ANNE GIESE, Chief Counsel (State Bar No. 143934)
DANIEL L. LUNA, Senior Attorney (SBN 253881)
SERVICE EMPLOYEES INTERNATIONAL UNION, Local 1000
12501 Imperial Highway, Suite 510
Norwalk, CA 90650
(916) 554-1279 - Office
(559) 313-8243 - Cell
(916) 554-1292 - Facsimile
Email: dluna@seiu1000.org

Attorneys for SEIU Local 1000

BEFORE THE PUBLIC EMPLOYMENT RELATIONS BOARD

OF THE STATE OF CALIFORNIA

In the Matter of the Unfair Practice Charge	Case No.: SA-CE-2282-S
SEIU LOCAL 1000,	**SEIU LOCAL 1000'S MOTION TO EXPEDITE**
v.	
STATE OF CALIFORNIA (OFFICE OF THE GOVERNOR)	
_____/	

I. SUPPORT OF MOTION FOR EXPEDITED REVIEW

SEIU Local 1000 (the "Union" or "SEIU") hereby requests expedited review of a recently filed Unfair Practice Charge assigned Case No.: SA-CE-2282-S due to the importance and significance for state worker labor relations and public sector labor relations in general here in California, as set forth below. Without providing any advanced notice, in violation of the bargaining agreement, Ralph C. Dills Act and Government Code sections 14200-14203, over 35,000 represented employees will soon be adversely impacted by Governor Gavin Newsom's Executive Order ("EO") N-22-25 if this charge is not promptly addressed by PERB.

In the summer of 2020, when Governor Gavin Newsom declared that he would pursue 10 percent pay cuts and cancel raises for state workers as part of an effort to address a projected $54 billion budget deficit caused by the coronavirus, SEIU Local 1000 responded in the appropriate manner the moment required to effectively and aggressively represent its workers interests.

Advanced notice and the opportunity to negotiate were provided and an agreement was reached for a pay reduction in exchange for two paid personal days among other mutual agreements. (Decl. of Kenneth Sims, April 7, 2025, ¶2.) Regrettably, Governor Newsom now shuns this approach in an unprecedented supposedly personnel-focused executive order that usurps the role SEIU Local 1000, and its represented employees have, as well as what the Legislature has established regarding remote work, and also the authority and ability agencies and departments have to assess their unique operational needs. (Decl. of Kenneth Sims, April 7, 2025, ¶3.) As set forth below, expedited review is critical to ensure that the remedies available at PERB are achieved swiftly to restore the parties to *status quo ante*.

A. SEIU Local 1000 respectfully requests that PERB expedite this recently filed Unfair Practice Charge.

Expedited Review is governed by Cal. Code of Regs., section 32147. It provides in relevant parts: Expediting Matters Before the Board. (a) Motions to Expedite (1) A motion to expedite proceedings within a single division of the Board shall be filed with the General Counsel, Chief Administrative Law Judge, Director of State Mediation and Conciliation Services, or the Board itself, as appropriate. A motion to expedite proceedings at all divisions shall be filed with the Board itself….(b) Applicable Criteria (2) In all cases not subject to mandatory expedited processing under subparagraph (b)(1) of this Section, the following criteria shall be considered in determining whether a case should be expedited: (A) whether expedited processing is necessary to preserve the Board's ability to issue an effective remedy; (B) whether the case involves alleged conduct that would irreparably harm the exercise of employee or employee organization rights; (C) whether the case involves an important and unresolved question of law, the prompt resolution of which would significantly benefit one or more segments of the public sector labor-management community; (D) whether the case arises from or relates to a representation or recognition dispute; (E) whether a court injunction is in place pending resolution of the case; (F) the number of employees affected, the size of any potential monetary remedy, or the nature, scope, or importance of any potential non-monetary remedy; and (G) any compelling circumstances showing that expedited processing is warranted.

B. There is ample support for PERB to grant expedited review of the Governor's Executive Order in Unfair Practice Charge Case No.: SA-CE-2282-S

The Union's request for expedited review should be granted in this matter because (F) the number of employees affected, the size of any potential monetary remedy, or the nature, scope, or importance of any potential non-monetary remedy, and because (G) there are compelling circumstances showing that expedited processing is warranted.

C. This PERB charge involves unlawful unilateral action by Governor Newsom that impacts the working conditions, lives and families of more than 30,000 state workers.

As can be drawn from the participation levels of recent informational pickets on this issue in Sacramento, San Diego, Los Angeles and San Francisco, there are thousands of state workers represented by SEIU Local 1000 and other employee organizations that are concerned about the executive order for its impact on their working conditions and pay. Thousands of state workers throughout all the various departments and all around the State are being unreasonably restricted to one remote workday a week. At the same time with the unlawful action, 30,000+ SEIU Local 1000 represented employees stand to lose their $50.00/a month remote centered pay differential. Given the number of workers involved and interest that may accrue, a make whole remedy on this charge would very likely require the State of California to pay millions of dollars of backpay, just to SEIU Local 1000 represented employees. (Decl. of Kenneth Sims, April 7, 2025, ¶5.)

If the unilateral action is allowed to continue, impacted state workers will also be exposed to additional expenses and time commitments because of the commute required to work out of the office when it has been demonstrated that they can efficiently and successfully perform their work remotely. The additional expenses will be exacerbated by the loss of the remote work differential.

Consistent with PERB's standard, compelling circumstances showing that expedited processing is warranted here. First, the charge involves an executive order that supposedly seeks to address a worker/labor relations issue, but recent statements by Governor Newsom suggest he is instead fundamentally concerned about businesses in downtown areas making

profits. While it's not surprising that the pro-business Governor is more focused on the support of business than his own workforce, it should not be done at the expense of SEIU Local 1000 members who provide essential services for the State of California and all of its residents. The executive order also glosses over many of the realities of the benefits and advantages that remote work provides for any employer. In the last few years, the State of California has saved hundreds of millions each year with remote work by reducing its real estate needs.

The State of California and scholars have recognized the savings coming from telework and these savings were reflected as prior year budget savings. The 2022-2023 California budget summary indicated that the California Department of General Services relinquished 767,000 sq. ft. of office space for an estimated $22.5 million in savings due to implementation of telework policies. (Decl. of Kenneth Sims, April 7, 2025, ¶8, see Attachment "1".)

However, for the State to immediately act to restore this 700,000 + sq. ft. of office space at the cost of $28 sq. ft. (average) will cost about $20 million/month or 235 million/year. The Governor's EO fails to recognize the costs associated with this initiative, and it is not reflected in the proposed State budget. The putative rationale of "employee comradery" is mere camouflage. Just days before Newsom acted so precipitously based on the illusion of comradery, multiple admissions to the contrary unmask the real reason for his actions, which are clearly politically motivated (and not for a legitimate labor relations purpose). (Decl. of Kenneth Sims, April 7, 2025, ¶¶9 and 10, see Attachment "2".)

Governor Newsom issued a hurried and improper executive order that will impact thousands of state workers and our state budget by the hundreds of millions of dollars. This increase in spending is at the same time that Newsom's expanded health care for undocumented residents will cost the State as much as $8-9 billion in increased spending. (Decl. of Kenneth Sims, April 7, 2025, ¶16.) ("The state's Medi-Cal expansion for undocumented immigrants costs about $8.5 billion from the state general fund annually, according to a recent budget hearing." CalMatters) (See Attachment "3".)

While the State, and at Newsom's direction, has departments running budget efficiency drills for 2025 savings, Newsom has attempted to hide the impact of his completely inconsistent

directives. Spending more money than anticipated in the current budget year, increased demands on unfunded and underfunded mandates all continue to pressure the current budget as departments are required to multiple by tenfold their office space footprint. Demanding that departments seek Budget Change Proposals to immediately gain back the space relinquished just two budget years ago – increasing the current year budget shortfall and threatening the upcoming budget. Just like DOGE's inconsistent directives and the federal government's chaotic and inconsistent directives, Newsom is using the same playbook. (Decl. of Kenneth Sims, April 7, 2025, ¶17.)

Expedited review is critical as departments have been directed to plan for RTO and DGS has been tasked with securing office space and entering new leases in advance of the July 1 deadline. Departments are seeking Budget Change Proposals to acquire additional budget resources to pay for the space ordered at Newsom's whim.

D. The Executive Order overlooks the current benefits and reality of remote work for an employer, especially one as large and diverse as the State of California.

Remote work existed before the COVID pandemic. This was especially the case with the State of California, who although with many offices around the State, cannot possibly cover its responsibilities everywhere that the various State agencies provide services to the public. Many state workers worked remotely and even on a full-time basis before COVID. The legislature specifically has outlined that "It is the intent of the Legislature to encourage state agencies to adopt policies that encourage telecommuting by state employees." (Government Code section 14200.1(b))

COVID did help encourage the State and its various agencies to adopt teleworking arrangements. These departments and agencies should have learned from their experiences with telework. The executive order seems to suggest that remote work only came because of COVID and that there are too many state workers who are not already working in their state offices, yards, clinics or hatcheries. The reality is that most state workers, or over 60,000 workers represented by SEIU Local 1000 are proudly providing their labor so that the prisons, state

hospitals, and DMV offices they work at are ready and able to provide the essential services the State demands.

The Departments or Agencies have very likely confirmed or addressed what studies have shown are the benefits of remote work. Many departments and agencies have fully embraced remote work. Meetings, hearings and brainstorming often occur over Microsoft Teams, Webex or zoom, even when employees are nearby. Recruitment and retention of workers has also likely improved with remote work. A 2023 General Accounting Office review of telework studies reported that there's evidence that telework allows employers to recruit from a larger pool of applicants, which can help to fill hard to fill positions. (Decl. of Kenneth Sims, April 7, 2025, ¶13, see Attachment "4".)

In 2022, the Journal Frontiers in Psychology published a systematic study of telework literature that showed that "when telework is voluntary, it appears that both actual employee turnover rates and intentions to leave the organization are lower." (Decl. of Kenneth Sims, April 7, 2025, ¶14, see Attachment "5".)

If the unilateral action is allowed to continue as outlined, the State will continue to struggle with filling vacancies at a time when state agencies are struggling with high vacancies in many critical positions. Taking away remote work, an important recruitment and retention tool that helps to fill positions, will make the dire problem of understaffing at state agencies even worse. This is particularly the case as baby boomers continue to move into retirement.

E. There is a high likelihood that this unfair practice charge will succeed on the merits, and it would be appropriate for PERB to carefully assess unilateral executive officer for the public service in California so prompt action would be appropriate.

Governor Newsom issued a hurried and improper executive order that will impact thousands of state workers and our state budget. There are no emergency or special circumstances that justify it. As the executive officer of our State, Governor Newsom needs to demonstrate and exemplify how the state can be a good public employer and take into account the rights of workers. Through this executive order, Governor Newsom has not demonstrated good governance of the state's workforce. As the highest profile public executive officer, it is

mission critical for PERB to enforce its own guidelines allowing for expediting this important matter. When an executive officer acts in such an unlawful and unilateral manner without respecting the rights of employees, justice demands that PERB enforce its statutory mandate. Only PERB stands between the DOGE-like tactics, the abandonment of the rule of law, and the rights of state workers being trammeled like their federal worker counterparts.

The Governor of California has taken an unprecedented step in issuing an executive authority that is inconsistent with State laws and overlooks the agreements already in existence regarding remote work. This bad faith unilateral change – declaring the predetermined outcome without the right to bargain - should not, and could not, have been taken without proper notice and the right to meet and confer – as PERB orders in countless other cases. This was a violation of the Dills Act, which is administered by this Board. Therefore, this Charge should be expedited under section 32147 of PERB's regulations.

Dated: April 7, 2025

SEIU Local 1000

By _____
ANNE M. GIESE
Attorney for Charging Party

ANNE GIESE, Chief Counsel (State Bar No. 143934)
DANIEL L. LUNA, Senior Attorney (SBN 253881)
SERVICE EMPLOYEES INTERNATIONAL UNION, Local 1000
12501 Imperial Highway, Suite 510
Norwalk, CA 90650
(916) 554-1279 - Office
(559) 313-8243 - Cell
(916) 554-1292 - Facsimile
Email: dluna@seiu1000.org

Attorneys for SEIU Local 1000

BEFORE THE PUBLIC EMPLOYMENT RELATIONS BOARD

OF THE STATE OF CALIFORNIA

In the Matter of the Unfair Practice Charge SEIU LOCAL 1000, v. STATE OF CALIFORNIA (OFFICE OF THE GOVERNOR) _____/	Case No.: SA-CE-2282-S **DECLARATION OF KENNETH SIMS IN SUPPORT OF SEIU LOCAL 1000'S MOTION TO EXPEDITE**

I, KENNETH SIMS, declare as follows:

1. I am an employee of the Service Employees International Union Local 1000 (herein referred to as "the Union") where I work as Director in the Research and Apprenticeship Department. In this capacity, I am responsible for conducting and overseeing research and analysis concerning the Union's efforts to represent its workers in all aspects of collective bargaining and terms and conditions of employment in the state civil service. I have worked in this capacity for virtually all of the past decade.

2. In the summer of 2020, when Governor Gavin Newsom announced that he would pursue 10 percent pay cuts and cancel raises for state workers as part of an effort to address a projected $54 billion budget deficit caused by the coronavirus, SEIU Local 1000 responded in the appropriate manner the moment required to effectively and aggressively represent its workers interests. Advanced notice and the opportunity to negotiate were provided and an agreement was

reached for a pay reduction in exchange for two paid personal days among other mutual agreements.

3. The Administration now obfuscates this obligation by acting in a unilateral action by executive fiat – ignoring the clear and present requirements of state laws, MOUs and policies regarding its telework obligations.

4. The Union's request for expedited review should be granted in this matter because of the number of employees affected, the size of any potential monetary remedy, or the nature, scope, or importance of any potential non-monetary remedy, and because there are compelling circumstances showing that expedited processing is warranted. This PERB charge involves an unlawful unilateral action by Governor Newsom that impacts the working conditions, lives and families of more than 30,000 state workers.

5. As can be drawn from the participation levels of recent representative actions on this issue in Sacramento, San Diego, Los Angeles and San Francisco, there are thousands of state workers represented by SEIU Local 1000 and other employee organizations that are concerned about the executive order for its impact on their working conditions and pay. Thousands of state workers throughout all the various departments and all around the State are being unreasonably restricted to one remote workday a week. At the same time with the unlawful action, the 30,000+ represented employees SEIU Local 1000 represents stand to lose their $50.00/a month remote centered pay differential. Given the number of workers involved and interest that may accrue, a make whole remedy on this charge would very likely require the State of California to pay millions of dollars of backpay, just to SEIU Local 1000 represented employees.

6. If the unilateral action is allowed to continue, impacted state workers will also be exposed to additional expenses and time commitments because of the commute required to work out of the office when it has been demonstrated that they can efficiently and successfully perform their work remotely. The additional expenses will be exacerbated by the loss of the remote work differential.

7. There are compelling circumstances showing that expedited processing is warranted here. First, the charge involves an executive order that supposedly seeks to address a

worker/labor relations issue, but recent statements by Governor Newsom suggest he may be mainly concerned about businesses in downtown areas making profit. While we expect the pro-business Governor being supportive of business, it should not be done at the expense of SEIU Local 1000 members who provide essential services for the State of California and all of its residents. The executive order also glosses over many of the realities of the benefits and advantages that remote work provides for any employer.

8. In the last few years, the State of California has saved money with remote work by reducing its real estate needs. The State of California and scholars have recognized the savings coming from telework and these savings were reflected as prior year budget savings. The 2022-2023 California budget summary indicated that the California Department of General Services relinquished 767,000 sq. ft. of office space for an estimated $22.5 million in savings due to implementation of telework policies. (See, Attachment "1".) (2022-2023 California Budget Summary p. 214 (PDF) Budget Summary and Governing, January 2022 California Lets 23 Leases Expire as Workers Stay Remote) Operating Costs - Greater Sacramento Economic Council. (See Attachment "2".)

9. However, for the State to immediately act to restore this 700,000 + sq. ft. of office space at the cost of $28 sq. ft. (average) will cost about $20 million/month or $235 million/year. The Governor's EO fails to recognize the costs associated with this initiative, and it is not reflected in either the 2024-25 State budget or the proposed 2025-26 State budget.

10. Research discloses the putative rationale of "employee comradery" is mere camouflage. Just days before Newsom acted so precipitously based on the illusion of comradery, two points unmask the real reason for his actions, which are clearly politically motivated (and not for a legitimate labor relations purpose). More recently, the camouflage has been removed disclosing the real societal and business development/economic reasons backing this change:

a. First, San Francisco acts unilaterally and preemptively to return public workers to the business districts – specifically to help support downtown SF businesses https://www.sfgate.com/bayarea/article/mayor-lurie-return-to-office-memo-20190335.php (See Attachment "2".)

b. Newsom gets bad press for failing to support downtown Sacramento businesses. https://www.sacbee.com/opinion/article300976424.html (See Attachment "2".)

c. Newsom announces in Modesto press conference that the purpose is to help small businesses, and to get state workers into "mom and pop" businesses. Why Gavin Newsom backs in-person work for state employees | Sacramento Bee (See Attachment "2".)

d. Newsom announces in the same press conference, that the reason is to address what he thinks is loneliness and the scourge of "disaffected youth" who follow social media miscreants and criminals.

"Newsom said the trend of becoming more connected through technology, yet more isolated from each other, was particularly worrying among young men. He noted that many boys have come to admire figures like Andrew Tate, a social media influencer who has been accused of sexual assault and human trafficking, though he has denied wrongdoing."

Read more at: https://www.sacbee.com/news/politics-government/the-state-worker/article303340651.html#storylink=cpy (See Attachment "2".)

11. Expedited review is critical as departments have been directed to plan for RTO and DGS has been tasked with securing office space and entering new leases in advance of the July 1 deadline. Reasonable expectations concerning the securing of leases, outfitting offices with necessary furniture, equipment, supplies, IT connectivity suggest that extraordinary funds would need to be expedited to comply with this deadline in advance of the July 1 mandate.

12. Remote work existed before the COVID pandemic. This was especially the case with the State of California, who although with many offices around the State, cannot possibly cover its responsibilities everywhere that the various State agencies provide services to the public. Many state workers worked remotely and even on a full-time basis before COVID. The legislature specifically has outlined that "It is the intent of the Legislature to encourage state

agencies to adopt policies that encourage telecommuting by state employees." (Government Code section 14200.1(b))

13. COVID's widespread scourge encouraged or forced the State and its various agencies to adopt teleworking arrangements. These departments and agencies should have learned from their experiences with telework. The executive order seems to suggest that remote work only came because of COVID and that there are too many state workers who are not already working in their state offices, yards, clinics or hatcheries. The reality is that most state workers, or over 60,000 workers represented by SEIU Local 1000 are proudly providing their labor in person so that the prisons, state hospitals, and DMV offices they work at are ready and able to provide the essential services the State demands.

14. The Departments or Agencies have very likely confirmed or addressed what studies have shown are the benefits of remote work. Many departments and agencies have fully embraced remote work. Meetings, hearings and brainstorming often occur over Microsoft Teams, Webex or zoom, even when employees are nearby. Recruitment and retention of workers has also likely improved with remote work. A 2023 General Accounting Office review of telework studies reported that there's evidence that telework allows employers to recruit from a larger pool of applicants, which can help to fill hard to fill positions. GAO-23-105999, TELEWORK: Growth Supported Economic Activity during the Pandemic, but Future Impacts are Uncertain p. 27. (See Attachment "4".)

15. In 2022, the Journal Frontiers in Psychology published a systematic study of telework literature that showed that "when telework is voluntary, it appears that both actual employee turnover rates and intentions to leave the organization are lower." A systematic review of the research on telework and organizational economic performance indicators - PMC (nih.gov) (Preface) (See Attachment "5".)

16. If the unilateral action is allowed to continue as outlined, the State will continue to struggle with filling vacancies at a time when state agencies are struggling with high vacancies in many critical positions taking away remote work, an important recruitment and retention tool

that helps to fill positions, will make the dire problem of understaffing at state agencies even worse. This is particularly the case as baby boomers continue to move into retirement.

17. Governor Newsom issued a hurried and improper executive order that will impact thousands of state workers and our state budget by the hundreds of millions of dollars. This increase in spending is at the same time that Newsom's expanded health care for undocumented residents will cost the State as much as $8-9 billion in increased spending. ("The state's Medi-Cal expansion for undocumented immigrants costs about $8.5 billion from the state general fund annually, according to a recent budget hearing." GOP blames immigrant health care as Medi-Cal costs increase - CalMatters (See Attachment "3".)

18. While the State, and at Newsom's direction, has departments running budget efficiency drills for 2025 savings, Newsom has attempted to hide the impact of his completely inconsistent directives. Spending more money than anticipated in the current budget year, increased demands on unfunded and underfunded mandates all continue to pressure the current budget as departments are required to multiple by tenfold their office space footprint. Demanding that departments seek Budget Change Proposals to immediately gain back the space relinquished just two budget years ago – increasing the current year budget shortfall and threatening the upcoming budget. Just like DOGE's inconsistent directives and the federal government's chaotic and inconsistent directives, Newsom is using the same playbook. Newsom takes friendlier tack with Trump in sign of new political reality

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed this 8th day of April, 2025, in Sacramento, California.

KENNETH SIMS

Attachment "1"

GOVERNOR'S BUDGET SUMMARY

Gavin Newsom, Governor
State of California

2022-23

To the California Legislature
Regular Session 2021-22

Government Operations Agency (GovOps). The Center will work with state departments to develop and implement innovative pilot projects, which can be scaled across state government to improve statewide operations. The Center will use these pilots and other projects to build a repository of best practices and case studies of successful projects to improve future state operations.

STATEWIDE TELEWORK

The COVID-19 Pandemic forced most state departments and agencies into emergency telework. The Administration continues to support the adoption and continued use of telework, when appropriate, through efforts led by GovOps, Department of General Services (DGS), California Department of Human Resources (CalHR), Office of Digital Innovation, and California Department of Technology (CDT). These efforts include the continued support of telework resources for departments, the adoption of statewide telework policies, and the requirement that drafts of departmental telework policies be submitted to DGS for review by January 31, 2022. The state's use of a hybrid workforce furthers government efficiency by enabling reductions in office footprints and the need for travel, in addition to allowing more flexibility for employers, larger potential candidate pools for telework eligible classifications, and building resiliency in the event of future emergencies. The Administration intends to pursue opportunities to support departments, collect data, and validate policy compliance.

STATE LEASED OFFICE SPACE

In support of the Administration's goal of leveraging telework strategies to improve government efficiency, DGS is working to reduce the state's leased portfolio of office space. In total, state agencies lease approximately 23.2 million total square feet, of which approximately 14.4 million square feet is office space. While DGS has prioritized working with its largest leasing clients, the department is working with 24 state agencies across 86 individual leases to consolidate space. This effort has resulted in 767,000 square feet of office space relinquished, equating to an annual savings of approximately $22.5 million.

Over the next three years, DGS is projecting a 20-percent overall space reduction in the state's leased office space portfolio, which will realize approximately $84.7 million in annual savings.

TECHNOLOGY MODERNIZATION AND STABILIZATION

CDT continues to lead several efforts and collaborate with departments to improve the way Californians interact with government entities and ensure essential services are not

WORKFORCE

California Lets 23 Leases Expire as Workers Stay Remote

The Department of General Services will relinquish approximately 767,000 square feet of office space as many state departments continue with remote work. The state expects to save about $22.5 million annually.

Jan. 12, 2022 • **Wes Venteicher, The Sacramento Bee**

(TNS) — New budget documents show California's state government has begun to make progress on one of the promises of telework: saving money on office leases.

The Department of General Services, which manages about 14.4 million square feet of leased office space for the state, has relinquished or is in the process of relinquishing about 767,000 square feet of space, according to Gov. Gavin Newsom's Monday budget proposal.

The changes will save the state about $22.5 million per year, according to the state's projections.

They're the first specific figures on lease savings the state has released since Newsom announced in May 2020 that he would move to make telework a permanent option for state workers with jobs that could accommodate it.

Over the next three years, the state expects to reduce leased office space by 20%, which would save about $84.7 million per year, according to the budget proposal.

Along with leases, the Department of General Services manages state-owned

buildings. Major renovations and new construction projects totaling about $4 billion will continue in Sacramento, according to budget documents.

"While statewide consolidation efforts will continue, the administration recognizes the need for modern office space to conduct the state's core business functions, and remains committed to investing in the construction and renovation of these assets," Newsom's budget proposal states.

The state is relinquishing leases in 30 cities. The majority of them — 23 leases — are in Sacramento, Department of General Services spokeswoman Monica Hassan said in an email.

Twenty-four departments, boards and offices have been affected so far, Hassan said.

In addition to saving money on leases, the state's shift to telework is expected to reduce traffic congestion and vehicle emissions while helping the state recruit and retain workers in a rapidly changing hiring environment.

The transition to remote work has ripple effects for the economy, and in how employees interact.

Downtown businesses that depended on a steady stream of state workers have struggled during the COVID-19 pandemic, with some restaurants closing. State worker union representatives have said the shift to remote work is making recruitment more difficult.

The shift to permanent remote work is still unfolding across state government. The Newsom administration has directed department leaders to support telework, but has given them the discretion to hash out specifics, including how many days per week employees show up in person.

Large departments in general have been telling employees they need to spend about half their time in the office, while smaller departments and offices have been more likely to authorize full-time remote work.

Below are the departments that have been affected by the lease reduction process so far, according to Hassan:

— Alcoholic Beverage Control

— Baldwin Hills Conservancy

— California Community Colleges

— Department of Community Services and Development

— Department of Consumer Affairs

— Department of Corrections and Rehabilitation

— Department of Fish & Wildlife

— Department of Food and Agriculture

— Department of Forestry and Fire Protection

— Department of General Services

— Department of Health Care Services

— Department of Managed Healthcare

— Department of Military

— Department of Parks & Recreation

— Department of Rehabilitation

— Department of Social Services

— Department of Tax and Fee Administration

— Department of Technology

— Department of Toxic Substances Control

— Employment Development Department

— Financial Information System of California

— Governor's Office of Business & Economic Development

— Office of Systems Integration

— Office of the Inspector General

Related Articles

What Will Happen to Government Buildings After the Pandemic?

Should State IT Agencies Recruit More Remote Workers?

California's Bay Area Workspaces Will Change Post-Pandemic

Coworking Spaces in Spokane Benefit from Remote Work

As Tech Companies Emigrate, Some Worry About S.F. Economy

Attachment "2"

THE STATE WORKER

Gov. Gavin Newsom addresses return-to-work order. What did he say?

By **William Melhado** and **Stephen Hobbs**

Updated April 2, 2025 4:41 PM

See California state workers protest Gavin Newsom's return-to-office order

State workers protest on March 26, 2025, at the California Environmental Protection Agency Headquarters in Sacramento against Gov. Gavin Newsom's order directing them to return to the office four days per week. By Paul Kitagaki Jr.

MODESTO

Gov. Gavin Newsom on Wednesday made what appear to be his first public comments on his recent order calling state workers back to offices four days a week and suggested that it was about more than just collaboration and government efficiency.

He said he was also thinking about the "mom and pop" businesses, like sandwich shops, that are struggling to make ends meet.

"They're just desperate to see people back on the sidewalks," Newsom said. "I'd like to see people walk in the streets again."

The comments, which the governor made during a career advancement event in Modesto, offered additional insight into Newsom's decision, which goes into effect this summer.

The State Worker Bee newsletter is back!

Sign up here to get our weekly newsletter for California employees.

On Wednesday, he echoed the justifications outlined in an executive order issued on the subject March 3 , which said it was to improve collaboration, efficiency and public trust in state government.

The governor said he thinks a fully in-person workweek is ideal but stopped short of saying that he would issue a five-day directive.

"We're public servants," Newsom said, "and I think it's important to show up for each other, for ourselves, connect with folks."

He added in-person work strengthened government workers' output and productivity. He also noted that remote work was denying opportunities for the next generation of state workers by limiting their career path.

"I think the people of this state deserve our full energetic commitment," he said. "For, I think, the vast majority of us, certainly in my office, we're so much better off, so much more productive, so much more creative when we're together."

Newsom seemed to suggest that prior to the pandemic, one day of remote work would have been celebrated by state employees by saying the four-day schedule was the "gold-standard dream."

Newsom also pointed to other public employees, like teachers, who work in person as further reason government employees should be back in state buildings.

State Superintendent Tony Thurmond cited similar reasons — "to be in alignment" with teachers — when he alerted California Department of Education employees they would be expected to return to offices four days a week. As an elected official, Thurmond has the authority to establish a different telework policy than the governor.

On the topic of remote work, Newsom also gave another reason for his decision: Technology and social media have made individuals more isolated from each other. In 2023, the former U.S. Surgeon General issued a report on the "epidemic of loneliness."

Newsom said the trend of becoming more connected through technology, yet more isolated from each other, was particularly worrying among young men. He noted that many boys have come to admire figures like Andrew Tate, a social media influencer who has been accused of sexual assault and human trafficking, though he has denied wrongdoing.

"I just really feel strongly we need to get out of Facebook and get back on the street and see peoples' faces," the governor said.

Asked whether he would call state workers back to offices five days a week, Newsom said, "If people want to go back five days a week, I think we'll all be better off."

But he stopped short of saying that he would order them to do so.

"We went from two to four," he said, "that may be my contribution to this cause."

This story was originally published April 2, 2025 at 3:02 PM.

Related Stories from Sacramento Bee

THE STATE WORKER

CA state worker return-to-office FAQ: What does Gavin Newsom's order actually do?

March 19, 2025 4:55 AM

THE STATE WORKER

The return-to-office question on California state workers' minds: 'Why now?'

March 6, 2025 5:00 AM

William Melhado *The Sacramento Bee*

William Melhado is The Sacramento Bee's State Worker reporter. Previously, he reported from Texas and New Mexico. Before that, he taught high school chemistry in New York and Tanzania.

