likely that these sources of stress have all compounded each other and affected work performance. Employers are seeking to address the problems facing employees while tackling additional, unprecedented organizational problems.

³⁰ Nelson D. Schwartz, “Working from Home Poses Hurdles for Employees of Color,” *New York Times*, September 6, 2020.

³¹ Laura Morgan Roberts and Courtney L. McCluney, “Working from Home While Black,” *Harvard Business Review*, June 17, 2020.

³² Roberts and McCluney, 2020; Schwartz, 2020.

³³ Kanfer, Lyndgaard, and Tatel, 2020.

³⁴ Roberts and McCluney, 2020.

³⁵ Lisa M. Finkelstein, Eden B. King, and Elora C. Voyles, “Age Metastereotyping and Cross-Age Workplace Interactions: A Meta View of Age Stereotypes at Work,” *Work, Aging and Retirement*, Vol. 1, No. 1, January 2015.

³⁶ Project Include, 2021.

³⁷ Adam Ozimek, “The Future of Remote Work,” SSRN, May 27, 2020.

³⁸ Paul A. Schulte, Jessica M. K. Streit, Fatima Sheriff, George Delclos, Sarah A. Felknor, Sara L. Tamers, Sherry Fendinger, James Grosch, and Robert Sala, “Potential Scenarios and Hazards in the Work of the Future: A Systematic Review of the Peer-Reviewed and Gray Literatures,” *Annals of Work Exposures and Health*, Vol. 64, No. 8, October 2020.

³⁹ Choudhury, 2020; and Nicole Mo, “The Pandemic Is Changing Work Friendships,” *The Atlantic*, July 21, 2020.

Employer Challenges in the Work-from-Home Transition

Even prior to being thrust into the work-from-home experiment, employers had been grappling with the advantages and disadvantages of permitting employees to telework. In the years leading up to the pandemic, some companies, such as Yahoo, IBM, and HP, reversed their policies on teleworking, citing a need to have employees spend more time in the office to prompt greater innovation.⁴⁰ At the same time, some U.S. government agencies and private companies greatly increased the proportions of their workforces engaged in full-time teleworking (i.e., all work activities are performed outside a traditional workplace setting) and were able to maintain existing levels of efficiency, open up new channels for recruitment, and reduce overhead costs due to real estate.⁴¹ Although employer experiences with telework prior to the pandemic were mixed, employers had never been forced to contemplate a shift to telework on the sheer scale that the pandemic set in motion, together with a host of unexpected associated challenges.

Early in the pandemic, for example, news reports warned of an increase in cyberattacks and “Zoombombing,” in which unwanted, disruptive intruders hack into a videoconference.⁴² Company security infrastructures were not adequately equipped to handle the influx of threats promulgated through the vulnerabilities of employees working through nonsecure home networks.⁴³ This forced companies to rapidly distribute and enforce the use of virtual private networks and training to identify phishing scams and other cyberattacks. The fact that communication was occurring almost exclusively over internet-based platforms also placed substantial strain on company data centers.⁴⁴

Although improving data protection and communications security posed the most pressing issue for companies, establishing practices and protocols for human resources and workplace culture closely followed. Monitoring productivity, holding difficult conversations, building trust among teams, prompting organic spurts of creativity, and creating team camaraderie are aspects of employment that were not easily transposed from the workplace to the home office. Data are mixed with respect to the impact of telework on overall workplace productivity, which is likely the byproduct of the aforementioned disparities in work-from-home experiences.⁴⁵ On the whole, employees report being more productive and working, on average, 50 minutes longer per day, although this suggests that productivity might actually be lower if evaluated against the increased time employees are working in lieu of their commutes.⁴⁶ In addition, data are often self-reported, which could introduce bias.⁴⁷

All this points to a central challenge of tracking employee productivity remotely. If monitoring is done remotely and is automated, it might lead to a “centralization of decision-making” that could detract from

⁴⁰ Kate North, Lorri Rowlandson, and Colette Temmink, “Space Without Boundaries: From Reimagining to Managing a New Way of Working,” *FMJ*, September–October 2020.

⁴¹ Cortney Weinbaum, Bonnie L. Triezenberg, Erika Meza, and David Luckey, *Understanding Government Telework: An Examination of Research Literature and Practices from Government Agencies*, Santa Monica, Calif.: RAND Corporation, RR-2023-OSD, 2018.

⁴² Taylor Lorenz, “‘Zoombombing’: When Video Conferences Go Wrong,” *New York Times*, updated April 7, 2020.

⁴³ Nicholas J. Erickson, “Across the Digital Divide: Managing Remote Workers,” *Computer & Internet Lawyer*, Vol. 37, No. 8, September 2020.

⁴⁴ Chip Cutter, “The Office Is Far Away. Can Its Culture Survive?” *Wall Street Journal*, updated June 5, 2020a.

⁴⁵ Ozimek, 2020.

⁴⁶ The Conference Board, “Adapting to the Reimagined Workplace: Human Capital Responses to the COVID-19 Pandemic,” podcast, November 12, 2020.

⁴⁷ Erickson, 2020.

workplace engagement at lower organizational levels.⁴⁸ Furthermore, without being able to directly monitor the stages of employees' productivity and progress, managers may default to measuring productivity based on raw results, which may not adequately reflect effort and creativity expended, especially given that the employees themselves are in a chaotic period of adjustment. Basing performance measurement solely on workers' output also may remove the ability to provide constructive and holistic feedback, especially for newer employees who may be less familiar with underlying aspects of workplace culture and whose strengths and weaknesses may be less apparent to supervisors.⁴⁹ In addition, tracking and evaluating teamwork, including individual contributions of team members, is an emergent challenge within virtual work environments.⁵⁰

Data collected throughout the pandemic suggest that employee inclination to work from home is here to stay, leaving gaping physical spaces within office settings and concerns over what will happen to office real estate going forward. Chief executive officers are anticipating the longevity of working from home and are already shifting toward renting office spaces and selling office buildings.⁵¹ Real estate companies, such as Cushman & Wakefield, have tried to mitigate the waning importance of physical office spaces by creating "safer" office spaces that are more conducive to inevitable future infectious disease threats, but whether these office spaces will take hold remains unclear.⁵² The reduced use of office space also has adverse implications for ancillary services, such as nearby cafés, dry cleaners, and transportation services.⁵³ Hence, the loss of the office could mean the loss of urban vibrancy and economic vitality, although it is possible that, because most corporate leasing contracts extend five years or more, the issue of vacant spaces might not appear for some time.⁵⁴ Whether companies will opt to invest in improving collaborative online platforms or in making offices accommodating and safe remains an open question but will likely drive the future evolution of workplaces.⁵⁵

The potential return to the workplace is also raising issues related to COVID-19 vaccination requirements. Several large companies (e.g., Facebook, Marriott International, Discover Financial Services) have declared that they will encourage but not enforce vaccination. Others will offer cash or 401(k) incentives for vaccination or will exclude employees who refuse vaccination from attending company events or traveling

⁴⁸ Kevin M. Kniffin, Jayanth Narayanan, Frederik Anseel, John Antonakis, Susan P. Ashford, Arnold B. Bakker, Peter Bamberger, Hari Bapuji, Devasheesh P. Bhawe, Virginia K. Choi, Stephanie J. Creary, Evangelia Demerouti, Francis J. Flynn, Michele J. Gelfand, Lindred L. Greer, Gary Johns, Selin Kesebir, Peter G. Klein, Sun Young Lee, Hakan Ozcelik, Jennifer Louise Petriglieri, Nancy P. Rothbard, Cort W. Rudolph, Jason D. Shaw, Nina Sirolo, Connie R. Wanberg, Ashley Whillans, Michael P. Wilmot, and Mark van Vugt, "COVID-19 and the Workplace: Implications, Issues, and Insights for Future Research and Action," *American Psychologist*, Vol. 76, No. 1, 2021, p. 66.

⁴⁹ Kniffin et al., 2021.

⁵⁰ Kniffin et al., 2021.

⁵¹ Geoff Colvin, "Employers Bringing Workers Back to the Office May Be Inviting Them to an Unfamiliar Place," *Fortune*, December 4, 2020; and Bill Conley, "Evolving Real Estate: New Challenges Present New Opportunities," *FMJ*, August 2020.

⁵² Mark Wilson, "Our Offices Will Never Be the Same After COVID-19. Here's What They Could Look Like," *Fast Company*, April 13, 2020.

⁵³ Alexander W. Bartik, Marianne Bertrand, Zoe Cullen, Edward L. Glaeser, Michael Luca, and Christopher Stanton, "The Impact of COVID-19 on Small Business Outcomes and Expectations," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 117, No. 30, 2020.

⁵⁴ Mark H. Hyman, James B. Talmage, and Kurt T. Hegmann, "Evaluating COVID-19 Injury Claims with a Focus on Workers' Compensation," *Journal of Occupational and Environmental Medicine*, Vol. 62, No. 9, September 2020.

⁵⁵ Matthew Finnegan, "Businesses to Boost Collaboration Spending in '21 as Remote Work Continues," *Computerworld*, December 28, 2020.

under the auspices of company duties.⁵⁶ Whether employers can ask whether their workers have received the vaccine is yet another potential snag, although legal experts claim that requesting this information would likely not violate the protection of disability information stipulated in the Americans with Disabilities Act.⁵⁷ Thus, whether or how employees return to the office is contingent upon company, U.S., and individual state policy responses, many of which remain unclear, incomplete, and in flux.

U.S. Policy Responses

The U.S. federal government and states have been grappling with policy challenges from the massive upending of work during the pandemic. The persistence of working from home is also raising questions about whether employees or employers should absorb workplace costs and liability. This section explores implications of policy decisions for employers, states, and the federal government.

Employment law has not kept pace with the rise of remote work.⁵⁸ For example, if an office is closed because of public health regulations and an employee injures themselves while working from home, who is liable? Questions have also been raised with respect to whether employers can be held liable if employees who are unable to work from home contract COVID-19. Several states have already leveraged the fact that employees could ostensibly become infected *anywhere* and have therefore passed legislation to protect employers from liability, and several other states are starting to follow suit.⁵⁹

In addition, if an employee requires an upgrade of internet speed, should the employer bear the cost of this expenditure? California, Illinois, Massachusetts, Montana, and New Hampshire require employers to cover necessary expenditures to facilitate services that are directly related to one's work, such as an added phone line, a router, or software, but these mandates are hardly universal and say nothing of the increased utilities costs (e.g., electricity, heating) incurred by employees.⁶⁰ These policy challenges with direct implications for the employer's bottom line are unprecedented with respect to both the scale and the rapidity of the onset of COVID-19.

The Family and Medical Leave Act (FMLA) allows up to 12 weeks of unpaid leave annually for such reasons as having a serious health condition or caring for an immediate family member with a serious health condition.⁶¹ However, the FMLA applies only to companies that employ 50 or more employees who are located within 75 miles of the employer. In addition, it is limited to employees who have worked more than 1,250 hours per year. With these exclusions, only 60 percent of American workers are eligible for FMLA benefits.⁶² In 2020, the federal government enacted the Families First Coronavirus Response Act,⁶³ which attempted to provide family leave for parents dealing with school closures or the need to care for sick relatives. Although this law was an improvement over the FMLA, it still contained gaps that left some workers

⁵⁶ Chip Cutter and Sarah Krouse, "Why Many Bosses Won't Require Workers to Get the COVID-19 Vaccine," *Wall Street Journal*, December 21, 2020.

⁵⁷ Jena McGregor, "Six Ways Your Office Job Will Be Different in 2021, Assuming You Ever Go Back to It," *Washington Post*, January 3, 2021.

⁵⁸ Hyman, Talmage, and Hegmann, 2020; Schulte et al., 2020.

⁵⁹ McGregor, 2021.

⁶⁰ Chip Cutter, "COVID-19 Has Forced a Radical Shift in Working Habits," *The Economist*, September 12, 2020b.

⁶¹ Public Law 103-3, Family and Medical Leave Act of 1993, February 5, 1993.

⁶² Olga Khazan, "A Hidden COVID-19 Risk Factor: Your Boss," *The Atlantic*, June 1, 2020.

⁶³ Public Law 116-127, Families First Coronavirus Response Act, March 18, 2020.

uncovered, particularly part-time workers.⁶⁴ Another relevant law is the Americans with Disabilities Act, which grants workers with preexisting health conditions that could exacerbate a COVID-19 illness the right to continue working from home instead of eventually returning to a workplace.⁶⁵ Some states have enacted additional policies, such as Colorado’s Safer at Home public health order, which protects vulnerable individuals (those who are pregnant, aged 65 or older, immunocompromised, etc.) from having to attend in-person work.⁶⁶ In turn, employers can expect an increase in workers who might opt for continued teleworking arrangements as workplaces reopen.

A lingering issue is the “tax mess” resulting from the uncertainty of where employees who have been working from home in a different state from where they had been working prior to the pandemic should pay taxes.⁶⁷ This has been of particular significance to tristate areas, such as New York, New Jersey, and Connecticut. Lawmakers have urged Congress to create more uniformity over where workers should pay income taxes, whether commuter taxes (taxes applied to workers who commute to workplaces in another state) should still be imposed during remote work conditions, whether states can retain withholding for temporary work-from-home locations, how to apply corporate income taxes, and whether state tax credits and incentives still apply.⁶⁸

U.S. policy responses to COVID-19 more broadly are still in development. In March 2021, the federal government passed the \$1.9 trillion American Rescue Plan Act of 2021, which, in addition to providing stimulus checks to many Americans, will provide additional support for schools and state and local governments to fund vaccination rollouts.⁶⁹ But, given the rest of the systemic vulnerabilities and challenges, it is unlikely that vaccinations alone will allow for a return to “normalcy” in the immediate sense.

