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From Office to Online: Multi-Faceted Study of Remote Project Management Challenges and Adaptations

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Abstract

Remote work, propelled by digital tools and changing employee expectations, has reshaped team dynamics. Yet project leaders still lack evidence-based guidance on which teams struggle, when, and why. We analyze the first cross-regional dataset linking project-level outcomes to individual well-being: Reports from 79 project managers. The design is convergent mixed-methods. A two-level logistic regression explained 42% of the variance in deadline slippage and revealed a three-way interaction that raised the odds of remote-work failure by 3.7 ($p < .01$). Quantitative predictors included technical disruptions, time-zone coordination issues, communication barriers, work-life balance conflicts, home-office distractions, limited resource access, and cybersecurity threats. Qualitative evidence described adaptive practices and mitigation tactics. Organizations invested in digital infrastructure, adopted unified communications tools, used AI-assisted scheduling platforms, and provided continuous training. The study offers practical guidance to strengthen resilience, productivity, and sustainability in remote project teams while clarifying organizational implications of digital transformation.

Keywords: Project management, Digital transformation, Organizational adaptation, Virtual collaboration, Virtual office culture.

1 | Introduction

In 2024, more than half of the world's knowledge workers worked remotely at least one day per week, and what began as a pandemic response is now a core element of corporate strategy [1]. Boards increasingly view location-agnostic models as a way to build resilience, reduce costs, and attract global talent. For project

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managers who coordinate complex interdependencies, remote work brings real difficulties. With fewer in-person touchpoints, ad hoc problem-solving drops. Deadlines slip more often, miscommunication rises, and engagement can falter. Extensive industry surveys report that remote projects overrun schedules 32% more often than co-located efforts [2]. The same surveys show wide dispersion in outcomes. Some teams perform strongly. Others do not.

This managerial problem has spurred a fast-growing literature. Much of it tracks workforce-level indicators such as mean productivity or stated preferences, and it rarely engages with the practical obstacles project leaders face during execution. Technological, psychological, and procedural factors are often treated in isolation, which leaves practitioners without an integrated way to translate dispersed talent into dependable performance.

This study responds to that gap by proposing and testing a multidimensional model that links digital tools, managerial practices, and team psychology to two executive priorities: Project success and employee well-being. We fielded a multi-industry survey to 79 project professionals drawn from an initial pool of 94 after screening for completeness and balance across industries, regions, and demographic groups. To deepen causal insight, we conducted comparative case analyses and distilled a set of actionable practices. These practices range from asynchronous coordination protocols to targeted supports for well-being that executives can adopt without delay.

The paper proceeds as follows. Section 2 situates the research questions in the literature. Section 3 outlines the mixed-methods design. Section 4 presents the findings. Section 5 offers practitioner guidance and directions for future work. Section 6 closes with limitations and next steps.

2 | Literature Review

2.1 | Digital Infrastructure, Flexibility, and Autonomy

Digital technologies, such as cloud platforms and collaboration software, have fundamentally reshaped organizational operations and cultures by increasing flexibility and autonomy in work practices [3–6]. Mariani et al. [7] highlight that platforms like Zoom and Slack have deepened reliance on remote work, offering access to global talent while introducing technical and managerial challenges. This shift is rooted in digitization, the conversion of analog data into digital form, which underpins digitalization, the broader transformation of business processes and models through digital tools [3].

2.2 | Pandemic Acceleration and Macro Adoption Patterns

COVID-19 moved remote work from a limited practice to a mainstream arrangement and reshaped expectations about where and how work gets done [6], [5], [8]. Before the pandemic, 5.4% of EU-27 employees regularly telecommuted [9]. By mid-2023, about 28% of working days in the United States were remote.

Globally, as of May 2022, 14% of jobs were fully remote and 24% hybrid [10], [11]. Leonardi et al. [12] propose an integrative account showing how remote work reshapes psychological, temporal, technological, and structural dimensions. How these four dimensions interact remains an open question.

2.3 | Psychological and Technological Factors

Evidence points in two directions. With adequate support, remote settings can lift productivity, efficiency, and well-being [13], [14]. Weak home-office setups, unreliable tools, and thin peer contact can depress performance and cohesion [15], [16]. Individual differences matter as well. Extroversion tends to raise trust and commitment toward virtual leaders, while neuroticism erodes trust [17]. In Agile contexts, remote work can strain basic psychological needs, underscoring the importance of adaptive leadership for morale and cohesion [18].

Sustaining engagement in dispersed teams calls for deliberate social and coordination routines. Regular check-ins and simple team-building activities can strengthen cohesion and morale when people rarely meet in person. Organizations also benefit from a virtual culture that foregrounds clear communication, trust, and participation among team members.

2.4 | Hybrid Models and Digital Leadership

Hybrid arrangements that blend on-site and remote work can moderate known drawbacks of fully remote setups and support job satisfaction, work-life balance, and adaptability when paired with reliable communication tools and flexible schedules [19], [20]. A sense of belonging still matters. Regular in-person contact and inclusive leadership are associated with higher well-being and cohesion [21]. Effective digital leadership in these settings features agility, clear communication, and a healthy balance between online and face-to-face interaction, which together foster innovation and productivity [22], [23]. Leaders with strong emotional intelligence can also reduce technostress and support well-being through trust and clarity [24]. Real gains often require strategic and cultural adjustments to fully capture the benefits of digital transformation in project settings [25].