Stephen Hobbs *The Sacramento Bee*

916-321-1692

Stephen Hobbs is an enterprise reporter for The Sacramento Bee. He has worked for newspapers in Colorado, Florida and South Carolina.

TRENDING 1h ago

SF-based skier dies from traumatic head injury at Palisades Tahoe

NEWS | BAY AREA & STATE

San Francisco's 34,000 city workers are being ordered back to the office

By **Olivia Hebert**, *News Reporter*
Feb 26, 2025

An aerial shot of downtown San Francisco and the Bay Bridge covered in the golden evening light.
Getty Images

Listen Now: San Francisco's 34,000 city workers are being ordered back to the office San Fr 2:44 1x

San Francisco Mayor Daniel Lurie is ordering thousands of city employees back to the office at least four days a week, part of a move to strengthen city services while injecting life into the city's struggling downtown.

Watch More

In a memo obtained by SFGATE, Lurie set an April 28 deadline for full implementation, directing the Department of Human Resources to oversee the transition. The order primarily affects around 10,000 office–based employees who currently work hybrid schedules. The remaining 24,000 city workers, including those in public safety, healthcare, and transportation, are already in person full time, the memo said.

"Increased in-office presence provides critical operational benefits to the city as an employer, as well as in its primary mission in serving the public," Lurie wrote. He argued that more in-person work would improve communication, collaboration and employee engagement while helping new hires integrate more smoothly into city departments.

Lurie framed the move in the memo as a necessity, calling in-office work critical for communication, collaboration and employee engagement. The policy makes exceptions for workers with disabilities who have

approved accommodations and those covered under the city's Family Friendly Workplace Ordinance, which allows remote work in certain caregiving situations.

Beyond city operations, the mandate comes as San Francisco struggles to bring workers back downtown.

New data from Placer.ai and Kastle Systems shows San Francisco remains the worst-performing metro in the nation for returning to the office, as SFGATE previously reported. Office visits in the city are down 51.8% compared with pre-pandemic levels, the steepest decline of any major metro, and its office occupancy rate continues to trail behind cities such as Houston and Chicago. Even on Feb. 18, the highest office occupancy day for the San Francisco metro area between Feb. 13 and Feb. 19, just 49.3% of workers returned to the office.

Some business leaders see Lurie's decision as a step in the right direction. "We applaud Mayor Lurie's leadership in bringing city workers back downtown four days weekly and hope private sector employers with San Francisco headquarters will follow this example of civic commitment," Steve Gibson, the executive director of the Mid-Market Business Association and Foundation, said in an email. "City workers returning to offices will bring much-needed energy to our neighborhood streets."

Feb 26, 2025

Olivia Hebert

NEWS REPORTER

Olivia Hebert is a news reporter at SFGATE, where she covers breaking news and a diverse array of topics. Before joining SFGATE, she wrote lifestyle news for the Independent, often exploring the intersection of health, technology, pop culture, travel and style. She's also written entertainment news for Collider, Distractify and StyleCaster. You can reach her at olivia.hebert@sfgate.com.

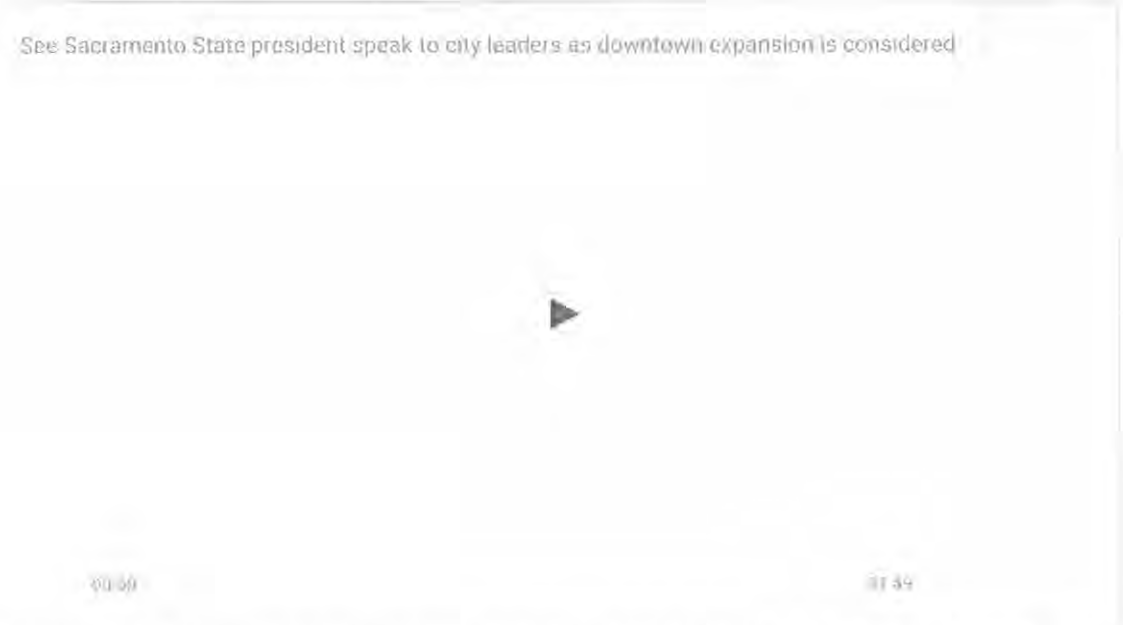
Opinion articles provide independent perspectives on key community issues, separate from our newsroom reporting.

OPINION

The worst partner for the city of Sacramento? Would you believe it's Gov. Gavin Newsom? | Opinion

By **Tom Philp**

Updated February 27, 2025 11:25 AM



Sacramento State President Luke Wood speaks remotely to city leaders during the annual State of Downtown breakfast on Feb. 25, 2025, at the SAFE Credit Union Convention Center. Michael Ault, executive director of the Downtown Sacramento Partnership, said at the event that the university is considering a mixed-use university village downtown. By HECTOR AMEZCUA

Only have a minute? Listen instead

Powered by **Trinity Audio**

00:00 05:11 1.0x

Downtown Sacramento's annual pep rally, hosted in the convention center Tuesday morning by its business interests, offered an unusually dramatic contrast between the urban core's reality and the dreams of its potential as a hub of sports, education and entertainment.

It is as if downtown Sacramento is not home to the capital, the state's center of government, any longer.

But we are. Governments own and occupy sizeable portions of downtown. Sacramento is the California capital. And no amount of soccer, baseball, basketball and hospitals can fully compensate Sacramento for government buildings that are occupied only a fraction of the time.

Downtown's largest landowner, the state of California, was conspicuously overlooked at the Downtown Partnership's annual gathering. And this landowner, led by mega-commuter Gavin Newsom of Marin County, is approaching an inevitable choice as the state hurtles into the post-pandemic economy.

OPINION

If state workers will only come downtown a fraction of the time, the state needs to begin reducing its downtown footprint proportionately for the sake of the city. Or the state can follow the lead of much of the private sector and bring back its workers to their respective offices most of the time.

Private interests, meanwhile, are not waiting for the state government to decide on its downtown future. As an example of a dramatic transformation that is coming, the Sacramento Municipal Utility District is spending more than a third of a billion dollars to prepare for growth in downtown and the Railyards district as it tracks more than 200 projects on the drawing boards.

"We want to move forward with a vibrant downtown," said SMUD's chief operating officer, Frankie McDermott.

The reality — downtown's mixed bag

Ground has broken on the 310-bed Kaiser Permanente hospital in the railyards. "It will bring thousands of physicians, nurses and patients.....to the Railyards," said Jay Robinson, the health system's area manager. A health center as a new economic anchor for downtown is beyond huge.

To the east on Railyards Boulevard, the first Native American tribe (the Wilton Rancheria) to own a professional soccer team is committed to building a new home for the Sacramento Republic. And for at least three years, West Sacramento will host Major League baseball. "It's our chance to show that we deserve another major league sports team," said Vivek Ranadive, owner and chairman of the Sacramento Kings and owner of the region's minor league baseball team, the Sacramento Rivercats.

Yet downtown remains the epicenter of the region's homelessness, with more than 3,000 unsheltered residents based on a 2024 survey. One week earlier this month, the week of February 10-16, the city received 792 calls from residents seeking help on a homeless matter. The city also picked up 182,890 pounds of trash that week.

"Destructive behavior will not be tolerated in Sacramento," Downtown Partnership Executive Director Michael Ault told the gathering, as if homelessness is primarily a crime.

"Let's make downtown clean and safe," said Sacramento Mayor Kevin McCarty. "It's not that complicated." But, actually, it is when two-thirds of those homeless left on the streets are self-diagnosed as mentally ill and not receiving anywhere near the care that they desperately need. The local and state governments that occupy more than half of downtown remain crucial for true and permanent progress.

The dreams growing bigger

The government's greatest insult to downtown is the county jail on I Street, where the Sacramento County Sheriff's Department releases inmates directly onto the streets with a new daily supply of despair. Talk of building a new jail outside of downtown, long a dream of downtown interests, is now something they are talking about.

District Attorney Thien Ho is "the leading voice to relocate the county jail outside of downtown," Ault said. It was a horrible decision to build that jail in 1989 to be logistically close to courthouses. Downtown has endured this unfair burden long enough.

There's increasing talk of a major downtown education hub for Sacramento State, which in the short term is grappling with major budget cuts due to a tight proposed state budget. "A university presence downtown....is a reflection of the university's role in shaping our region," said Ault, an alumnus. "This would be a dream come true for us."

And while the Athletics' planned stay in the capital is scheduled to be temporary, the yearning for a true Sacramento team is feeling more and more permanent.

"It's our moment," Ranadive said. "Our best days are ahead."

Downtown is truly Sacramento's field of dreams. The state with all of its partially occupied buildings is holding the city back. But Sacramento can't wait for its largest government to get its act together. Windows of opportunity don't remain open forever.

This story was originally published February 26, 2025 at 5:00 AM.

Related Stories from Sacramento Bee

OPINION

Sacramento County mulls a stronger way to lead affordable housing while the city dithers | Opinion

February 24, 2025 5:00 AM

OPINION

If Sacramento leaders fight neighbors over millions in state dollars, we all lose | Opinion

February 11, 2025 5:00 AM

Attachment "3"

HEALTH

It's costing California more than expected to provide immigrant health care. Is coverage at risk?


BY ANA B. IBARRA AND KRISTEN HWANG
MARCH 14, 2025

More Californians are using Medi-Cal for health care coverage than state officials expected, and the Newsom administration is moving money from the general fund to cover increased costs. Here, Medical personnel work in the emergency room unit at the Hazel Hawkins Memorial Hospital in Hollister on March 30, 2023. Photo by Larry Valenzuela, CalMatters/CatchLight Local

IN SUMMARY

California is spending more than it expected on Medi-Cal and Republican lawmakers are pointing to coverage expansions that benefited immigrant households.

Lea esta historia en Español

The California health care program that covers almost 15 million people is costing more money than Gov. Gavin Newsom projected, creating a **new budget problem** in a lean year.

Now his administration is borrowing $3.4 billion from the state's general fund to cover the unexpected cost increase. It's unclear when the administration plans to restore the money.

The administration acknowledged that more people are enrolled in the program than the state anticipated, and that the state is spending $2.7 billion more than it planned on coverage expansions for immigrants without legal status.

Roughly 1.6 million immigrants without legal status are enrolled in **Medi-Cal**, according to state data. The program is a lifeline to people who traditionally have not had access to health insurance, and California is one of six states that **offer coverage to immigrant adults** regardless of whether they are in the country legally.

Senate Minority Leader Brian Jones said Newsom has overpromised and under-delivered on health care at a time when all Californians are struggling to afford the cost of living in the state.

"Democrats and the governor are picking priorities, and they're prioritizing people that have come into our country illegally over people who immigrated here legally, people that are citizens," Jones said.

The state's Medi-Cal expansion for undocumented immigrants costs about $8.5 billion from the state general fund annually, according to **a recent budget hearing**.

"If we weren't spending eight-and-a-half billion dollars on illegal immigrants, we wouldn't need to borrow $3.4 billion to cover the difference," Jones said.

H.D. Palmer, a spokesperson for the state's finance department, acknowledged that the rise in spending is partially attributable to higher-than-projected costs associated with larger enrollment numbers for California's

undocumented population. In January, the Department of Health Care Services, which oversees Medi-Cal, estimated California is spending $2.7 billion beyond what it budgeted due to the cost of covering care and prescriptions for newly enrolled immigrants.

But immigrants aren't the only population that is using Medi-Cal more than the state expected.

California's Medi-Cal population in general ballooned during the COVID-19 pandemic when the federal government temporarily suspended income eligibility checks to keep people insured during the national emergency. Before the pandemic about 13 million people used Medi-Cal. That number peaked at 15.6 million in 2023 when eligibility checks resumed. Today 14.9 million people are enrolled, according to state data.

The Legislative Analyst's Office has also noted a 40% growth over the last four years in the number of seniors enrolled in Medi-Cal. While seniors make up only about 10% of the program's enrollees, they account for a large part of the program's spending because benefits such as long-term care are among the most expensive.

Medi-Cal spends about $15,000 a year per senior. That compares to the $8,000 a year the program spends on average on other enrollees.

Newsom's office said these issues are neither new nor unique to California. Medi-Cal is California's version of Medicaid, the federal-state program that provides health coverage nationwide to low-income households.

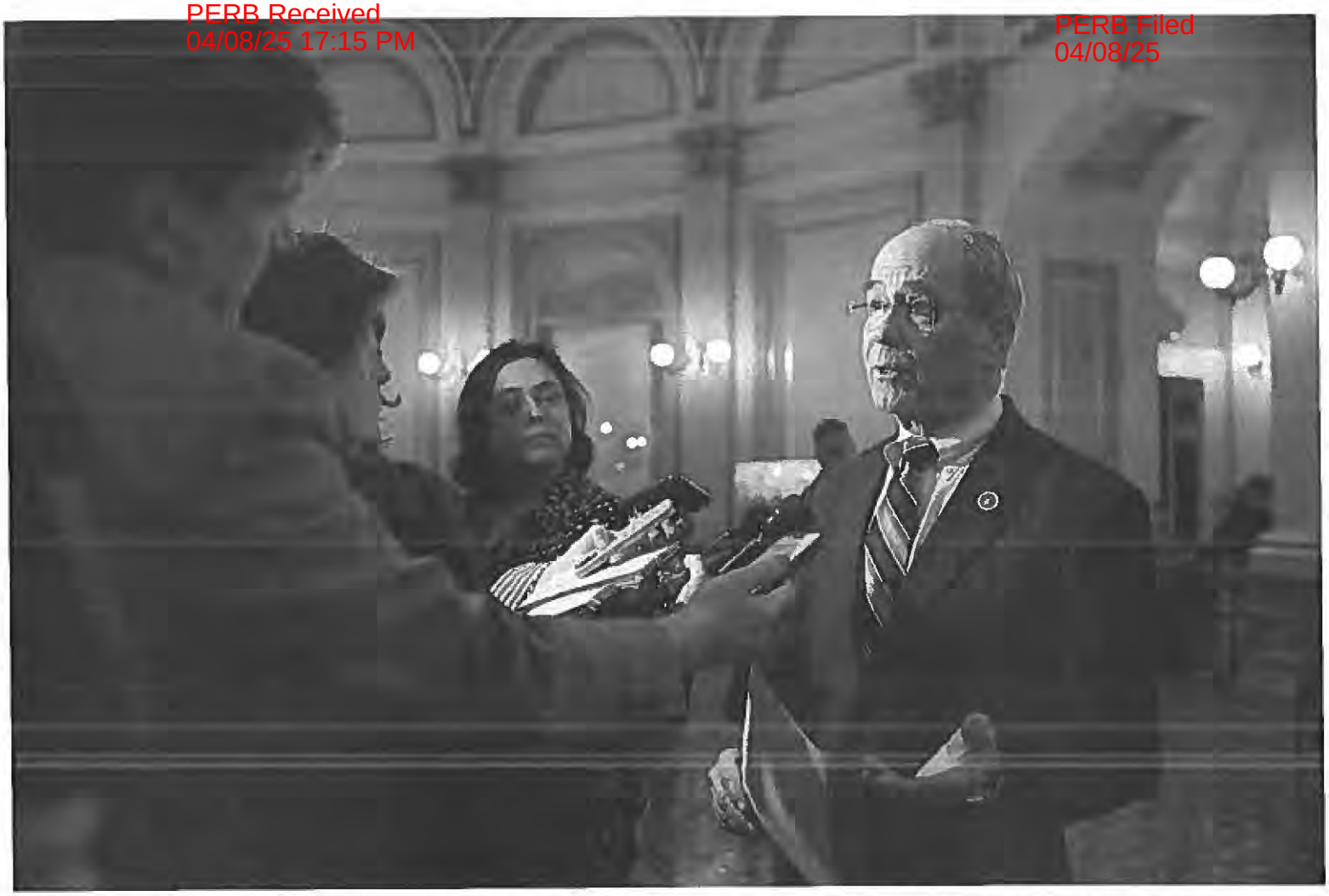
"Rising Medicaid costs are a national challenge, affecting both red and blue states alike," Elana Ross, a spokesperson for the governor's office, said in an email.

Democrats pledge to protect immigrant health care

Sen. Roger Niello, a long-time critic of the state's closed-door budgeting process, which is typically hashed out between Democratic leaders and the governor, acknowledged that other factors like senior enrollment and high drug costs could be contributing to the high expenses. He said Republicans are worried about increasing spending on immigrant health care.

The Republican from Roseville criticized the lack of transparency from Newsom's finance department.

"The completely opaque nature of the request, which says nothing about any of that, is entirely inappropriate," Niello said.



State Sen. Roger Niello holds a news conference in the rotunda of the state Capitol in Sacramento on March 13, 2025. Niello requested more transparency from Gov. Newsom as to why the state needs $3.5 billion to keep Medi-Cal solvent. Photo by Fred Greaves for CalMatters

Democratic lawmakers said they need more information about what exactly is behind the unexpected spending increases, but pushed back on the idea that the state would need to roll back coverage for its undocumented population.

"Immigrant workers and families, who pay billions in taxes, deserve access to care, and I am proud to protect California's progress expanding Medi-Cal," Assembly Speaker Robert Rivas said in a statement. "There are tough choices ahead, and Assembly Democrats will closely examine any proposal from the governor. But let's be clear: We will not roll over and leave our immigrants behind."

Immigrants lacking permanent status contribute approximately $8.5 billion in state and local taxes a year, according to an analysis by the California Budget and Policy Center, a nonprofit research group. That's about the same amount it's costing the state to give them Medi-Cal.

State lawmakers first allowed undocumented children to enroll in Medi-Cal in 2016 under Gov. Jerry Brown. Since then Newsom has approved adding young adults up to age 25 in 2020 and older adults and seniors in 2022. Adults ages 26-49 were the final group added in 2024. Throughout those years, even some Republican lawmakers supported covering this population.

"The Republicans need to take a better and keen-eyed look at the timeline associated with those expansions," said Assemblymember Mia Bonta, an Oakland Democrat who leads the Health Committee. "For them to just try to play the blame game and put it all at the feet of California values to ensure that we have universal health coverage for all with this particular age group being included is just specious."

Billions more in potential Medicaid cuts

Assemblymember Dawn Addis, who chairs a budget subcommittee on health, said she will be questioning Newsom officials closely about the spending increase in an upcoming hearing.

"We really need to understand the details of what the Department of Finance is saying, what the executive is seeing, and how they're calculating this information," Addis, a Democrat from San Luis Obispo, said.

Addis emphasized that the biggest threat to Medi-Cal right now is coming from the federal government.

Learn more about legislators mentioned in this story.

Roger Niello
Republican, State Senate, District 6 (Roseville)

Brian Jones
Republican, State Senate, District 40 (San Diego)

Mia Bonta
Democrat, State Assembly, District 18 (Oakland)

Robert Rivas
Democrat, State Assembly, District 29 (Salinas)

Dawn Addis

Democrat, State Assembly, District 30 (San Luis Obispo)

House Republicans recently voted to advance a proposal that could result in cuts of $880 billion to a group of programs, largely Medicaid, over the next 10 years. The California Budget and Policy Center has estimated that the proposals currently at play in Congress could translate into annual losses of $10 billion to $20 billion a year for the state.

"The reason why it's so important for us to fight back against cuts at the federal level to Medicaid is because there is no easy or painless solution to fill that budget hole," said Amanda McAllister-Wallner, interim executive director of Health Access California.

Health Access California along with the California Immigrant Policy Center spearheaded the campaign nearly a decade ago to insure all immigrants in the state.

McAllister-Wallner said it was unfair and unreasonable to pin the state budget shortfall on the immigrant expansions. Over the same time period, the state has added benefits, such as doula services and family therapy, and invested heavily in reforming the system through a multibillion-dollar initiative called CalAIM.

"Those changes that we've made in Medi-Cal made the program stronger (and) have made the state healthier," McAllister-Wallner said.

CalMatters reporter Alexei Koseff contributed to this story.

Supported by the California Health Care Foundation (CHCF), which works to ensure that people have access to the care they need, when they need it, at a price they can afford. Visit www.chcf.org to learn more.

MORE ON HEALTH CARE IN CALIFORNIA

They live in California's Republican districts. They feel betrayed by looming health care cuts

MARCH 11, 2025

STATE WATCH

Newsom takes friendlier tack with Trump in sign of new political reality

BY JULIA MANCHESTER - 02/09/25 11:53 AM ET

Listen to this Article

California Gov. Gavin Newsom (D) is taking a friendlier approach to President Trump as he adjusts to the new political realities of governing amid a GOP-dominated Washington.

This week Newsom traveled to Washington to lobby Trump for disaster aid following last month's catastrophic wildfires in Southern California. Newsom's tone and approach to Trump was notably more conciliatory compared to his past rhetoric toward the president, with the governor dubbing his relationship with Trump as "one of the more interesting relationships in politics" during a CNN interview on Thursday.

The apparent change in approach comes as Newsom finds himself in a different position than years prior, with Trump and Republicans having made inroads in California last November and Democrats facing backlash for their handling of the wildfires last month.

"It probably serves him well politically in the state," said Rob Stutzman, a California political consultant who was an aide to former Gov. Arnold Schwarzenegger (R). "Except for extreme partisans, I don't think anyone has much appetite for fire recovery being a political issue."

At least 29 people are known to have died as a result of last month's wildfires that tore through the greater Los Angeles area. The fires destroyed roughly 17,000 structures and tens of thousands of people were displaced from their homes.

Trump traveled to Los Angeles last month, where he was greeted by Newsom, who told the president at the time he had "all the expectations" the two will be able to work together.

Less than a month later, it was Newsom traveling to Trump following a meeting with lawmakers on Capitol Hill in an effort to secure aid as the state begins its long road to recovery.

Newsom called his closed -door meeting with Trump this week "incredibly productive."

"I have all the confidence in the world that it's going to be a strong partnership moving forward," the governor told CNN.

"Part of me is celebrating. Yay, the parties are working together. And then part of me is really angry because this shows that the last nine years didn't have to be so tense," said

To what extent do you approve or disapprove of California Gov. Gavin Newsom's (D) decision to take a more friendly approach toward President Trump?

- ◯ Strongly approve
- ◯ Somewhat approve
- ◯ Somewhat disapprove
- ◯ Strongly disapprove
- ◯ Other / No opinion

* By clicking "NEXT" I submit my answers and consent to the use of cookies for research and advertising purposes; I have read and agree to the CivicScience Privacy Policy and Terms of Service

NEXT *

Newsom told CNN he did not receive "specific commitments" but "broad strokes" from the president.

"It wasn't about focusing on disagreements. It was focusing on what we have in common," the governor said of his conversation with the president. "What we have in common is a desire to support the people of LA"

Newsom went on to heap praise on Trump's Environmental Protection Agency Administrator Lee Zeldin, saying the official is "doing an amazing job."

"He's on the ground today in Los Angeles," Newsom said. "They are moving the first phase of the debris removal at record pace and I think it's that mindset that we brought to the meeting and the mindset that came out of that meeting. The president wants to do something that has never been done and that is address this crisis with a degree of sophistication and focus to get the job done and get people's lives back."

It's a sea change in rhetoric for Newsom. Just a few months ago, the governor called a special session following Trump's election victory in an effort to "protect California values."

In calling for the special session, Newsom cited the track record of the first Trump administration and his rhetoric on the campaign trail as indications of "the consequences of his presidency."

"You were there for us during COVID," Newsom told Trump last month in LA. "I don't forget that, and I have all the expectations that we'll be able to work together to get this speedy recovery."

Newsom praised Trump's response during the height of the pandemic in April 2020, specifically pointing to Trump's help in getting the USNS Mercy, a hospital ship, docked in the state.

"If you look at Newsom on day one of COVID, it's very reminiscent of what we're seeing now: nonpartisan, focused on the job and the crisis, was not criticizing Trump but would praise federal assistance," Stutzman said.

On Thursday, Newsom signed an executive order aimed at protecting homes in wildfire-prone areas through new regulations. Additionally, the governor has signed a slew of other post-wildfire executive orders in recent weeks, including one that he said would "maximize the capture and storage of water" during rain and snowstorms.

Newsom's order came days after Trump issued his own executive order for California that would "maximize water delivery to high-need communities" and would "override" the state's policies if needed.

"In terms of water management, the potential for some agreement and some new look at water management is not as far apart as the political rhetoric would suggest," Stutzman said. "Newsom and Trump in a lot of ways are talking about the same thing, which is saving water and delivering water."

Environmentalists have criticized the two orders, noting the similarities in language between them, and they have expressed fears about the impact the order could have on protections for fish and clean water.

Attachment "4"

United States Government Accountability Office

GAO

Report to Congressional Committees

July 2023

TELEWORK

Growth Supported Economic Activity during the Pandemic, but Future Impacts are Uncertain

GAO-23-105999

July 2023

GAO Highlights

Highlights of GAO-23-105999, a report to congressional committees

TELEWORK

Growth Supported Economic Activity during the Pandemic, but Future Impacts Are Uncertain

Why GAO Did This Study

For many years, employers have used telework to manage their business operations and to promote a better work-life balance for their employees. In this report, telework refers to a flexible work arrangement under which employees perform their duties from a worksite—often at home—other than the location from which they would otherwise work. More recently, telework became an important part of the national response to the COVID-19 pandemic, which emerged in the U.S. in early 2020.

GAO was asked to examine the impact of telework, both as it pertains to the workforce and various sectors of the economy. This report is the first in a series of reports that will respond to this request, and examines: (1) changes in the extent of telework in the United States before and during the COVID-19 pandemic, and (2) reported impacts of teleworking on worker productivity and firm performance. Subsequent reports will focus on public policies affecting telework, among other issues.

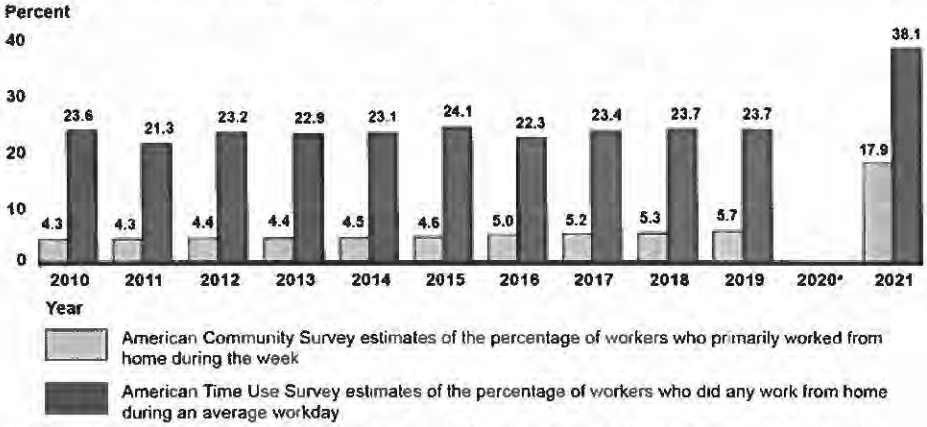
GAO used the ACS and ATUS to describe trends in the use of telework from 2010 through 2021, the most recent data available at the time of the analysis in May 2023, and the growth of telework by select worker characteristics between 2019 and 2021. GAO also reviewed 44 studies that met GAO criteria for methodological rigor and examined the relationship between telework and worker productivity and firm performance.

View GAO-23-105999. For more information, contact Michael Hoffman at (202) 512-6445 or hoffmanme@gao.gov, or John Sawyer at (202) 512-7215 or sawyerj@gao.gov

What GAO Found

The percentage of workers who worked from home (teleworked) rose sharply between 2019 and 2021 (see figure). The increase was concentrated among workers with higher earnings and education and in certain occupations, according to GAO's analysis of nationally representative survey data. Specifically, GAO's analysis of the American Time Use Survey (ATUS) found that the estimated percentage of workers who teleworked for any portion of an average workday increased from 24 percent in 2019 to 38 percent in 2021. Similarly, GAO's analysis of the American Community Survey (ACS) found that the estimated percentage of workers who primarily teleworked in the prior work week more than tripled from 5.7 percent in 2019 to 17.9 percent in 2021. The extent of telework also varied across occupations. For example, 28 percent of workers in management and related occupations primarily worked from home in 2021 compared to 7.5 percent of workers in service occupations. Despite increases in telework, most workers did not telework in 2021.

Estimated Percentage of U.S. Workers Who Primarily Worked from Home and Who Did Any Work at Home on an Average Workday, and during the Week, 2010–2021



Source: GAO analysis of data from the Census Bureau's American Community Survey (ACS) and the Bureau of Labor Statistics' American Time Use Survey (ATUS). | GAO-23-105999

[a]Data for 2020 are not shown because ACS 2020 1-year data and the 2020 annual ATUS estimates failed to meet Census Bureau's quality standards for publication.