Conclusion: Looking to the Future of Work in the United States

It is increasingly probable that workers will not return to the prepandemic definition of normalcy but rather will establish a new postpandemic “normal,” especially considering that nearly two-thirds of workers are planning on continuing to work remotely, whether at home or elsewhere, once physical distancing restrictions are lifted.⁷⁰ Given the policy gaps and the variation in the ability to work from home, significant changes must be made to enable work from home to be more widely and successfully adopted. For instance, access to affordable child care would help ameliorate the added burden that parents, most notably mothers, who are working from home are experiencing. Expanding existing infrastructure to connect all corners of the United States to high-speed internet is necessary for creating greater access to teleworking opportunities and, in turn, narrowing social and economic divides.

More attention also needs to be given to worker well-being, especially when interactions are almost exclusively mediated through digital technologies. Are the drivers and consequences of work-related burnout fun-

⁶⁴ Erickson, 2020.

⁶⁵ ADA.gov, homepage, undated.

⁶⁶ Colorado.gov, “Stay at Home Colorado Guide,” webpage, undated.

⁶⁷ Brian Faler, “Congress Struggles to Fix Tax Mess Caused by People Working from Home,” *Politico*, December 4, 2020.

⁶⁸ Jeffrey Friedman and Dennis Jansen, “The Year That Left Us SALT-y: Key State and Local Tax Developments in 2020,” *Tax Executive*, Vol. 72, November 3, 2020.

⁶⁹ White House, “American Rescue Plan,” webpage, undated.

⁷⁰ Ozimek, 2020.

damentally different when work is conducted solely by digital means?⁷¹ What does it mean to be resilient in an age in which one’s technological capabilities and know-how are constantly being tested?⁷² Devoting resources to tracking and addressing the diverse needs and experiences of people who are working from home will be an important priority for employers going forward. In addition, retaining, if not re-creating, workplace culture and values—in other words, keeping the human element front and center in an increasingly virtual and globalized workplace—will be necessary to support workers’ well-being.

The shock wave of the pandemic on the American workplace has prompted scholars to call this period “a re-set opportunity” to “create and reinforce sustainable workplaces that adhere to the triple bottom line of profits, planet, and people.”⁷³ To achieve this reset, employers, researchers, and policymakers need to augment the current evidence base by collecting rigorous and objective data. In addition, employer and governmental policies and programs could seriously explore adopting a holistic systems approach to further implementing telework. Taking this approach would mean not only rectifying infrastructural disparities (e.g., improving access to high-speed internet) but also giving attention to people-centric challenges, such as ensuring that virtual communication channels are effective for all employees. Doing so would ensure that vulnerabilities are identified and addressed and, in turn, could foster increased vitality of the American workforce and prosperity of the economy for all.

⁷¹ Heidi Forbes Öste, “Digital Well-Being to Promote Agility for the Future of Work,” *American Journal of Health Promotion*, Vol. 34, No. 7, 2020.

⁷² Linda M. Hite and Kimberly S. McDonald, “Careers After COVID-19: Challenges and Changes,” *Human Resource Development International*, Vol. 23, No. 4, 2020, p. 431.

⁷³ Hite and McDonald, 2020.

How the Pandemic Is Changing the Way Japan Works

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Introduction

The Japanese debate over telework has long been defined by skeptics who have cast doubts on its benefits, with the result that only a relatively small number of firms adopted telework as a substantial component of their operations prior to the pandemic. The outbreak of the novel coronavirus, however, has fueled a dramatic change in Japan's relationship with telework. Telework first started to attract interest in Japan in the 1990s, although the country quickly fell behind other leading advanced industrial economies in its level of adoption. Although some companies implemented teleworking, only about 30 percent of firms experimented with its adoption, on a limited scale;¹ it was a rare exception to see a company that fully incorporated telework across the entirety of its operations. Indeed, as evidenced by surveys conducted by Ono and Mori in 2020, Japan had much lower rates of telework before the pandemic than peer nations.² Despite the world shifting from the analog to the digital age, telework continued to expand only slowly in Japan, facilitated mostly by recognition of its positive impact on diversification and the efficiency of business operations, as well as by the rapid progress of information technology.

Under the Abe administration (2012–2020), the central government began aggressively promoting the adoption of telework under the rubric of “work-style reform.”³ The Ministry of Health, Labor, and Welfare; the Ministry of Economy, Trade, and Industry; MLIT; and the Ministry of Internal Affairs and Communications have all promoted this policy. The goal is to ensure that people are provided the flexibility to work from

¹ Ministry of Land, Infrastructure, Transport, and Tourism (MLIT), *Direction of Town Development Triggered by the New Corona Crisis*, Tokyo, August 2020, p. 4.

² Hiroshi Ono and Takeshi Mori, “COVID-19 and Telework: An International Comparison,” *Journal of Quantitative Description: Digital Media*, Vol. 1, 2021.

³ Then-Prime Minister Shinzō Abe announced the Japan Revitalization Strategy on June 14, 2013, and clarified the overall picture of Abenomics, which included “aggressive monetary policy, flexible fiscal policy, growth strategy that promotes private investment”—the “three arrows” of Abenomics (Prime Minister's Office, *The Action Plan for the Realization of Work Style Reform*, Government of Japan, March 28, 2017, pp. 1, 3). The third arrow set out a policy to create a shining Japan for women from a “growth strategy” that would lead to sustainable economic growth in Japan. Specifically, that policy sought to achieve the elimination of waitlists for children, provide support for returning to work and reemployment, and increase the number of women officers and managers (Prime Minister's Office, 2017).

anywhere while efficiently using limited time, an example being supporting working mothers and fathers whose children might be at home because of the pandemic to work from home, leading to a more comfortable life that allows for leisure time. Telework is thus aimed at enabling a healthier work-life balance, and the government has encouraged private companies to adopt the practice while also preparing legislation to support such steps. Despite these policy moves, however, telework was not widely embraced by companies or individuals until the outbreak of the pandemic. With the spread of COVID-19, the Japanese discussion about telework suddenly changed from being about the benefits of telework to focusing on its essential nature for the continuity of business operations.

The Benefits of Telework

The various benefits of telework have been discussed at length previously and are reviewed only briefly here. Although there are many benefits, seven can be particularly singled out as highly noteworthy (see Figure 3.1).⁴ These are

- **reduction of office costs:** reduction in the need for office space, paper costs, and commuting and transportation costs
- **creation of additional opportunities for employment and workforce support:** creation of a new subset of employees, including elderly retirees, people with disabilities who cannot commute to work easily, and people who live too far away to commute
- **retention of excellent employees:** realization of an environment that is supportive of employees on maternity or paternity leave, nursing leave, family emergency leave, etc., preventing them from having to quit their jobs because of their temporary period of inability to work (i.e., continuous employment)
- **reduction of burden on the environment:** reductions in electricity costs (volume) and carbon dioxide emissions as a result of reductions in commuting and office energy consumption
- **increase in productivity:** swift and accurate responses to customers (in sales), increase in work efficiency through better-planned and more-focused implementation of work (in research and development, human resources, and sales)
- **realization of work-life balance:** increased time with family, increased time for self-expression
- **secure business continuity planning (BCP):** continuation of business even during emergencies or pandemics.

For companies, telework is expected to have a direct effect, such as in a reduction in office-operating costs; for employees, it is seen as useful in establishing a better work-life balance.

However, from the perspective of BCP, telework attracted substantial new attention for its utility in the event of a pandemic. As early as 2009, as the number of people infected with swine flu (H1N1) surged in North America, there was concern that it would cross the sea and reach Japan. At that time, the importance of telework was noted somewhat, as it was effective in enabling BCP. However, because the H1N1 flu did not spread widely in Japan, the initial alarm soon abated, and the use of telework for BCP did not actually occur. It has only been as a consequence of the COVID-19 pandemic that telework suddenly emerged as a widespread social reality in Japan.

In the years leading up to the outbreak of the COVID-19 pandemic, there was a growing focus on telework in large part because of the implementation of the Abe administration's policies. The focal points were on

⁴ Japan Telework Association, *Telework White Paper 2016*, Tokyo, 2016; and Ministry of Internal Affairs and Communications, Japan, *White Paper 2014: Information and Communications in Japan*, Tokyo, 2014, p. 208.

FIGURE 3.1
Direct Effects Expected from Telework



SOURCE: Japan Telework Association.

the wider enabling of women's labor and the realization of work-life balance. In 2019, a law was enacted to provide people with more flexibility at work. Consequently, there was an increase in momentum to introduce telework into business operations, and then, suddenly, the pandemic created a situation in which Japan had no choice but to adopt it.

The Prevalence of Telework

Changes in Thinking About Work During and After the Pandemic

In late 2020, the Mori Memorial Foundation, where I serve as the executive director, conducted a survey of teleworking under the pandemic in six global cities: Tokyo, Paris, Singapore, London, New York, and the greater San Francisco Bay area. The first question we asked was, "To what extent has the COVID-19 pandemic influenced your lifestyle?" The possible answers were "not at all," "slightly," "moderately," and

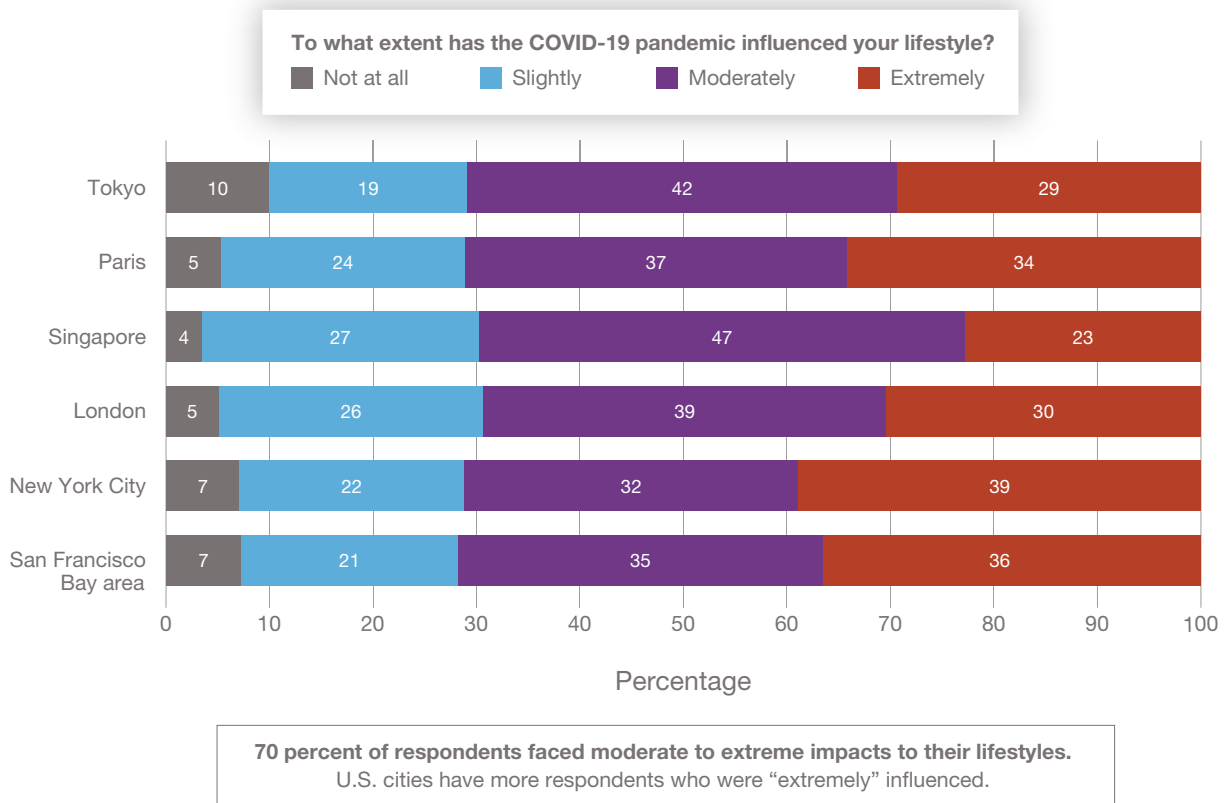
“extremely.” Seventy percent of the respondents faced moderate to extreme impacts to their lifestyle from the pandemic. U.S. cities had more respondents who were extremely influenced (Figure 3.2).⁵

This questionnaire was deployed for two weeks in October 2020 through an online survey research service to residents aged 18 and older in the six target cities. Respondents were given a screening question that asked for their employment status. Those who were unemployed at the time of the survey were screened out, with an average of 760 disqualifications per city. The survey was able to achieve 1,000 completed responses for each city, with an average completion rate of 73.4 percent.

The second question we asked was, “How did policies regarding ‘working from home’ change in your firm?” Here, there were three possible answers: “I work from home,” “I do not work from home, but I have the option to,” and “Working from home is not allowed” (Figure 3.3).