Remote work has also surfaced distributional concerns. White-collar employees gained flexibility and autonomy that many blue-collar roles cannot access [26]. Risks have increased for younger workers, minorities, and disadvantaged groups [27], [28]. Virtual work can both advance and hinder gender equity, calling for intentional practices that protect women's visibility and access to opportunities [29]. Experiences with work-life balance vary widely across sectors, family contexts, and cultures [30].

2.5 | Remote Work and Project Management

Remote project management depends on digital capability, adaptable leadership, and structured communication. Managerial adaptability helps hold teams together under changing conditions [31]. Healthcare cases from the pandemic illustrate how organizations adjusted project practices under pressure [32].

Other studies connect digital transformation with mental health concerns among employees [33], [34]. Trust, leadership, and communication remain central challenges. Virtual teams perform better with adaptive leadership and intentional design [35], [36]. Agile methods continue to evolve for remote settings through subteams and shared leadership, with caution against micromanagement [37]. Success in global virtual teams often turns on how well leaders manage cultural differences, time zones, and communication barriers [38].

2.6 | Research Gaps and Study Objectives

Despite rapid progress, important gaps remain in understanding how psychological, technological, and managerial elements interact in remote projects, especially during major disruptions. Research often treats these domains separately, which limits prediction about which configurations will succeed or fail.

The present study addresses this problem through an integrated contingency model linking remote work to organizational performance and employee well-being. The framework brings together psychological factors, digital infrastructure, and managerial strategies to generate practical if-then guidance for improving remote and hybrid project management across industries.

3|Data and Method

This study examines the distinctive challenges project managers faced during COVID-19 through a mixed-methods design that combines qualitative insight with quantitative testing. We evaluate remote work initiatives and trace workflows from research questions through data collection, analysis, and practical recommendations. *Fig. 1* summarizes the sequence and makes the approach's logic visible. By drawing on traditional, Agile, and virtual project management techniques, the framework is well-suited to remote settings and provides a foundation for follow-up inquiry.

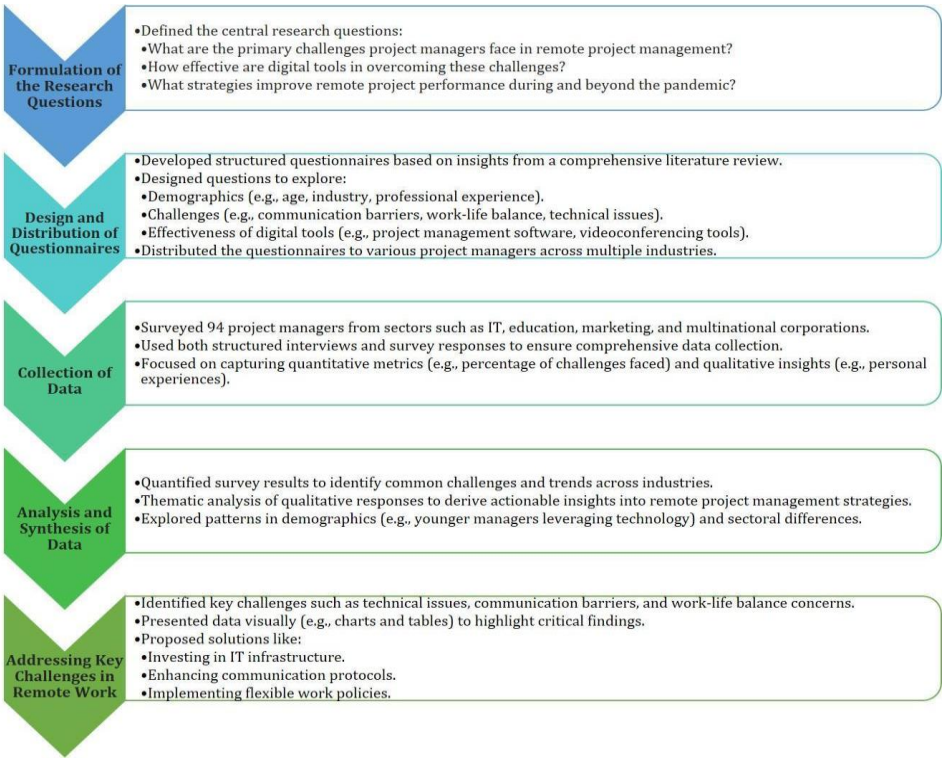

Fig. 1. Research methodology overview.

The methodology builds on established project management principles and current Agile practices. We focus on Scrum and the Scaled Agile Framework (SAFe). Scrum's short, time-boxed sprints, daily stand-ups, and sprint reviews create quick feedback cycles and keep teams aligned across locations. SAFe scales those routines to the enterprise through Program Increment planning, Agile Release Trains, and a Lean-Agile mindset, which supports shared priorities and synchronized delivery among dispersed stakeholders.