Studies GAO reviewed found that telework generally had a positive impact on worker productivity and firm performance in certain sectors, but methodological issues complicate efforts to estimate its long-term impacts. For example, a study of a Chinese call center found that telework increased productivity by 13 percent. Some studies also found that telework mitigated the negative impact of the pandemic on firm performance and the economy. Estimating the long-term impacts of telework is difficult however because some economic effects may emerge only over time. For example, studies GAO reviewed identified potential cost savings from reduced office space needs and potential collaboration challenges that could impact worker productivity or firm performance in the longer run.

Contents

Letter		1
	Background	4
	Telework Grew Significantly between 2019 and 2021 and Was Concentrated among Certain Workers, Industries, and Occupations	6
	Studies Found Telework Generally Had a Positive Impact on Worker Productivity and Firm Performance in Certain Settings, but Long-term Impacts Are Uncertain	19
	Agency Comments and Our Evaluation	28
Appendix I	Objectives, Scope, and Methodology	30
Appendix II	Overview of Selected Alternative Measures of Telework	39
Appendix III	List of 44 Studies Included in Our Literature Review of the Impact of Telework on Worker Productivity and Firm Performance	46
Appendix IV	GAO Contacts and Staff Acknowledgments	51
Table		
	Table 1: Earnings Quartiles for Usual Weekly Earnings of Full-time and Salaried Workers at Their Primary Job, 2019–2021	35
Figures		
	Figure 1: Estimated Percentage of Workers Who Primarily Worked from Home and Estimated Percentage Who Did Any Work at Home on an Average Workday, and during the Week, 2010–2021	7
	Figure 2: Estimated Percentage of Workers Who Did Any Work at Home on an Average Day, 2019 and 2021, by Quartiles of Weekly Earnings	9
	Figure 3: Estimated Percentage of Workers Who Did Any Work at Home on an Average Day, 2019 and 2021, by Education, for Individuals 25 Years Old and Over	11

Figure 4: Estimated Percentage of Workers Who Primarily Worked from Home during the Week, by Industry, 2019 and 2021 13
Figure 5: Estimated Percentage of Workers Who Primarily Worked from Home during the Week, by Occupation, 2019 and 2021 15
Figure 6: Estimated Percentage of Workers Who Primarily Worked from Home during the Week, by Gender, Race, Ethnicity, Language at Home, and Age, 2019–2021 17
Figure 7: Percentage of Workers Who Did Any Work from Home during Each Hour of the Day, 2019 and 2021 42
Figure 8: Alternative Measures of Telework Prevalence, 2010–2021 43
Figure 9: Average Hours Worked at Home, among Those Who Worked at Home on Previous Day, 2010–2021 45

Abbreviations

BLS	Bureau of Labor Statistics
ATUS	American Time Use Survey
ACS	American Community Survey

GAO U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

July 26, 2023

The Honorable Bobby Scott
Ranking Member
Committee on Education and the Workforce
House of Representatives

The Honorable Jamie Raskin
Ranking Member
Committee on Oversight and Accountability
House of Representatives

The Honorable Mark DeSaulnier
Ranking Member
Subcommittee on Health, Employment, Labor and Pensions
Committee on Education and the Workforce
House of Representatives

For many years, employers have used telework to manage their business operations and to promote a better work-life balance for their employees.[1] More recently, telework became an important part of the national response to the COVID-19 pandemic, which emerged in the United States in early 2020.[2] While many offices and businesses allowed employees to telework extensively to help employees stay safe and assist the nation in combatting the pandemic, this expansion in telework was an abrupt and unprecedented change in the nature of work. The ongoing use of telework, even in the absence of many of the initial challenges presented by the onset of the COVID-19 pandemic, has raised questions and concerns about its effects on workers, businesses, and the economy.

You requested that GAO conduct a review of the impact of telework, both as it pertains to the workforce and various sectors of the economy. This report represents the first in a series of reports that will respond to this request, and examines (1) changes in the extent of telework in the United

[1]In this report, telework refers to a flexible work arrangement under which employees perform their duties from a worksite, often at home, other than the location from which they would otherwise work.

[2]On January 31, 2020, the Department of Health and Human Services declared a public health emergency for COVID-19 in the United States. The public emergency was lifted on May 11, 2023.

States before and during the pandemic, and (2) reported impacts of teleworking on worker productivity and firm performance.[3] Our subsequent reports will focus on public policies affecting telework, and how telework has affected various sectors, including housing and transportation, among other issues.

To address our first objective, we analyzed two nationally representative datasets: the Bureau of Labor Statistics' (BLS) *American Time Use Survey* (ATUS) and the Census Bureau's *American Community Survey* (ACS).[4] We used ATUS and ACS data to describe trends in the use of telework from 2010 through 2021, the most recent data available at the time that we completed our analysis in May 2023, and to describe the growth of telework by select worker characteristics during the years 2019 and 2021, the time period in which the COVID-19 pandemic began. We excluded ATUS and ACS data from 2020 because the ACS year 2020 data and ATUS 2020 annual estimates failed to meet the Census Bureau's quality standards for publication due to the impact of the COVID-19 pandemic on data collection.

To assess the reliability of these datasets, we interviewed BLS officials with knowledge of both the ATUS and ACS data. Also, to ensure the robustness and consistency of our results, we performed analyses using different measures of telework from ATUS and ACS. In addition, we compared our results with peer-reviewed studies and official reports such as those from BLS. We found that the data were sufficiently reliable for the purposes of our reporting objectives.

To better understand the impact of telework on worker productivity and firm performance, we conducted a review of relevant empirical research.[5]

[3]A firm is a business entity that produces goods and services to make a profit.

[4]The annual American Time Use Survey (ATUS), sponsored by the Bureau of Labor Statistics and conducted by the Census Bureau, provides annual, nationally representative estimates of the amount of time people spend doing various activities such as paid work, child care, volunteering, and socializing. For this report, we use ATUS's measure of the percentage of respondents who worked from or near their home for any amount of time on the previous day. The Census Bureau's American Community Survey (ACS) is a national survey that annually collects population and housing information from a random sample of about 3.5 million households. For this report, we use ACS's measure of the percentage of workers who primarily worked from home over the past week.

[5]We will describe later in the report the methodological challenges of assessing the impacts of telework on worker productivity during the COVID-19 pandemic and in the longer run.

To ensure that we identified an appropriate number of relevant studies with strong causal research design, we included studies from the United States and other countries and included both public and private sector workers. We identified 181 studies and reports from a literature search using related keywords such as "telework" or "work from home" and "productivity" or "firm performance" in various databases such as EconLit, Business Source Corporate Plus, and ProQuest Dialog.[6] We focused specifically on studies and reports published between 2015 and 2022 that examined the relationship between telework or flexible work arrangements and various measures of worker productivity and firm performance. We chose this time period to ensure an appropriate number of recent and relevant studies for further review. We developed a shortlist of 71 studies based on review of the abstracts of 181 studies.

When reviewing the shortlisted studies, we evaluated the quality and robustness of their methodology. For example, we examined whether each study included a relevant control group. We also evaluated the validity and robustness of the key outcome indicators used for each study. For example, we examined whether the studies used small sample sizes or outcome indicators that may not effectively measure productivity. We prioritized studies with a strong causal research design that included an appropriate control group. We also considered the studies' relevance to our objective to provide additional contextual information as corroborating evidence.

Forty-four studies met our criteria for inclusion in the literature review. We used 32 of these 44 studies to provide primary supporting evidence for our findings related to the impacts of telework on worker productivity and firm performance. We used 12 of these 44 studies to provide additional contextual information as corroborating evidence. Appendix I provides a more detailed description of the objectives, scope, and methodology of our review.

We conducted this performance audit from April 2022 to July 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

[6]EconLit, Business Source Corporate Plus, and ProQuest Dialog are library databases that contain scholarly economic, business, and other more general trade literature.

the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Practice of Telework

With the advancement of information technology, employers are able to allow employees to telework on regularly scheduled days or on unscheduled days or hours in response to a situational need such as inclement weather or personal well-being. Telework usually includes a work arrangement where an employee works from an alternative location mutually agreeable to the employee and the employer, such as a telework site or an employee's home. Actual telework arrangements may vary in that employees may be able to telework beyond their routine work hours, or employees may be able to work at a worksite other than their home.

The term telework is often used interchangeably with terms such as remote work, work from home, virtual work, telecommute, or flexi-work to refer to various telework arrangements.[7] For example, telework sometimes is used to describe hybrid arrangements that include both work at home and at an office.

Whether an employee's tasks or duties are suitable for telework is an important factor employers consider in whether and how to implement telework. For example, jobs where tasks primarily involve working on a computer are typically more suitable for telework compared to certain service industry jobs requiring direct contact with customers. Employers may consider many other factors in their decision regarding whether and how to implement telework such as retention of employees. Moreover,

[7]While these different terms are not synonymous, unless otherwise specified, we will use telework as a collective term to describe the various telework arrangements referred to by these other terms including work from home, remote work, virtual work, telecommuting, flexi-work, work from everywhere, or hybrid work throughout this report.

researchers have attempted to classify occupations based on their relative suitability for telework.[8]

Worker Productivity and Firm Performance

According to BLS, across the U.S. economy as a whole, aggregate worker or labor productivity is defined as real output (amount or real value of goods or services produced) divided by labor hours (total number of work hours).[9] At an individual level, employers may assess workers' productivity by calculating some measure of their output per work hour. For example, in a call center business, the employer may measure the workers' productivity by observing the average calls by hour. However, in businesses or occupations where outputs are harder to measure, subjective evaluations are often used.

A firm's performance can also be measured in various ways. Researchers often use financial indicators such as profits, sales, and stock market performance for this purpose, as well as other measures such as retention, attrition, recruitment, or innovation to assess a firm's performance.

[8]For example, one study classified the feasibility of working from home for all occupations and found that 37 percent of all U.S. jobs could be performed entirely at home, with significant variation across cities and industries. See Jonathan I. Dingel and Brent Neiman, "How Many Jobs Can be Done at Home?" NBER Working Paper No. 26948 (April 2020). Another study found that rates of lost work during the COVID-19 pandemic varied by an occupation's suitability for telework. Matthew Dey, Harley Frazis, David S. Piccone Jr, and Mark A. Loewenstein, "Teleworking and Lost Work during the Pandemic: New Evidence from the CPS," *Monthly Labor Review* (Bureau of Labor Statistics, July 2021).

[9]For example, BLS calculates labor productivity for the nonfarm business sector by combining real output from the National Income and Product Accounts produced by the Bureau of Economic Analysis with BLS's measures of hours worked for all persons. The primary source of data on hours is the average-weekly-hours-paid series for production workers in goods-producing industries and for nonsupervisory workers in service-providing industries.

Telework Grew Significantly between 2019 and 2021 and Was Concentrated among Certain Workers, Industries, and Occupations

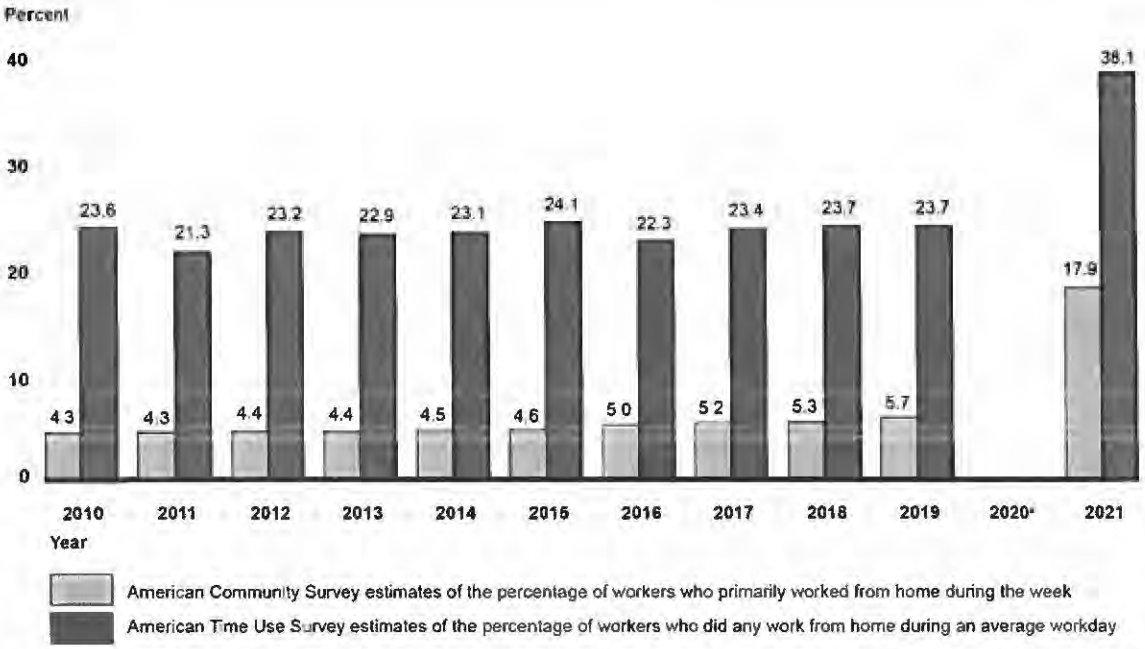
Telework Increased Substantially between 2019 and 2021, Although Most Workers Continued In-person Work According to Recent Survey Data

The percentage of U.S. workers who teleworked increased substantially between 2019 and 2021 compared to the decade preceding the pandemic; however, most continued in-person work on most days in 2021, according to two surveys we examined (see fig. 1).[10] Specifically, American Community Survey (ACS) data showed that the percentage of workers who primarily teleworked during the week more than tripled from an estimated 5.7 percent in 2019 to an estimated 17.9 percent in 2021. The American Time Use Survey (ATUS) showed that the percentage of workers who teleworked for any portion of an average workday increased by 14 percentage points, from an estimated 24 percent in 2019 to an estimated 38 percent in 2021. These two measures reflect a range of telework experiences: the ACS measure provides a conservative estimate of the number of teleworkers because it excludes people who work at home on an occasional basis, while the ATUS measure provides a more expansive estimate of telework because it includes those who only spend short periods of time working at home.[11]

[10]Data from 2021 is the most recent data available for the ACS and ATUS at the time of our reporting. See appendix I for more information.

[11]For more information on the telework measures used in this report, as well as an alternate measure of telework based on ATUS that shows comparable levels of telework to the ACS measure, see appendix II.

Figure 1: Estimated Percentage of Workers Who Primarily Worked from Home and Estimated Percentage Who Did Any Work at Home on an Average Workday, and during the Week, 2010–2021



Source: GAO analysis of data from the Census Bureau's American Community Survey (ACS) and the Bureau of Labor Statistics' American Time Use Survey (ATUS). | GAO-23-105999

Note: The bars for the American Time Use Survey show the annual average estimated percentage of respondents who participated in work at home, on an average day, among those who were employed, on days they worked. Respondents who indicated that they performed work (for their main job) at their home for any amount of time on a diary report of the previous 24 hour day were classified as teleworkers. This measure includes "incidental" work from home (for example, people who conduct 15 minutes of work from home, potentially unpaid, after a workday in the office). The bars for the American Community Survey show the estimated percentage of respondents who are identified as teleworking based on their response to a question about their primary means of transportation to work over the past week. We classified respondents who replied "worked from home" as teleworkers. Margins of error for all estimates in this figure are within +/- 2 percentage points.

[a]Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the ACS 2020 1-year data and the 2020 annual ATUS estimates failed to meet Census Bureau's quality standards for publication.

Unlike the significant increase in telework between 2019 and 2021—driven largely by the pandemic—the decade prior to the pandemic showed no increase or a gradual increase in telework, depending on the telework measure. For example, the ATUS showed that the estimated percentage of workers who worked from home for any amount of time during an average day remained about the same at 24 percent between 2010 and 2019. Conversely, according to the ACS, the estimated percentage of workers who primarily worked from home gradually grew from 4.3 percent in 2010 to 5.7 percent in 2019.

While the measures for ACS and ATUS show a significant economy-wide increase in telework in response to the pandemic, most workers did not telework on most days in 2021. Using ATUS data, we found that less than an estimated 40 percent of all workers teleworked for any amount of time during an average day in 2021. This may reflect a range of possibilities including that the work for many jobs either could not readily be conducted from home, or telework was not permitted or encouraged by employers.

Growth in Telework between 2019 and 2021 Was Concentrated among Workers with Higher Earnings and More Education, and in Certain Industries and Occupations

Earnings

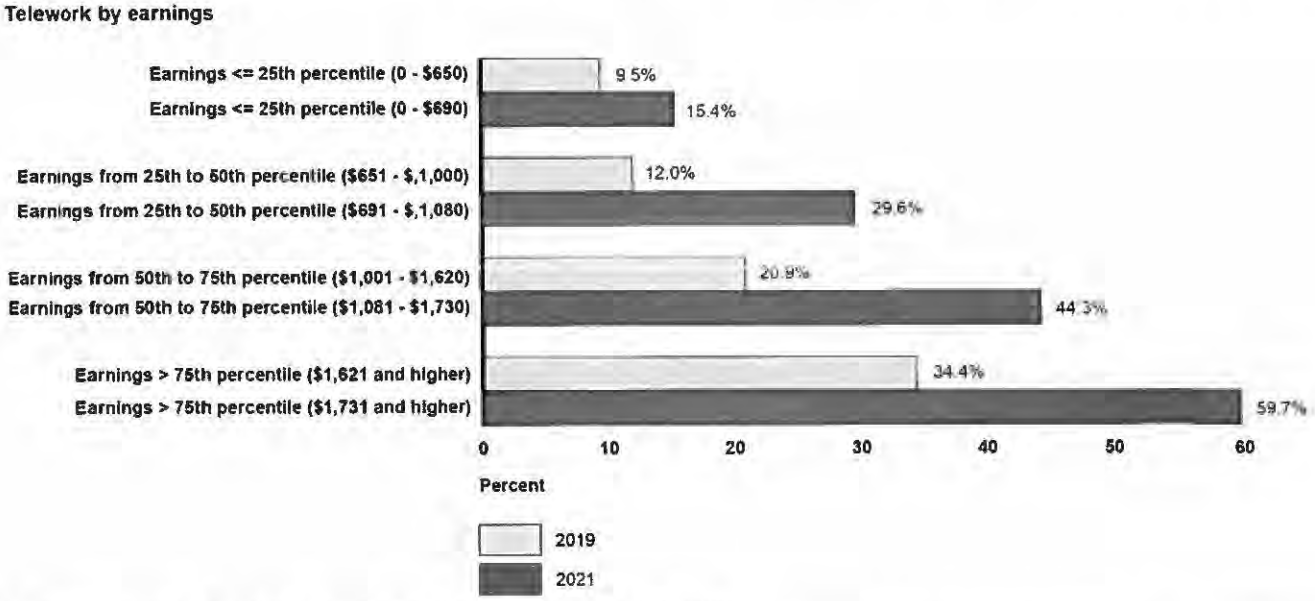
Prior to the pandemic, in 2019, we found that workers with higher earnings were far more likely to telework than those with lower earnings, and this gap in telework between workers in different earnings quartiles increased between 2019 and 2021.[12] For example, less than 10 percent of workers in the lowest quartile of earners (those earning $650 or less per week) teleworked on an average day in 2019. In comparison, an estimated 21 percent of workers in the third quartile (those earning $1,001 to $1,620 or over per week) teleworked, and over a third (34 percent) of workers in the top quartile of earners teleworked (those earning over $1,620 per week) (see fig. 2).

While telework increased significantly in every quartile between 2019 and 2021, the largest percentage point growth occurred among the highest

[12]For our analyses of telework by earnings, we measured telework using the ATUS estimate of the percentage of workers who did any work from their home during the previous day's 24 hour diary period, on days they were employed at their main job. This measure is our least restrictive measure of telework as it includes incidental, and potentially unpaid, work at home. We use this measure because the ACS data tables for means of transportation to work—the source for our more restrictive measure of telework, the percentage of workers who worked from home most days of the week—contain less useful measures of earnings than the American Time Use Survey; see appendix I for more information. Earnings estimates represent the usual weekly earnings of full-time wage and salary workers with one job only, before taxes and other deductions, and including any overtime pay, commissions, or tips usually received.

earners. For example, the percentage of workers in the lowest quartile of earnings who teleworked grew by about 6 percentage points between 2019 and 2021, compared to an estimated 25 percentage point growth for workers in the highest earning quartile for the same period (see fig. 2).

Figure 2: Estimated Percentage of Workers Who Did Any Work at Home on an Average Day, 2019 and 2021, by Quartiles of Weekly Earnings



Source: GAO analysis of Bureau of Labor Statistics' American Time Use Survey data. | GAO-23-105999

Note: Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the Census Bureau did not publish 2020 annual American Time Use Survey (ATUS) estimates. The telework measure by earnings shows the annual average estimated percentage of employees who did any of their work at home, on an average day, among those who were employed full time, on days worked at their main job, among wage and salary workers who were single jobholders. This measure captures "incidental" work from home (for example, people who conduct 15 minutes of unpaid work from home at the end of a workday in the office) and therefore indicates a higher overall incidence of working from home than measures that avoid the inclusion of "incidental" work; see appendix II for more detail. Earnings estimates represent the usual weekly earnings of full-time wage and salary workers with one job only. Within every earnings category, increases in telework from 2019 to 2021 were statistically significant. All differences in telework across earnings categories within a year are statistically significant except for the difference between the first and second quartile of earners in 2019. All earnings ranges are reported in nominal dollars. Margins of error for all estimates in this figure are within +/- 4.9 percentage points.

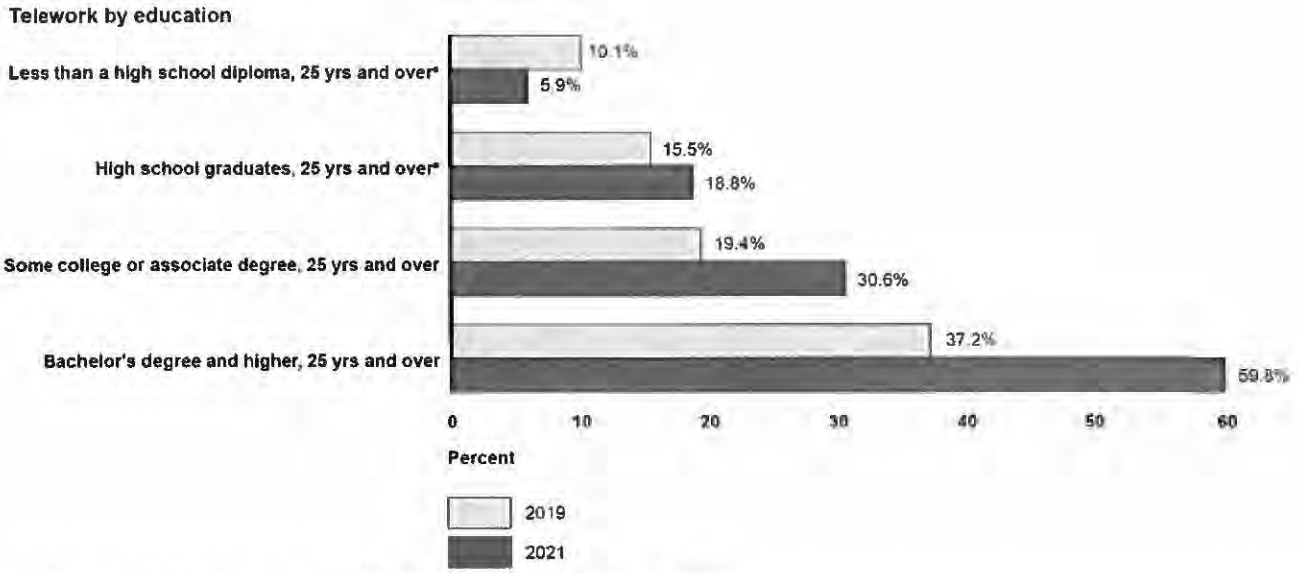
Education

Prior to the pandemic, in 2019, workers with more years of education engaged in telework at a higher rate than workers with fewer years of

formal education, and these gaps increased from 2019 to 2021.[13] For example, about 10 percent of workers with less than a high school diploma teleworked on an average day in 2019, compared to an estimated 19 percent of workers with some college or an associate's degree, and an estimated 37 percent of workers with a bachelor's degree or higher (see fig. 3). From 2019 to 2021, among workers with less than a high school diploma and workers with only a high school diploma, there was not a statistically significant change in the percentage who teleworked. In contrast, among workers with some college or an associate's degree, the percentage who teleworked increased by an estimated 11 percentage points between 2019 and 2021. In addition, among workers with a bachelor's degree or higher, the percentage of workers who teleworked increased by almost 23 percentage points between 2019 and 2021 (see fig. 3).

[13]For our analyses of telework by education, we measured telework using the ATUS estimate of the percentage of employed workers who did any work from their home on an average day, on days they worked. This measure is our least restrictive measure of telework as it includes incidental, and potentially unpaid, work at home. We use this measure because the ACS data tables for means of transportation to work—the source for our more restrictive measure of telework, the percentage of workers who primarily worked from home during the week—does not contain any information on means of transportation to work by educational attainment.

Figure 3: Estimated Percentage of Workers Who Did Any Work at Home on an Average Day, 2019 and 2021, by Education, for Individuals 25 Years Old and Over



Source: GAO analysis of Bureau of Labor Statistics' American Time Use Survey data | GAO-23-105999

Note: Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the Census Bureau did not publish 2020 annual American Time Use Survey (ATUS) estimates. The telework measure by education shows the annual average estimated percent of employees who did any of their work at home, on an average day, among those who were employed on days they worked. This measure captures "incidental" work from home (for example, people who conduct 15 minutes of unpaid work from home at the end of a workday in the office) and therefore indicate a higher overall incidence of working from home than measures that avoid the inclusion of "incidental" work; see appendix II for more detail.

[a]All differences across education categories within a year are statistically significant, except for the difference between those with less than a high school diploma and high school graduates, and high school graduates compared to those with some college or an associate's degree in 2019. Margins of error for all estimates in this figure are within +/- 6.3 percentage points.

Industry

While telework increased across all industries as a result of the pandemic, certain industries experienced much greater growth than

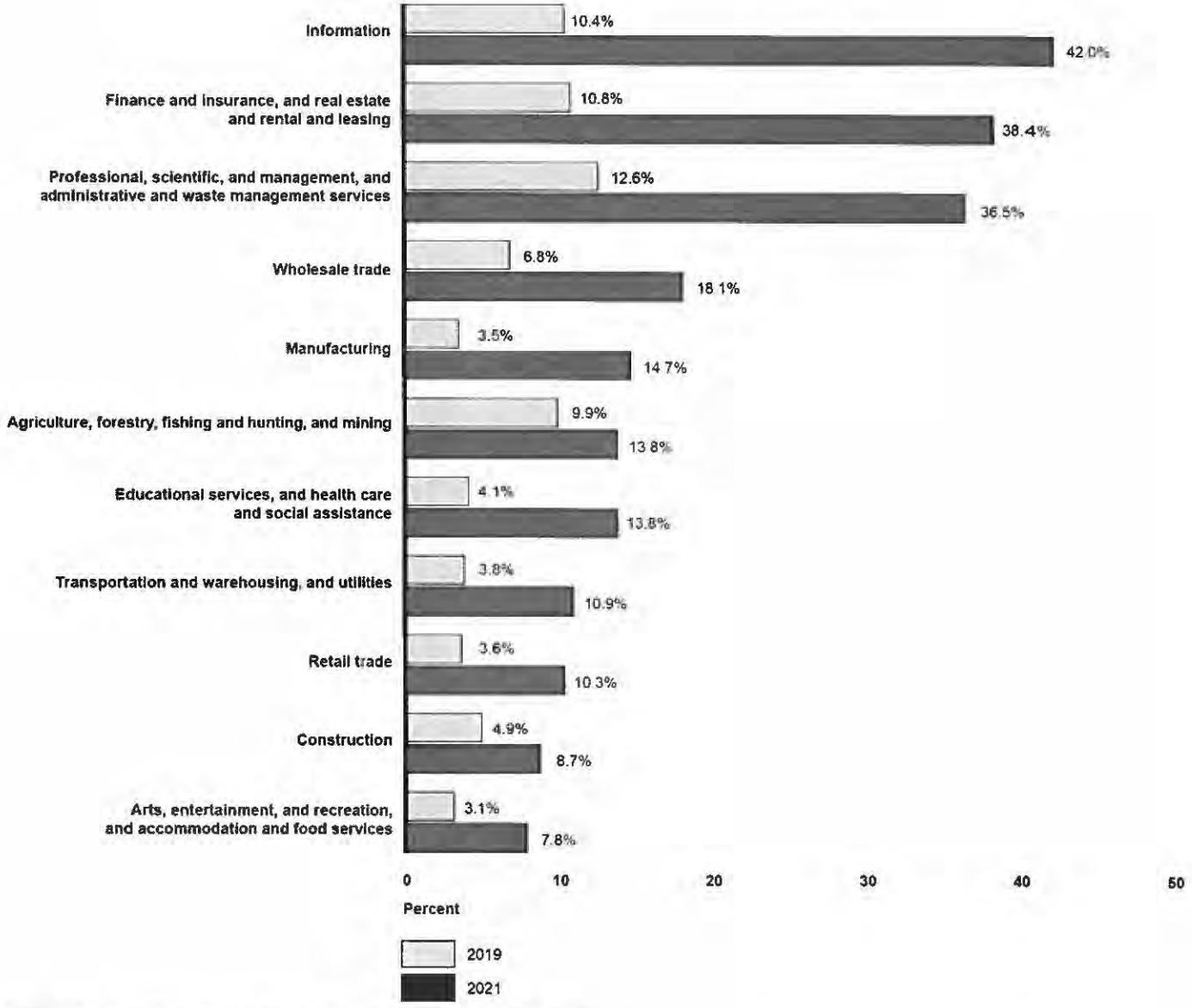
others.[14] For example, in 2019, the estimated percentage of workers who primarily teleworked was under 5 percent in six out of 11 major industries.[15] In particular, about 3.5 percent of workers in the manufacturing industry primarily teleworked—since many jobs in manufacturing do not lend themselves to telework. In the remaining five industries, the percentage of workers who primarily teleworked ranged from an estimated 7 percent (in wholesale trade) to an estimated 13 percent (in the professional, scientific, and management services industries) (see fig. 4). Thus, even in those industries with the highest rates of telework, close to 90 percent of workers did not primarily telework.