The results show that Singapore is the city with the biggest differential between working from home prior to and during the pandemic, with an increase from 21 percent to 63 percent. In contrast, Tokyo did not see much of an increase, only from 48 percent to 55 percent, while the percentage of respondents who reported working from home in New York increased from 37 percent to 59 percent, a bigger change than in London

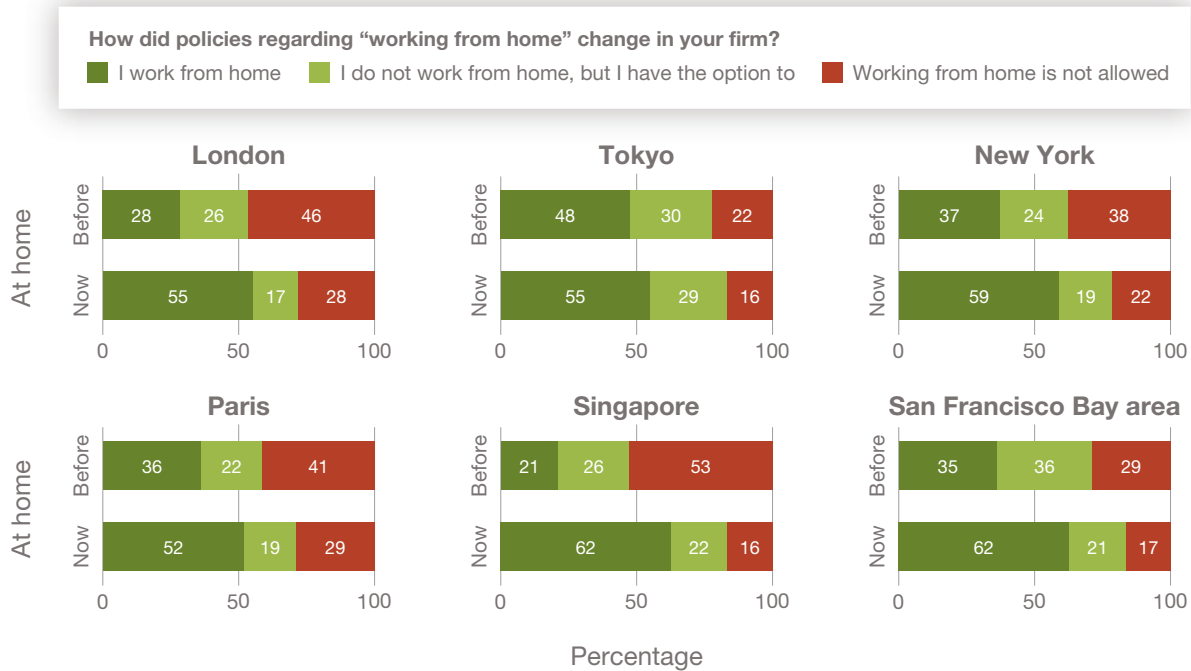
FIGURE 3.2
Influence of the COVID-19 Pandemic on Survey Respondent’s Lifestyle



SOURCE: Mori Memorial Foundation, 2020.

⁵ The survey period was October–November 2020. The number of respondents was 1,000 per city, with the exception of the San Francisco Bay area, where only 500 people were surveyed (Mori Memorial Foundation, *Questionnaire Survey About the Influence of COVID-19 on Global Cities*, Tokyo, 2020).

FIGURE 3.3
Impact of the COVID-19 Pandemic on the Survey Respondent’s Company’s Work-from-Home Policies



Because of the pandemic, more companies and organizations are now implementing the policy of working from home.

SOURCE: Mori Memorial Foundation, 2020.

or Paris. Clearly, because of the pandemic, more companies and organizations are giving their employees the option of working from home.

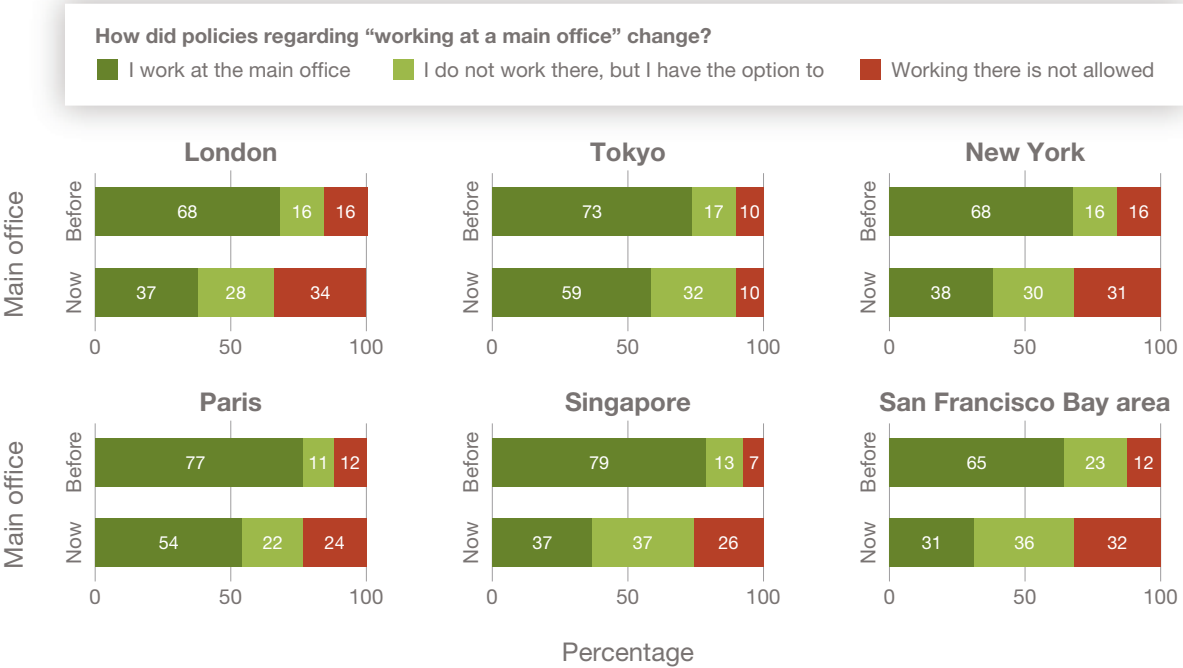
The third question our survey explored was, “How did policies regarding ‘working at the main office’ change?” Here, there were three possible answers: “I work at the main office,” “I do not work there, but I have the option to,” and “Working there is not allowed” (Figure 3.4).

Again, the results show that Singapore is the city with the largest differential between working in a firm’s main office before and during the pandemic, down almost half from 79 percent to 37 percent. New York is in a similar situation, down from 68 percent to 38 percent, which is comparable to London. The percentage of respondents working at a main office in Tokyo, by contrast, did not decrease so dramatically, dropping only from 73 percent to 59 percent. As a result of the pandemic, more companies and organizations are now prohibiting working at the main office, and this is especially true in London and New York.

The fourth question was, “Where do people work?” This question related to three points—before, during, and after the pandemic—and had multiple answers based on the following four: “at home,” “at the organization’s main office,” “at sites designated by my company,” and “at sites not designated by my company” (Figure 3.5).

The results show that the difference between working in the main office during and after the pandemic is almost unchanged in New York and London. By contrast, respondents in Tokyo showed a significant increase in their desire to work from home, suggesting that 42 percent of respondents anticipate wanting to work

FIGURE 3.4
Impact of the COVID-19 Pandemic on Policies Governing Working at the Main Office



Because of the pandemic, more companies and organizations are now prohibiting work at a main office.

SOURCE: Mori Memorial Foundation, 2020.

from home after the pandemic concludes (up from 30 percent today). Overall, the survey reveals a substantial global trend of shifting from working in the main office to working from home since the COVID-19 outbreak. A large proportion of people appear likely to want to continue to work from home in the future, after the pandemic concludes.

The fifth question was, “Are people satisfied with teleworking?” Here, there were five possible answers: “very dissatisfied,” “dissatisfied,” “neutral,” “satisfied,” and “very satisfied.” We found that, in Tokyo, 35 percent of respondents reported being satisfied or very satisfied while, in New York, the number was 47 percent, revealing a significant difference between Japan and the United States. In general, this reflects the reality that Japanese are less familiar than Americans with working exclusively on a computer. Furthermore, living space in Japanese homes is often not sufficient for working, and there is a strong Japanese tradition that people go to the office to work.

In addition, we asked, “Does teleworking increase productivity?” There were three possible answers: “decrease,” “no change,” or “increase.” Thirty-seven percent of Tokyo-based respondents answered “increase,” but an even higher percentage of New Yorkers said that teleworking increases productivity (46 percent).

FIGURE 3.5
Where People Prefer to Work in Six Global Cities



Huge global trend shift from the main office to at home since COVID-19 outbreak.
People who wish to work at home in the future (post-pandemic) remains relatively high.

SOURCE: Mori Memorial Foundation, 2020.

So, which is preferable, teleworking from home or working in a main office? According to a survey conducted by the Gensler Research Institute in the United States, 70 percent of Americans still want to work in the office, while 30 percent prefer to work more flexibly.⁶

How do generational differences appear to affect the satisfaction and productivity of workers engaged in telework from home? When Millennials (born between 1981 and 1996) or members of Generation Z (born between 1996 and 2011) are compared with Baby Boomers (born between 1946 and 1964), younger people express a preference to work in the office rather than telework.⁷ Older workers, by contrast, are more likely than their younger peers to feel productive and achieve a sense of satisfaction while working from home.

⁶ Gensler Research Institute, *U.S. Work from Home Survey 2020*, San Francisco, Calif., 2020. The survey period was April 16–May 4, 2020, and the number of respondents was 2,300 full-time workers across 100 companies.

⁷ Gensler Research Institute, 2020.

There is a similar trend in Japan. Younger employees (Millennials or members of Generation Z) tend to find working from home more stressful and less productive than Baby Boomers. These facts show that, as telework becomes more widely adopted in the future, it is important to consider how to best implement it for the younger generations.

How Widespread Will Telework Be After COVID-19?

If telework does become more prevalent in the post-COVID-19 world, where will it take place? MLIT investigated this question in 2019 and found that telework is generally conducted in three major types of locations: mobile, satellite, or home.⁸ *Mobile* refers to conducting work activities anywhere, a typical example being people who work on their computers at a coffee shop. *Satellite* can refer to coworking spaces or to a company having offices that it rents outside its main facilities. The situation in Japan is almost balanced; 54.9 percent of telework is mobile, 52.9 percent takes place in satellite offices, and 49.8 percent takes place at home.⁹ However, with the pandemic and the sudden rise of telework from home, the number of workers who were teleworking from home in late 2020 and early 2021 is likely much higher. However, these levels are likely to drop off as the pandemic winds down.

In terms of location, currently, many coworking spaces are in the center of big cities. Tokyo, with 122 locations, has the third largest number of such facilities, trailing only London (200 locations) and New York (161 locations). The number of such spaces is expected to increase in the future, including with the addition of locations in the suburbs.¹⁰ This is particularly likely to be the case for Japan, since Japanese homes are generally lacking in space, making it problematic to find a room for work purposes. Of course, it will take time for coworking spaces to be constructed in new suburban locations, and, as a consequence of the extreme shortage of workspace options, some train stations have even installed small-scale office booths for mobile work.

As noted earlier, the spread of telework is lagging in Japan compared with other developed countries. In July 2020, *The Nikkei* published comparative data on the global telework context.¹¹ These data showed both the percentage of people who were able to work from home and the percentage decline in the number of people who went to work (on-site/in the office) in June compared with pre-COVID-19 levels. Specifically, the percentage of workers who had the option to work from home was 47 percent in Japan, 51 percent in the United States, and 53 percent in the United Kingdom, and there was a 12-percent contraction in Japan of those actually going to their places of work, a 30-percent drop-off in the United States, and a 44-percent fall in the United Kingdom. What we can see from this is that, compared with Japan, nearly twice as many people in the United States and three-and-a-half times as many in the United Kingdom most likely worked from home instead of going to the office. Data also show that, in Tokyo, the percentage of people who stopped working at their company offices and started working from home because of the pandemic far exceeded half, although this was likely only a temporary trend.¹² In Japan as a whole, the number of people going into the office to work decreased by 12 percent.

⁸ MLIT, *Yearly Telework Population Survey*, Tokyo, 2019.

⁹ Note that, because a person may telework from multiple locations, the total value can add up to greater than 100 percent.

¹⁰ Data are from the *Global Power City Index 2018* by the Institute for Urban Strategies in the Mori Memorial Foundation. Numbers represent total WeWork facilities and total coworking facilities available through coworker.com for each city as of June 2018. Mori Memorial Foundation, *Global Power City Index 2018*, Tokyo, 2018.

¹¹ Hashimoto Shinichi and Motokazu Matsui, “Japan Lags the US and Europe in Working from Home” [在宅定着、ニッポンの壁], *The Nikkei*, July 5, 2020.

¹² Mori Memorial Foundation, 2020.

There are likely two major reasons why the number of people teleworking from home in Japan is smaller than that of other countries.¹³ The first is related to occupational function; workers in specialist professions (including semiprofessionals, such as technical workers) make up only 17 percent of the workforce in Japan, which is less than half that of the United States (36 percent) and the United Kingdom (37 percent). Specialist professionals engage in a multitude of knowledge-intensive tasks, such as legal affairs, finance, and information technology, and, for these workers, it is easy to remain connected and productive by using the internet, making working from home more accessible.

The second reason is that 27 percent of the workforce in Japan is employed in service or retail, a markedly higher number than 17 percent in the United States and 16 percent in the United Kingdom. In other words, the ratio of professionals to the total number of employees in Japan is half that of the United States and the United Kingdom, which is probably a primary reason for the low number of people engaged in telework. In addition, there are more service and retail workers in Japan whose jobs are not suited to telework, leading to the situation in which fewer people work from home.

Under the state of emergency, many companies prohibited workers from working in their offices, meaning that, for a certain period of time, more than 90 percent of large companies in Tokyo had their employees work from home, while the average number for companies of all sizes exceeded 60 percent. Telework, which had undergone a long period of trial and error, was suddenly basically imposed on companies, making it suddenly seem like the norm. However, to bring about a longer-term, more comprehensive introduction of telework into business operations, it will be essential for companies to consider a new system of performance evaluation for those employees conducting telework.