Well after the onset of the COVID-19 pandemic, in 2021, over one-third of workers in the three industries with the highest rates of telework primarily teleworked. Specifically, an estimated 42 percent of workers in the information industry teleworked, as well as an estimated 38 percent of workers in the finance, insurance, and real estate and rental and leasing industry (see fig. 4). In contrast, less than 10 percent of workers in some industries (such as the construction industry, and the arts, entertainment, recreation, and accommodation and food services industry) primarily teleworked in 2021.

[14]For our analyses of telework by industry, we measured telework using the ACS, our more conservative measure of telework. Where possible, we used the ACS measure to analyze the variation in telework prevalence across groups because it does not include incidental telework. For more information, see Appendix I. In addition to the findings of cross-industry variation presented here, it is important to note the prevalence of within-industry variation also. BLS's *2021 Business Response Survey* found variation of prevalence of telework within the same industry. For example, businesses paying a high average wage in the same industry used more telework than those paying a lower wage. See Michael Dalton and Jeffrey A. Groen, "Telework during the COVID-19 Pandemic: Estimates using the 2021 Business Response Survey," *Monthly Labor Review* (Bureau of Labor Statistics, March 2022).

[15]Industries are broad groupings of firms that are grouped together based on the type of product or service that the firms create. Thus, many different types of jobs exist within each industry. For example, the construction industry contains all workers who are employed by construction firms; this includes workers physically involved in construction, as well as the managers, office support staff, and other workers who are employed by construction firms. We report on 11 major industries in this report. We do not include data on public administration and armed forces in our figures, because the focus of this objective is the private sector civilian labor force. However, for reference, in the public administration industry category, the percentage of workers who primarily worked from home rose from 3 percent in 2019 to 19.8 percent in 2021. We excluded the "other services" category because it is a miscellaneous category that contains workers employed in widely varied industries.

Figure 4: Estimated Percentage of Workers Who Primarily Worked from Home during the Week, by Industry, 2019 and 2021



Source: GAO analysis of Census Bureau's American Community Survey data | GAO-23-105999

Note: Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the American Community Survey (ACS) 2020 1-year data failed to meet Census Bureau's statistical quality standards. Respondents are identified as teleworking based on their response to a question about their primary means of transportation to work over the past week. Respondents who replied "worked from home" are classified as teleworkers. All changes from 2019 to 2021 are statistically significant. American Community Survey industry categories are defined in the ACS 2021

code list in this document on pages 32- 41: https://www.census.gov/programs-surveys/acs/technical-documentation/code-lists.html. The following industries are not included in this figure: public administration, armed forces, and other services (excluding public administration). We excluded public administration and armed forces because the focus of this report is the private sector civilian labor force. We excluded the "other services" category because it is a miscellaneous category that contains workers employed in widely varied industries. Margins of error for all estimates in this figure are within +/- 0.8 percentage points.

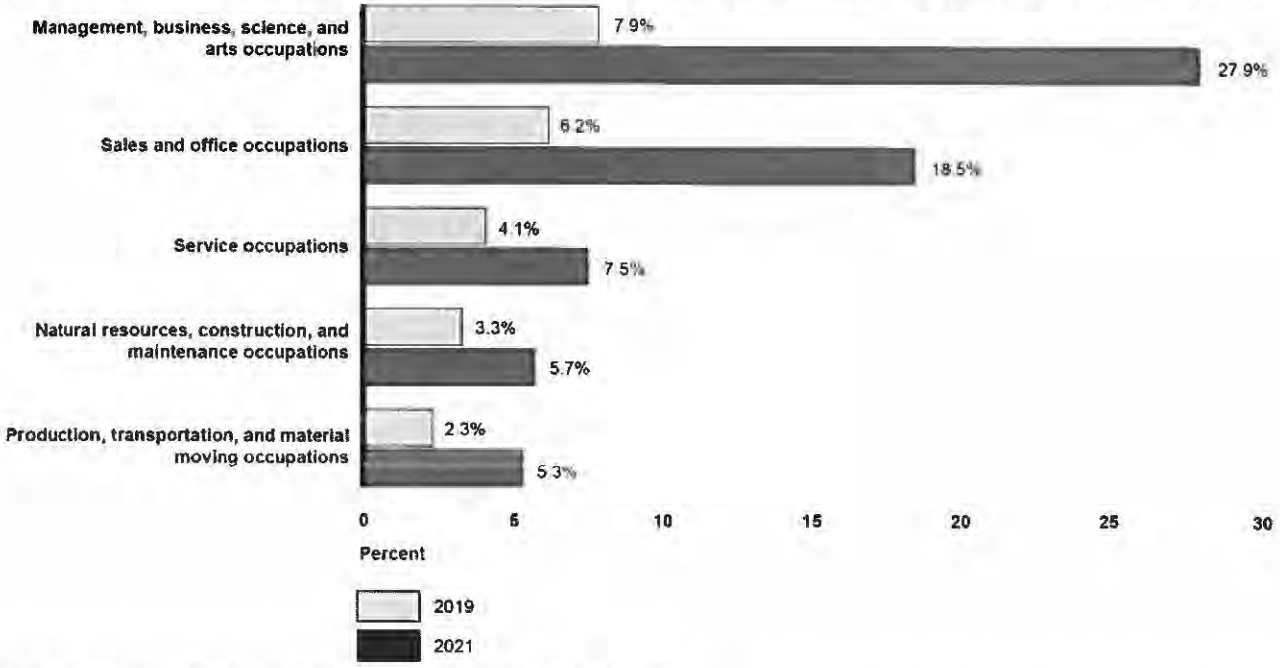
Occupation

Rates of telework also increased across all occupations between 2019 and 2021, but certain occupations experienced much greater growth than others.[16] Prior to the pandemic, in 2019, the percentage of workers who primarily worked from home ranged from an estimated 2 to 8 percent, depending on the broad occupational category.[17] The lowest rates of telework in 2019 were found among workers in production, transportation, and material moving—these occupations do not readily lend themselves to telework, as they rely heavily on the physical presence of workers. In 2021, only about 5 percent of workers in these occupations primarily worked from home. The highest rate of telework in 2019 was found in the broad occupational category that included management, business, science, and arts occupations. In this occupational category, almost 28 percent of workers primarily teleworked in 2021 after the onset of the COVID-19 pandemic (see fig. 5).

[16]For our analyses of telework by occupation we measured telework using ACS, our more conservative measure of telework. Where possible, we used the ACS measure to analyze the variation in telework prevalence across groups because it does not include incidental telework. For more information, see appendix I. It should be noted that occupations with low rates of telework are not necessarily characterized by work that is inherently difficult to perform from home; low rates of telework in individual firms or in specific occupations may reflect management priorities that are unrelated to how feasible it is to perform work from home, among other cultural- and preference-related issues.

[17]This analysis uses five broad occupational classifications because these are the categories that are available in the ACS public tables with data on primary mode of transportation to work, which was our source for identifying workers who primarily worked from home during the week. We excluded "military specific occupations" from this percentage because the focus of this objective is the private sector civilian labor force. These broad categories aggregate multiple finer occupational categories, likely masking considerable variation in telework penetration across finer occupational groups. In contrast to industries, occupations refer specifically to the kind of work that a person does on the job. Occupational groupings are more directly predictive of whether the jobs in that grouping are suitable to telework, compared to industrial groupings which reflect the type of output a firm creates.

Figure 5: Estimated Percentage of Workers Who Primarily Worked from Home during the Week, by Occupation, 2019 and 2021



Source: GAO analysis of Census Bureau's American Community Survey data. | GAO-23-105999

Note: Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the American Community Survey (ACS) 2020 1-year data failed to meet Census Bureau's quality standards for publication. Respondents are identified as teleworking based on their response to a question about their primary means of transportation to work over the past week. Respondents who replied "worked from home" are classified as teleworkers. All changes from 2019 to 2021 are statistically significant. We excluded "military specific occupations" from this figure because the focus of this objective is the private sector civilian labor force. American Community Survey occupation categories are defined in this document on pages 78-92 https://www2.census.gov/programs-surveys/acs/tech_docs/code_lists/2021_ACS_Code_Lists.pdf. Margins of error for all estimates in this figure are within +/- 0.16 percentage points.

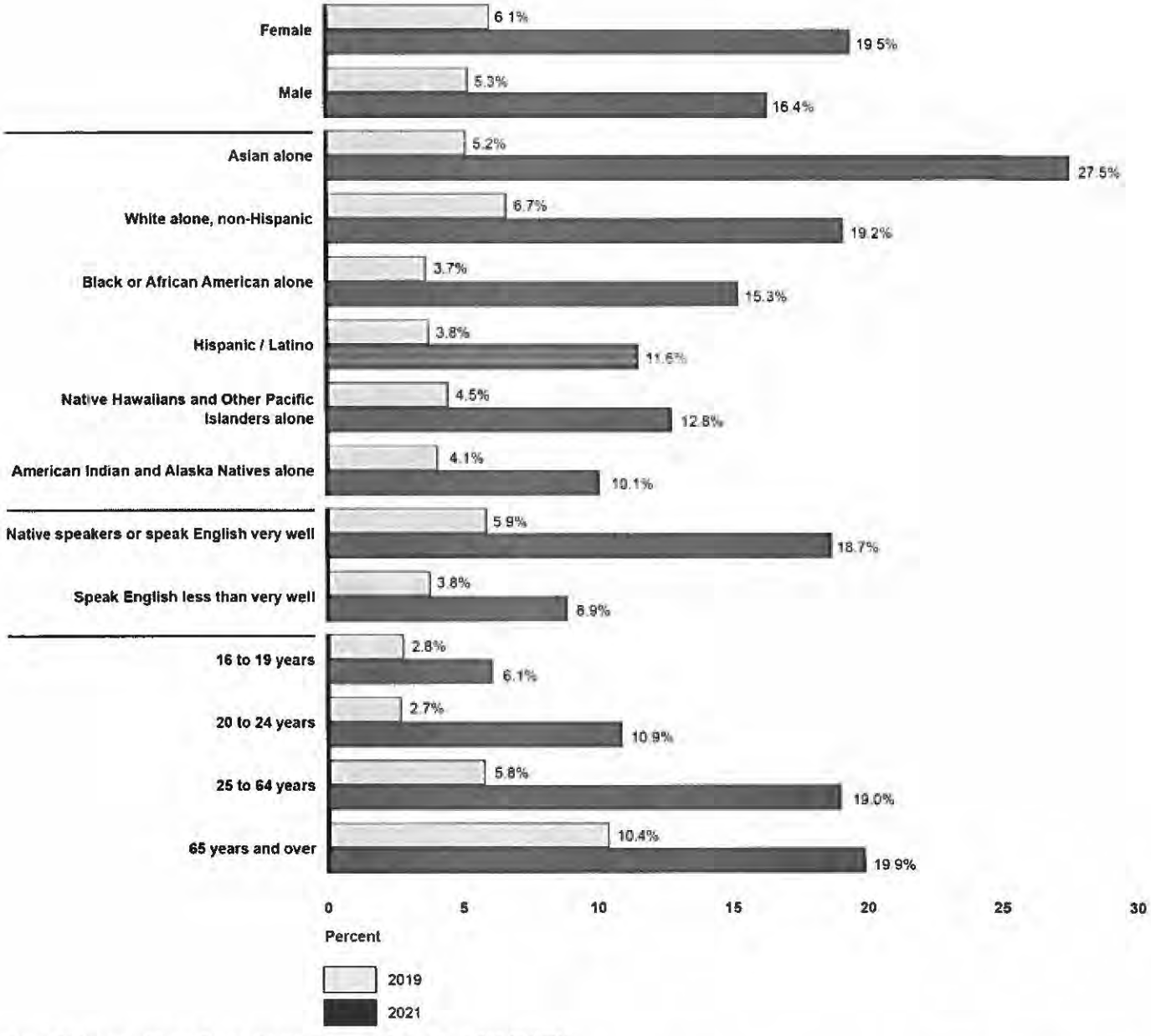
Prevalence of Telework Varied by Race, Ethnicity, and Other Demographic Characteristics

The onset of the pandemic created large gaps in the prevalence of telework across workers of different genders, races, ethnicities, ages, and other demographic characteristics that had not been present before the

pandemic.[18] For example, an estimated 20 percent of women and 16 percent of men primarily teleworked in 2021, compared to about 6 percent and 5 percent, respectively in 2019 (see fig. 6). By race and ethnicity, an estimated 28 percent of Asian workers primarily teleworked in 2021, compared to an estimated 19 percent of White workers (who are not Hispanic or Latino), and an estimated 15 percent of Black or African American workers; in all other groups 13 percent or less primarily teleworked. In contrast, prior to the pandemic in 2019, there was only about a 1 to 1.5 percent gap between the percent of Asian workers who primarily teleworked, and any other racial or ethnic group. Figure 6 provides further illustrations of differences in telework across other demographic characteristics.

[18]For our analyses of telework by demographic characteristics, we measured telework using the ACS, our more conservative measure of telework. Where possible, we used the ACS measure to analyze the variation in telework prevalence across groups because it does not include incidental telework. For more information, see appendix I. In this report, we use the terms "women" and "men" to describe female and male workers, and we use the term "gender" rather than "sex." The ACS data we analyzed includes demographic information based on sex as defined by female and male and does not include additional information on gender identity.

Figure 6: Estimated Percentage of Workers Who Primarily Worked from Home during the Week, by Gender, Race, Ethnicity, Language at Home, and Age, 2019–2021



Source: GAO analysis of Census Bureau's American Community Survey data | GAO-23-105999

Note: Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the American Community Survey (ACS) 2020 1-year data failed to meet Census Bureau's quality standards for publication. Respondents are identified as teleworking based on their response

to a question about their primary means of transportation to work over the past week. Respondents who replied "worked from home" are classified as teleworkers. All changes from 2019 to 2021 are statistically significant. The "White" category in this figure refers specifically to people who are White alone (no other race), and non-Hispanic. The "African American", "Asian", "American Indians and Alaska Natives", and "Native Hawaiians and other Pacific Islanders" categories each refer to people who report that race group and no other. The "Hispanic/Latino" category includes people who may be of any race. These categories are not mutually exclusive, because each race group (except for White alone, non-Hispanic) may include Hispanic and non-Hispanic people. Respondents reporting "some other race" and respondents who reported two or more races are excluded from this figure due to significant changes in how the multi-racial population was surveyed between 2019 and 2021. Margins of error for all estimates in this figure are within +/- 0.6 percentage points, except for the estimate for Native Hawaiians and other Pacific Islanders, which has a maximum margin of error of +/-1.5 percentage points. See appendix I for more information.

Studies Found Telework Generally Had a Positive Impact on Worker Productivity and Firm Performance in Certain Settings, but Long-term Impacts Are Uncertain

Studies on Telework before the COVID-19 Pandemic Found a Modest Increase in Worker Productivity in Certain Industries

Eight studies we reviewed found a modest increase in worker productivity from telework in certain settings, primarily prior to the COVID-19 pandemic, using a number of different measurements.[19] For example, a study that used objective measurements to assess the impact of telework on productivity of a Chinese call center found that productivity as measured by calls resolved increased by 13 percent.[20] In addition, a

[19]We found that these eight studies, from among the 44 we reviewed, had a strong research design that would allow the researchers to assess the causal impacts of telework on worker productivity. We also identified 19 other studies that examined the impacts of telework on worker productivity. However, we do not include the findings of those studies in this section because they lacked causal research design as described for the eight studies. We also do not include findings from the 17 remaining studies because they did not focus on the impacts of telework on worker productivity, and for other reasons. Appendix I provides more details on the methodology we used to review the studies we identified.

[20]Nicholas Bloom, James Liang, John Roberts, and Zhichun Jenny Ying, "Does Working from Home Work? Evidence from a Chinese Experiment," *The Quarterly Journal of Economics* (2015): 165-218. A study of a U.S. call center released in 2021 also found that telework increased the productivity of call center employees. Natalia Emanuel and Emma Harrington, "Working remotely? Selection, Treatment and the Market Provision of Remote Work." Working Paper (April 2021): 1-83. The researchers issued a revised version of this paper in May 2023, using data from a different time period, and found in this case that telework decreased productivity. We did not include this new version in our report because the publication date of May 2023 fell outside our date range and because the updated version focused on telework during the COVID-19 business closures. We discuss specific challenges associated with estimating the impact of telework on worker productivity during the early months of COVID-19 later in this report.

survey fielded in Great Britain found a positive relationship between teleworking and manager-assessed productivity for workers.[21]

Also, some of the eight studies examined workers who teleworked some days and worked on-site other days, and found that this type of work arrangement slightly enhanced worker productivity. For example, a study of a large U.S. government agency used subjective self-reported productivity measures to compare the performance of hybrid workers on their at-home and in-office days. The study found that workers reported higher levels of job performance on telework days compared to the days when they were working in the office.[22]

Another study examining telework in a large Chinese travel agency found that computer engineers who were randomly assigned the option to work from home up to 2 days a week wrote 8 percent more lines of code relative to those who were not provided this option. The study also found that there was no impact on the performance reviews for workers who were allowed to telework. Additionally, the study found that the engineers reported that their productivity rose by 1.8 percent on average compared to the peers who were not teleworking.[23]

In addition, all eight of the studies analyzed the impact of a particular telework policy in a specific context, and findings may not generalize to

[21]Eleftherios Giovanis, "The Relationship Between Flexible Employment Arrangements and Workplace Performance in Great Britain," *International Journal of Manpower*, vol. 39, no. 1 (2018): 51-70.

[22]Ronald P. Vega, Amanda Anderson, and Seth A. Kaplan, "A Within-Person Examination of the Effects of Telework," *Journal of Business Psychology*, 30 (2015): 313-323.

[23]Nicholas Bloom, Ruobing Han, and James Liang, "How Hybrid Working from Home Works out" (NBER Working Paper 30292, National Bureau of Economic Research, Cambridge, Mass., July 2022), 1-47. Similarly, a study in a life sciences firm in the United Kingdom found that the option to work remotely increased self-reported productivity relative to when the same workers did not have that option. See Eliot L. Sherman, "Discretionary Remote Working Helps Mothers Without Harming Non-Mothers: Evidence from a Field Experiment," *Management Science*, vol. 66, no. 3 (March 2020): 1351-1374.

other occupations or settings.[24] For example, occupations may differ in how telework impacts essential job tasks. However, collectively these studies demonstrate the potential for a full-time or hybrid telework arrangement to enhance productivity in a number of specific settings. In the studies, productivity gains were attributed to factors such as quieter workspaces and fewer distractions, more flexibility in scheduling, or increased motivation and effort.

Studies Found That Firms with Greater Ability to Allow Workers to Telework Were More Resilient during the COVID-19 Pandemic

We identified seven studies examining the relationship of telework and firm performance during the COVID-19 pandemic.[25] All of these studies found that firms with greater ability to allow workers to telework were more resilient during the pandemic, and that telework mitigated the negative impact of the pandemic on firm performance.[26] We were unable to identify a sufficient number of studies that allowed us to report on the impacts of telework on firm performance before the COVID-19 pandemic (see appendix I for more details on our scope and methodology). Studies on the impact of telework on firm performance during the COVID-19 pandemic generally used firm or industry-level data on firm productivity or output to assess the extent to which telework mitigated losses that might have occurred due to the closure of non-essential businesses and stay-at-home orders.

While the overall U.S. economic output fell during the start of the pandemic, the ability for workers to telework buttressed certain industries and enabled output to be maintained at substantially higher levels than would have been possible without telework. In the U.S., gross domestic

[24]For example, a study found a telework arrangement that allowed employees to fully telework, unconstrained by the geographic area of the employer, resulted in an increased work output by 4.4 percent for patent examiners in the U.S. when these examiners were given the option to telework from anywhere compared to those teleworking without permission to relocate. Prithwiraj (Raj) Choudhury, Cirrus Foroughi, and Barbara Larson, "Work from Anywhere: The Productivity Effects of Geographic Flexibility," *Strategic Management Journal*, 42 (2021): 655-683.

[25]As noted earlier, the other 37 studies focused on the impacts of telework on worker productivity.

[26]For the definition of resiliency and other details, see GAO, *Disaster Resilience Framework: Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters*, GAO-20-100SP (Washington, D.C.: Oct. 23, 2019).

product declined by 9 percent in the second quarter of 2020.[27] In addition, total hours worked declined by 11.7 percent in the second quarter compared to the previous quarter.[28] One of the seven studies we reviewed estimated that telework mitigated decline in gross domestic product during the recession that occurred during the early months of the COVID-19 pandemic to half of what it would have been.[29] The greatest reductions in output and hours worked were among workers earning lower wages, where workers were not able to substitute telework for in-location hours.[30]

In addition, several of these studies we reviewed found that firms and industries less able to use telework experienced greater declines in key economic indicators such as output, firm productivity, firm stock market performance, and increase in likelihood of firm default.[31] These studies compared the performance of firms or industries in the U.S. with a greater ability to telework (for example, the information and technology industry) to those with less ability to telework (such as the hospitality industry).

One study found that firms with high pre-pandemic telework levels had higher resilience to the pandemic and fared significantly better than firms with lower pre-pandemic telework levels. Specifically, firms with high pre-pandemic telework levels had roughly 15 percent higher net incomes, 4

[27]Gross domestic product is the total value of goods and services produced in the United States. The National Bureau of Economic Research (NBER) declared a recession from February 2020 to April 2020. The NBER traditionally defines a recession as a significant decline in economic activity that is spread across the economy and that lasts more than a few months.

[28]Klaas de Vries, Abdul Erumban, and Bart van Ark, "Productivity and the Pandemic: Short-Term Disruptions and Long-Term Implications: The Impact of the COVID-19 Pandemic on Productivity Dynamics by Industry," *International Economics and Economic Policy*, 18 (2021): 541-570.

[29]Janice C. Eberly, Jonathan Haskel, and Paul Mizen, "'Potential Capital', Working from Home, and Economic Resilience" (NBER Working Paper 29431, National Bureau of Economic Research, Cambridge, Mass., October 2021), 1-39.

[30]Nicholas Bloom, Philip Bunn, Paul Mizen, Pawel Smietanka, and Gregory Thwaites, "The Impact of COVID-19 on Productivity." According to the Bureau of Labor Statistics, people employed in service occupations, particularly personal care and service occupations and food preparation and serving-related occupations, were among the most likely to have been unable to work due to the pandemic in July 2020. https://www.bls.gov/cps/effects-of-the-coronavirus-covid-19-pandemic.htm.

[31]Firm default risk refers to the risk that a borrower is unable to make required payments on debt obligations.

percent higher sales, and better stock market performance—measured by stock returns and volatility.[32]

Other studies found that firms with lower pre-pandemic telework levels had slight increases in default probability over the next 6 months, larger declines in operating revenue and stock market performance, and lower cash flow, among other outcomes.[33]

In addition to the seven studies, we identified one study that conducted a large survey of managers and workers from 25 countries about their beliefs on how telework was impacting firm performance. This study found that both managers and workers had an overall positive view of the impact of telework on firm performance during the COVID-19 pandemic.[34]

Methodological Challenges Complicate Efforts to Assess the Long-term Impacts of Telework on Worker Productivity and Firm Performance

Several methodological challenges make it difficult to assess the long-term impacts of telework on worker productivity and firm performance. These challenges include the ability to measure outputs from varying types of jobs, separating impacts of telework from those of other macroeconomic events on worker productivity and firm performance, and confounding factors associated with the rapid expansion of telework during the COVID-19 pandemic.

Job Type

Measuring productivity for certain jobs is inherently difficult, especially for jobs in the knowledge economy that do not have tangible or concrete outputs. Worker productivity is generally defined as output per worker per hour. While some jobs lend themselves to such a measurement, others do not. For example, when analyzing productivity within a call center,

[32]This study compared firms with high pre-pandemic telework levels to firms with low levels to see whether they performed differently from each other while accounting for other factors such as firm size. John (Jianqiu) Bai, Erik Brynjolfsson, Wang Jin, Sebastian Steffen, and Chi Wan, "Digital Resilience: How Work-from-Home Feasibility Affects Firm Performance" (NBER Working Paper 28588, National Bureau of Economic Research, Cambridge, Mass., March 2021), 1-37.

[33]Dimitris Papanikolaou and Lawrence D.W. Schmit, "Working Remotely and the Supply-Side Impact of COVID-19" (NBER Working Paper 27330, National Bureau of Economic Research, Cambridge, Mass., June 2020), 1-41; Ting Zhang, Dan Gerlowski, and Zoltan Acs, "Working from Home: Small Business Performance and the COVID-19 Pandemic," *Small Business Economics*, vol. 58 (2022): 611-636.

[34]Chiara Criscuolo, Peter Gal, Timo Leidecker, Francesco Losma, and Giuseppe Nicoletti, "The Role of Telework for Productivity During and Post COVID-19: Results from an OECD Survey among Managers and Workers" (OECD Productivity Working Papers 31, OECD Publishing, Paris, France, December 2021), 1-64.

researchers have used the number of calls per hour. Similarly, when analyzing productivity for computer engineers, researchers have used lines of code written.

However, some jobs do not have clearly defined hourly output, such as a scientific researcher producing research that informs product development over years and decades, making measuring productivity for these jobs difficult. For jobs without clearly defined outputs, productivity could be assessed by a survey of workers, but self-reported productivity collected this way is subjective. In particular, workers may conflate working long hours with being highly productive, rather than assessing output on an hourly basis.

Separating Impacts of Telework from Other Macroeconomic Events

It has been difficult to disentangle the impact of telework from the impact of other macroeconomic events, such as the recession during the COVID-19 pandemic. For example, during the early months of the COVID-19 pandemic, the workforce composition changed because workers with the lowest productivity were more likely to be laid off or lose hours of work.[35] Measured labor productivity increased during the early months of the COVID-19 pandemic because the reduction in hours worked was larger than the reduction in economic output.[36] Moreover, some changes in measured worker productivity or firm performance during the COVID-19 pandemic could be attributed to changes in employment composition rather than telework. For this reason, studies of how telework impacted worker productivity or firm performance during the COVID-19 recession may not be generalizable to other time periods with different macroeconomic conditions.

Confounding Factors due to Rapid Expansion of Telework during COVID-19

We found that specific challenges related to telework during the pandemic influenced measures of worker productivity and may not apply to telework in a non-pandemic setting. The COVID-19 pandemic led to a rapid expansion of telework, during which many firms suddenly transitioned workers from office to telework. Surveys of worker productivity fielded during the pandemic primarily relied on measures of self-assessed or

[35]Bloom, Bunn, Mizen, Smietanka, and Thwaites, "The Impact of COVID-19 on Productivity."

[36]De Vries, Erumban, and van Ark, "Productivity and the Pandemic: Short-Term Disruptions and Long-Term Implications."

manager-assessed productivity, and these studies had inconsistent results.

Some studies found that teleworkers reported being more productive, while others found teleworkers reported being less productive. For example, a survey of U.S. workers found increases in telework frequency were associated with higher self-perceived productivity per hour.[37] Conversely, a survey of four manufacturing companies in Japan found that productivity declined on average for teleworkers in all four companies.[38]

We identified many confounding factors from the pandemic that limit the generalizability of the results of these studies. Specific confounding factors we identified include:

- *Child care.* Some studies found that telework had a negative impact on parents relative to non-parents during the COVID-19 pandemic.[39] Respondents in one study specifically cited child care concerns as a challenge of working from home during the COVID-19 pandemic.[40]
- *Mental health.* Some studies reported that mental health was another challenge for workers during the COVID-19 pandemic that may also impact worker productivity.[41]
- *Work equipment.* Inadequate home office equipment and information technology issues were commonly cited as productivity concerns

[37]Jose Maria Barrero, Nicholas Bloom, and Steven J. Davis, "Why Working from Home Will Stick" (NBER Working Paper 28731, National Bureau of Economic Research, Cambridge, Mass., April 2021), 1-68.

[38]Ritsu Kitagawa, Sachiko Kuroda, Hiroko Okudaira, and Hideo Owan, "Working from Home and Productivity under the COVID-19 Pandemic: Using Survey Data of Four Manufacturing Firms," *PLOS ONE*, vol. 16, no. 12 (2021).

[39]Sumit S. Deole, Max Deter, and Yue Huang, "Home Sweet Home: Working from Home and Employee Performance during the COVID-19 Pandemic in the UK" (GLO Discussion Paper 791, Global Labor Organization (GLO), Essen, Germany, 2021).

[40]Ben Etheridge, Li Tang, and Yikai Wang. "Worker Productivity during Lockdown and Working from Home: Evidence from Self Reports." ISER Working Paper Series 202-12. Institute for Social & Economic Research, University of Essex, October 2020, 1-31.

[41]Etheridge, Tang, and Wang, "Worker Productivity during Lockdown and Working from Home." See also Darja Smite, Anastasiia Tkalich, Nils Brede Moe, Efi Papatheocharous, Eriks Klotins, Marte Pettersen Buvik, "Changes in Perceived Productivity of Software Engineers during the COVID-19 Pandemic: The Voice of Evidence," *The Journal of Systems & Software*, vol. 186 (2022): 1-14.

during the COVID-19 pandemic among surveyed teleworkers in the studies we reviewed.[42]

- *Change in work responsibilities.* Another study reported that a reason for lower productivity was that some workers were assigned less work during the COVID-19 pandemic.[43]
- *Number of hours worked.* Hours worked is a key input for labor productivity statistics, but actual hours worked can be difficult to track since they may differ from contractual hours, particularly when working from home. A common theme among the COVID-19 studies is that many workers reported working more hours than when they were working from the office before the COVID-19 pandemic.[44] Thus some of the self-reported productivity gains may be attributable to longer work days, rather than true increases in per-hour productivity.

In light of these confounding factors, studies examining the impacts of telework on worker productivity during the COVID-19 pandemic should be interpreted with the understanding that their results could be affected by the pandemic. In fact, one study using survey data from the United Kingdom found productivity decreases during the pandemic—even among those who teleworked both before and during the pandemic—suggesting that the COVID-19 pandemic caused a negative impact on worker productivity.[45]

[42]Ritsu Kitagawa, Sachiko Kuroda, Hiroko Okudaira, and Hideo Owan, "Working from Home and Productivity under the COVID-19 Pandemic"; Smite, Tkalich, Moe, Papatheocharous, Klotins, and Buvik, "Changes in perceived productivity of software engineers during the COVID-19 Pandemic"; Masayuki Morikawa, "Work-from-Home Productivity during the COVID-19 Pandemic: Evidence from Japan," *Economic Inquiry*, vol. 60, no. 2 (2022): 508-527.

[43]Etheridge, Tang, and Wang, "Worker Productivity during Lockdown and Working from Home."

[44]Mohamad Awada, Gale Lucas, Burcin Becerik-Gerber, "Working from Home during the COVID-19 Pandemic: Impact on Office Worker Productivity and Work Experience," *Work*, vol. 69, no. 4 (2021): 1171-1180; Michael Gibbs, Friederike Mengel, and Cristoph Siemroth, "Work from Home & Productivity: Evidence from Personnel & Analytics Data on IT Professionals," *Journal of Political Economy Microeconomics*, Forthcoming (March 2022).

[45]Etheridge, Tang, and Wang, "Worker Productivity during Lockdown and Working from Home."

Current Research Highlights Important Uncertainties about the Impact of Telework on Worker Productivity and Firm Performance in the Long Run

The 44 studies we reviewed found that telework affected how employees work and how employers operate. However, whether and how many of these effects may impact worker productivity or firm performance would likely not yet be evident in more recent changes in the prevalence of telework.[46] For example, studies we reviewed found that telework might affect employee turnover and recruitment or firms' office needs. One of the studies found that telework reduced employee attrition and generated cost savings in floor space needs for a Chinese call center.[47]

Several of the studies also found that telework may allow firms to recruit from greater geographic areas, thus drawing from a wider pool of talent and potentially improving the match between jobs and hires. Additionally, several of the studies also found that workers perceive telework as an employee benefit.[48] By helping firms recruit and retain workers best suited for the jobs, telework could improve productivity and firm performance.

However, some other studies have found that telework may result in less innovation or impede collaboration, which could result in reduced productivity or firm performance over time. A field experiment found that workers generated fewer novel ideas when brainstorming over videoconference compared to workers who were brainstorming within the same room.[49] Another study found that professional chess players displayed reduced cognitive performance when competing from home as compared to tournaments on site.[50] In addition, two studies identified

[46]The impacts of factors on productivity may also change over time. Specifically, some studies found that workers reported increases in productivity for later time periods relative to earlier time periods, suggesting there may be a transition period after which some of these negative impacts may diminish. For example, see Smite, Tkalich, Moe, Papatheocharous, Klotins, and Buvik, "Changes in perceived productivity of software engineers during the COVID-19 Pandemic."

[47]Bloom, Liang, Roberts, and Ying, "Does Working from Home Work?"

[48]Michael Dalton and Jeffrey A Groen, "Telework during the COVID-19 Pandemic." Cevat Giray Aksoy, Jose Maria Barrero, Nicholas Bloom, Steven J. Davis, Mathias Dolls, and Pablo Zarate, "Working from Home Around the World" (NBER Working Paper 30446, National Bureau of Economic Research, Cambridge, Mass., September 2022).

[49]Melanie S. Brucks and Jonathan Levav, "Virtual Communication Curbs Creative Idea Generation," *Nature*, vol. 605 (April 2022): 108-112.

[50]Steffen Kunn, Christian Seel, and Dainis Zegners, "Cognitive Performance in Remote Work Evidence from Professional Chess," *The Economic Journal*, vol. 132 (April 2022): 1218-1232.

potential challenges with collaboration and teamwork for teleworking employees.[51]

A survey of managers across 25 countries reported manager concerns about training staff remotely and reduced on-the-job learning, and that the teleworking environment was less innovative and creative. The same study also found that a majority of managers surveyed believed that "excessive" levels of telework could decrease collaboration between team members, thereby hampering firm-level productivity growth in the long run.[52]

The current state of research on the impact of telework on productivity and firm performance has important gaps across occupations, industries, and effects that may emerge only over the longer term. Current research suggests some promising opportunities for workers and firms in certain occupations and sectors to benefit from telework. Research also suggests additional economic and workforce impacts that are not yet well understood. Evolving remote work practices, new measures of productivity, and future research could illuminate key opportunities and challenges associated with telework, including how new technologies and business practices might best harness the benefits and manage challenges from the growth of telework across the economy.

Agency Comments and Our Evaluation

We provided a courtesy copy of our draft report to the Department of Labor, the Office of Management and Budget, and the Office of Personnel Management, and invited them to provide comments. All three agencies provided no comments.

[51]Gibbs, Mengel, and Siemroth, "Work from Home & Productivity"; Smite, Tkalich, Moe, Papatheocharous, Klotins, and Buvik, "Changes in Perceived Productivity of Software Engineers during the COVID-19 Pandemic."

[52]Criscuolo, Gal, Leidecker, Losma, and Nicoletti, "The Role of Telework for Productivity during and Post COVID-19."

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees and the Acting Secretary of Labor, Director of the Office of Management and Budget, and Director of the Office of Personnel Management. In addition, the report will be available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have any questions about this report, please contact us at (202) 512-6445 or hoffmanme@gao.gov, or (202) 512-7215 or sawyerj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

Michael Hoffman
Director
Center for Economics
Applied Research and Methods

John D. Sawyer
Director
Education, Workforce, and Income Security

Appendix I: Objectives, Scope, and Methodology

This report examines (1) changes in the extent of telework in the United States before and during the pandemic, and (2) reported impacts of teleworking on worker productivity and firm performance. For this report, the term telework refers to a flexible work arrangement under which employees perform their duties from a worksite—often at home—other than the location from which they would otherwise work.

Methodology to Examine the Extent of Telework in the United States

Telework is implemented through a variety of work arrangements, and is measured in a variety of ways. In this report we present data from two national datasets that allow us to describe trends in the use of telework from 2010 through 2021, the most recent data available at the time that we completed our analysis in May 2023, and the growth of telework by selected worker characteristics between 2019 and 2021, the time period in which the COVID-19 pandemic began: (1) Bureau of Labor Statistics' (BLS) *American Time Use Survey* (ATUS); and (2) *Bureau of Census' American Community Survey* (ACS).[1] We selected these datasets based on reviews of relevant literature and interviews with BLS subject matter experts.[2]

We limited our data sources to nationally representative datasets from federal statistical agencies because they are widely used by researchers, and we determined that they are sufficiently reliable for our reporting

[1]The annual American Time Use Survey (ATUS), sponsored by the Bureau of Labor Statistics and conducted by the Census Bureau, provides annual, nationally representative estimates of the amount of time people spend doing various activities such as paid work, child care, volunteering, and socializing. For this report, we use ATUS's measure of the percentage of respondents who worked from or near their home for any amount of time on the previous day. The Census Bureau's American Community Survey (ACS) is a national survey that annually collects population and housing information from a random sample of about 3.5 million households. For this report, we use ACS's measure of the percentage of workers who primarily worked from home over the past week.

[2]We identified and interviewed three BLS researchers based on peer-reviewed studies we identified through our literature search: Matthew Dey, Harley Frazis, and Sabrina Pabilonia. For example, see 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* (Bureau of Labor Statistics, June 2020), https://doi.org/10.21916/mlr.2020.14; Matthew Dey, Harley Frazis, David S. Piccone Jr, and Mark A. Loewenstein, "Teleworking and lost work during the pandemic: new evidence from the CPS," *Monthly Labor Review* (Bureau of Labor Statistics, July 2021), https://doi.org/10.21916/mlr.2021.15; S.W. Pabilonia and V. Vernon "Telework and Time Use" (Institute of Labor Economics Discussion paper No. 14827, November 2021).

objective after we reviewed technical documents and assessed the reliability of the two databases according to GAO internal data guidance.[3] Data from these surveys represented the most recent data available at the time of our review.[4] Our analysis excluded ATUS and ACS data from 2020 because the ACS 2020 year data and ATUS 2020 annual estimates failed to meet Census Bureau's quality standards for publication due to the impact of the COVID-19 pandemic on data collection. To assess the reliability of these datasets, we interviewed BLS subject matter experts. We also performed analyses using different measures of telework from ATUS, and compared our results with peer-reviewed studies and official reports such as those from BLS to ensure the robustness and consistency of our results.[5]

American Community Survey

The ACS is a national survey that annually collects population and housing information from a random sample of about 3.5 million households.[6] From the ACS, we used the percentage of workers who primarily worked from home during the week as the measure of telework. We defined workers who primarily worked from home during the *week (or primarily teleworked)* as those who reported "work from home" in response to the question "how did you usually get to work in the last week?"[7] The ACS measure provides a conservative estimate of the number of teleworkers because it only captures information about people who primarily work at home, not those who do so on an occasional basis.

The ACS also includes questions about the respondent's employment and demographic characteristics, such as their employer's type of business or industry, their main occupation, their race and ethnicity, their

[3]GAO, *Assessing Data Reliability*, GAO-20-283G (Washington, D.C.: December 2019).

[4]We initially also identified other data sources such as BLS's Current Population Survey (CPS) supplemental monthly data measuring the effects of the COVID-19 pandemic on the labor market from May 2020 through June 2022. However, we decided not to use CPS because CPS is becoming less representative of our target population as increasingly fewer respondents telework due to the COVID-19 pandemic.

[5]See appendix II for more information about our analyses using alternative measures of telework.

[6]The primary purpose of the ACS is to measure characteristics of the U.S. population. Some tables in the ACS cover the entire population, while some cover only a subset of the population (such as tables of employment status, which include data only for the population age 16 and older).

[7]The ACS question on the method of transportation usually used to get to work was asked of respondents ages 16 and over who were employed and at work in the previous week.

age, and how well they speak English. We used the ACS measure to analyze the variation in telework prevalence across groups because it does not include incidental telework—work performed at home that is not replacing work that would otherwise occur at a primary worksite, for example, a teacher who brings papers home to grade after school, or an office worker who checks email for half an hour in the evening.[8] Moreover, incidental telework could obscure differences across groups.[9] However, we were unable to use the ACS to report telework rates by education, as the published ACS tables did not contain educational attainment. In addition, we chose not to use the ACS to report telework rates by earnings because the ACS data captures annual earnings of full-time and part-time workers, as well as self-employed workers, which makes comparisons across earnings groups difficult to interpret.

To determine the growth of telework between 2019 and 2021 for different groups of workers, we developed estimates for the percentage of workers who primarily teleworked across the following groups:[10]

- **Industry.** Our analysis included 11 ACS industry categories, such as information, manufacturing, and retail trade, and the professional, scientific, and management services industries. We excluded the categories public administration and armed forces to focus this objective on the private sector civilian labor force.[11] We also excluded the category other services because it is a miscellaneous category that contains workers employed in widely varied industries.

[8]Incidental telework may often be unpaid, which is another way that it differs from non-incidental telework. The BLS researchers we interviewed stressed the importance of understanding and assessing the extent of incidental telework in our measures of telework by, to the extent possible, reporting on the extent to which work at home replaces work that is otherwise done in the office.

[9]This is important in our analysis of cross-group variation, because certain groups are more likely to perform incidental telework than other groups. For example, if incidental telework is higher among groups that have higher rates of non-incidental telework, then the capture of incidental telework would exaggerate differences across groups at any point in time; it may also underestimate the impact of the pandemic on telework rates among groups with high levels of incidental telework, because pre-pandemic telework levels would be inflated.

[10]All changes from 2019 to 2021 are statistically significant at the 95 percent level for all categories of workers we report unless otherwise noted.

[11]American Community Survey industry categories are defined in this document on pages 32-41: https://www2.census.gov/programs-surveys/acs/tech_docs/code_lists/2021_ACS_Code_Lists.pdf.

- **Occupation.** Our analysis included five ACS occupational categories: management, business, science, and arts occupations; sales and office occupations; service occupations; natural resources, construction, and maintenance occupations; and production, transportation, and material moving occupations. We excluded military specific occupations because the focus of this objective is the private sector civilian labor force.[12]
- **Race and ethnicity.** Our analysis of race and ethnicity categories included the following categories: non-Hispanic White alone, Hispanic/Latino, Black or African American alone, Asian alone, American Indian or Alaska Natives alone, and Native Hawaiians or Other Pacific Islanders alone. The "alone" categories include those respondents who reported only a single race entry, and no other race.[13] Our analysis of race by telework prevalence excluded respondents who reported Some Other Race and Two or More Races because of important changes to a survey question between 2019 and 2021; these respondents were not excluded from any other analyses in this report.[14]
- **Ability to speak English**. Our analysis of the ability to speak English is based on questions about languages spoken at home and how well someone speaks English. We include people who speak only English, or speak English very well, in addition to speaking some other language at home, into the category "Native speaker or speak English very well." We include all other people who speak a language other

[12]American Community Survey occupation categories are defined in this document on pages 78-92: https://www2.census.gov/programs-surveys/acs/tech_docs/code_lists/2021_ACS_Code_Lists.pdf.

[13]These categories are not mutually exclusive, as Black alone and Asian alone include Hispanic and non-Hispanic people. The Hispanic category incorporated Hispanics of all races.

[14]The Census Bureau changed the questions underlying their race and ethnicity measures in 2020 and changed the way it coded the results, and these changes had a substantial impact on certain estimates. Notably, there was a significant increase in the percentage of people coded as "two or more races" (from 2.7 percent in 2019 to 11.5 percent in 2021), and a substantial decrease in the percentage of people coded as "White alone" (from 73 percent to 63 percent). Changes to the underlying definition of a population group could make cross-year comparisons of telework rates invalid. Based on our assessment of the data, we determined that telework rates for the people coded as "two or more races" or "some other race" were not sufficiently reliable for our purpose. We also determined that telework rates for the White alone, non-Hispanic population were more reliable than telework rates for the White alone population. In our analysis of data from the ACS, the percentage of people coded as "White alone, non-Hispanic" only fell from 62 percent to 60 percent.

than English at home in the category "Speak English less than very well."

- **Sex.** The data include two sex categories: male and female.
- **Age.** Our analysis uses four age categories: (1) Age 16 to 19 years, (2) 20 to 24 years, (3) 25 to 64 years, and (4) 65 years and over.

American Time Use Survey

The American Time Use Survey (ATUS) provides continuous, nationally representative estimates of how, where, and with whom Americans spend their time. Individuals who are interviewed for the ATUS are randomly selected from a subset of households that have completed their eighth and final month of interviews for the Current Population Survey (CPS).[15] These individuals fill out a time use diary of their activities over a 24-hour period, which includes information about where and when people work—at their workplace, home, or another location.

From the ATUS, we use, as a measure of telework, the percentage of respondents who conducted work from their home for any amount of time on the previous day. We use this measure to present trends in telework over time, and we use this measure for our analyses of telework prevalence by education and earnings. This measure of telework likely overestimates the number of people who telework on an average day because it may include incidental telework and workers who spend any amount of time working at home, even if they spend only a few minutes a day, and even if the time spent working is unpaid.[16] In effect, this measure of telework captures the extent to which telework has become a part of daily life for a large segment of the working population. Moreover, this estimate of the number of people engaged in telework during an average day is lower than the number of people engaged in telework during an average week.

[15]The Current Population Survey is sponsored jointly by the Census Bureau and the Bureau of Labor Statistics and is the primary source of labor force statistics for the civilian non-institutional population of the United States. ATUS sample households are selected to ensure that estimates will be nationally representative. One individual age 15 or over is randomly chosen from each sampled household to be interviewed about his or her activities on the day before the interview. In 2021, the estimated annual sample size was 26,400 and the response rate was 39.4 percent, yielding approximately 10,400 completed interviews.

[16]The ATUS diary data do not allow researchers to identify whether work is paid or unpaid.

Thus, even this less conservative measure does not necessarily capture the full extent of people engaged in some telework during a typical week. In appendix II we also present supplemental information on telework intensity (hours spent working at home).

The ATUS survey includes additional questions about worker characteristics, including earnings and level of educational attainment.[17] We used data from these questions to determine the growth of telework between 2019 and 2021 across workers with different characteristics using the following data elements:

- **Earnings.** ATUS provides information on respondents' usual weekly earnings at their main job. Earnings data are restricted to full-time wage and salary workers with a single job. Estimates classify workers into earnings quartiles based on the distribution of weekly earnings among survey respondents (see table 1).[18]

Table 1: Earnings Quartiles for Usual Weekly Earnings of Full-time and Salaried Workers at Their Primary Job, 2019–2021

Earning quartiles	2019	2021
First quartile	$0–$650	$0–$690
Second quartile	$651–$1,000	$691–$1,080
Third quartile	$1,001–$1,620	$1,081–$1,730
Fourth quartile	$1,621 and above	$1,731 and above

Source: Department of Labor, Bureau of Labor Statistics News Release: American Time Use Survey (ATUS)–2021 Results, USDL-22-1261 (released on June 23, 2022) and Department of Labor, Bureau of Labor Statistics News Release: American Time Use Survey (ATUS)–2019 Results, USDL-20-1275 (released on June 25, 2020). | GAO-23-105999

- **Education.** The CPS survey obtains information about educational attainment for survey respondents 25 years or older through a question asking about the highest grade or degree completed. Our analysis includes four categories of educational attainment: less than high school diploma, high school graduates, some college or associate degree, and bachelor's degree or higher. All percentage

[17]The CPS survey obtains information about educational attainment through a question asking about the highest grade or degree completed. BLS links responses from the CPS to responses from the ATUS.

[18]The ATUS earnings data are limited to wage and salary workers (both incorporated and unincorporated self-employed workers are excluded). Each earnings range represents approximately 25 percent of full-time wage and salary workers who held only one job. BLS links responses from the CPS to responses from the ATUS, which is usually administered 2 to 5 months after the CPS; therefore, earnings data may be out of date for some respondents.

estimates we report are statistically significant at the 95 percent confidence level unless otherwise indicated.

Methodology to Examine the Impacts of Telework on Worker Productivity and Firm Performance

To better understand the impact of telework on worker productivity and firm performance, we conducted a review of relevant empirical research published between 2015 and 2022 that examined telework in the United States and abroad. We chose this time period to ensure an appropriate number of recent and relevant studies for further review. We conducted a total of four rounds of searches of various databases such as EconLit, Business Source Corporate Plus, and ProQuest Dialog using keywords such as "telework," "remote work," "work from home," "productivity," or "firm performance."[19] We also identified studies through other sources, such as those cited within the studies we reviewed. To ensure that we identified an appropriate number of relevant studies with strong causal research design, we included studies from the United States and other countries, with both public and private sector workers. We identified a total of 181 studies from these searches.

To assess the relevance of these 181 studies and reports, we reviewed their abstracts to determine whether they addressed the impacts of telework on measures of worker productivity such as hourly output or self-assessed work efficiency or firm performance such as firm sales, firm productivity, stock prices, or profitability. Furthermore, because we identified relatively fewer studies related to the impacts of telework on firm performance in the first three rounds of our literature search, we conducted a fourth round focusing on studies related to the impacts of telework on firm performance. However, we were unable to identify many additional studies related to the impacts of telework on firm performance. We determined 71 out of 181 studies to be relevant to our objective for further review.

The 71 shortlisted studies were then independently reviewed by two GAO economists to evaluate the quality and robustness of the methodology. We compared the economists' assessments and discussed and reconciled differences. For example, GAO examined the sample size and validity of the key outcome indicators, the rigor of the methodology, and the robustness of findings in the presence of any data or methodological limitations. We prioritized studies with a strong causal research design that would allow the researchers to assess the causal impacts of telework

[19]EconLit, Business Source Corporate Plus, and ProQuest Dialog are library databases that contain scholarly economic, business, and other more general trade literature.

on productivity or firm performance—for example, a research design that included an appropriate control group.

In our review, we found that some of these studies used experimental methods to assess the impacts of telework on productivity by randomly assigning workers to telework (treatment group) or work from the office (control group). Other studies estimated the impacts of telework on worker productivity by tracking a group of workers at multiple points in time and comparing their productivity when they were teleworking to when the same workers were working from their traditional worksite.

We excluded 27 of the 71 studies because we determined that their methodology was not sufficiently rigorous or because of other reasons, such as the studies were outside the scope of our review. For example, we excluded studies that used insufficient sample sizes, or studies that did not use valid measures of labor productivity in their analyses. We included the remaining 44 studies as supporting evidence for our findings in this report (see the list of studies in app. III). Out of the 44 studies, we identified seven studies examining the relationship of telework and firm performance during the COVID-19 pandemic, but we did not have a sufficient number of studies that met our criteria to allow us to report on the impacts of telework on firm performance before the COVID-19 pandemic.[20] This is because, as noted earlier, we were unable to identify additional studies in our fourth search round focusing on the impacts of telework on firm performance.

We used 31 of these 44 studies to provide primary supporting evidence for our findings of the impacts of telework on worker productivity and firm performance. We prioritized eight of 31 studies with the strongest research designs, and these eight studies focused on the impacts of telework on worker productivity. We also broadly summarized the findings of another 16 (out of 31) studies on the impacts of telework on worker productivity while noting potential limitations to their methodologies. For example, we found that some survey studies conducted during the

[20]We identified two studies that examined firm performance before the COVID-19 pandemic: one study, while primarily focused on estimating the impacts of telework on productivity of workers of a call center in China, also examined the productivity of the firm. See Nicholas Bloom, James Liang, John Roberts, and Zhichun Jenny Ying, "Does working from home work? Evidence from a Chinese Experiment," *The Quarterly Journal of Economics* (2015): 165-218. Another study examined managers' self-reported assessment of the financial performance of companies. See Eleftherios Giovanis, "The Relationship Between Flexible Employment Arrangements and Workplace Performance in Great Britain," *International Journal of Manpower*, vol. 39, no. 1 (2018): 51-70.

COVID-19 pandemic had research design limitations and did not isolate the impacts of telework on worker productivity from the impact of the COVID-19 pandemic itself. Lastly, we corroborated the contextual information provided by the 31 studies with another 13 studies to synthesize the potential long-term impacts of telework and the methodological challenges of assessing these long-term impacts. For example, these 13 studies provided examples of the challenges of measuring productivity or assessing impacts of telework in the longer run.

We conducted this performance audit from April 2022 to July 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Overview of Selected Alternative Measures of Telework

In this report, we present two primary measures of telework, selected based on reviews of relevant literature and interviews with subject matter experts at the Bureau of Labor Statistics (BLS).[1] We limited our data selection to nationally representative datasets from federal statistical agencies that provide consistent information about telework before and after the onset of the COVID-19 pandemic. The primary measures we selected are from the BLS's American Time Use Survey (ATUS)[2] and the Census Bureau's American Community Survey (ACS).[3] This appendix presents an overview of some of the alternative measures of telework that we examined and other researchers have developed using ATUS. It also describes analyses we have performed to ensure the consistency of the ACS and ATUS as sources of telework information, and provides supplemental information on an additional measure of telework—hours worked at home—from 2010 to 2021.

While we used the percentage of teleworkers to examine the extent of telework, there are other measures that may examine other aspects of telework. For example:

[1]We identified and interviewed three BLS researchers based on peer-reviewed studies we identified through our literature search: Matthew Dey, Harley Frazis, and Sabrina Pabilonia. For example, see 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* (Bureau of Labor Statistics, June 2020), https://doi.org/10.21916/mlr.2020.14; Matthew Dey, Harley Frazis, David S. Piccone Jr, and Mark A. Loewenstein, "Teleworking and lost work during the pandemic: new evidence from the CPS," *Monthly Labor Review* (Bureau of Labor Statistics, July 2021), https://doi.org/10.21916/mlr.2021.15; S.W. Pabilonia and V. Vernon "Telework, wages, and time use in the united states," *Review of Economics of the Household* (2022); S.W. Pabilonia and V. Vernon, "Telework and Time Use" in *Handbook of Labor, Human Resources and Population Economics*, eds. K.F. Zimmermann and Cham Springer, https://doi.org/10.1007/978-3-319-57365-6_274-2.

[2]ATUS, sponsored by the Bureau of Labor Statistics and conducted by the Census Bureau, provides estimates of the amount of time people spend doing various activities, such as paid work, child care, volunteering and socializing. For this report, we use ATUS's measure of the percentage of respondents who worked from or near their home for any amount of time on the previous day.

[3]ACS provides demographics data about all communities to help local officials, community leaders, and businesses understand the changes taking place in their communities. For this report, we use ACS's measure of the percentage of workers who primarily worked from home over the past week.

- estimates of the intensity of telework, as measured by the number or percentage of hours worked at home;[4]
- estimates that classify different types of hybrid workers, based on the duration and regularity of telework;[5] and
- estimates that identify the extent of "incidental" and "non-incidental" telework in the workforce, where non-incidental telework can be defined as work at home that is replacing work that would otherwise be done in the office or worksite.[6]

In this appendix, we present time trends using several different measures. Using ATUS, we constructed various measures of telework by limiting the time of day and days of the week when work at home is observed. We assumed that these alternate ATUS measures restrict incidental telework to different degrees. This allows us to examine the consistency of the ACS measure (which does not capture any incidental telework) with measures obtainable from ATUS (which capture incidental telework to different degrees). We also present a time trend of average hours worked at home, using ATUS.

Comparison of Telework Prevalence Measures Used in This Report

From the ACS, we used the percentage of workers who primarily worked from home during the week as the measure of telework. This measure was constructed as an annual average based on responses to the survey question "how did you usually get to work last week?" We classified respondents who selected "worked from home" as teleworkers. This measure likely underestimates the number of people who could be

[4]Examples include the percentage of paid working hours that are worked at home; the percentage of days that are worked at home; or the average number of hours worked at home. See figure 9 in this appendix for information on average hours worked at home.

[5]For example, Harley Frazis has classified different types of hybrid teleworkers based on criteria such as the number of "long workdays" that are worked (in this case, long days are defined as four or more hours), which helps identify workers who are conducting the majority of their work at home on certain days. (Harley Frazis, "Who Telecommutes? Where is the Time Saved Spent?" (Bureau of Labor Statistics Working Papers, Working Paper 523, April 2020). In related work, researchers have classified workers into occasional teleworkers and home-based teleworkers, based on the frequency with which people work at home over a 2-week period.

[6]Examples of incidental telework could include a teacher who brings papers home to grade after school, or an office worker who checks email for half an hour in the evening. Such incidental telework may often be unpaid, which is another way that it differs from non-incidental telework. The BLS researchers we interviewed stressed the importance of understanding and assessing the extent of incidental telework in our measures of telework. This can be done by reporting on the extent to which work at home replaces work that is otherwise done in the office.

considered teleworkers, because it excludes many hybrid workers. For example, workers who work 3 days per week in the office and 2 days at home would likely not be captured as teleworkers using this measure.

From the ATUS, we used the percentage of respondents who did any work from their home or yard for any amount of time on the previous day. This measure likely overestimates the number of people who would be considered teleworkers because it captures incidental telework—work performed at home that is not replacing work that would otherwise be performed in the office.[7] This measure includes work at home reported by employed people who report any amount of time working at home.[8] They are included in this measure even if they report working from home for only a few minutes a day and the time spent working is unpaid. In effect, this measure of telework captures the extent to which telework has become a part of daily life for a large segment of the population.

Consistency between ACS and ATUS Measures of Telework

As part of our assessment of the reliability of the data, we sought to determine whether the measures of telework constructed using the two data sources presented a consistent time trend of telework prevalence despite being based on two different samples of workers. To do this, we first examined multiple measures of telework that are available in ATUS, to see whether we could obtain telework prevalence similar to that found in ACS. We determined that if we used an ATUS measure that likely captures less incidental telework, it was possible to obtain a very similar estimate of telework prevalence using ATUS data.