I am the president of the Japan Telework Society (JTS), and, in looking at the temporary increase in telework due to the pandemic and what is necessary to support more-permanent adoption of flexibility to telework in the future, JTS has made five proposals—what we are calling “three awareness reforms and two institutional reforms.”¹⁴

What are the three changes in awareness? First, we are calling for the fostering of social awareness about telework being an essential tool for conducting business. Second, we are calling attention to the fact that telework is expected to diversify and improve the efficiency of operations in companies and organizations. To do so, however, appropriate performance evaluations must be made for employees who engage in telework. Third, teleworking can free individuals to be productive and achieve work-life balance in ways that increase happiness without necessarily reducing productivity. It is imperative to rethink the idea that the traditional Japanese style of work in which it is considered ideal to arrive at the office at a fixed time and work diligently at one’s desk is the only “real” or appropriate way of working.

In addition to these three reforms in awareness, JTS has urged reforms to the legal system that are intended to support telework as a phenomenon. Finally, we argue that, for telework to become more prevalent, concrete measures must be implemented to improve various situations, such as enhancing the quality of information systems and facilities and developing facilities that are comfortable to work in.

Of particular importance are issues related to the second and fourth recommendations of establishing an appropriate evaluation system for teleworking employees and developing a relevant set of employment laws, respectively. Data published by *The Nikkei* show how companies in Japan are dealing with telework; 5 percent of companies are using a flex-time system, and approximately 12 percent are using an “off-site deemed work-

¹³ Japan Institute for Labour Policy and Training, *Databook of International Labour Statistics: 2018*, Tokyo, 2018.

¹⁴ At the 22nd annual conference of the JTS, held on September 26, 2020, the five proposals were deemed “indispensable consciousness reforms and institutional reforms” for the full-scale introduction of telework (Hiroo Ichikawa, “Keynote Speech,” Tokyo: Japan Telework Society, 2020).

ing hour system.”¹⁵ Roughly 2 percent are using a “professional services/discretionary labor” system, while less than 1 percent are using a “planning services/discretionary labor” system. The current Labor Standards Law in Japan presupposes working hours and work locations. This means that, when employees are engaged in telework, it is treated as an exceptional measure within the scope of the Labor Standards Law, requiring firms to treat employees as if they temporarily fall under the systems of professional services and/or discretionary labor, planning and/or discretionary labor, flex time, or an off-site deemed working-hour system. Clearly, this is not ideal for a more permanently flexible system that extends full respect and support to teleworking as an approach to productivity. In a more modernized, dynamic labor standards system, employees’ evaluations are based on the achievement of results, not simplistically on how many hours are spent working. Such a modernized system of labor standards still faces obstacles to adoption in Japan because it is not much in keeping with Japan’s traditional labor practices. Japan is now barely managing and finds itself facing a situation in which a failure to actively apply this “job-type” employment will result in a failure to spread the practice of telework.

Because the current Labor Standards Law has to be followed even when telework is implemented, there have been a large number of requests to the government from the management side of companies seeking clarification on working conditions and an understanding of working hours. As a result, the situation has arisen in which teleworking employees are forced to adhere to the standard assumption that the working day is eight hours long. As a result, opinions are divided on whether to adopt a deemed working-hour system or a variable working-hour system. Many experts argue that an “off-site deemed working-hour system” is the most suitable for telework, but the issue is how best to evaluate employees in this case, and clear conclusions about the merits of this system have not yet been reached.¹⁶ Despite this, some companies are already working on the introduction of telework through trial and error, and it is likely that the reforms to support telework will become a major theme in the restructuring of the Japanese labor system in the future.

The fifth recommendation presented by JTS relates to enhancing the security of facilities and other support systems to reduce the risk of information leakage that could occur by taking work out of the office. The central government is particularly sensitive to this issue. This is not to say that telework is an inherently risky activity, but improving information and technology system security will make it feasible for telework to move forward more easily.

Indeed, security concerns partly explain why the Japanese central government itself has struggled to adopt telework, despite telework being one of Prime Minister Abe’s own featured policies and something that the government advocates the importance and merits of for countless industries, families, and individuals. The rate of telework being carried out by public officials in the central government is very low. In fiscal year 2020, a survey conducted by the Cabinet Secretariat showed that 50 percent of employees have at least some experience in telework, but Japanese central government officials typically engage in telework only a few times a year.¹⁷ In response to questions about what kinds of tasks were carried out through telework, the survey found that many officials used it to conduct such tasks as preparing materials for submission to the Diet, creating budgets, and developing draft laws and regulations. How to increase the central government’s usage of telework remains a serious challenge.

¹⁵ Hashimoto and Motokazu, 2020.

¹⁶ The term *off-site deemed working-hour system* describes a situation in which it is difficult for a given company to document the working hours of its employees because they performed their work off-site, in which case it is simply assumed that they worked for a predetermined period of time. In the normal working-hour system, the start and end times must be set in the work regulations, such as from 9:00 to 17:00. The off-site deemed working-hour system governs companies whose employees conduct their work in a manner that does not necessarily correspond to the prescribed normal working hours.

¹⁷ National Strategy Office of Information Technology and Personnel Office, Cabinet Secretariat, “Survey on Telework Performance of National Government Employees,” Tokyo, July 2020.

There is a heavy concentration of people, money, and goods in Tokyo, and the accumulation of business functions in central Tokyo in particular is increasing. The expectation that the pandemic will cause the relocation of business functions (specifically offices) from central Tokyo to suburban areas, other cities, and rural areas is rising, particularly among those who criticize the phenomenon of this overconcentration. The Tokyo Chamber of Commerce and Industry (TCCI) surveyed member companies regarding changes in the locations where they operate as a result of COVID-19 and their future plans.¹⁸ Since the outbreak of the pandemic, a large number of companies have banned employees from coming into the office, so TCCI asked employees where they have been working. Of respondents, 91.3 percent worked from home, 21.5 percent worked in existing offices other than the main office, 5.0 percent worked in newly established satellite offices, and 3.5 percent worked at shared offices.¹⁹ Because companies were unable to provide satellite offices or shared offices in time for the large number of employees who needed them because of the pandemic, many people ended up working from home.

So, will businesses relocate their offices back to the center of Tokyo once the pandemic ends? Of the companies surveyed, 83.9 percent indicated that they will maintain their current locations. At the same time, however, we found that nearly 10 percent of companies are considering relocating their offices and business functions away from the city center, 5.7 percent are considering reducing office size, 4.0 percent are considering relocating, and 3.5 percent are considering expanding. In general, however, a large number of companies have expressed their intention to remain in the city center. Because a large number of people have been working from home during this time, from that experience, the number of employees who want to work from home or satellite offices in the suburbs instead of going to their offices in central Tokyo has increased to between 30 percent and 40 percent. However, there remains a difference in mindset between employees and company managers, with no sign that the preferences of managers, who have tended to focus on the desirability of offices based in the center of large cities, are undergoing any dramatic change.

Conclusion

Telework was not a widespread practice in the private and public sectors before the outbreak of COVID-19 in Japan, and the merits of telework were not widely understood or accepted by decisionmakers for more than two decades since the phenomenon first arose in the West. The occurrence of the pandemic suddenly accelerated the adoption of telework as it became mandatory for the continuation of business operations.

People's viewpoints of what constitutes a typical workplace have shifted from the concept of a main office to more-varied styles and locations, such as other corporate offices, satellite offices in the suburbs, shared offices, and home offices. However, the cognitive gap that exists between managers and employees regarding suitable places to work will likely remain a significant obstacle to more-widespread adoption of teleworking once the pandemic is over, and it constitutes a key issue that remains to be resolved. The majority of managers still believe that the main office is the most important base for conducting business, while an increased number of employees now prefer working from home.

The occurrence of the pandemic holds the potential for the realization of a larger variety of working styles and workplaces in the near future in Japanese society. For that to become a reality, focus must be put on how, when, and where these changes will occur in addition to what is to be reformed, with reform of the Labor Standards Law being a particularly pressing issue.

¹⁸ Committee for Greater Tokyo Region, Tokyo Chamber of Commerce and Industry, *Report on Urban Policy Under and After COVID-19*, Tokyo: Tokyo Chamber of Commerce and Industry, 2020.

¹⁹ Again, the total is over 100 percent because some respondents work at more than one location.

Finally, when we talk about the issue of the spread of telework, social issues, such as race, gender, and income inequality, are not as widely addressed in Japan as they have been in the United States. This is partly because such matters are not widely considered as serious domestic issues or divisions in Japan—although gender issues were a substantial component of former Prime Minister Abe’s approach to the evolution of Japanese society and the economy, particularly via his focus on “Womenomics.” However, as telework continues to spread in Japanese society, a social and digital divide might naturally emerge as an obstacle to be overcome and, if that comes to pass, then the American experience will certainly help shed light on possible approaches to resolving these issues.

Is More Technology the Solution to Problems with Cryptocurrency and Blockchain? A U.S. View

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Introduction

As cryptocurrencies expand beyond their initial use cases as speculative digital coins, can U.S. policymakers and blockchain users overcome some of the legacy and emergent problems associated with them? The pandemic-related events of 2020 only raised the profile of cryptocurrencies, or digital “cash” maintained in distributed ledgers across their users’ computers.¹ However, accompanying cryptocurrency’s rising popularity are three commonly expressed concerns: that the technology facilitates illicit markets, that it permits financial sanctions evasion, and that it creates a host of social and environmental costs as a byproduct of computational mining. This chapter reviews the three most common criticisms of cryptocurrency and asks the question, “Can blockchain technology help solve some of the problems that cryptocurrencies created?”

U.S. policymakers have been publicly wrestling with how best to categorize and regulate cryptocurrency, at times speaking positively about the technology’s potential and at times describing cryptocurrency pejoratively, as a “scheme.”² Regulators must often walk a proverbial tightrope, fostering development and innovation on the one hand and protecting citizens and financial markets from predation on the other. To determine whether blockchain holds the answers to some of cryptocurrency’s problems, it is critical to define what we mean by these technologies and lay out an appraisal of the scope of the cryptocurrency market, before exploring solutions to some of cryptocurrency’s problems.

The State of Cryptocurrency in Finance and Policy

In the early 2010s, cryptocurrency was seen as a novelty, a trendy but passing phenomenon.³ Today, at the beginning of the 2020s, cryptocurrency has substantial size as an asset class and includes currency diversity categorized by the nature of the digital token—or the underlying computer code—that could characterize

¹ Scott R. Baker, Nicholas Bloom, Steven J. Davis, Kyle Kost, Marco Sammon, and Tasaneeya Viratyosin, “The Unprecedented Stock Market Reaction to COVID-19,” *Review of Asset Pricing Studies*, Vol. 10, No. 4, December 2020; and Phillip Inman, “Bitcoin Jumps to Three-Year High as COVID Crisis Changes Investor Outlook,” *The Guardian*, November 17, 2020.

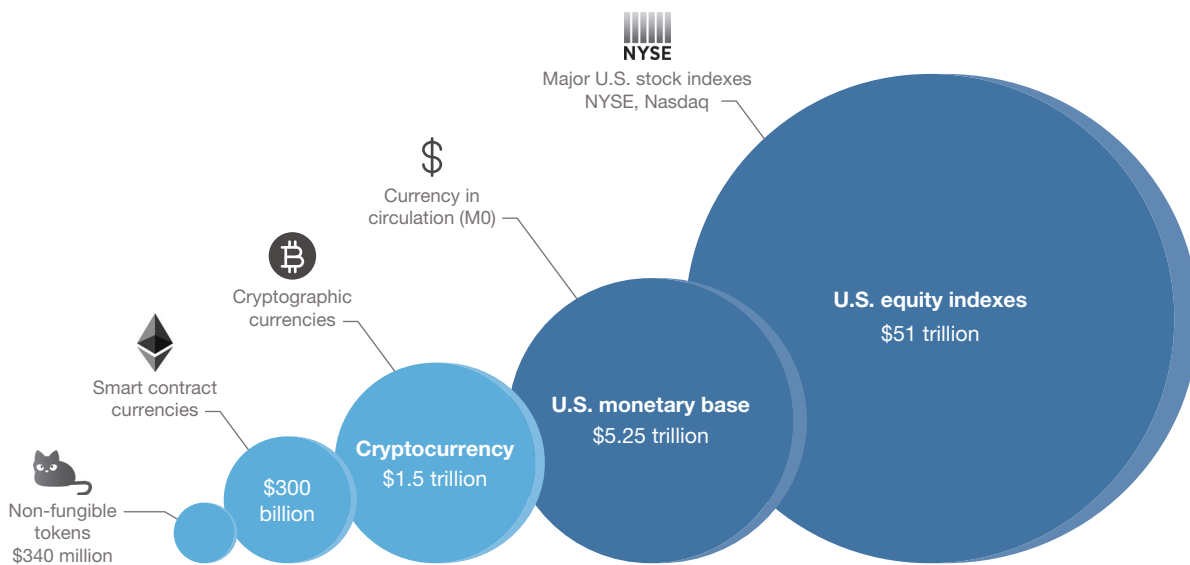
² Dawn Causey, Andrew Doersam, and Thomas Pinder, “Cryptocurrency Conundrum: Regulators Grapple with Digital Currencies,” *ABA Banking Journal*, January 18, 2019.