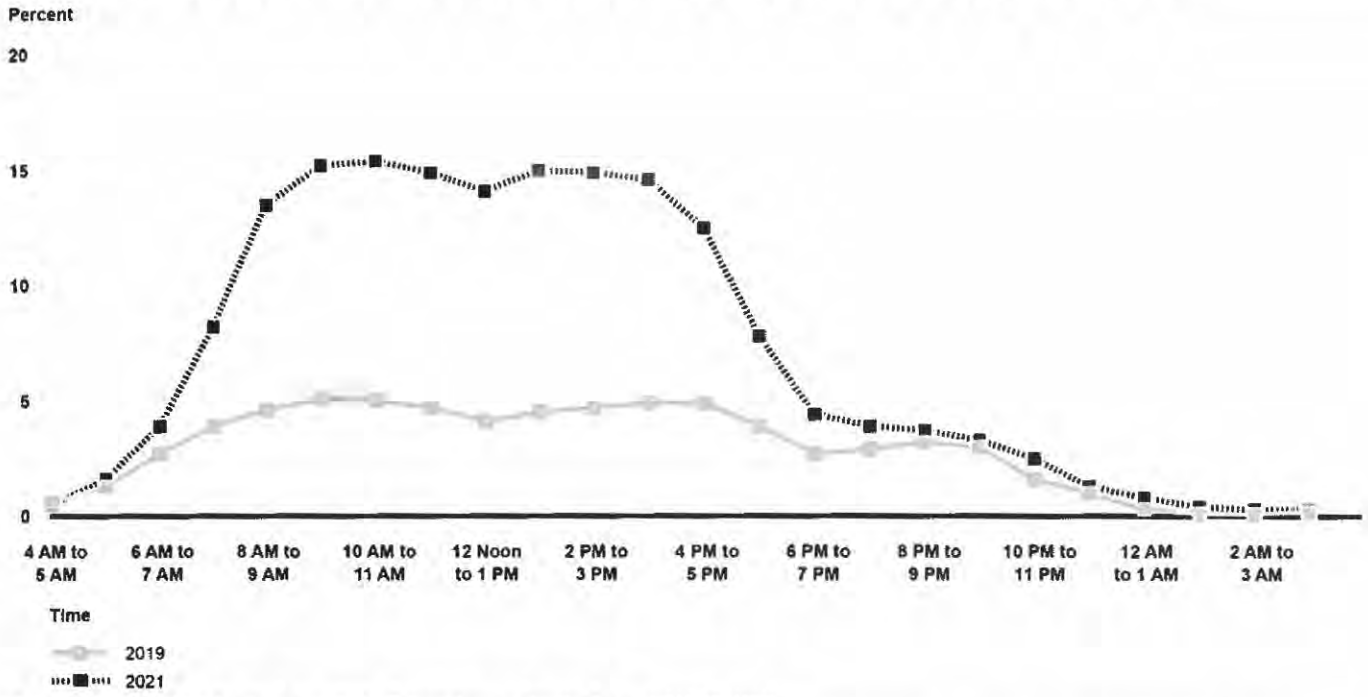
One way to reduce the amount of incidental telework captured in the ATUS time use data is to take into account the time of day in which work at home is performed. We constructed histograms for 2019 and 2021 that examine the amount of work that is performed at home by time of day. Figure 7 shows that in both 2019 and 2021 a very small percentage of people worked at home early in the morning (before 7 a.m.) and late at night (after 9 p.m.). We expect that work during these atypical hours are more likely to be incidental work (work that is not replacing work that would otherwise be done in an office or worksite). In contrast, work from home that is done during standard work hours (for example, from 1 p.m.

[7]At the same time, this estimate of the number of people engaged in telework during an average day is lower than the number of people engaged in telework during an average week; so even this less conservative measure does not necessarily capture the full number of people engaged in some telework during a typical week.

[8]The ATUS diary data do not permit researchers to identify whether work is paid or unpaid.

to 2 p.m.) is more likely to be replacing work that would otherwise be done in an office or worksite.

Figure 7: Percentage of Workers Who Did Any Work from Home during Each Hour of the Day, 2019 and 2021



Source: GAO analysis of data from the Bureau of Labor Statistics American Time Use Survey. | GAO-23-105999

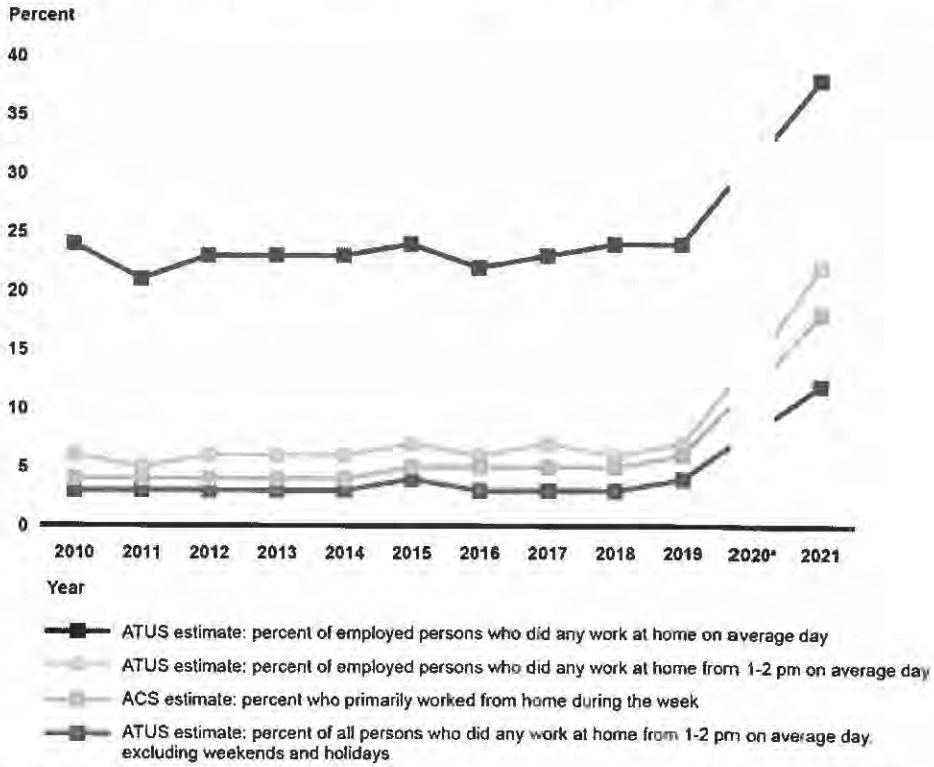
Note: Data shown is the percentage of the employed population who reported doing work at home, for any number of minutes, during each hour of the data. The population is restricted to employed workers reporting on survey days when they did any work at home. All estimates in this figure have margins of error less than or equal to 1.2 percentage points, and all estimates are statistically different from zero at the 95 percent confidence level.

We used this information to construct additional telework measures from the ATUS diary data that are likely to reduce the inclusion of incidental telework:

- The first additional measure we examined may reduce the impact of incidental telework by focusing on work reported during a core work hour. Like our primary measure, this measure also is restricted to employed people. The measure is the percentage of employed people who reported doing any work at home between 1p.m. and 2 p.m., limited to those who worked on the diary day. This ATUS measure yields a telework prevalence that is close to the telework prevalence

estimated by the ACS. In 2021, 22 percent of workers were teleworking under this definition, compared to 18 percent under the ACS definition (see fig. 8).

Figure 8: Alternative Measures of Telework Prevalence, 2010–2021



Source: GAO analysis of data from the Bureau of Labor Statistics American Time Use Survey and the Census Bureau's American Community Survey. | GAO-23-105999

Note: The upper line (an American Time Use Survey (ATUS) measure) shows the annual average estimated percentage of respondents who participated in work at home, on an average day, among those who were employed, on days they worked. Respondents who indicated that they performed work at their home for any amount of time on a diary report of the previous 24 hour day were classified as teleworkers. The second line (an ATUS measure) shows the annual average estimated percent of employed people who did any work at home during the hour of 1 p.m. to 2 p.m. during the diary survey day, on any day of the week. The third line (the ACS measure) shows the percentage of respondents who are identified as teleworking based on their response to a question about their primary means of transportation to work over the past week. We classified respondents who replied "worked from home" as teleworkers. The bottom line (an ATUS measure) shows the annual average estimated percentage of people who did any work at home during the hour of 1 p.m. to 2 p.m. during the diary survey day, excluding diaries collected on weekdays and holidays; this line was not restricted to people who were employed. Margins of error for all estimates in this figure are within +/- 1.96 percentage points.

[a]Data for 2020 are not shown because, due to the impact of the COVID-19 pandemic on data collection, the ACS 2020 1-year data and the 2020 annual ATUS estimates failed to meet Census Bureau's quality standards for publication.

- A second additional measure we examined may reduce the impact of incidental telework by excluding weekends and holidays; however, it is not restricted to people who are employed.[9] This measure is the percentage of people who reported doing any work at home between 1 p.m. and 2 p.m., limited to those who participated in some work at home on the day they filled out their diary reports of activities, excluding weekends and holidays. Using this ATUS measure yields a telework prevalence that is slightly lower than the telework prevalence estimated by the ACS—in 2021, 12 percent of workers were teleworking under this definition, compared to 18 percent under the ACS definition.

The similarity between these alternate ATUS measures and the ACS measure demonstrates that the ACS and ATUS surveys can produce telework measures that are highly consistent with each other. The difference in the telework prevalence across ATUS measures is explainable, and in part reflects the extent to which incidental telework is captured in each of the measures. We chose to focus on the broadest ATUS measure in this report because it is most useful in presenting a more expansive and narrowly defined measure of telework, reflecting the various forms of work arrangements that telework can take.

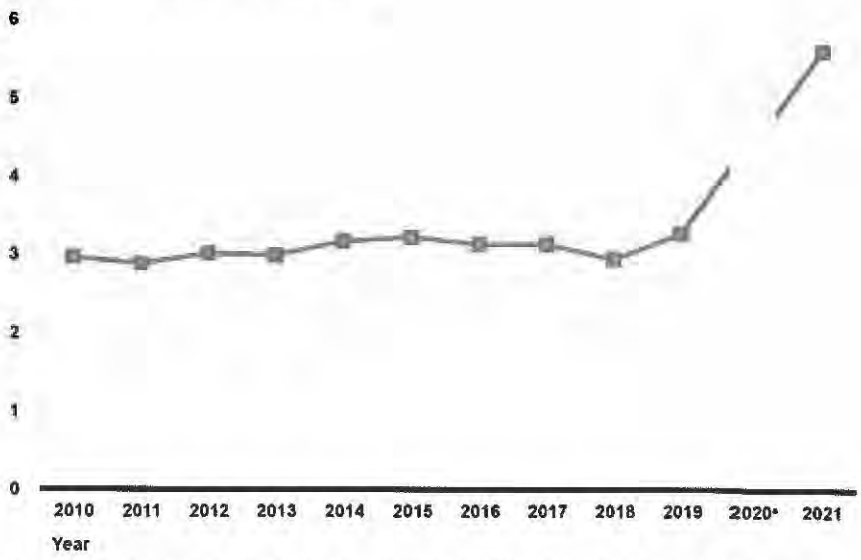
Hours Worked at Home

In order to provide additional context to our analysis of telework prevalence, we also used ATUS data to present a measure of telework intensity: the average number of hours worked at home over time, and by various characteristics. Figure 9 shows the average number of hours that employed workers spent working at home, on days that they worked at home. As shown in figure 9, the average number of hours spent working at home did not change much from 2010 (3.0 hours) to 2019 (3.3 hours), and increased significantly in 2021, rising to 5.6 hours per day.[10] Overall, figure 9 demonstrates the substantial shift in work location among those able to telework. The trend in telework intensity shown in figure 9 is consistent with the trends in telework prevalence shown in figure 8.

[9]This estimate may include a small number of people who do not meet the ATUS definition of employed, but spent time working.

[10]This measure of telework intensity may overestimate telework to an extent because it captures incidental telework, in part because the average hours of telework shown in figure 9 include both paid and unpaid work. On the other hand, because this measure of telework intensity includes people who reported very low amounts of telework in a day, this measure could also be biased downwards relative to a measure that is more restrictive about who is counted as a teleworker.

Figure 9: Average Hours Worked at Home, among Those Who Worked at Home on Previous Day, 2010–2021



Source: GAO analysis of data from the Bureau of Labor Statistics American Time Use Survey | GAO-23-105999

Note: Data shows the estimated annual average number of hours worked per day at home, among employed persons age 15 or over, on days that they worked at home. Workers may report working in both home and office on the same day. Margins of error for all estimates in this figure are within +/- 0.32 percentage points.

[a]Data for 2020 are not shown because data collection issues prevented the Bureau of Labor Statistics from publishing 2020 annual ATUS estimates.

Appendix III: List of 44 Studies Included in Our Literature Review of the Impact of Telework on Worker Productivity and Firm Performance

Aksoy, Cevat Giray, Jose Maria Barrero, Nicholas Bloom, Steven J. Davis, Mathias Dolls, and Pablo Zarate. "Working from Home Around the World." NBER Working Paper 30446, National Bureau of Economic Research, Cambridge, Mass., September 2022.

Angelici, Marta, and Paola Profeta. "Smart-Working: Work Flexibility without Constraints." CESifo Working Paper 8165, Munich Society for the Promotion of Economic Research, Munich, Germany, March 2020.

Awada, Mohamad, Gale Lucas, and Burcin Becerik-Gerber. "Working from Home during the COVID-19 Pandemic: Impact on Office Worker Productivity and Work Experience." Work, vol. 69 (2021): 1171-1189.

Bai, John (Jianqiu), Erik Brynjolfsson, Wang Jin, Sebastian Steffen, and Chi Wan. "Digital Resilience: How Work-from-Home Feasibility Affects Firm Performance." NBER Working Paper 28588, National Bureau of Economic Research, Cambridge, Mass., March 2021, 1-37.

Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis. "Why Working from Home Will Stick." NBER Working Paper 28731, National Bureau of Economic Research, Cambridge, Mass., April 2021, 1-68.

Bao, Lingfeng, Tao Li, Xin Xia, Kaiyu Zhu, Hui Li, and Xiaohu Yang. "How Does Working from Home Affect Developer Productivity? A Case Study of Baidu during the COVID-19 Pandemic." *Science China Information Sciences,* vol. 65. (April 2022).

Battiston, Diego, Jordi Blanes I Vidal, and Tom Kirchmaier. "Is Distance Dead? Face-to-Face Communication and Productivity in Teams." CEP Discussion Paper 1473, Centre for Economic Performance, London, England, March 2017.

Blit, Joel, Mikal Skuterud, and Michael R. Veall. "The Pandemic and Short-Run Changes in Output, Hours Worked and Labour Productivity: Canadian Evidence by Industry." *International Productivity Monitor,* no. 39 (2020): 16-32.

Bloom, Nicholas, James Liang, John Roberts, and Zhichun Jenny Ying. "Does Working from Home Work? Evidence from a Chinese Experiment." *The Quarterly Journal of Economics* (2015): 165-218.

Bloom, Nicholas, Philip Bunn, Paul Mizen, Pawel Smietanka, and Gregory Thwaites. "The Impact of Covid-19 on Productivity." NBER Working Paper 28233, National Bureau of Economic Research, Cambridge, Mass., December 2020.

Bloom, Nicholas, Ruobing Han, and James Liang. "How Hybrid Working from Home Works out." NBER Working Paper 30292, National Bureau of Economic Research, Cambridge, Mass., July 2022.

Bolisani, Ettore, Enrico Scarso, Christine Ipsen, Kathrin Kirchner, and John Paulin Hansen. "Working from Home during COVID-19 Pandemic: Lessons Learned and Issues." *Management & Marketing. Challenges for the Knowledge Society,* vol.15, Special Issue (2020): 458-476.

Brucks, Melanie S. and Jonathan Levav. "Virtual Communication Curbs Creative Idea Generation." *Nature,* vol. 605 (2022): 108-112.

Chouldhury, Prithwiraj (Raj), Tarun Khanna, Cristos. A. Makridis, Kyle Schirmann. "Is Hybrid Work the Best of Both Worlds? Evidence from a Field Experiment." Working Paper 22-063, Harvard Business School, 2022.

Choudhury, Prithwiraj (Raj), Cirrus Foroughi, and Barbara Larson. "Work from Anywhere: The Productivity Effects of Geographic Flexibility." *Strategic Management Journal,* 42 (2021): 655-683.

Criscuolo, Chiara, Peter Gal, Timo Leidecker, Francesco Losma, and Giuseppe Nicoletti. "The Role of Telework for Productivity during and Post COVID-19: Results from an OECD Survey among Managers and Workers." OECD Productivity Working Papers 31, OECD Publishing, Paris, France, December 2021, 1-64.

Dalton, Michael and Jeffrey A. Groen. "Telework during the COVID-19 Pandemic: Estimates using the 2021 Business Response Survey." *Monthly Labor Review.* U.S. Bureau of Labor Statistics, March 2022.

Deole, Sumit S., Max Deter and Yue Huang. "Home Sweet Home: Working from Home and Employee Performance during the Covid-19 Pandemic in the UK." GLO Discussion Paper 791, Global Labor Organization (GLO), Essen, Germany, 2021.

De Vries, Klaas, Abdul Erumban, and Bart van Ark. "Productivity and the Pandemic: Short- Term Disruptions and Long-Term Implications. The

Impact of the COVID-19 Pandemic on Productivity Dynamics by Industry." *International Economics and Economic Policy,* vol. 18 (2021): 541-570.

Eberly, Janice C., Jonathan Haskel, and Paul Mizen. "'Potential Capital', Working from Home, and Economic Resilience." NBER Working Paper 29431, National Bureau of Economic Research, Cambridge, Mass., October 2021, 1-38.

Emanuel, Natalia and Emma Harrington. "Working Remotely? Selection, Treatment and the Market Provision of Remote Work." Working Paper (April 2021): 1-83.

Etheridege, Ben, Li Tang, and Yikai Wang. "Worker Productivity during Lockdown and Working from Home: Evidence from Self Reports." ISER Working Paper Series 2020-12, Institute for Social & Economic Research, University of Essex, October 2020, 1-31.

Gibbs, Michael, Friederike Mengel, and Christoph Siemroth. "Work from Home & Productivity: Evidence from Personnel & Analytics Data on IT Professionals." *Journal of Political Economy Microeconomics, Forthcoming* (2022).

Giovanis, Eleftherios. "The Relationship Between Flexible Employment Arrangements and Workplace Performance in Great Britain." *International Journal of Manpower,* vol. 39, no. 1 (2018): 51-70.

Hackney, Amy, Marcus Yung, Kumara G. Somasundram, Behdin Nowrouzi-Kia, Jodi Oakman, and Amin Yazdani. "Working in the Digital Economy: A Systematic Review of the Impact of Work from Home Arrangements on Personal and Organizational Performance and Productivity." *PLOS ONE,* vol. 17, no. 10 (2022).

Kitagawa, Ritsu, Sachiko Kuroda, Hiroko Okudaira, and Hideo Owan. "Working from Home and Productivity under the COVID-19 Pandemic: Using Survey Data of Four Manufacturing Firm." *PLOS ONE,* vol. 16, no. 12 (2021).

Künn, Steffen, Christian Seel, and Dainis Zegners. "Cognitive Performance in Remote Work Evidence from Professional Chess." The *Economic Journal,* vol. 132 (April 2022): 1218-1232.

Maghlaperidze, Eka, Natalia Kharadze, and Halyna Kuspliak. "Development of Remote Jobs as a Factor to Increase Labor Efficiency."

Journal of Eastern European and Central Asian Research, vol. 8, no. 3 (2021).

Mihalca, Loredana, Tudor Irimias, and Gabriela Brendea. "Teleworking during the COVID-19 Pandemic: Determining Factors of Perceived Work Productivity, Job Performance, and Satisfaction." *Amfiteatru Economic,* vol. 23 (2021): 620-636.

Moens, Eline, Louis Lippens, Philippe Sterkens, Johannes Weytjens, and Stijn Baert. "The COVID-19 Crisis and Telework: a Research Survey on Experiences, Expectations and Hopes." *The European Journal of Health Economics,* vol. 23 (2022): 729-753.

Morikawa, Masayuki. "Work-from-Home Productivity during the COVID-19 Pandemic: Evidence from Japan." *Economic Inquiry,* vol. 60, no. 2 (2022): 508-527.

OECD. "Productivity Gains from Teleworking in the Post COVID-19 Era: How Can Public Policies Make it Happen?" *OECD Policy Responses to Coronavirus* (COVID-19), OECD Publishing, Paris, France, 2020.

Okubo, Toshihiro, Atsushi Inoue, and Kozue Sekijima. "Telework Performance in the COVID-19 era in Japan." *Asian Economic Papers,* vol. 20, no. 2 (2020).

Papanikolaou, Dimitris and Lawrence D.W. Schmidt. "Working Remotely and the Supply-Side Impact of Covid-19." NBER Working Paper 27330, National Bureau of Economic Research, Cambridge, Mass., June 2020: 1-49.

Rietveld, Jacqueline R., Djoerd Hiemstra, Aleid E. Brouwer, and Jan Waalkens. "Motivation and Productivity of Employees in Higher Education during the First Lockdown." *Administrative Sciences,* vol. 12, no. 1 (2022).

Rupietta, Kira and Michael Beckmann. "Working from Home – What is the Effect on Employees' Effort?" WWZ Working Paper 2016/07, Center of Business and Economics, University of Basel, Basel, Switzerland, December 2016, 1-40.

Sherman, Eliot L. "Discretionary Remote Working Helps Mothers Without Harming Non-Mothers: Evidence from a Field Experiment." *Management Science,* vol. 66, no. 3 (2020): 1351-1374.

Smite, Darja, Anastasiia Tkalich, Nils Brede Moe, Efi Papatheocharous, Eriks Klotins, and Marte Pettersen Buvik. "Changes in Perceived Productivity of Software Engineers during the COVID-19 Pandemic: The Voice of Evidence." *The Journal of Systems & Software,* vol. 186 (2022): 1-14.

Stoker, Janka I., Harry Garretsen, and Joris Lammers. "Leading and Working From Home in Times of COVID-19: On the Perceived Changes in Leadership Behaviors." *Journal of Leadership and Organizational Studies,* vol. 29, no. 2 (2022): 208-218.

Tejero, Lourdes Marie S., Rosemary R. Seva, and Vivien Fe F. Fadrilan-Camacho. "Factors Associated with Work-Life Balance and Productivity before and during Work from Home." *Journal of Occupational and Environmental Medicine,* vol. 63, no. 12 (December 2021): 1065-1072.

Van der Lippe, Tanja and Zoltán Lippényi. "Co-workers Working from Home and Individual and Team Performance." *New Technology, Work and Employment,* vol. 35, no. 1 (2019): 60-79.

Varotsis, Nikolaos. "Exploring the Influence of Telework on Work Performance in Public Services: Experiences during the COVID-19 Pandemic." *Digital Policy, Regulation and Governance,* vol. 24, no. 5 (2022): 401-417.

Vega, Ronald P., Amanda Anderson, and Seth A. Kaplan. "A Within-Person Examination of the Effects of Telework." *Journal of Business Psychology,* vol. 30 (2015): 313-323.

Zhang, Ting, Dan Gerlowski, and Zoltan Acs. "Working from Home: Small Business Performance and the COVID-19 Pandemic." *Small Business Economics,* vol. 58 (2022): 611-636.

Appendix IV: GAO Contacts and Staff Acknowledgments

GAO Contacts

John D. Sawyer, (202) 512-7215 or sawyerj@gao.gov

Michael Hoffman, (202) 512-6445 or hoffmanme@gao.gov

Staff Acknowledgments

In addition to the contacts named above, Mary Crenshaw (Assistant Director), Terence Lam and Elaine Vaurio (Analysts-in-Charge), Amy Abramowitz, Colleen Candrl, Kirsten Lauber, Abigail Loxton, Joseph Maher, Alec McQuilkin, Abinash Mohanty, Jessica Orr, Dae Park, Rhiannon Patterson, Curtia Taylor, Meg Tulloch, and Brennan Williams, made key contributions to this report.

GAO's Mission	The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.
Obtaining Copies of GAO Reports and Testimony	The fastest and easiest way to obtain copies of GAO documents at no cost is through our website. Each weekday afternoon, GAO posts on its website newly released reports, testimony, and correspondence. You can also subscribe to GAO's email updates to receive notification of newly posted products.
Order by Phone	The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's website, https://www.gao.gov/ordering.htm. Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537. Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.
Connect with GAO	Connect with GAO on Facebook, Flickr, Twitter, and YouTube. Subscribe to our RSS Feeds or Email Updates. Listen to our Podcasts. Visit GAO on the web at https://www.gao.gov.
To Report Fraud, Waste, and Abuse in Federal Programs	Contact FraudNet: Website: https://www.gao.gov/about/what-gao-does/fraudnet Automated answering system: (800) 424-5454 or (202) 512-7700
Congressional Relations	A. Nicole Clowers, Managing Director, ClowersA@gao.gov, (202) 512-4400, U.S. Government Accountability Office, 441 G Street NW, Room 7125, Washington, DC 20548
Public Affairs	Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800 U.S. Government Accountability Office, 441 G Street NW, Room 7149 Washington, DC 20548
Strategic Planning and External Liaison	Stephen J. Sanford, Managing Director, spel@gao.gov, (202) 512-4707 U.S. Government Accountability Office, 441 G Street NW, Room 7814, Washington, DC 20548

Attachment "5"

frontiers | Frontiers in Psychology

TYPE Systematic Review
PUBLISHED 21 December 2022
DOI 10.3389/fpsyg.2022.1035310

OPEN ACCESS

EDITED BY
Kittisak Jermsittiparsert,
University of City Island, Cyprus

REVIEWED BY
Kulwadee Lim-u-sanno,
Prince of Songkla University, Thailand
Wei Zhang,
University of British Columbia, Canada
Jean Paolo Lacap,
City College of Angeles, Philippines
Sup Amornpinyo,
Khon Kaen University, Thailand
Nath Amornpinyo,
Udon Thani Rajabhat
University, Thailand

*CORRESPONDENCE
Emmanuel Aboagye
emmanuel.aboagye@ki.se

SPECIALTY SECTION
This article was submitted to Organizational Psychology, a section of the journal Frontiers in Psychology

RECEIVED 02 September 2022
ACCEPTED 28 November 2022
PUBLISHED 21 December 2022

CITATION
Mutiganda JC, Wiitavaara B, Heiden M, Svensson S, Fagerström A, Bergström G and Aboagye E (2022) A systematic review of the research on telework and organizational economic performance indicators. *Front. Psychol.* 13:1035310. doi: 10.3389/fpsyg.2022.1035310

A systematic review of the research on telework and organizational economic performance indicators

Jean Claude Mutiganda[1,2], Birgitta Wiitavaara[3], Marina Heiden[3], Sven Svensson[3], Arne Fagerström[1], Gunnar Bergström[3,4] and Emmanuel Aboagye[3,4]*

[1]Department of Business and Economic Studies, University of Gavle, Gävle, Sweden, [2]School of Business and Economics, Discipline of Accounting and Control, Åbo Akademi University, Turku, Finland, [3]Department of Occupational Health Sciences and Psychology, Faculty of Health and Occupational Studies, University of Gavle, Gavle, Sweden, [4]Unit of Intervention and Implementation Research for Worker Health, Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden

Introduction: A systematic review is conducted in the study to investigate the relationship between telework and organizational economic performance indicators such as self-reported employee performance, organizational performance, actual employee turnover rates, or intentions.

Methods: The databases Scopus, Business Source Premier, and Web of Science were used to conduct a literature search. Original articles published from 2000 and up to May 2021 were selected. Studies were screened for inclusion independently by review pairs and data were extracted. The Mixed Methods Appraisal Tool (MMAT) was used to evaluate the quality of the studies included.

Results: Forty-three studies were included with some addressing multiple outcomes. Self-reported performance was higher for teleworking employees compared to those working in the ordinary workplace. The extent of the change in performance was dependent on individual characteristics and the extent of the teleworking practice in the organization. Telework was also associated with increased organizational performance, particularly in homogenous samples with unique work tasks. When telework is voluntary, it appears that both actual employee turnover rates and intentions to leave the organization are lower.

Discussion: Further research with high-quality prospective designs is necessary to properly understand the contribution of telework to organizational economic performance indicators.

KEYWORDS

telework, employee turnover, systematic review, organizational economic performance, employee perceived performance

10.3389/fpsyg.2022.[illegible]

Introduction

Teleworking refers to working in a place outside the ordinary workplace where time flexibility or not can occur (Allen et al., 2015). Teleworking is a component of remote work practices, providing employees with greater freedom to alternate between the ordinary workplace and outside locations, mostly *via* the use of information and communications technology (ICT). While not a new phenomenon, teleworking increased significantly during the COVID-19 pandemic when organizations implemented intensive home-based teleworking in response to the global COVID-19 lockdowns and other pandemic related restrictions (EU-OSHA, 2021). Significant human resource management difficulties, including, but not limited to, where people should perform their tasks in small and large organizations occurred during the pandemic. Home-based teleworking was highly recommended for employees who could work remotely from home under the COVID-19 pandemic.

Before the pandemic struck, most organizations and employees were largely unprepared for shifts toward teleworking. Over half of EU workers lacked any prior teleworking experience (EU-OSHA, 2021). According to the Eurofund (2020), telework is most common in the Scandinavian countries, accounting for 38 and 33% of the workforce in Denmark and Sweden, respectively. Other EU countries with a high proportion of teleworkers include the Netherlands (31%), Luxembourg (29%), the United Kingdom (27%), France (26%), and Estonia (25%). This shows that telework agreements are more popular in the north and west of Europe, however there are notable outliers, such as Germany, with 13% below the EU average, and Estonia, with 24% above it. The data also showed variation in teleworking rates by occupation and socio-occupational category since some occupations are not suited to telework, for instance those in construction, hospitality, and personal services. When the COVID-19 pandemic spread widely rapidly, organizations whose work could be done from the outside of the regular workplace implemented broad use of telework to keep their business operations running while avoiding the virus's spread at work (Eurofund, 2020).

Prior to the pandemic, many employees had formal or informal agreements with their employers to work from home or another location. During the pandemic, much changed, resulting in a shift from direct presence or face-to-face supervision of work to full-time telework forms in which most work functions were conducted *via* technology or platform-based ICT in many businesses (Eurofund, 2021). Whether these changes would have occurred "organically" if COVID-19 had not broken out, and whether these changes will remain post COVID-19, especially now that the restrictions have been removed remains an open question in tele-workable sectors and occupations. An increasing number of organizations are debating whether to continue with teleworking, such as home-based telework or other hybrid teleworking forms i.e., part-time in the office, part-time at home or some other location (Nagy, 2020). However there is limited empirical research on the question of what teleworking means for organizational economic performance indicators i.e., outcomes that are measured and managed by organizations because they are important to their success. Previous studies provide ambiguous insight into organizational economic performance indicators for employees and organizations and therefore does not help management to understand whether telework makes economic sense and how it can be embedded in appropriate human resources management practices. An understanding of what telework implies for management is critical to ensuring that any future, more permanent modifications to teleworking regulations benefit both employees and the organization.

Teleworking is generally linked to several metrics of importance to the organization's bottom line namely, employee performance and productivity, absenteeism, turnover, commitment, and overall organizational performance (Bailey and Kurland, 2002; Tietze et al., 2009; de Menezes and Kelliher, 2011; Allen et al., 2015; Kazekami, 2020). From previous research, the relationship may be positive yet inconclusive on employees' perceptions and other performance reports (Samek Lodovici, 2021). In previous reviews, there was little unambiguous proof that telework increased organizational financial outcomes, yet teleworking is generally considered to promote productivity, decrease turnover, and improve organizational performance (Bailey and Kurland, 2002; Gajendran and Harrison, 2007; Harker Martin and MacDonnell, 2012). As in previous reviews, the evidence from de Menezes and Kelliher (2011) did not demonstrate a business case for the use of flexible work arrangements (FWAs). According to de Menezes and Kelliher (2011), employees in FWAs may have access to a variety of flexible or non-standard work arrangements, such as choice over when work is completed, work away from the ordinary workplace, working full time hours in fewer days, or reduced work hours. Some studies argue that a more inclusive approach to employee and organizational outcomes, as well as comparison groups, gender issues, different appreciation of workspace and time, and high-quality methodological designs, are necessary to make sense of the contradictory evidence of organizational economic performance outcomes attributable to telework alone (Tietze et al., 2009; De Ruiter and Peters, 2022). This suggests that knowledge of FWAs i.e., work away from the ordinary workplace and whom it works for, and in what circumstances the practice works including different categories of occupations and individual workers characteristics, is needed. This review presents up-to-date knowledge based on high-quality studies about how telework is associated with organizational economic performance outcomes.

The purpose of this study is to compile and synthesize the findings of previous studies on the relationship between

10.3389/fpsyg.2025.1

telework and organizational financial outcomes in terms of self-reported employee performance, organizational performance, actual employee turnover rates or intentions. The review seeks to answer two main research questions: (1) How is telework related to employees' self-reported measures such as work or job performance, productivity, work content execution, effectiveness, turnover intentions, etc.? and (2) How is telework related to objective organizational performance indicators including sales, added value, actual turnover, productivity, etc.?

The two primary contributions of this study are as follows: (1) Using data from relatively high-quality research, this review study assesses the evidence of an association between telework and productivity based on employees' self-reported performance or organizational records as well as actual turnover or intentions considering variations between businesses. The review study provides a comprehensive review that focuses on varied teleworking arrangements and the consequences on different organizational financial outcomes. (2) Because of the thorough information provided in some of the original research, the review study identifies some of the probable factors that are associated with organizational financial losses due to telework by occupation, albeit some of these factors may be shared by all occupations.

Materials and methods

Study design

A systematic review was conducted, which is a step-by-step approach to synthesizing the findings of multiple primary research studies (Tank, 2019). This systematic review study adheres to the preferred reporting guideline for systematic review and meta analysis (PRISMA) guidelines (Page et al., 2021).

The PEO framework

The PEO (i.e., population, exposure, and outcome) framework was used for the present search. The PEO as a framework can be especially useful when investigating the prospects of developing a certain outcome because of an exposure, as well as assist in focusing the review process and identifying searchable parts of a research question (Schardt et al., 2007).

Population

The population consisted of individuals working in organizations whose working arrangements for employees included flexible work locations. As a result, studies investigated included employees working in organizations who are allowed to work in a place outside the ordinary workplace (such as home-based telework or virtual or distant or remote work, where time flexibility or not can occur). Studies which had investigated organizational-level outcomes in relation to flexible work location practices were also included in this review.

Exposure

This definition of telework arrangement is used—a work practice that involves members of an organization substituting a portion of their typical work hours (ranging from a few hours per week to nearly full time) to work away from the ordinary workplace—principally from home—using technology to interact with others as needed to conduct work tasks (Shockley and Allen, 2007). Central to the definition is that work can be performed outside of the traditional temporal and/or spatial boundaries of the ordinary workplace (including full-time work from home but not necessarily limited to home-based work) and includes work from home-based businesses. Because of the nature of the exposure under consideration, this review covers research with a variety of designs, including intervention studies.

Outcome

Organizational economic performance indicators investigated in this study include financial performance (when referring to return on investments or profitability, cost saving practices) and performance indicators (when referring to self-reported performance, productivity, and turnover). The term performance is of high economic interest to organizations and can be measured in terms of perceived actual or potential increase or decrease in work output i.e., employees' perception of their own performance, or in relation to their colleagues' or the employer's assessment. For some organizations, the actual or the potential performance on a specific task at the individual level are aggregated at the team and/or organizational level to represent productivity or the value created from the resources available (Jungen, 2005). Employee turnover which refers to employees leaving the organization must be lowered to keep acceptable performance levels. Performance and employee turnover can be major weapons for organizations to achieve cost and quality advantages over their competitors (Jungen, 2005).

Literature search

Together with an information specialist, we formulated a systematic, documented literature search strategy to identify relevant literature based on the PEO framework. The search was conducted in two waves in collaboration with an information specialist. The first was a test search, which was performed in November 2020, aiming to identify, refine, and focus the search terms. The test search was performed in six databases: Scopus,

10.3389/fpsyg.2024.1372510

PubMed, Emerald, Business Source Premier, Academic Search Elite, and Web of Science. The second search in May 2021 was a final search conducted across three databases: Scopus, Business Source Premier, and Web of Science. These three databases were preferred because they are multidisciplinary and cover a wide range of research fields, they allow for free-text searches, and they provide access to some of the databases used in the first search. The literature search covered studies published from 2000 through and until May 2021. The search string is available in the Supplementary material 1. The search resulted in a total of $n = 6{,}067$ articles. After excluding duplicates, a total of 4,239 articles were left to be examined (Figure 1).

Study records

All relevant studies were compiled in Endnote or Mendeley reference managers. The records were saved in PDF format for full text reading and subsequent quality assessment, as well as to permit independent screening and cataloging of discrepancies amongst reviewers.

Inclusion and exclusion

The main criteria for inclusion and exclusion of literature which were defined in advance were as follows:

1. The population of the study should be clearly described and relevant, i.e., the research should concern organizations whose working arrangements allow work from a different location than the employer's workplace through ICT and the employees working in such organizations. Self-employed workers or business owners were not included.
2. The exposure investigated should be clearly described, measured and relevant, i.e., the working conditions in which it is allowed for a degree of flexibility and interaction between workers doing their work tasks that can be performed outside of the ordinary workplace context, including but not limited to home-based work or remote work.
3. Studies that examined non-specific collective concepts such as "flexible work arrangements" or unspecified workplace were not considered relevant as it is difficult to assess what the actual work location is in such cases.
4. Studies that focus only on the traditional temporal flexibility such as flextime and organizational practice of functional flexibility that requires employees to work from the central office were excluded.
5. The investigated outcome should be clearly described, measured and relevant, i.e., including but not limited to financial performance (such as return on investments or profitability, cost-saving practices e.g., rent cost reductions, sales, etc.) and non-financial performance indicators (such as self reported performance employer quality assessment productivity, organizational-level performance, and turnover).
6. The study should examine the link between telework practice and organizational economic outcomes at the employee or organizational level.
7. The study should be an original study, published in English, peer-reviewed, containing quantitative or qualitative data and published between 2000 and May 2021 in a scientific journal.
8. Knowledge summaries and systematic reviews, as well as theoretical articles that did not analyze their own data, opinions, study protocols, articles that only contained abstracts, student dissertations, and other gray literature, were all excluded.

Study selection

The assessment of relevance of the articles obtained from the systematic literature search was carried out in two selection rounds, based on the predefined inclusion and exclusion criteria. The first selection round was based on the article's title and abstract. The full text of articles that were considered relevant were read through in the next selection round to determine whether they were relevant to include in the subsequent quality assessment. In total of 4,243 articles were evaluated using the title and abstract. There was $n = 10$ of the 4,243 articles that could not be retrieved at first, so these were sought, and all were eventually found for inclusion in the screening process. Following the screening, $n = 4{,}082$ records were eliminated, leaving $n = 161$ for further consideration. Of the $n = 161$ reports evaluated for eligibility, $n = 106$ were excluded due to the following reasons: duplicates ($n = 3$), no data presented ($n = 23$), incorrect outcome described ($n = 36$), incorrect exposure described ($n = 22$), and research question posed was unrelated to review ($n = 22$). The $n = 55$ articles left after exclusion were split in three portions, where two researchers in each group read the articles separately, and thereafter discussed their evaluation to reach agreement on inclusion (see Figure 1). In the results section, only moderate to high-quality studies were included in evidence synthesis ($n = 43$).

Each article was evaluated by two researchers independently. The individual researcher's assessment was hidden from each study until two researchers had evaluated it, so that the researchers were not initially affected by each other's assessments. This ensures independent assessments of each article. After full text evaluation, $n = 55$ articles were considered to meet the inclusion criteria. These were then quality assessed.

10.3389/fpsyg.2025.1

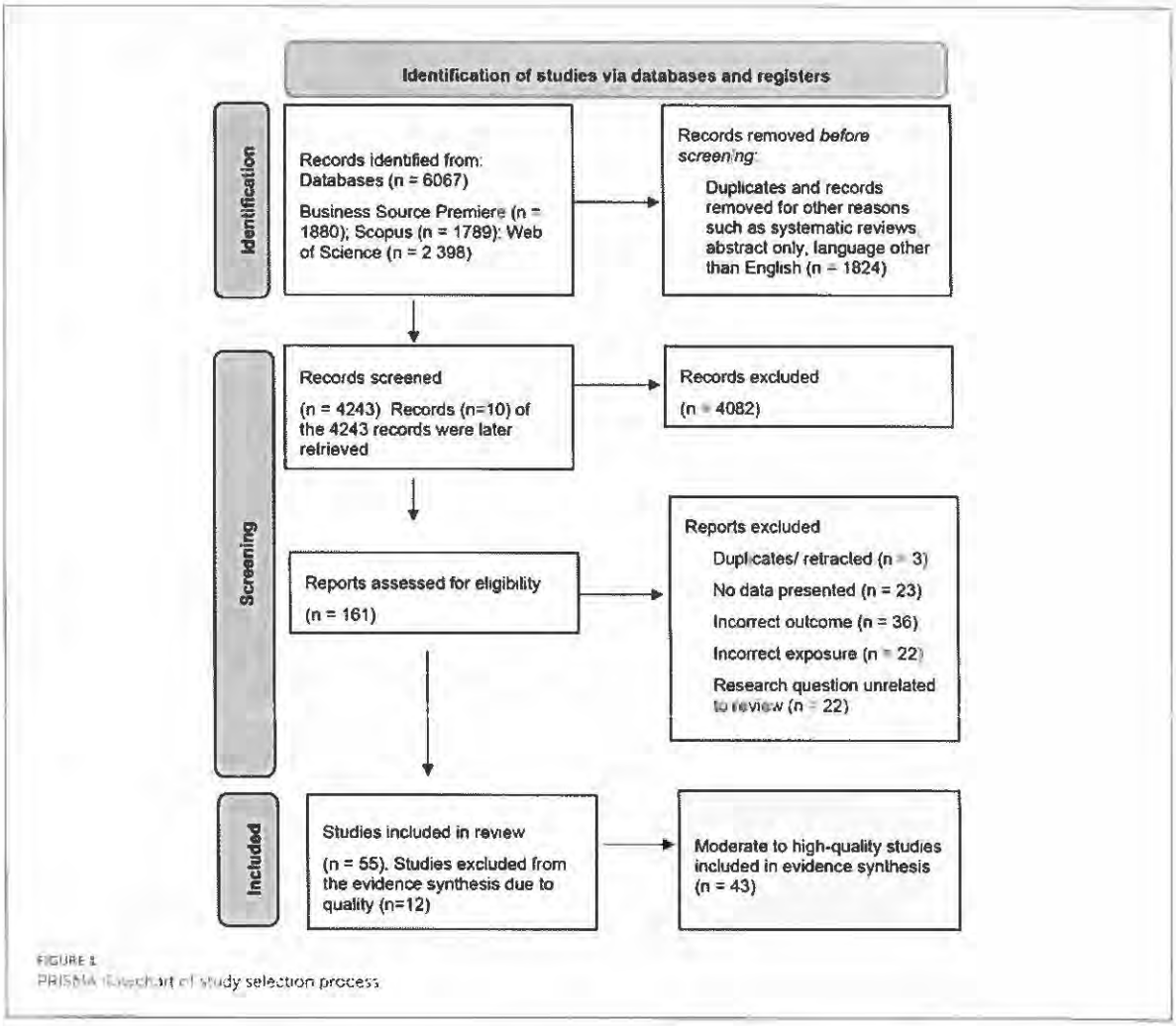


FIGURE 1
PRISMA flowchart of study selection process.

Data extraction and quality assessment

Ideally, data extraction should be completed in duplicate by two independent reviewers. In this review study, however, it was not practical. Thus, one reviewer extracted data, and another independently verified the results for accuracy and completeness. Based on the review objectives and research question, the data extraction and synthesis were carried out using rigorous processes that facilitate transparency of reporting on the characteristics of the included studies.

Two researchers independently assessed the quality of each article. The Hong et al. (2018) version of the Mixed Methods Appraisal Tool (MMAT) was used to assess the methodological quality of the included articles. The MMAT is a methodological quality appraisal tool that is designed for the quality assessment stage of systematic mixed studies reviews, i.e., reviews that include qualitative, quantitative, and mixed methods studies. It allows for the evaluation of the methodological quality in five categories: qualitative research, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed methods studies.

The MMAT contains two screening questions for all sorts of research designs to identify whether a study is empirical and hence the MMAT may be used. Based on study design type for each included study, the appropriate category of studies to appraise is chosen and a rating of criteria "Yes," "No," or "Can't tell." The "Can't tell" response category means that the paper does not report adequate information to answer "Yes" or "No." In this review, the reviewers agreed to convert "Can't tell" response category to "No," since no information or inadequate information were provided in the study.

The MMAT discourages reviewers from calculating an overall score from the ratings of each criterion since an overall score may not always be informative. Instead, it suggests

10.3389/fpsyg.2025.1535320

providing a more detailed presentation of the ratings of each criterion to better inform the quality of the included studies. For instance, the quality of the study can be described in stars (*) or percentages (%). For example, if a study receives five stars on each criterion, it could be interpreted as 100%, four stars equal 80%, three stars equal 60%, two stars equal 40%, and one star equals 20% quality criteria met. For this review study, the results of the appraisal were interpreted using arbitrary categories to help description of study quality. This study used three categories (i.e., low, medium, and high) to clearly describe included studies. Studies with five stars (one star for each criterion) were assessed to be of high quality, while those with three to four stars were of moderate quality and those with two stars or less were of low quality.

Results

This review includes a total of 55 articles, with several studies containing more than one outcome. Four of the 55 studies were performed across countries, with the rest coming from different countries, with U.S. (20 studies), Australia (five studies), the U.K. (five studies), Japan (three studies), and China (two studies). Canada, Germany, Finland, Ireland, Portugal, Spain, Italy, Belgium, South Africa, and Iran each had one study. The vast majority (67%, $n = 37$) were published between 2015 and 2021. The research covered private companies and public organizations in the banking and manufacturing sectors, information technology, healthcare and life insurance, government agencies, travel agencies, and other knowledge intensive occupations. More than half (60%, $n = 33$) investigated perceived employee performance, 29% ($n = 16$) investigated objective organizational performance indicators, and 18% ($n = 10$) investigated actual employee turnover and turnover intentions. In the Supplementary material 2: Characteristics of the included studies on telework and their comparator are provided. For details on the number of studies divided into study population, key outcome measure, findings, and quality assessment for the different study designs, see Tables 1–3. In the Supplementary material 3: The quality assessment ratings (i.e., the ratings of each criterion of MMAT) for the final 55 studies are provided. The next sections present the findings from studies of moderate to high quality ($n = 43$).

Telework and perceived productivity/job performance

A total of 20 studies examined the relationship between teleworking and employees' or managers perceived productivity and/or job performance (Table 1). Except for one randomized study (Sherman, 2020), almost all the studies described in this section were quantitative descriptive or non-randomized i.e., mostly descriptive, or analytical cross sectional studies.

Generally, supervisors and employees who could voluntarily work from home rated their perceived performance higher than those who worked from the employer's premises. Studies conducted on home-based office during the COVID-19 pandemic show perceived work productivity drop during the COVID-19 pandemic (Feng and Savani, 2020; Morikawa, 2020; Kitagawa et al., 2021). Sherman (2020) randomized study, conducting analysis for different subgroups, shows that teleworking enhanced job performance considerably for most subgroups, with female employees (mothers) benefiting the most. In their quasi-experimental study, Delanoeije and Verbruggen (2020), the users of telework reported slightly higher day-level performance on teleworking days but there were no significant differences in person-level performance between the users and non-users of telework.

Nine studies with cross-sectional designs (Hill et al., 2003; Golden and Veiga, 2008; Vega et al., 2014; Gajendran et al., 2015; De Menezes and Kelliher, 2016; Medina-Garrido et al., 2017; Golden and Gajendran, 2018; Narayanamurthy and Tortorella, 2021; Sakamoto, 2021) found that telework was positively associated with high productivity or better job performance. However, telework was shown not to be associated with any substantial improvement in productivity or job performance in three studies (Hylan I et al., 2005; Aguilera et al., 2016; Bao et al., 2022). In van der Lippe and Lippenyi (2020) study, the findings show that when more coworkers work from home, employee and team performance can be negatively impacted, but team performance tends to deteriorate the most. This implies that when coworkers do not work from home, team performance appears to improve, pointing to the interconnections of group and individual tasks. Informally negotiated remote working practice or access to flexi place had positive indirect effects on employee performance through commitment, and job satisfaction (De Menezes and Kelliher, 2016; Medina-Garrido et al., 2017).

In unpacking the role of voluntary teleworkers' job characteristics, studies investigating social job characteristics such as job interdependence, social support, and superior-subordinate relationships in an extensive telework mode found high levels of job performance in low levels of interdependence, low levels of social support, and high quality superior-subordinate relationships than employees who worked a limited amount in telework mode (Golden and Veiga, 2008; Golden et al., 2008; Golden and Gajendran, 2018). Knowledge job characteristics such as job complexity and problem solving show a positive relationship between telework and job performance, but most importantly, the extent of telework explained job performance, which ranged from benign to positive (Golden and Veiga, 2008; Golden et al., 2008; Golden and Gajendran, 2018).

10.3389/tpsyg.2025.1572320

TABLE 1 Findings from studies on telework and self-reported performance or productivity

References	Population/organization type	Key outcome measure	Findings	Rating
Quantitative randomized controlled trials				
Bloom et al. (2015)	Ctrip China travel agency. China. $n = 249$ employees.	Employees' job performance	Telework improved job performance, especially for mothers	*****
Quantitative non-randomized studies				
Bao et al. (2022)	Large IT firm, China. Four thousand records of $n = 107$ developers.	Productivity e.g., the number of builds/commits/code reviews	Developers Working from home have similar productivity to those working onsite.	***
Delanoeije and Verbruggen (2020)	Construction and property development firm, Belgium. $n = 78$ (39 each in intervention and control group)	Person- and day-level job performance	No differences in person-level performance, but day-level performance was higher for telework users	*****
De Menezes and Kelliher (2016)	Four organizations in the professional sector e.g., pharmaceutical, banking, etc., UK. $n = 2,617$ employees	Individual performance	Remote working has positive indirect effects on performance.	***
Feng and Savani (2020)	US resident fulltime employees, USA. $n = 286$ fulltime employees	Perceived work productivity	Women's perceived work productivity dropped when working from home during the COVID-19 pandemic	****
Gajendran et al. (2015)	Employers and employees, a wide assortment of organizations, USA. $n = 323$ employees and $n = 143$ matched supervisors	Task performance	Telecommuting positively associated with task performance	*****
Golden et al. (2008)	Large high-tech company, USA. A matched sample of $n = 261$ professional-level teleworkers and their managers	Job performance	Extensive teleworking in isolation negatively impacts performance	****
Golden et al. (2006)	Large high-tech company, USA. $n = 375$ professional-level virtual employees	Job performance	Extensive virtual mode workers have higher job performance	****
Golden and Gajendran (2018)	Supervisors and employees, a single organization, USA. $n = 253$ telecommuters and their supervisors	Job performance	Telecommuting had a positive association with job performance	****
Hill et al. (2003)	IBM, USA. Traditional office, $n = 4,316$, virtual office, $n = 767$, and home office, $n = 441$	Job performance, productivity, workload, success	Virtual/home office appear to positively impact performance	***
Holland et al. (2007)	Eight private and public organizations, Ireland. $n = 172$ employees from different organizations	Employee performance	Telework had no connection with performance	***
Kitagawa et al. (2021)	Four chemical and automobile manufacturing companies, Japan. $n = 22,815$ employees	Perceived productivity	Home-based work leads to a productivity decline	*****
Molina-Garrido et al. (2021)	Employees of banking sector, Spain. $n = 1,511$ employees	Job performance	Flexi-place indirectly related to performance through wellbeing	***
Morikawa (2020)	RIETI Survey of Corporate Management and Economic Policy, Japan. $n = 3,324$ sample was mainly used	Perceived productivity	Home-based work productivity was lower during the COVID-19	****
Narayanamurthy and Tortorella (2021)	Multiple organization sectors, UK. $n = 106$ employees	Employees' performance (i.e., output quality and delivery)	Home-based office enhances output quality and delivery	***

(Continued)

TABLE 1 (Continued)

References	Population/organization type	Key outcome measure	Findings	Rating
[illegible]	Survey of software developers, multi-country study, $n = 2,225$ usable responses from 53 countries.	Perceived productivity	Lower perceived productivity from home based work	[illegible]
[illegible]	Survey of workers in the general population, Japan, $n = 908$ respondents	Productivity	Telecommuting leads to higher productivity	[illegible]
[illegible]	Survey of nine EU countries, EU $n = 869$ teams and 11,011 employees from 259 establishments	Task performance, individual and team	Home-based work negatively impacts coworker performance	[illegible]
[illegible]	U.S. government organization, USA, $n = 180$ employees	Job performance	Teleworkers report higher levels of job performance	[illegible]
Quantitative descriptive studies				
[illegible]	SMEs, France, $n = 940$ responses from representative sample of residents of the Brittany	Perceived productivity	No association between home-based work and perceived productivity	[illegible]

Telework and objective organizational performance indicators

Seven out of 15 studies (Kitou and Horvath, 2006; Patti, 2011; Bloom et al., 2015; Ruostela et al., 2017; Choudhury et al., 2020; Zhang et al., 2021), showed positive benefits of telework on objective organizational performance (Table 2). According to Bloom et al. (2015) findings, worker productivity rose in the telework group compared to the control group without affecting the level of quality of work. Choudhury et al. (2020) study exploiting a natural experiment found that working form anywhere as opposed to home resulted in an increase in employee output, with no increase in rework. However, according to their model, all telework programs, whether from home or anywhere, increase productivity incrementally when compared to working in the office. In Zhang et al. (2021) study, small businesses performed better overall in states with higher work-from-home rates when industry-specific variations were considered, along with local economic, demographic, and policy factors. In Giovanis (2018) study, using an instrumental variable approach in a prospective design, responses from the management or their representatives indicated a significant positive relationship between telework and financial and labor performance.

A few of the studies that show positive results on organizational indicators also investigated outcomes like space usage, occupancy costs, fuel and energy costs, and environmental costs. The studies found that as telework programs and frequency increased, environmental performance might improve, which would benefit businesses by lowering workplace costs (Kitou and Horvath, 2007; Ruostela et al., 2017).

Four studies found negative impacts of telework on organizational performance (Lee and Hong, 2011; Kotey and Sharma, 2019; Neirotti et al., 2019; Monteiro et al., 2021). In the Lee and Hong (2011) study, telework programs performed significantly worse than other family-friendly initiatives like childcare subsidies, paid leave for caregiving, and flexible work schedules. Kotey and Sharma (2019) study found that working from home has a direct negative association with return on labor. According to the Neirotti et al. (2012) study, organizations that use telecommuting practices and operate in more dynamic business environments while also adopting a higher rate of information systems observe productivity gains compared with labor productivity when teleworking from home. This suggests that home-based telework is less productive than the type of teleworking that involve telecommuting strategies. The Monteiro et al. (2021) study found that, except for R&D organizations, where working remotely benefits the organization in terms of performance indicators, there is a significantly negative association between remote access and productivity. Four studies found that telework was not related with any significant gain in organizational performance (St George et al., 2009; KlindŽić and Marić, 2019; Viete and Erdsiek, 2020; Rocha et al., 2021).

Telework and intentions to leave/stay or actual turnover rates

Eight studies examined the association between different aspects of telework and intentions to leave or actual turnover rates (Table 3). Two of the studies had longitudinal designs (Caillier, 2016; Chou, 2020), one quasi experiment design

TABLE 2 Findings from studies on telework and objective organizational performance/ productivity.

References	Population/organization type	Key outcome measure	Findings	Rating
Quantitative randomized controlled trials				
[illegible] et al. (2015)	Travel agency, China. $n = 249$ randomized call center employees	No. of phone calls	Home working led to performance increases	*****
Quantitative non-randomized studies				
Choudhury et al. (2020)	Patent and Trademark Office, USA. $n = 831$ patent examiners	Total actions, rework	Work from anywhere resulted in increase in the total number of actions	*****
Giovanis (2018)	Management, random workplaces, G. Britain Panel data set for workplaces, with ~11,500–16,000 observations	Workplace performance: two alternative measures financial performance and labor productivity.	Positive relationship between telework and performance	*****
Kelley and Shatina (2019)	Public, private, and non-profit organizations Australia. $n = 4,204$ employees	Return on labor	Work from home reduced return on labor	*****
Lee and Hong (2011)	Federal agencies, USA. $n = 105$ employees	Proportion of met or exceeded annual performance indicators	Telework has a negative association with performance	*****
Monteiro et al. (2021)	Large Portuguese firms (>250 employees), Portugal. 1726 firm-year observations	Sales per employee	Working remotely is more likely to be harmful for productivity	****
Nerone et al. (2021)	Different Italian firms from industry groups, Italy. $n = 1,134$ companies included.	Value added per employee	Home-based telework do not exhibit higher labor productivity than "mobile work"	****
Pyöriä (2011)	Health and Life Insurance Company, USA $n = 342$ Insurance processors and examiners and $n = 45$ managers	No. of claims processed and examined	Teleworking increased productivity and lowered office expenses	*****
Raghuram et al. (2019)	Firms in Cyprus, Georgia, Greece, Italy, Moldova, and Russian Federation. $n = 3,864$ firms included	Sales growth	No overall statistically significant effect of telework, more positive effect on firms with greater growth	***
Ruostela et al. (2017)	Managers, salespeople and consultants in a production company. Finland $n = 52$ employees	Space usage, occupancy costs, environmental impact	New ways of working are cost saving and improves environmental performance	****
St George et al. (2009)	Department of Human Services, Australia. $n = 13$ telenursing call operators	Quality of advice, risk incidents, no. of phone calls	Working from home is positive for no. phone calls and had no statistically significant effect on quality and risk incidents	*****
Vieth and Erdsiek (2020)	German service firms. Germany $n = 1,045$ observations	Sales	Work from home did not statistically significant affect sales.	***
Zhang et al. (2021)	Survey of small businesses, USA $n = 8,399$ observations	Operating revenue, disruption of supply chain, business closures, cash flows	Higher home-based work rates positively influence operating revenue, disruption of supply chain and cash flow no effect on business closures	*****
Quantitative descriptive studies				
Knittel and Horvath (2007)	Simulated scenarios based on national data, USA. Simulated data from the $n = 81$ literature and surveys	Energy and fuel costs, external costs related to air emissions	Telework programs reduce energy and fuel costs in the office space	****
Klindžić and Marić (2019)	Large-sized organizations, Croatia. $n = 171$ organizations HR managers surveyed	Return on assets, return of equity, revenue per employee	No statistically significant effect of telework or home-based work	*****

(Lee and Kim, 2017) and the remainder had a descriptive or analytical cross-sectional designs (Hyland et al., 2005; Golden, 2006; Caillier, 2011; Masuda et al., 2012; Dilmaghani, 2021).

In Lee and Kim (2017), telework eligibility had a positive association with intention to stay. Dilmaghani (2021) study found no differences in the intentions to leave between male teleworkers and non-teleworkers, but female workers who teleworked in addition to having access to flexible working hours were less likely to consider changing jobs the following year compared to those who only teleworked. Golden (2006) found a weak, yet significant, negative association between the proportion of telework time per week and turnover intentions fully mediated by exhaustion. This study suggests that telework might reduce work exhaustion, which in turn reduce intentions to leave. According to Hyland et al. (2005) and Masuda et al. (2012), employees who frequently use telework and have a strong preference for segmented work and home roles showed a weak positive correlation with turnover intentions. Two studies using data from different years within the same organizational context, i.e., the US federal government, found that telework, or satisfaction with the potential to telework either had no impact on actual turnover intentions or reduced it (Caillier, 2016; Choi, 2020). Two of the studies found that teleworkers and non-teleworkers reported similar intentions to quit or no association between telework availability/eligibility and turnover intentions (Caillier, 2011).

Discussion

This review searched and analyzed the body of existing research to clarify the relationship between telework and critical self-reported and objective economic performance indicators at the individual and organizational level.

In general, employees and managers who could choose to telework rated their perceived performance higher than those who were required to work on the employer's premises, but to a differing extent. Employees working from home appear generally to have higher levels of self-reported job performance and productivity (Tsuhamoto, 2021), as well as perform better on an objective creative assignment (Vega et al., 2014), than those working in an office. However, different types of work-family policies, such as flexible work location (flexi-place), may be indirectly related to employee performance mediated by employee wellbeing (Medina Garrido et al., 2017), family-work conflict (Sherman, 2020), social interactions with managers and family members (Neufeld and Fang, 2005), employee preference for work segmentation (Hyland et al., 2005), and virtual connection technologies (Narayanamurthy and Tortorella, 2021).

Similarly, depending on the prevailing work-related circumstances and characteristics of the employees, type and size of the task, telework could be perceived differently as either having positive or negative associations with performance (Bao et al., 2022). This suggests that the performance metric used by studies varied considerably, which results in diverse findings among the studies included. Further, research on telework during the COVID-19 pandemic found a perceived decline in work productivity. Employees perceived that they were less productive during the COVID-19 pandemic, which could be expected considering the lack of childcare, inadequate technology, and other amenities (Ralph et al., 2020).