³ Chandra Steele, “Bitcoin Is the New Beanie Babies,” *PCMag.com*, February 7, 2018.

each cryptocurrency as a token, as a smart contract, or as a non-fungible token. A review of current cryptocurrency market valuation suggests that these digital assets, however categorized, are comparable to other classes of financial assets that are heavily regulated (Figure 4.1).

Currently, cryptocurrency is not as large as the U.S. monetary base, but, as an asset class that was without value prior to 2009, cryptocurrency—which has become a trillion-dollar asset class in just a few years—has had a remarkable rise. There are various drivers of cryptocurrency demand, including different global and regional phenomena, comparatively higher yields compared with domestic saving rates, and the utility of cryptocurrency in cross-border remittance or as a financial hedge against inflation-prone currencies, to name a few. The comparison with more-traditional finance is helpful for understanding why policymakers might feel compelled to speak out on cryptocurrency or to be concerned about the unforeseen ramifications of using a pseudo-anonymous digital wallet outside traditional financial markets.⁴ After all, it might be notable for a digital currency to rival the U.S. monetary base (or other asset classes),⁵ but, for economically smaller nations, such as Venezuela or Indonesia, the potential for divestiture from a state-backed currency into a cryptocurrency could be a very real concern for macroeconomic instability.⁶ That concern, along with a number of issues regarding money laundering and the use of cryptocurrency for illicit goods or contraband through the likes of the now defunct Silk Road market,⁷ has led to a variety of policy responses across the world’s major economies (Table 4.1).

FIGURE 4.1
Relative Currency, Cryptocurrency, and Equity Valuations, in U.S. Dollars



SOURCES: Created with data from Federal Reserve Bank of St. Louis, “Monetary Base; Total [Bogmbase],” web tool, Federal Reserve Economic Data, 2021; and Sibilis Research, “Total Market Value of U.S. Stock Market,” database, undated.

NOTES: M0 = monetary base; NYSE = New York Stock Exchange. M0 is equal to coin currency, physical paper, and central bank reserves.

⁴ A digital or electronic wallet is a file stored on a phone, a personal computer, or another peripheral that identifies the unique user, is encrypted, and may include other relevant financial details that are useful for conducting financial transactions, including credit card or bank account information to facilitate electronic commerce.

⁵ Federal Reserve Bank of St. Louis, 2021.

⁶ Aaron Brown, “Venezuela’s Failed Cryptocurrency Is the Future of Money,” Bloomberg, May 10, 2019.

⁷ For details on the Federal Bureau of Investigation’s closure of the Silk Road market in 2013, see Colin Harper, “The Long and Winding Story of Silk Road, Bitcoin’s Earliest Major Application,” *Bitcoin Magazine*, October 1, 2020.

TABLE 4.1
Cryptocurrency Exchanges and Policy Responses of Select G20 Nations

Policy Response	Countries
Individual ownership and exchanges banned	Turkey ^a China ^b
Individual ownership permitted, exchanges limited	India ^c Indonesia Saudi Arabia
Individual ownership permitted, exchanges allowed	Argentina Australia Brazil Canada France Germany Italy Japan Mexico Russia South Africa

SOURCES: Buy Bitcoin Worldwide, homepage, undated; and Hanibal Goitom, *Regulation of Cryptocurrency in Selected Jurisdictions*, Washington, D.C.: Law Library of Congress, Global Legal Research Center, June 2018.

^a Turkey's latest restrictions on cryptocurrency included digital wallets, effectively prohibiting legal ownership in many cases.

^b China banned all onshore and offshore crypto-transactions in September 2021, making China's policy much closer to Turkey's in its restrictive approach.

^c Private ownership of cryptocurrencies was recently permitted pending legal action (Mayank Aggarwal, "India to Ban Ownership of Cryptocurrencies," *The Independent*, March 15, 2021).

Present in these three general categories of cryptocurrency policy responses are nations that have attempted to entirely suppress cryptocurrencies, nations that have permitted individual cryptocurrency ownership while banning exchanges, and nations that permit individual ownership of cryptocurrency and permit exchanges to function. These cryptocurrency policy responses are happening in parallel with policy discussions about the use of central bank digital currencies. These digital currencies, deployed in a manner like that used to deploy cryptocurrencies, are not necessarily reliant on blockchain technology but are being trialed or developed by a number of nations, including the United States, Japan, and China.⁸ To date, the nations that have permitted relatively unfettered individual use of cryptocurrency and cryptocurrency exchanges have landed on a model that requires financial due diligence in executing trades and on a categorization of cryptocurrency akin to something like a financial asset or property. Japan went the furthest of all of the G20 nations in liberalizing financial laws to permit cryptocurrency and, in 2016, officially recognized cryptocurrency as legal tender.⁹ Regulators seem to be favoring a wait-and-see-approach that permits them some leeway between regulating numerous individual digital wallets and regulating the fewer but significant cryptocurrency exchanges that function much like foreign currency brokers do at airports or for tourists converting euros to dollars.

⁸ For more information on the U.S. digital dollar project, see Jim S. Cunha, "Boston Fed's Digital Dollar Research Project Honors 2 Hamiltons, Alexander and Margaret," Federal Reserve Bank of Boston, February 25, 2021.

⁹ Comply Advantage, "Cryptocurrency Regulations in Japan," webpage, undated.

The Key Concerns Regarding Cryptocurrency, and Blockchain-Based Solutions

In trying to understand the policy approaches to cryptocurrency that U.S. decisionmakers have considered, it is worth revisiting what issues concern regulators in the first place. As mentioned earlier, three problematic areas of cryptocurrency adoption are commonly mentioned: its use for illicit goods, sanctions evasion, and the environmental and social costs connected with cryptographic mining.¹⁰ There are also other concerns with cryptocurrency, such as the absence of consumer or investor protection that could cover fraudulent token offerings. Such concerns have been voiced at the highest level of the U.S. government; U.S. Secretary of the Treasury and former Federal Reserve Chair Janet Yellen has previously called cryptocurrency (specifically Bitcoin) a “highly speculative asset” that “doesn’t constitute legal tender”¹¹ and has been used for the illicit transfer of funds.¹² Cryptocurrency’s association with criminal activity was present at the very outset of Bitcoin’s use in the early 2010s, while other issues, such as the environmental costs associated with mining, have come about more recently.

Illicit and Fraudulent Activity

Cryptocurrency’s early adoption has been attributed to its popularity among drug traffickers, particularly those operating on the dark web.¹³ Although a dated example, Bitcoin’s temporary exchange rate collapse in 2013 following the seizure and shutdown of the online contraband exchange site Silk Road led many to conclude that cryptocurrency was a technology associated with criminal behavior.¹⁴ More recently, cryptocurrency has been in the news for the high-profile theft of coins, often occurring at online coin exchanges that offer custodial services for cryptocurrency investors, although it seems that these thefts have been enabled by long-present methods of cyber intrusion, such as spear phishing and social engineering.¹⁵ And since 2013, it has become somewhat common for U.S. law enforcement entities to process the sale of cryptocurrency, digitally seized, pursuant to shutting down criminal networks.¹⁶ However, cryptocurrency as a technology category or as a financial asset has aged by almost a decade. Illicit activity, although perhaps notable, represents a shrinking minority of cryptocurrency transaction volume.¹⁷ And cryptocurrencies, as public blockchains, possess certain tools that lend themselves to digital forensics and crime fighting.¹⁸

¹⁰ Isaac Stone Fish, “Bitcoin Mining Is Big in China. Why Investors Should Worry,” *Barron’s*, February 19, 2021.

¹¹ Craig Torres, “Yellen Says Bitcoin Is a ‘Highly Speculative Asset,’” *Bloomberg*, December 13, 2017.

¹² Hailey Lennon, “The False Narrative of Bitcoin’s Role in Illicit Activity,” *Forbes*, January 19, 2021.

¹³ Erik Silfversten, Marina Favaro, Linda Slapakova, Sascha Ishikawa, James Liu, and Adrian Salas, *Exploring the Use of Zcash Cryptocurrency for Illicit or Criminal Purposes*, Santa Monica, Calif.: RAND Corporation, RR-4418-ECC, 2020.

¹⁴ Marco Santori, “Silk Road Goes Dark: Bitcoin Survives Its Biggest Market’s Demise,” *CoinDesk*, May 5, 2017.

¹⁵ “Hackers Steal \$600 Million in Major Crypto Theft,” *CNBC*, August 11, 2021.

¹⁶ U.S. Department of Justice, U.S. Attorney’s Office, Northern District of California, “United States Files a Civil Action to Forfeit Cryptocurrency Valued at Over One Billion U.S. Dollars,” press release, November 5, 2020.

¹⁷ Chainalysis, *The 2020 State of Crypto Crime*, New York, January 2020, p. 5.

¹⁸ As cryptocurrency use has increased, several digital forensics firms that focus on public blockchains and law enforcement have arisen. For an example, see Billy Bambrough, “Chainalysis Reveals Huge Growth in Government Bitcoin, Crypto and Blockchain Interest—Makes Dire Monero Warning,” *Forbes*, October 13, 2020.

Cryptocurrencies have been described by some as anonymous, but that is hardly an accurate representation of the ways in which cryptocurrency transactions actually occur.¹⁹ Digital wallets that store and transact cryptocurrencies are visible on a public network, and, even if the individual using the wallet is unknown to other users (or to law enforcement), the wallet's behavior, digital pattern of life, and transaction history are often readily available to anyone who cares to look. The visibility of digital wallets is a deliberate feature of decentralized cryptocurrencies that makes them incredibly transparent to users equipped with simple and typically free tools, such as Block Explorer or other blockchain readers.²⁰ Digital forensics for law enforcement have also been aided by policymakers who have chosen to engage at the cryptocurrency exchange level, working directly with institutions that are now treated similarly to financial intermediaries, to enforce know-your-customer (KYC) standards.²¹

As a brief historical comparison, only a generation ago, in the wake of the attacks on September 11, 2001, U.S. law enforcement was preoccupied with the illicit means of financing terrorism. One means of terrorism financing that became a focus of domestic and international law enforcement was *hawala networks*, informal exchanges of promissory notes common in Asia and the Middle East.²² U.S. law enforcement described these networks in terms that were very similar to those it would use a decade later to describe cryptocurrency.²³ What is notable about cryptocurrency is that, if it is used as a modern criminal's "bag of cash," this bag of cash now publicly advertises how heavy it is (wallet holdings or deposits), how often its owner conducts business (public transaction ledgers), and when its owner conducts activities (public time stamps). Cryptocurrency coins have evolved as well, with a new generation of so-called privacy coins, decentralized peer-to-peer networks, and coin-mixing tools available to users who wish to further conceal transactions.²⁴ The evolution of anonymity tools in cryptocurrency has no doubt complicated digital forensics and law enforcement; however, it seems that law enforcement now has more technological tools at its disposal than it had two decades ago.

Sanctions Evasion and National Security Concerns

Closely linked to the illicit use of cryptocurrency is the preference that rogue or pariah states have shown for utilizing cryptocurrencies to evade sanctions.²⁵ The list of nations that concern U.S. policymakers includes Russia, Iran, and North Korea.²⁶ The presumption is that, if these nations had to work through U.S.-imposed financial sanctions under normal constraints, they would be pushed to adopt inefficient means to transact in non-dollar assets (perhaps in barter), but the use of cryptocurrency allows them to evade sanctions.²⁷ For

¹⁹ Toshendra Kumar Sharma, "How Is Blockchain Verifiable by Public and Yet Anonymous?" *Blockchain Council*, 2020.

²⁰ For an example of a free-to-use blockchain explorer for some of the more popular cryptocurrencies in use, see Blockchain.com, "Bitcoin Explorer," web tool, undated.

²¹ "What Is AML/KYC in Crypto?" blog post, Sygna, undated.

²² Patrick M. Jost and Harjit Singh Sandhu, *The Hawala Alternative Remittance System and Its Role in Money Laundering*, Vienna, Va.: U.S. Department of the Treasury, Financial Crimes Enforcement Network, 2000, pp. 4, 5.

²³ Nikita Malik, "Does the Hawala Payment System Still Benefit Terrorists?" *Forbes*, April 29, 2019.

²⁴ Chainalysis, 2020, p. 68.

²⁵ U.S. Department of Justice, Office of the Deputy Attorney General, Cyber-Digital Task Force, *Cryptocurrency Enforcement Framework: Report of the Attorney General's Cyber Digital Task Force*, Washington, D.C., October 2020, pp. 1, 15.

²⁶ U.S. Department of the Treasury, "Treasury Escalates Sanctions Against the Russian Government's Attempts to Influence U.S. Elections," press release, Washington, D.C., April 15, 2021.

²⁷ Tanvi Ratna, "Iran Has a Bitcoin Strategy to Beat Trump," *Foreign Policy*, January 24, 2020.

the U.S. Department of the Treasury's Office of Foreign Assets Control, which is tasked with enforcing U.S. sanctions, cryptocurrency certainly complicates enforcement. Before the rise of cryptocurrency, banking consortia, with the proper legislation and authorities, might be compelled to freeze, withhold, or even reverse transactions on behalf of U.S. interests. That substantial enforcement arm still exists, but states and nonstate actors that have functions like those of states, such as the Islamic State of Iraq and Syria, have used cryptocurrencies to conduct transactions.²⁸

Cryptocurrencies do, by their very nature, provide features that facilitate digital forensics, but pursuing a criminal is quite different from trying to influence the behavior of a nation-state. Using many of the same cyber forensic tools employed against criminals transacting in cryptocurrency, U.S. government entities have tried to directly sanction cryptocurrency wallets associated with sanctioned nations to, in effect, limit or restrict the ability of these wallets to trade or cash out on U.S. cryptocurrency exchanges.²⁹ In other cases, by directly participating in blockchain validation, a process that does not necessarily entail financial investment in a particular cryptocurrency, governments can discreetly observe the activities of sanction evaders. However, open-source intelligence does not necessarily guarantee that Iranian, North Korean, and Russian cryptocurrency programs can be restricted. Iranian-backed support for Bitcoin mines and reported North Korean efforts to build state-sanctioned Monero mines seem to be proof that state-backed cryptocurrency programs are bearing some fruit.³⁰

Still, the confluence of digital forensic tools and engagement with cryptocurrency exchanges or other virtual asset service providers (VASPs) provides a path forward for the United States and other like-minded nations. VASPs and cryptocurrency exchange requirements to practice KYC compliance, coupled with the enormous financial importance of the United States as the global center of equity markets, mean that U.S. policymakers could continue to pursue sanctions enforcement under similar circumstances to those of the pre-cryptocurrency era.

Environmental and Social Impacts of Cryptographic Mining

An increasingly common criticism of the use of cryptocurrency is that cryptocurrency's widespread adoption has been accompanied by widespread environmental damage.³¹ This criticism is primarily levied toward Bitcoin because it is by far the most commonly known cryptocurrency and is tracked via the Cambridge Bitcoin Electricity Consumption Index.³² Cryptocurrency *mines*, the processors that calculate mathematical solutions, consume enormous amounts of energy to perform calculations and to power heat exchangers responsible for cooling hardware. In the past year or two, there has been more nuance to this criticism, including evidence of mining-related brownouts in developing regions, such as Iran, Abkhazia, and Inner Mongolia, where the combination of subsidized energy or inexpensive coal mines with a local desire to avoid

²⁸ Cynthia Dion-Schwarz, David Manheim, and Patrick B. Johnston, *Terrorist Use of Cryptocurrencies: Technical and Organizational Barriers and Future Threats*, Santa Monica, Calif.: RAND Corporation, RR-3026, 2019, pp. 7–9.

²⁹ U.S. Department of the Treasury, "Treasury Designates Iran-Based Financial Facilitators of Malicious Cyber Activity and for the First Time Identifies Associated Digital Currency Addresses," press release, Washington, D.C., November 28, 2018.

³⁰ Insikt Group, *How North Korea Revolutionized the Internet as a Tool for Rogue Regimes*, Recorded Future, CTA-2020-0209, 2020, p. 13.

³¹ Cristina Criddle, "Bitcoin Consumes 'More Electricity Than Argentina,'" BBC News, February 10, 2021.

³² "Cambridge Bitcoin Electricity Consumption Index," homepage, Cambridge Centre for Alternative Finance, University of Cambridge, undated (accessed April 2021).

monetary inflation or monetary confiscation has driven groups (in some cases, possibly criminal gangs) to siphon energy toward mining.³³

Another development in the social and environmental costs associated with mining is related to the dominance of China in coin mining. Well over half of the world's Bitcoins are mined from mining *pools*, or consortia of miners, located in China, and a substantial portion of these mines are operated from coal-rich Xinjiang.³⁴ To date, there has not been strong evidence that these two phenomena are linked, or, at least, these issues have not been connected in the same way in which Xinjiang's forced labor, human hair harvesting, and cotton have been linked.³⁵ But the location of Bitcoin mining, a seemingly irrelevant detail for a digitally traded and almost infinitely divisible coin, is suddenly relevant. If firms in the United States are being asked to withhold investment or manage supply chains in a way that avoids human rights abuses based on region alone,³⁶ are Bitcoins mined in a controversial location somehow different?

Unlike in the case of illicit cryptocurrency activity, the solutions to the environmental impacts of cryptocurrency mining are more notional than grounded in industry best practices. First and foremost, cryptocurrency users have their choice of coins. Users and their preference for some of the more energy-intensive cryptocurrency options are the fundamental driver of mining. It should be mentioned that alternative mining methods exist, and not all coins require energy-intensive proof-of-work solutions to function. In this regard, Ethereum provides an alternative, less energy-intensive path for cryptocurrency. Although Ethereum, like Bitcoin, is validated by proof-of-work, energy-intensive methods of mining,³⁷ members of the developer community are trying to tackle some of the problems associated with block validation by modifying their approach to validation (effectively modifying how the underlying blockchain system is governed).

Ethereum is the world's second largest cryptocurrency by market capitalization,³⁸ and it is best known as the first and most dominant smart-contract platform. For a variety of reasons, Ethereum developers have announced plans to shift toward a proof-of-stake model for randomly selected block validators.³⁹ The details of and differences between proof of work and proof of stake are relevant for the mining pools and currency owners, but, for policymakers concerned with the environmental and social costs of mining, some cryptocurrency developers argue that a proof-of-stake blockchain governance model could greatly reduce the envi-

³³ "China's Inner Mongolia Declares War on Crypto Mining," Bloomberg TV clip, Bloomberg Markets, March 4, 2021; Mike Eckel, Izida Chania, and Anaid Gogoryan, "Bitcoin Blackouts: Russian Cryptocurrency 'Miners' Minting Millions While Sucking Abkhazia's Electricity Grid Dry," Radio Free Europe/Radio Liberty, November 25, 2020; Alijani Ershad, "In Iran, Power Outages Reveal the Secret Business of Chinese Bitcoin Farms," France 24 Observers, last modified February 3, 2021; and Mariana Zuniga, "Bitcoin 'Mining' Is Big Business in Venezuela, but the Government Wants to Shut It Down," *Washington Post*, March 10, 2017.

³⁴ By midsummer 2021, Chinese authorities seemed to be more inclined to restrict domestic cryptocurrency mining efforts, perhaps initiating a shift away from China being the world's most dominant cryptocurrency mining hub. "Cambridge Bitcoin Electricity Consumption Index," undated (accessed August 2021).

³⁵ Allison Gordon, "13-Ton Shipment of Human Hair, Likely from Chinese Prisoners, Seized," CNN, July 2, 2020; and U.S. Department of the Treasury, "Treasury Sanctions Chinese Entity and Officials Pursuant to Global Magnitsky Human Rights Executive Order," press release, Washington, D.C., July 31, 2020.

³⁶ See, for example, Nike, "Nike Statement on Xinjiang," press release, undated.

³⁷ For an energy monitor for Ethereum that is similar to Cambridge University's Bitcoin index, see Digiconomist, "Ethereum Energy Consumption Index," webpage, undated.

³⁸ Messari, homepage, undated. As of April 2021, Ethereum had a market capitalization of around US\$300 billion, compared with Bitcoin's capitalization of US\$1 trillion.

³⁹ See "Proof-of-Stake (POS)," *Ethereum*, September 29, 2021. A proof-of-stake blockchain consensus mechanism randomly assigns an algorithm validator among all users rather than utilizing a computationally intensive mechanism or a proof-of-work mechanism, which requires validators to prove or disprove the trillions upon trillions of incorrect mathematical solutions before validating a new blockchain.

ronmental costs of mining. Ethereum has previously demonstrated that deliberate design can influence the scope of mining hardware usable in mining, perhaps such a solution might also reduce the scope of second-order effects from mining, such as increased carbon emissions and localized brownouts.⁴⁰

Conclusion

As the cryptocurrency ecosystem has evolved, there has been a great deal of maturation in the actors participating, most notably cryptocurrency exchanges and other VASPs, and the laws and policies that pertain to cryptocurrency. For each of the major cryptocurrency concerns articulated in this chapter, there are extant or developing pieces of the blockchain ecosystem that might be used to facilitate redress when cryptocurrency is a source of harm. Some of these tools, as in the case of digital forensics, seem to have reached a useful maturity; in other cases, such as energy usage in mining, the solutions notionally exist within the blockchain ecosystem but remain to be deployed. Existing and possible solutions to these concerns are categorized in Table 4.2.

In the span of a decade, cryptocurrency has expanded from a new invention with novel uses to a trillion-dollar asset class. That growth in popularity has not been without economic or environmental costs. Cryptocurrency-related problems have left policymakers across the world trying to balance a host of disparate and sometimes competing policy agendas spanning traditional macroeconomic management, counter-terrorism financing, criminal law enforcement, and even energy grid management. In that light, it is not hyperbole to state that the introduction of cryptocurrency and its underlying technology of blockchain has been world changing—and certainly disruptive.

TABLE 4.2
Cryptocurrency Challenges and Solutions

Cryptocurrency Concern	Possible Solutions and Responses
Illicit or criminal use <ul style="list-style-type: none"> • Illicit goods markets • Money laundering • Tax evasion 	<ul style="list-style-type: none"> • Digital blockchain forensics: This is the fusion of traditional forensic techniques and the employment of blockchain readers; cryptocurrency exchange and wallet transaction data are used to develop criminal pattern-of-life analysis for follow-on law enforcement action. • KYC policies: KYC efforts emphasize performing due diligence on customer identity; this responsibility is typically incumbent on the cryptocurrency exchange performing transactions as a custodian of a digital wallet and includes information that could be subpoenaed pursuant to law enforcement (in addition to traditional money service licensing).
Financial sanctions evasion	<ul style="list-style-type: none"> • Digital wallet sanctions: A digital wallet sanction bans a particular wallet from accessing or using designated cryptocurrency exchanges, for inbound and outbound transactions, including banning law-abiding users from transacting with that wallet address. • Digital blockchain forensics • KYC policies
Cryptographic mining impact <ul style="list-style-type: none"> • Environmental • Social and community 	<ul style="list-style-type: none"> • Proof-of-stake governance: Blockchain governance is modeled to limit incentives for large-scale mining operations, either by hardware bias or by avoiding proof-of-work block validation models. • Coin divestiture, user preference: Cryptocurrency holders ultimately choose the coin that they prefer to own; there are eco-friendly coins that, by design, have reduced ecological impacts or offset impacts of carbon emissions. • Adoption of carbon-neutral offsets: This is similar to carbon-emission permit markets, although this method does not necessarily address the energy-intensive nature of mining, only that sufficient offsets exist to make mining enterprises carbon neutral.

⁴⁰ Shubham Panchal, “Does ASIC Miner Works in ETH and ETC,” Ethereum Stack Exchange, September 14, 2020.

Blockchain: A Technology with the Potential to Reshape Japan

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Introduction

How is blockchain, or distributed ledger technology (DLT), currently being used in Japan, and what future do Japanese observers foresee for this technology? As this chapter argues, blockchain will not only strengthen how we share and store information but also significantly enhance the benefit of ongoing digital transformation. It will likely prove as transformative as the internet for the worldwide economy. Furthermore, it constitutes a rare opportunity for Japan to reshape and even reboot business fundamentals for a more dynamic future.

Background

To assess the current uses and prospects of blockchain and its applications, it is important to first describe the technology. Blockchain is a new way of storing data in a distributed ledger that allows multiple stakeholders to confidently and securely share access to the same information. Only stakeholders who need to see the data will have access. If anyone tries to tamper with, duplicate, or alter any part of the data, all stakeholders will know. Ecosystem partners will have access to the same data in near real time. It is important to point out that what partners have access to is not a copy of the data, but the actual data, including their history.¹ A single source of truth in the data means that validation no longer relies on the primitive system of back-and-forth checks and reconciliation, the traditional data management style based on “effort”; instead, blockchain provides “trust” based on a structure as simple as “I see what you see,” or transparency, in which the trust is associated not with the partners to a transaction but with the reliability of the data involved in the transaction. There is no need to think of blockchain as a technology; instead, it can be more accurately understood as a strategic operating model that simplifies how we share data securely, move value, and better manage the identities of people, groups, and things in the digital world (see Figure 5.1).

Now that blockchain’s underlying conceptual basis has been described, it is important to take the next step to disaggregate the technology into three broad categories, each of which represents a stage in its evolution. These are Blockchain 1.0, or cryptocurrency; Blockchain 2.0, which focuses on digital assets, including

¹ Off-chain data can be recorded using the hash data of blockchain to accommodate sensitive data or a large volume of data.

security tokens and central bank digital currency (CBDC); and Blockchain 3.0, which centers around the use of DLT for supply chain tracking and identity verification (Table 5.1).

Blockchain in Japan

Owing to the presence of the Mt. Gox exchange in Tokyo, Japan attracted a significant portion of global activity in the early days of cryptocurrency (or Bitcoin) trading. The collapse of the Mt. Gox exchange in 2014 motivated local authorities to move toward regulating these technologies earlier than in most other countries. As a result of the introduction of broad consumer protection measures and strict legislation for anti-money laundering and combating the financing of terrorism (AML/CFT), in the past few years, Japan has lost its appeal as a favored destination for many cryptocurrency users (Blockchain 1.0).