In this review, studies indicated beneficial impacts of telework on organizational performance typically among homogenous samples (e.g., call center operators) with unique work tasks (St George et al., 2009; Patil, 2011; Bloom et al., 2014; Choudhury et al., 2020). Studies that showed negative or no impact of telework, on the other hand, were more likely to cover different types of organizations and rely on more general organizational economic performance measures. In the study by Monteiro et al. (2021), which found both negative (small firms) and positive (R&D firms) association between remote access (as a proxy for telework) and sales, it was suggested that the association depended on the type of activities performed by the organizations. For instance, small businesses did not engage in exporting and hired workers with lower levels of skill. Similarly, Zhang et al. (2021) study reported a substantial variation in the effect of home-based work across industry sectors. Hence, there is not uniformity in the literature with respect to factors associated with productivity in home-based or teleworking organizations (OECD, 2020). The different conclusions arrived at by the studies might not be caused by the type of activity only. There could be reasons such as nature of work (Boell et al., 2016), technology availability (OECD, 2020), industry type (Monteiro et al., 2021), tasks (Bao et al., 2022), sufficient communication with colleagues and managerial support (Gajendran and Kok, 2014), and other social-health psychological factors such as commuting time and interruptions (Kazekami, 2020), social and professional isolation (Felstead and Henseke, 2017), affecting employees in different ways, which can negatively impact employee and organizational productivity.

According to the studies reviewed, using telework or being eligible to telework could determine whether employees stayed with the company or left it (Caillier, 2016; Choi, 2020). Although the conclusions were fairly consistent, most of the findings showed weak and non-significant associations from studies with methodological issues, such as evaluating data without taking into account people who are nested in multiple countries and/or organizations (Masuda et al., 2012); using non-random sampling or cross-sectional designs in which exposure and result were gathered simultaneously. Further, although some studies clearly state that turnover rate is defined as the number of employees who left the company during the year divided by the average number of employees over that time multiplied by 100, it

TABLE 3 Findings from studies on telework and intentions to leave or actual turnover rates.

References	Population/organization type	Key outcome measure	Findings	Rating
Quantitative non-randomized studies				
[illegible]	Federal Government employees. USA n = 263,475 federal government employees	Dichotomous (considering leaving organization within the next year yes/no)	Teleworkers and non teleworkers reported similar intentions to quit	⋆⋆⋆
[illegible]	Federal Government employees. USA n = 144 observations from 36 agencies	Actual turnover rates	Telework had no impact actual turnover	⋆⋆
[illegible]	Federal Government employees. USA n = 428 observations from 143 sub-agencies of federal government	Voluntary turnover (register data)	Higher proportions of teleworkers reduced the rates of voluntary turnover.	⋆⋆⋆⋆
[illegible]	Canadian General Social Survey. Canada n = 7,416 observations from nationally representative data	Dichotomous (considering leaving organization within the next year yes/no)	Female teleworkers had lower turnover intentions	⋆⋆⋆
[illegible]	Eight public and private organizations. Ireland n = 172 employees from different organizations	Turnover intentions	A weak, non-significant, positive association between telework and turnover intentions	⋆⋆
[illegible]	Federal Government employees. USA. n = 194,739 federal employees	Intention to stay	Telework eligibility has positive association with intention to stay	⋆⋆⋆⋆⋆
[illegible]	Managers of organizations, 15 countries (Asian, American, and Latin American country clusters) n = 3,918 managers from 15 countries	Turnover intentions	No association between telework and turnover intentions.	⋆⋆
[illegible]	Large internet solution corporation. USA n = 393 employees	Turnover intentions	More teleworking weakened turnover intentions	⋆⋆

is unclear whether it was voluntary leave, involuntary leave, temporary hires, or temporary leaves that were used in the estimate. Some work and employee characteristics that influence intentions to quit or stay include employees who were denied the opportunity to telework, i.e., no eligibility to telework, despite their personal preferences for segmented work and telework (Hyland et al., 2005), the amount of telework time per week (Golden, 2006), and home roles due to gender (Hyland et al., 2005; Dilmaghani, 2021). This suggests that it is the possibility to choose the optimal mix of telework and office hours based on one's preferences, rather than teleworking *per se*, which motivates employee's intentions to stay or leave the organization. More studies in different work contexts are required to confirm these associations.

Home-based or hybrid telework might have had implications for organizational productivity during the pandemic. According to Batut and Tabet (2020), during the pandemic, home-based or hybrid teleworking was heavily reliant on high-quality supervision and managerial support (e.g., by providing ICT infrastructure or training, ergonomics), which were critical for positive teleworking experiences and productivity. The findings of this review suggest that individual and organizational outcomes in telework were not only associated with the supportive management style (Choi, 2020), and type of job/ industry (Zhang et al., 2021; Bao et al., 2022), but also the work set-up and experience of employees during the pandemic (Morikawa, 2020; Rocha et al., 2021; Tsukamoto, 2021). As earlier pointed out, some studies conducted during the pandemic indicated negative association of telework with individual and organizational outcomes, such as, self-rated performance (Feng and Savani, 2020; Mireia, 2020; Morikawa, 2020; Kitagawa et al., 2021), organizational performance (Ralph et al., 2020; Monteiro et al., 2021), and employee turnover (Dilmaghani, 2021). Other studies also conducted during the pandemic found no significant change in individual and organizational outcomes due to telework (Chapman and Thamrin, 2020; Dixit et al., 2020; Moretti et al., 2020; Viete and Erdsiek, 2020). More studies on telework supervision and management, type of job/industry, telework intensity before and after the pandemic might better contribute to the understanding of difference in organizational economic performance indicators.

10.3389/fpsyg.2022.1053510

Telework influences on organizational policies and practices

Telework has become a solution for people at different stages in their lives, when they may be studying, bringing up a family, or growing older, or it can simply match their individual preferences by letting them decide when and where to work. Employees seem to be willing to choose this form of work since it improves their working and social lives by easing work constraints and yielding gains in autonomy over their own affairs. However, there are pros and cons, in particular the cost-benefit trade-off for organizations and employees practicing telework (Golden, 2001).

Likely, widespread teleworking in the long-term has implications for self-reported performance, productivity, and intention to stay or leave the organization. Working outside of the ordinary workplace may be challenging for both employee and organization, especially in the aftermath of the COVID-19 pandemic. Many high-profile businesses want to accept this flexible work future to attract employees, and many employees are striving to spend as little time in the workplace as possible—and others are planning to leave employers who are averse to working from anywhere, at least for now. To maximize the gains inherent in the use of more widespread telework from the perspective of the employer and employee, organizations could promote investments in its physical apparatus (i.e., workspace, ICT, and home office ergonomics) and enhance the relation between managers and employees who choose this work form. Uninterrupted ICTs are critical in allowing employees who prefer to telework from home or anyplace to engage in work activities (Eurofound, 2020). In the post-COVID-19 era, targeted public policies related to productivity gains from teleworking can be beneficial to both private and public organizations (OECD, 2020). Public policies and co-operation among social partners (i.e., employers, employees, and other stakeholders) are crucial to ensure that new, efficient, and welfare-improving working methods emerging after the pandemic can be developed and maintained as conventional forms of telework practices.

A comparison of how different work venues (e.g., traditional office, virtual office, and home office) influence aspects of work and organizational outcomes were considered in the reviewed studies. The review findings suggest that there is a potential for continual teleworking in terms of self-reported performance and organizational economic performance indicators, which could be obtained from the best combinations of different flexible working arrangements. For instance, Yamashita et al. (2022) observed impaired work functioning among employees who preferred and teleworked four or more days a week compared with those who almost never teleworked. Although this review did not investigate closely the topic of frequency or intensity and preference for telework, it would be interesting to study whether frequency/intensity of telework in relation to preference for it has any significance for organizational performance. Organization (i.e., either private or public) may need to evaluate their employees' needs to be flexible and accommodating, especially if they wish to recruit and retain a diverse workforce by finding the sweet spot of flexible working arrangements combinations.

Strength and limitations of the review

This review has several advantages. The systematic review process allows for a qualitative description of included studies to uncover gaps and provides a basis for clear findings through a thorough search of existing published literature on the topic. This review is based on the findings of studies moderate to high quality studies. Low-quality studies were excluded from the evidence synthesis. This notwithstanding would not affect the conclusion drawn for employee turnover and self-reported performance outcomes. There were no low-quality studies on the objective outcome of organizational performance. In comparison to previous reviews, this article addresses a broader range of employee and organizational outcomes, gender issues, and different perceptions of traditional temporal and/or spatial work practices, allowing for a more nuanced assessment of the relationship between telework and organizational economic performance outcomes. However, some limitations of the study should be mentioned. Most of the included studies were cross-sectional non experimental study designs, precluding inferences of causality. Thus, the studies do not provide information on whether telework is the cause of performance/productivity changes or decision to stay on the job or leave. To our knowledge, only a few studies have adopted a true experimental methodology in a field setting and have found positive effects of telework on turnover intentions and work performance (Bloom et al., 2015; Sherman, 2020). Many studies also lack generalizability. It may be difficult, for example, to generalize findings from a study of younger employees to older employees, or to generalize findings from certain organizations, because the organization type determines how performance can be measured and the tasks performed in the different organizations differ. This is especially important in job performance research since various work performance levels fluctuate with industry type. The studies' methodological limitations, as well as substantial heterogeneity in organizations and work tasks, definitions of telework as well as comparison work forms, the different ways organizational outcomes were measured, complicate a general, overall conclusion. This implies that the quality of evidence on the relationships between organizational economic outcomes and telework should be interpreted reasonably.

After selecting all relevant studies, the critical and constructive analysis of the quality of the studies were performed using the MMAT. The MMAT is a critical appraisal

tool that was developed for use in systematic mixed studies reviews (i.e., reviews combining qualitative, quantitative and/or mixed methods studies). The MMAT has been criticized for not being thorough enough for evaluating mixed methods studies (O'Cathain, 2010), however other reviews of critical appraisal tools found the opposite (Crowe and Sheppard, 2011). In the present study, we excluded 12 studies with low quality (i.e., two stars or less). Although the cut-off points for low, moderate, and high quality were arbitrary, they were valuable for qualitative assessment, and we have described in detail how the appraisal results were interpreted and applied in the review.

Conclusion

Several studies found that telework is associated with increased perceived job performance and organizational performance particularly in homogenous samples with unique work tasks. When telework is voluntary, it appears that both actual employee turnover rates and intentions to leave the organization are lower. Further research on the implementation and evaluation of effective work forms including but not limited to home-based telework and hybrid telework is needed to understand their contribution to self-rated performance and organizational economic performance indicators. High-quality prospective studies are clearly needed in the future. This effort will contribute to the knowledge on how to organize and implement such working arrangements in a way that is beneficial and sustainable for employees, organizations, and society.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

EA contributed to formal analysis, visualization, writing—original draft preparation, supervision, and project administration. All the authors agree to be accountable for the content of the work, contributed to data curation, screening, and selection of articles for this review, and contributed to conceptualization, methodology, investigation, resources, and writing—review and editing. All authors contributed to the article and approved the submitted version.

Funding

Financial support to conduct this project came from the Swedish Research Council for Health, Working life and Welfare—(Forte) with reference number: Ref. No. 20 19 01257.

Acknowledgments

The authors are very grateful to the Swedish Research Council for Health, Working life and Welfare—(Forte) for the financial support to this project.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1033310/full#supplementary-material

References

Aguilera, A., Lethiais, V., Rallet, A., and Proulhac, L. (2016). Home-based telework in France: characteristics, barriers and perspectives. *Transport. Res. A.* 92, 1–11. doi: 10.1016/j.tra.2016.06.021

Allen, T. D., Golden, T. D., and Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychol. Sci. Public Interest* 16, 40–68. doi: 10.1177/1529100615593273

Bailey, D. E., and Kurland, N. B. (2002). A review of telework research: findings, new directions, and lessons for the study of modern work. *J. Org. Behav.* 23, 383–400. doi: 10.1002/job.144

Bao, L., Li, T., Xia, X., Zhu, K., Li, H., and Yang, X. (2022). How does working from home affect developer productivity? a case study of Baidu during the COVID-19 pandemic. *Sci. China Inform. Sci.* 65, 4. doi: 10.1007/s11432-020-3278-4

Batut, C., and Tabet, Y. (2020). *What Do We Know About the Economic Effects of Remote Work? Directiongénérale du Trésor, Trésor-Economics 270*. Available online at: https://www.tresor.economie.gouv.fr/Articles/7b3b...7f07-4c7b-b539-... (accessed January 25, 2022).

Bloom, N., Liang, J., Roberts, J., and Ying, Z. J. (2015). Does working from home work? Evidence from a Chinese experiment. *Quart. J. Econ.* 130, 165–218. doi: 10.1093/qje/qju032

Boell, S. K., Cecez-Kecmanovic, D., and Campbell, J. (2016). Telework paradoxes and practices: the importance of the nature of work. *N. Technol. Work Employment.* 31, 114–131. doi: 10.1111/ntwe.12063

Caillier, J. G. (2011). Are teleworkers less likely to report leave intentions in the united states federal government than non-teleworkers are? *Am Rev. Public Admin.* 43, 72–88. doi: 10.1177/0275074011425084

Caillier, J. G. (2016). Does satisfaction with family-friendly programs reduce turnover? A panel study conducted in U.S. federal agencies. *Public Person. Manag.* 45, 284–307. doi: 10.1177/0091026016652424

Chapman, D. G., and Thamrin, C. (2020). Scientists in pyjamas: characterising the working arrangements and productivity of Australian medical researchers during the COVID-19 pandemic. *Med. J. Aust.* 213, 516–520. doi: 10.5694/mja2.50860

Choi, S. (2020). Flexible work arrangements and employee retention: a longitudinal analysis of the federal workforces. *Public Person. Manag.* 49, 470–495 doi: 10.1177/0091026019886340

Choudhury, P., Foroughi, C., and Larson, B. (2020). Work-from-anywhere: the productivity effects of geographic flexibility. *Strategic Manag. J.* 42, 655–683. doi: 10.1002/smj.3251

Coenen, M., and Kok, R. A. W. (2014). Workplace flexibility and new product development performance: the role of telework and flexible work schedules. *Eur. Manag. J.* 32, 564–576. doi: 10.1016/j.emj.2013.12.003

Crowe, M., and Sheppard, L. (2011). A review of critical appraisal tools show they lack rigor: alternative tool structure is proposed. *J. Clin. Epidemiol.* 64, 79–89. doi: 10.1016/j.jclinepi.2010.02.008

de Menezes, L. M., and Kelliher, C. (2011). Flexible working and performance: a systematic review of the evidence for a business case. *Int. J. Manag. Rev.* 13, 452–474. doi: 10.1111/j.1468-2370.2011.00301.x

De Menezes, L. M., and Kelliher, C. (2016). Flexible working, individual performance, and employee attitudes: comparing formal and informal arrangements. *Hum. Resour. Manag.* 56, 1051–1070. doi: 10.1002/hrm.21822

De Rutter, M., and Peters, P. (2022). "Flexible work initiatives, employee workplace well-being and organizational performance" in *Handbook on Management and Employment Practices*. eds P. Brough, F. Gardiner and K. Daniels (Cham: Springer International Publishing), 687–709. doi: 10.1007/978-3-030-29010-8_30

Delanoeije, J., and Verbruggen, M. (2020). Between-person and within-person effects of telework: a quasi-field experiment. *Eur. J. Work Org. Psychol.* 29, 795–808. doi: 10.1080/1359432X.2020.1774557

Dilmaghani, M. (2021). There is a time and a place for work: comparative evaluation of flexible work arrangements in Canada. *Int. J. Manpower.* 42, 167–192. doi: 10.1108/IJM-12-2019-0555

Dixit, R., Chinnam, R. B., and Singh, H. (2020). Decision-making dynamics in the defense industry during work from home circumstances. *IEEE Eng. Manag. Rev.* 48, 44–54. doi: 10.1109/E.M.R.2020.3019472

EU-OSHA (2021) *Home-Based Teleworking and Preventive Occupational Safety and Health Measures in European Workplaces: Evidence From ESENER 3*. Luxembourg: Publications Office of the European Union.

Eurofund (2020). *Telework and ICT-Based Mobile Work. Flexible Working in the Digital Age, New Forms of Employment Series*. Luxembourg: Publications Office of the European Union.

Eurofund (2021). *Living and Working in Europe 2020*. Luxembourg: Publications Office of the European Union.

Felstead, A., and Henseke, G. (2017). Assessing the growth of remote working and its consequences for effort, well-being and work-life balance. *N. Technol. Work Employment.* 32, 195–212. doi: 10.1111/ntwe.12097

Feng, Z., and Savani, K. (2020). Covid-19 created a gender gap in perceived work productivity and job satisfaction: implications for dual career parents working from home. *Gender Manag.* 35, 719–736. doi: 10.1108/GM-07-2020-0202

Fink, A. (2019). *Conducting Research Literature Reviews*. Thousand Oaks, CA: Sage Publications.

Gajendran, R. S., and Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: meta-analysis of psychological mediators and individual consequences. *J. Appl. Psychol.* 92, 1524–1541. doi: 10.1037/0021-9010.92.6.1524

Gajendran, R. S., Harrison, D. A., and Delaney-Klinger, K. (2015). Are telecommuters remotely good citizens? Unpacking telecommuting's effects on performance via I-deals and job resources. *Person. Psychol.* 68, 353–393. doi: 10.1111/peps.12082

Giovanis, E. (2018). The relationship between flexible employment arrangements and workplace performance in Great Britain. *Int. J. Manpower.* 39, 51–70. doi: 10.1108/IJM-01-2016-0083

Golden, L. (2001). Flexible work schedules: what are we trading off to get them? *Monthly Labor Rev.* 124, 50.

Golden, T. D. (2006). Avoiding depletion in virtual work: telework and the intervening impact of work exhaustion on commitment and turnover intentions. *J. Voc. Behav.* 69, 176–187. doi: 10.1016/j.jvb.2006.02.003

Golden, T. D., and Gajendran, R. S. (2018). Unpacking the role of a telecommuter's job in their performance: examining job complexity, problem solving, interdependence, and social support. *J. Bus. Psychol.* 34, 55–69. doi: 10.1007/s10869-018-9530-4

Golden, T. D., and Veiga, J. F. (2008). The impact of superior–subordinate relationships on the commitment, job satisfaction, and performance of virtual workers. *Leadersh. Quart.* 19, 77–88. doi: 10.1016/j.leaqua.2007.12.009

Golden, T. D., Veiga, J. F., and Dino, R. N. (2008). The impact of professional isolation on teleworker job performance and turnover intentions: does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *J. Appl. Psychol.* 93, 1412–1421. doi: 10.1037/a0012722

Harker Martin, B., and MacDonnell, R. (2012). Is telework effective for organizations? A meta-analysis of empirical research on perceptions of telework and organizational outcomes. *Manag. Res. Rev.* 35, 602–616. doi: 10.1108/01409171211238820

Hill, E. J., Ferris, M., and Märtinson, V. (2003). Does it matter where you work? A comparison of how three work venues (traditional office, virtual office, and home office) influence aspects of work and personal/family life. *J. Voc. Behav.* 63, 220–241. doi: 10.1016/S0001-8791(03)00042-3

Hong, Q. N., Pluye, P., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., et al. (2018). *Mixed Methods Appraisal Tool (MMAT), Version 2018*. Registration of Copyright (# 1148552). Canadian Intellectual Property Office, Industry Canada.

Hyland, M. M., Rowsome, C., and Rowsome, E. (2005). The integrative effects of flexible work arrangements and preferences for segmenting or integrating work and home roles. *J. Behav. Appl. Manag.* 6, 141–160. doi: 10.21818/001c.14527

Kazekami, S. (2020). Mechanisms to improve labor productivity by performing telework. *Telecommun. Pol.* 44, 101868. doi: 10.1016/j.telpol.2019.101868

Kitagawa, R., Kuroda, S., Okudaira, H., and Owan, H. (2021). Working from home and productivity under the COVID-19 pandemic: using survey data of four manufacturing firms. *PLoS ONE.* 16, 261761. doi: 10.1371/journal.pone.0261761

Kitou, E., and Horvath, A. (2007). External air pollution costs of telework. *Int. J. Life Cycle Assess.* 13, 155–165. doi: 10.1065/lca2007.06.338

Klindžić, M., and Marić, M. (2019). Flexible work arrangements and organizational performance – the difference between employee and employer driven practices. *Drustvena istrazivanja.* 89–108. doi: 10.5559/di.28.1.05

Kotey, B. A., and Sharma, B. (2019). Pathways from flexible work arrangements to financial performance. *Person. Rev.* 48, 731–747. doi: 10.1108/PR-11-2017-0353

Lee, D., and Kim, S. Y. (2017). A quasi experimental examination of telework eligibility and participation in the U.S. Federal Government. *Rev. Public Person. Admin.* 38, 451–471. doi: 10.1177/0734371X16680269

Lee, S.-Y., and Hong, J. H. (2011). Does family-friendly policy matter? Testing its impact on turnover and performance. *Public Admin. Rev.* 71, 870–879. doi: 10.1111/j.1540-6210.2011.02416.x

Masuda, A. D., Poelmans, S. A. Y., Allen, T. D., Spector, P. E., Lapierre, L. M., Cooper, C. L., et al. (2012). Flexible work arrangements availability and their relationship with work-to-family conflict, job satisfaction, and turnover intentions: a comparison of three country clusters. *Appl. Psychol.* 61, 1–29. doi: 10.1111/j.1464-0597.2011.00453.x

Medina-Garrido, J. A., Biedma-Ferrer, J. M., and Ramos-Rodríguez, A. R. (2017). Relationship between work-family balance, employee well-being and job performance. *Academia Revista Latinoamericana de Administración.* 30, 40–58. doi: 10.1108/ARLA-08-2015-0202

Mircla, B. (2020). *The Impact of Working From Home on productivity. A study on the Pandemic Period*. Oradea: Annals of Faculty of Economics, University of Oradea, Faculty of Economics. 267–275.

Monteiro, N. F., Straume, O. R., and Valente, M. (2021). When does remote electronic access (not) boost productivity? Longitudinal evidence from Portugal. *Inform. Econ. Pol.* 56, 100923. doi: 10.1016/j.infoecopol.2021.100923

Moretti, A., Menna, F., Aulicino, M., Paoletta, M., Liguori, S., and Iolascon, G. (2020). Characterization of home working population during COVID-19 emergency: a cross-sectional analysis. *Int. J. Environ. Res. Public Health* 17, 176284. doi: 10.3390/ijerph17176284

Morikawa, M. (2020). Productivity of working from home during the COVID-19 pandemic: evidence from an employee survey. *Covid Econ.* 49, 123–147. Available online at: https://cepr.org/[illegible]download-token=JK8-3_F9

Narayanamurthy, G., and Tortorella, G. (2021). Impact of COVID-19 outbreak on employee performance – moderating role of industry 4.0 base technologies. *Int. J. Prod. Econ.* 234, 108075. doi: 10.1016/j.ijpe.2021.108075

Neeley, T. (2021). *Remote Work Revolution*. New York, NY: HarperCollins.

Neirotti, P., Paolucci, E., and Raguseo, E. (2012). Telework configurations and labour productivity: some stylized facts. *Int. J. Eng. Bus. Manag.* 4, 51641. doi: 10.5772/51641

Neirotti, P., Raguseo, E., and Gastaldi, L. (2019). Designing flexible work practices for job satisfaction: the relation between job characteristics and work disaggregation in different types of work arrangements. *New Technol. Work Employment.* 2019, ntwe.12141. doi: 10.1111/ntwe.12141

Neufeld, D. J., and Fang, Y. (2005). Individual, social and situational determinants of telecommuter productivity. *Inform. Manag.* 42, 1037–1049. doi: 10.1016/j.im.2004.12.001

O'Cathain, A. (2010). "Assessing the quality of mixed methods research: towards a comprehensive framework," in *Handbook of Mixed Methods in Social and Behavioral Research*, eds A. Tashakkori and C. Teddlie (Thousand Oaks, CA: Sage), 531–555. doi: 10.4135/9781506335193.n21

OECD (2020). *Productivity Gains From Teleworking in the Post COVID-19 Era: How Can Public Policies Make It Happen?*. Paris: OECD.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Br. Med. J.* 372, n71. doi: 10.1136/bmj.n71

Patti, P. P. (2014). *Measuring ROI in a Work-at-Home Program: Family Mutual Health and Life Insurance Company (FMI)*. Beverly, MA: Scrivener Publishing LLC.

Ralph, P., Baltes, S., Adisaputri, G., Torkar, R., Kovalenko, V., Kalinowski, M., et al. (2020). Pandemic programming: how COVID-19 affects software developers and how their organizations can help. *Empir. Softw. Eng.* 25, 4927–4961. doi: 10.1007/s10664-020-09875-y

Rocha, L. A., Cárdenas, I. Q., Silva, N. G. A., and de Almeida, C. A. S. (2021). The Covid-19 pandemic and its impact on the performance of firms: an analysis based on world bank microdata. *J. Develop. Areas.* 55, 411–433. doi: 10.1353/jda.2021.0072

Ruostela, J., Lönnqvist, A., Palvalin, M., Vuolle, M., Patjas, M., and Raij, A.-L. (2017). 'New Ways of Working' as a tool for improving the performance of a knowledge-intensive company. *Knowl. Manag. Res. Practice.* 13, 382–390. doi: 10.1057/kmrp.2013.37

Samek Lodovici, M. et al. (2021). *The impact of teleworking and digital work on workers and society, Publication for the committee on Employment and Social Affairs and Policy Department for Economic, Scientific and Quality of Life Policies*. Luxembourg: European Parliament. p. 59–67.

Schardt, C., Adams, M. B., Owens, T., Keitz, S., and Fontelo, P. (2007). Utilization of the PICO framework to improve searching PubMed for clinical questions. *BMC Med. Inform. Decis Mak.* 7, 16. doi: 10.1186/1472-6947-7-16

Sherman, E. L. (2020). Discretionary remote working helps mothers without harming non-mothers: evidence from a field experiment. *Manag. Sci.* 66, 1351–1374. doi: 10.1287/mnsc.2018.3237

Shockley, K. M., and Allen, T. D. (2007). When flexibility helps: another look at the availability of flexible work arrangements and work-family conflict. *J. Voc. Behav.* 71, 479–493. doi: 10.1016/j.jvb.2007.08.006

St George, L., Baker, J., Karabatsos, G., Brimble, R., Wilson, A., and Cullen, M. (2009). How safe is telenursing from home? *Collegian.* 16, 119–123. doi: 10.1016/j.colegn.2009.05.002

Tangen, S. (2005). Demystifying productivity and performance. *Int. J. Product. Perform. Manag.* 54, 34–46. doi: 10.1108/17410400510571437

Tietze, S., Musson, G., and Scurry, T. (2009). Homebased work: a review of research into themes, directions and implications. *Person. Rev.* 38, 585–604. doi: 10.1108/00483480910992229

Tsukamoto, Y. (2021). Rethinking telecommuting with an i-deals perspective. *Ann. Bus. Admin. Sci.* 20, 33–46. doi: 10.7880/abas.0210115a

van der Lippe, T., and Lippenyi, Z. (2020). Co-workers working from home and individual and team performance. *N. Technol. Work Employ.* 35, 60–79. doi: 10.1111/ntwe.12153

Vega, R. P., Anderson, A. J., and Kaplan, S. A. (2014). A within-person examination of the effects of telework. *J. Bus. Psychol.* 30, 313–323. doi: 10.1007/s10869-014-9359-4

Viete, S., and Erdsiek, D. (2020). Mobile information technologies and firm performance: the role of employee autonomy. *Inform. Econ. Pol.* 51, 100863. doi: 10.1016/j.infoecopol.2020.100863

Yamashita, S., Ishimaru, T., Nagata, T., Tateishi, S., Hino, A., Tsuji, M., et al. (2022). Association of preference and frequency of teleworking with work functioning impairment: a nationwide cross-sectional study of Japanese full-time employees. *J. Occup. Environ. Med.* 64, e363–e368. doi: 10.1097/JOM.0000000000002536

Zhang, T., Gerlowski, D., and Acs, Z. (2021). Working from home: small business performance and the COVID-19 pandemic. *Small Bus. Econ.* 58, 611–636. doi: 10.1007/s11187-021-00493-6

DECLARATION OF SERVICE

CASE NAME: *In the Matter of the Unfair Practice Charge – SEIU Local 1000 v. State of California (Office of The Governor)*
COURT NAME: Public Employment Relations Board
CASE NUMBER: PERB No.: SA-CE-2282-S

I am a citizen of the United States and employed in the County of Sacramento, California. I am over the age of eighteen (18) years and not a party to the above-entitled action. My business address is 1808 14th Street, Sacramento, California 95811.

On April 8, 2025, I caused the following document(s) to be served:

SEIU LOCAL 1000'S MOTION TO EXPEDITE; and
DECLARATION OF KENNETH SIMS IN SUPPORT OF SEIU LOCAL 1000'S MOTION TO EXPEDITE

[X] (BY E-MAIL or electronic transmission) - I served a copy of the above-listed document(s) by transmitting via electronic mail (e-mail) or via e-PERB to the electronic service address(es) listed below on the date indicated. (May be used only if the party being served has filed and served a notice consenting to electronic service or has electronically filed a document with the Board. See PERB Regulation 32140(b).)

DAVID VILLALBA
Principal Labor Relations Counsel
CA Department of Human Resources
1515 S Street, N. Bldg., Ste. 500
Sacramento, CA 95811
E-mail: david.villalba@calhr.ca.gov

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this Declaration was executed on April 8, 2025,, at Sacramento, California.

Mary A Walsh
MARY A. WALSH