By contrast, Blockchain 2.0 appears primed to be a game changer for the overall economy in Japan, attracting many corporations and traditional financial institutions to conduct research and development (R&D) and proof of concept (PoC) for digitalized assets in the past few years. Projects and services are now moving to pilot and live stages. Blockchain 2.0 is seen by many Japanese observers as a disruptive technol-

FIGURE 5.1
Data Storage Evolution from Effort- to Trust-Based Management

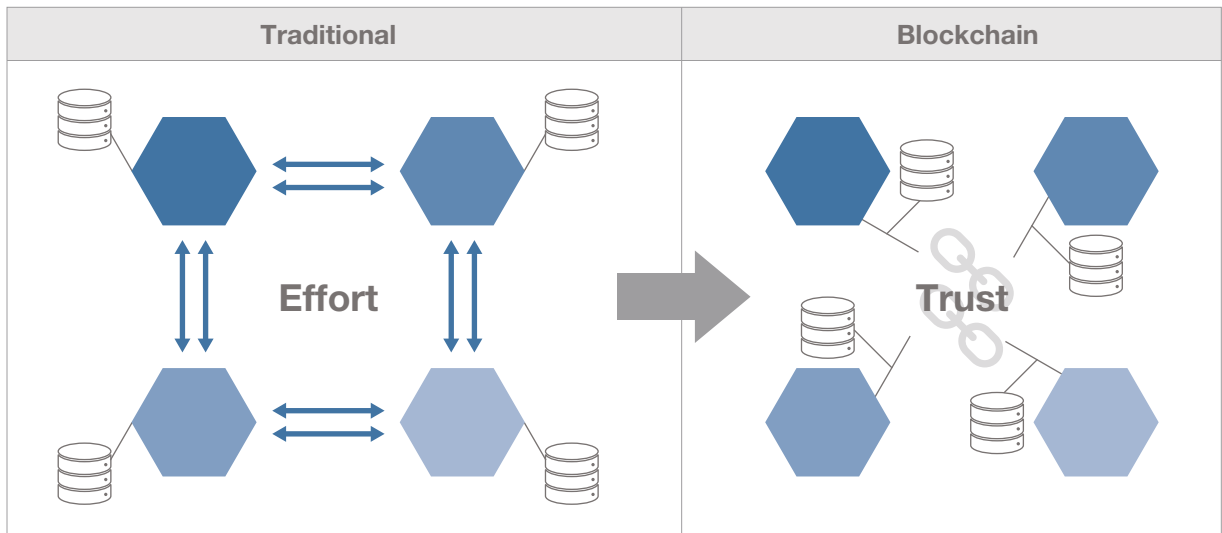


TABLE 5.1
Blockchain Technology by Generation and Usage

Blockchain Category	Application	Examples
Blockchain 1.0	Financial	<ul style="list-style-type: none"> • Cryptocurrency
Blockchain 2.0	Financial and other	<ul style="list-style-type: none"> • Digital assets (including security tokens) • CBDC
Blockchain 3.0	Supply chain	<ul style="list-style-type: none"> • Lot lineage and provenance • Goods management and control • Traceability
	Identity verification	<ul style="list-style-type: none"> • Identification of people and goods • Record or data of individuals and goods (e.g., digital twin)

ogy that can fuel Japan's digital transformation, potentially freeing up many presently highly illiquid asset classes, such as private equity, private debt (loans), real estate, patent ownership, regional currency, and loyalty point systems.

Furthermore, corporations involved in fields ranging from manufacturing to logistics, as well as import and export, have begun to use blockchain and peripheral DLT platforms, such as R3/Corda, Hyperledger Fabric, and Ethereum, for supply chain management and identity verification (Blockchain 3.0). The benefits of using these technologies, including automation, real-time control, and traceability, are tangible and financially predictable; thus, its adoption by large corporations and conglomerates is likely to grow exponentially. However, projects or usage of a public nature, such as broad-spectrum personal identity verification, might prove to be challenging in the short term. One of the critical areas of excitement in public discussions of these technologies pertains to digital identity and enabling people to be in complete control of their own data. The public, as the beneficiary of such technology, needs to be educated and convinced that it is worth paying for.

As envisioned by many Japanese observers, the benefits of blockchain will act as a source of growth in the economy by allowing more-effective allocation and utilization of value and resources, improving liquidity, and ultimately contributing to a more robust business and economic ecosystem. The outcome of the shift to this new economy will also enrich worldwide environmental, social, and corporate governance initiatives. Energy and environmental resource management improvements are also expected, along with a more sustainable social and governance structure.

Like the internet revolution, most blockchain initiatives and projects described in stages 1.0, 2.0, and 3.0 will develop over time, and the benefits will eventually outweigh the costs in the medium to long term. However, there is also a choice to expedite blockchain's implementation and capture superior outcomes by supporting consortia and ecosystem partnerships, especially between allies and partners, such as the United States and Japan. Coordinated blockchain usage support between the United States and Japan can benefit both countries with immediate effect by improving import and export administration, corporate identity registration, personal identity verification involving COVID-19 vaccination and medical records, and much more.

The remainder of this chapter explores in greater depth how Blockchain 1.0, Blockchain 2.0, and Blockchain 3.0 are developing and likely to develop in Japan. The chapter closes with some thoughts on U.S.-Japanese cooperation on blockchain.

Blockchain 1.0: Cryptocurrency

Mt. Gox pioneered Bitcoin exchange services in 2010, just two years after a pseudonymous person or persons, Satoshi Nakamoto, published the first-ever white paper on Bitcoin, the origin of blockchain. Located in Tokyo, Mt. Gox became the world's largest exchange at the time, processing approximately 70 percent of the world's Bitcoin trade by 2013. Triggered and accelerated by the price hike from \$120 per Bitcoin in September 2013 to \$1,121 per Bitcoin in December 2013, the numerous failures of Japan's Bitcoin exchange service providers in areas ranging from security breaches and data leakage to service suspension and misplacement of client assets could no longer be ignored as minor or niche glitches in a relatively unimportant start-up service sector. As a result, Japanese authorities dramatically tightened and enforced cryptocurrency laws and regulations, especially following the loss of approximately \$450 million worth of clients' Bitcoins by Mt. Gox.

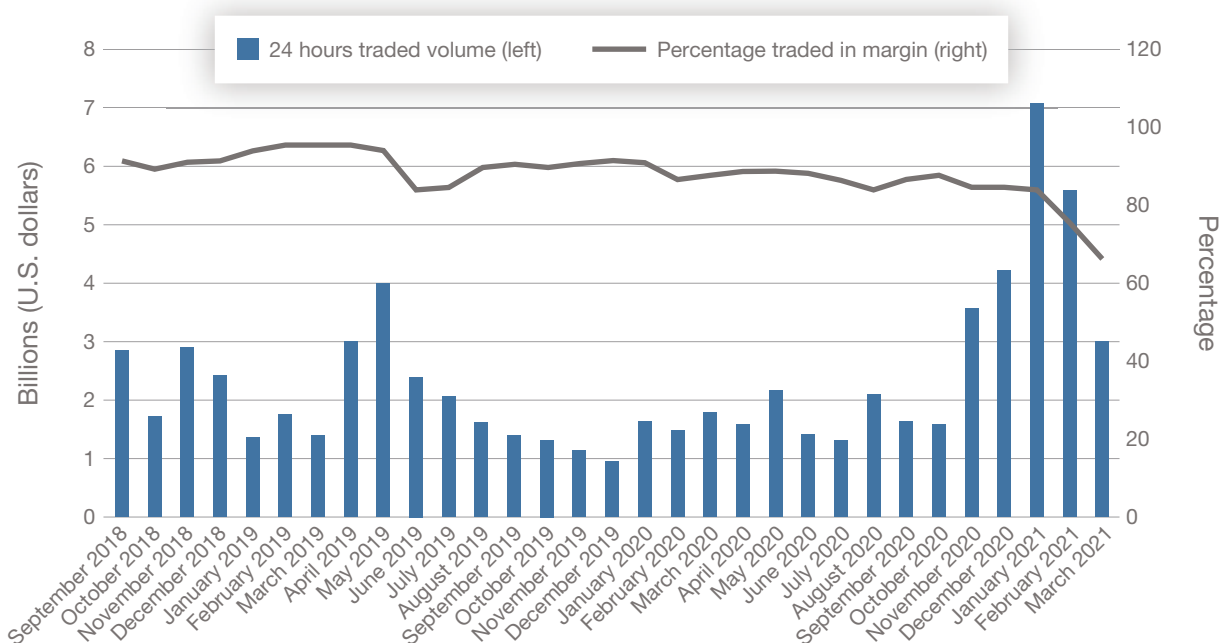
Cryptocurrency licensing, supervised by the Financial Services Agency, was introduced in 2017 and reinforced in 2020. Today, consumer protection and AML/CFT procedures in Japan are on par with—or even more strictly regulated than—traditional financial services, eliminating fraudulent and irresponsible service providers. However, the license acquisition; governance, risk, and compliance costs; capital adequacy ratio constraints; and auditing requirements imposed on cryptocurrency exchanges by Japanese regulators constitute a heavy burden for start-ups, limiting service providers to those with sufficient funding and expe-

rience to survive in the traditional financial industry. Furthermore, KYC and other compliance requirements shifted the scope of client coverage to domestic residents (offshore client KYC and cross-border transaction monitoring costs being too heavy) and services for cryptocurrencies preregistered (or white-listed) by the Japan Virtual and Crypto Assets Exchange Association, a self-regulatory organization approved by the Financial Services Agency.²

As of the drafting of this chapter, there are 27 approved—and 25 active—service providers,³ representing just 5.7 percent of the 471 total cryptocurrency exchanges worldwide.⁴ Some major global exchange service providers, such as Kraken, Huobi, bitFlyer, and Liquid/Quoine, operate in Japan, but they all do so through properly registered localized entities. Many other prominent international exchanges, such as Binance, Bitfinex, Gemini, and Coinbase, have yet to gain approval and do not provide services in Japan. It was the development and implementation of Japan’s regulatory framework that rerouted many of the global cryptocurrency trading activities offshore. The aggregate daily traded volume of cryptocurrencies in Japan was over US\$7 billion in January 2021 (Figure 5.2), but this represents just 4.4 percent of the worldwide volume of approximately US\$160 billion per day during the same period.

Institutional asset managers, pension funds, and corporations in Japan have yet to invest in cryptocurrencies. Current participants are still largely limited to opportunistic private individuals and traders actively trading on margin. The transitional measure for the leverage cap regulation enforced since May 2020 expired in April 2021, and the ceiling (the maximum leverage approved for investors) has been lowered; investors

FIGURE 5.2
Cryptocurrency Traded by Volume Daily (24 hours) in Japan



SOURCE: Created using data from the Japan Virtual and Crypto Assets Exchange Association.

² Japan Virtual and Crypto Assets Exchange Association, Japan Cryptocurrency Trading Association, homepage, undated.

³ Financial Services Agency, Government of Japan, “Cryptocurrency Exchange Company Registration List” [暗号資産交換業者登録一覧], June 11, 2021.

⁴ CoinGecko, “Exchange Data,” webpage, undated.

used to be able to trade on margin up to 400 percent of their collateral but now can only do so up to 200 percent.⁵ As a result, cryptocurrency trading activities in Japan will most likely wind down further, relative to the rest of the world, in the months ahead.

Regardless of the high volatility in cryptocurrency assets, service providers in Japan, excluding a few significant players, face severe business continuity problems. The domestic retail investor market is simply not large enough to justify the overall cost. Additionally, bitFlyer, Liquid/Quoine, Bitbank, Huobi, and a few others are trying to capture offshore flows (via offshore group entities, utilizing existing technology resources). GMO Coin, DMM Bitcoin, SBI VC Trade, SBI FX Trade, Coincheck, Rakuten Wallet, and LVC all expect to capture value blended with services by their parent conglomerate groups. Furthermore, many cryptocurrency service companies are looking for new ways to strengthen capital and secure cash from new partnerships and investors. This reflects how quickly the markets in Japan have evolved.

BitTrade, an exchange that had very limited client exposure and brand value, was purchased by a wealthy individual in Singapore for approximately US \$49 million less than four years ago (June 2018). The exchange was sold to Chinese cryptocurrency exchange Huobi just three months after that (September 2018).⁶ By contrast, in January 2021, Coinage announced that it was moving to close down its operations as of March 2021, just six months after its service launch in July 2020, and no one bought the company or its license to operate. Industry consolidation and merger and acquisition activities, including private equity investments in cryptocurrency service companies, are likely to continue for some time. It will be interesting to see whether the traditional securities brokerage industry will migrate into cryptocurrency services; to date, major traditional securities brokers, such as Nomura, Daiwa, Mitsubishi UFJ Morgan Stanley, Mizuho Securities, and SMBC Nikko Securities, have yet to enter the field.

Blockchain 2.0: Digital Assets

The circumstances in Japan surrounding Blockchain 2.0, or digital assets, are unique compared with many other developed countries. In Japan, such assets as private equity, real estate, intellectual property, commercial papers, and various economic rights and ownership are relatively illiquid, unutilized, and dormant. For example, Japan's private equity investment market is only 0.2 percent of the nominal gross domestic product, much smaller than that of its peers (Figure 5.3).

The asset securitization market in Japan (asset-backed securities and mortgage-backed securities⁷) was only 1.3 percent of the size of that in the United States in 2018.⁸ Additionally, special-purpose acquisition company listings are prohibited, the equity crowdfunding market (total issuance) is tiny because of regulatory caps on size,⁹ and electronic trading platforms do not exist for private equity and similar assets. Further compounding the situation, the language barrier and costs associated with it have cut off the local Japanese market from international capital for much of the field of private asset transactions. As a result, Blockchain 2.0 comes with a massive benefit for the economy inasmuch as it represents an opportunity to secu-

⁵ Financial Services Agency, Government of Japan, "Amendment of Financial Instruments and Exchange Act" [資金決済法等改正に係る精霊・内閣府令案等に対するパブリックコメントの結果等について (金融庁)], webpage, April 3, 2021.

⁶ Wolfie Zhao, "Huobi Eyes Japan Expansion with Acquisition of Licensed Crypto Exchange," CoinDesk, last updated September 13, 2021.

⁷ Japan Securities Dealers Association, "Stock Investment Type Crowdfunding," webpage, undated.

⁸ Japan Securities Dealers Association and Japanese Bankers Association, *Securitization Market Trends Survey Report: Issuance Trends in Fiscal 2018*, Tokyo, May 31, 2019; and Statista, "New Issue Volume of the Asset-Backed Securities* in the United States from 2000 to 2018 (in billion U.S. dollars)," webpage, March 11, 2021.

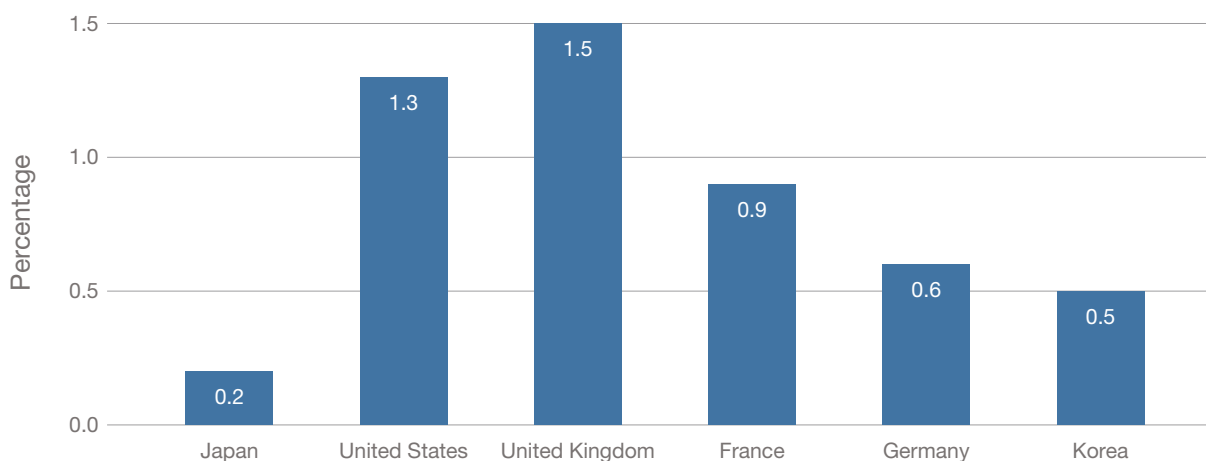
⁹ Private companies can fund only 100 million yen (approximately US\$950,000) per annum via crowd funding. The issuance in 2020 was only approximately US\$15.4 million (Japan Securities Dealers Association, undated).

ritize and digitalize both non-securitized and illiquid security at the same time, killing two birds with one stone. With the growth of artificial intelligence–powered language solutions and worldwide internet reach, the internationalization of assets in Japan may accelerate for the first time in history.

Most of the financial institutions in Japan understand the significant value that this blockchain may deliver and are looking to position themselves to take advantage of this opportunity by taking steps to enter the digital asset and security token market (Table 5.2).

As noted earlier, most traditional financial institutions, except online foreign exchange services or brokers, are hesitant to participate in Blockchain 1.0. However, they are engaged in developing Blockchain 2.0 (digital asset and security) token services. PoC projects and pilot security tokens are being released on a frequent basis, and 59 member companies have already joined the Japan Security Token Offering Association. The Bank of Japan has expressed its interest in a CBDC by releasing a report, *The Bank of Japan’s Approach*

FIGURE 5.3
Private Equity Market as a Percentage of Gross Domestic Product



SOURCE: Created using data from the Japan Private Equity Association.

TABLE 5.2
Digital Asset and Security Token Project Examples

Project	Focus	Stakeholders
ibet by Bostry	Securitization, tokenization, custody/wallet	Nomura, NRI, SBI Holdings
Komainu	Custody	Nomura, Ledger, CoinShares
Mizuho FG	Digital currency	Mizuho Securities, Mizuho Bank, other smaller companies
Osaka Digital Exchange	Digital asset exchange	SBI Holdings, Sumitomo Mitsui Financial Group
Progmatt	Securitization, tokenization, trading	Mitsubishi UFJ Trust and Banking

SOURCES: Bostry Japan, homepage, undated; Komainu, homepage, undated; Mizuho Bank, Ltd., “Launch of J–Coin Pay, Smartphone Payment Service Using QR Codes,” press release, February 20, 2019; Progmatt, homepage, Mitsubishi UFJ, undated; and SBI Holdings, “Notice of Completion of Establishment of Joint Venture ‘Osaka Digital Exchange Co., Ltd.’ by SBI Group and SMBC Group,” news release, April 1, 2021.

to *Central Bank Digital Currency*,¹⁰ in October 2020 and subsequently announcing the commencement of a CBDC PoC study, to run between April 2021 and March 2022.

In some cases, regional digital tokens have been issued to revitalize local economies (see Table 5.3), and more than 20 other token plans are anticipated later in 2021 to help increase project-based funding and activity bonding in response to COVID-19, natural disasters, and efforts to decentralize Japan (from overconcentration in Tokyo).

Digital token projects are often well integrated into other ongoing initiatives wrapped in the trend of digital transformation. For example, the regional digital token MyCoin (running on the Hyperledger Fabric blockchain technology) was developed by iBank, the online bank subsidiary of the Fukuoka Financial Group (a regional financial group in Fukuoka prefecture). As a regional currency, MyCoin supports the royalty point ecosystem used by many entities, including local corporations, shops, public entities, and insurance companies, to bond and enhance business transactions within the ecosystem (of Fukuoka region). The key to the success of a digital asset or security token project lies in managing the consortium, stakeholders, and consumers (end users). Japan is still testing the waters to gain experience in the design of such ecosystems and assessing their future prospects.

Blockchain 3.0: Supply Chain and Identity Verification

Many corporations have progressed from the R&D stage to the PoC stage in deploying Blockchain 3.0 for supply chains and operational use. A good example is the multinational automotive manufacturer Toyota. Toyota launched a blockchain R&D lab in 2019 with the ambition of achieving implementation across its “Mobility-as-a-Service”¹¹ strategy in the medium term. In spring 2021, the company began implementing blockchain for its supply chain management using R3/Corda smart contracts.¹² With an average of 25,000 to 30,000 parts per car, 228 key component suppliers, and 350 facility and logistics service providers, overall cost reduction is significant. Moreover, the contract procedure requires just a few minutes instead of a few days, and visibility and control will be feasible in real time. The plan is also to create digital twin identities of all parts and assemble cars with complete traceability. If any car component needs to be recalled, immediate identification and communication to associated stakeholders, including end clients, will be possible, and, if a vehicle malfunctions, the garage or dealer can immediately trace the troubled part to the root supplier.

Blockchain 3.0 and distributed ledger (smart-contract type) technology are being tested in various industries to solve complex supply chain and logistics management problems. The benefits of Blockchain 3.0 are more tangible and predictable than those of Blockchain 2.0. As a result, most Japanese manufacturers, sup-

TABLE 5.3
Regional Digital Token Project Examples

Project	Region
Aqua Coin	Kisarazu City, Chiba
Byacco	Aizu region, Fukushima
MyCoin	Fukuoka City, Fukuoka
Sarubobo Coin	Hida City, Takayama City, Gifu

¹⁰ Bank of Japan, *The Bank of Japan’s Approach to Central Bank Digital Currency*, Tokyo, October 9, 2020.

¹¹ *Mobility-as-a-Service* is a type of service that enables users to experience mobility as a comprehensive solution across different, nontraditional platforms through connected applications.

¹² R3/Corda technically may be considered to be a non-blockchain, but it is more of a blockchain-like distributed ledger application.

pliers, and logistics companies of sufficient scale are expected to implement the technology within the next few years.

Identity verification of people is another anticipated application, but implementation in this area might face more challenges than in the realm of supply chain management because, in this case, the beneficiaries are not necessarily the direct payers of cost. For example, blockchain (or a blockchain-like distributed ledger application) in the management of social identification numbers and personal health care databases could benefit all users of health care services, leading to less paperwork and faster medical record sharing among health care institutions. However, who will be responsible for paying the initial costs of implementation? The beneficiary is often the public, but the public needs to be convinced to pay these costs, since this is a new area. Currently, such projects still face difficulty owing to the lack of general understanding of the technology's applications and benefits, leading to difficulties in arranging initial funding for the transition.

Conclusion

Like most other nations, Japan is confronting the challenges of keeping COVID-19 under control and jump-starting the economy. However, even amid the pandemic, former Prime Minister Yoshihide Suga and his cabinet members have valued and prioritized the digitalization policy. On May 12, 2021, the Diet enacted digital reform bills to create the Digital Agency, the purpose of which is to lead the digital transformation of the economy and its social infrastructure. Blockchain is, without a doubt, one of the critical technologies or the new data management framework to achieve necessary outcomes in the new era. In contrast to the corporate community, which is beginning to adopt the technology for actual use for Blockchain 2.0 and 3.0 (digital assets and supply chain management, respectively), the general public and the government still might not understand its value proposition outside Blockchain 1.0 (cryptocurrency). Therefore, industry organizations, such as the Japan Blockchain Association and the Japan Association of New Economy, are currently proposing the inclusion of blockchain as one of the core pillars of national strategy.¹³ It is imperative that policymakers and the government swiftly adopt blockchain in the social infrastructure while providing support for the private sector to do the same.

Blockchain will be as transformative as the internet; moreover, it will likely follow a similar path in becoming vital infrastructure to our lives. As with the introduction era of the internet, blockchain technology will benefit those who make full use of it to collaborate with a broader audience. As important allies, Japan and the United States can enhance and strengthen their respective interests and well-being through collaborative engagement in blockchain policy discussion and its implementation.

¹³ Japan Association of the New Economy, "Proposal for Blockchain National Strategy," press release, March 6, 2020; and Japan Blockchain Association, "Blockchain as National Strategy," briefing slides, Tokyo, 2020.

Conclusion

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A few months after the two conferences that undergird this volume were held, the much-delayed Tokyo 2020 Olympic and Paralympic Games were hosted against a backdrop of surging delta-variant COVID-19. Although many Americans and Japanese were fully vaccinated as of July 25, 2021, the hopes of early 2021 that the pandemic might be over by the summer seemed to be receding as vaccination rates slowed in the United States, even as some areas were reintroducing mandatory masking. As of mid-2021, millions of Americans and hundreds of thousands of Japanese had contracted COVID-19, and many had died of it. For these citizens and the friends and families they left behind, it is hoped that the chapters in this volume can make a small contribution to help identify policy questions and potential policy options that might make work and life safer and more rewarding in the future. Shared understanding of the experiences of the United States and Japan could conceivably help policymakers who are overwhelmed by potential choices and data to recognize and react in ways that could save lives, reduce risk, free up economic potential, and even transform socioeconomic structures to empower individuals to live safer, healthier, more-fulfilling, and more-productive lives.

Some of the clearest distinctions among the chapters in this volume were, interestingly, based not on the policy questions at hand but rather on the analytic approaches taken by the American authors, whose attention was focused on seeking to identify problems, and the Japanese authors, whose attention seemed to be more centered on the prospective gains from adopting teleworking or employing DLT solutions across the economy. If this is correct, it would not be the first time that techno-optimism proved more characteristic of the views of Japanese participants than of those of American participants, as a previous volume on artificial intelligence found.¹

To be sure, this point should not be oversold. Ichikawa, for example, did express concerns about the challenges of promoting teleworking, resistance from employers, and validation of work. On the one hand, Watanabe noted the challenge of explaining DLT to the public and eliciting its support for the resource expenditures necessary to facilitate the widespread adoption of this technology. On the other hand, some of Lilly's points hinted at a possible techno-optimism, describing the means of addressing some of cryptocurrency's greatest challenges as possibly already resident within blockchain via digital forensics in combination with KYC policies and market pressures to adopt less energy-intensive approaches to mining. And Bouskill closed her chapter by noting that some observers have expressed the hope that the COVID-19 pandemic might prompt a "reset" in which employers, researchers, and policymakers take steps based on data and analysis

¹ Scott W. Harold, Greg Brunelle, Ritika Chaturvedi, Jeffrey W. Hornung, Shunichi Koshimura, Osonde A. Osoba, and Chizuru Suga, *United States–Japan Research Exchange on Artificial Intelligence: Proceedings from a Pair of Conferences on the Impact of Artificial Intelligence on Work, Health, and Data Privacy and on Disaster Prediction, Resilience, and Recovery*, Santa Monica, Calif.: RAND Corporation, CF-A521-1, 2020.

derived from the experience of the pandemic to “ensure that vulnerabilities are identified and addressed [in such a way as to] foster increased vitality of the American workforce and prosperity of the economy for all.”

Overall, however, as much as the perspectives of U.S. and Japanese analysts on the issues of remote work during the pandemic and the growing impact of blockchain and cryptocurrency might have diverged in general focus, they converged on the agreement that increased exchanges between Washington and Tokyo could help inform the publics on both sides of the Pacific about each other’s experiences, both positive and negative, in ways that might improve policymaking. As the pandemic has clearly shown, the United States and Japan, two of the leading global economies, have key roles to play in articulating, normalizing, and establishing rules both for new technologies, such as blockchain and cryptocurrency, and for existing technologies that are being adapted to new circumstances, such as high-speed internet for working from home or teleworking. In the course of laying down the rules of the 21st-century economy for the postpandemic era—whenever that arrives—such exchanges as those that laid the foundation for this volume could prove invaluable.

Abbreviations

AML/CFT	anti-money laundering and combating the financing of terrorism
BCP	business continuity planning
CBDC	central bank digital currency
COVID-19	coronavirus disease 2019
DLT	distributed ledger technology
FMLA	Family and Medical Leave Act
JTS	Japan Telework Society
KYC	know your customer
MLIT	Ministry of Land, Infrastructure, Transport, and Tourism
R&D	research and development
PoC	proof of concept
VASP	virtual asset service provider

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