Guided by Tereso et al. [39], we treat project management as a strategic process that contributes to organizational performance and value. A targeted questionnaire, developed from a focused literature review, gathered data from diverse demographics and industries. The analysis covered performance indicators, collaboration patterns, communication effectiveness, and project outcomes to build a rounded view of remote work dynamics.

To capture lived experience, we fielded a structured survey for project managers who had navigated the shift. Items reflected themes commonly noted in prior studies: the use of digital tools, psychological and logistical hurdles, and the balance of personal and professional responsibilities in home settings. We also collected demographic data, including gender, age, location, and professional experience, to identify patterns that shape the effectiveness of digital strategies. The results show that benefits and constraints are not evenly distributed.

Industry context matters, so the instrument included sector-specific questions on the adoption and use of digital tools. We added items on the COVID-19 timeline to distinguish short-term responses from continuing practices. Finally, we measured known pressure points, including communication barriers, technical

disruptions, and cybersecurity concerns. These domains were selected based on prior research and were intended to produce evidence that can guide concrete responses to remote work challenges.

3 | Questionnaire Design and Validation

A structured questionnaire anchored the study's data collection. Items were drawn from the literature on communication barriers, technical hurdles, work–life balance, and the efficacy of digital tools. Responses used a five-point Likert scale to capture intensity and perceived effectiveness. To secure validity and reliability, we followed three steps. Subject matter experts in project management and remote work first reviewed the draft for alignment with the research aims. We then ran a pilot with 100 project managers to test clarity and item structure, and made minor edits to tighten wording and remove ambiguity. Finally, internal consistency was assessed with Cronbach's alpha. Core sections, including "challenges" and "digital tool effectiveness," each exceeded 0.70, which supports use in the main study.

Table 1. Professional sectors of survey participants.

S/N	Sector	n	Description
1	IT services	14	Companies focused on software development, IT services, and tech support.
2	Multinational corporations	33	Large companies with global operations in various industries.
3	Local private companies	29	Privately owned businesses operating primarily within the country.
4	Small business enterprises	6	Small-scale businesses across various sectors are not industry-specific.
5	Education and academia	8	Institutions and organizations in the education sector.
6	Marketing and advertising	4	Specialists in marketing, advertising, and market research.

The survey targeted 94 project managers from multiple industries, including IT, education, marketing, and multinational firms. Participants were recruited through professional networks and online platforms to capture a wide range of remote work experiences. Of 184 invitations, 94 usable responses were returned, a response rate of 51.1%. Early–late comparisons of delay frequency, gender composition, and tool adoption showed no significant differences ($p > .10$), suggesting limited nonresponse bias.

To deepen interpretation, 20 respondents completed semi-structured interviews about their remote work practices. We also embedded a short test phase in which managers used selected digital tools in their daily work and recorded experiences. Chat platforms and virtual whiteboards improved real-time exchange and group problem-solving. Participants received brief guidance for integrating these tools into existing workflows. Quantitative analysis then examined frequency and severity of reported issues by category: technical glitches, language barriers, cyber threats, access to resources, distractions, time-zone differences, and work–life balance.

3.1 | Power Analysis

An a priori analysis in G*Power 3.1 indicated that at least 72 observations were needed to detect a medium effect (odds ratio about 1.7) in a logistic regression with seven predictors at $\alpha = .05$ and power = .80. The final sample of 79 meets this requirement.

3.2 | Bias Mitigation and Acknowledgment

We recognized several risks to inference: voluntary participation could introduce self-selection bias; IT and multinational sectors were overrepresented in the pool; responses skewed toward Europe and Asia, with

limited input from the Americas and none from Africa or Oceania; and interpretation of items might vary across respondents. To address these risks, we used stratified sampling targets for industry, region, age, and experience; piloted and refined the instrument for clarity and accessibility; applied statistical weights where imbalances persisted, especially for the IT segment; and cross-validated patterns across gender, age, and region for both survey and interview data.

Initial collection produced 94 cases. After screening for completeness and accuracy, 15 were removed due to missing demographics or incomplete key items. The final dataset contained 79 participants. The composition remained balanced across industries and regions within the constraints noted above.

3.3 | Robustness Test

To verify that findings were not driven by the IT segment (36% of cases), we re-estimated all logistic models after excluding IT respondents and with 1,000 bias-corrected bootstrap samples. The direction, magnitude, and significance of core predictors were stable.

3.4 | Limitations

The sample size limits detailed subgroup analysis. Self-selection and regional concentration may temper generalizability to under-sampled geographies or less digitized sectors. The cross-sectional design does not support causal claims. Weighting and robustness checks help, but the results are best read as analytical generalizations that clarify mechanisms rather than as estimates of population prevalence. Future work should use larger, randomly drawn samples and longitudinal or experimental designs to test durability and causality.

4 | Findings

Respondents came from several sectors: multinational corporations (36.71%), local private companies (29.11%), IT services (16.46%), education and training (10.13%), small businesses (5.06%), and marketing and advertising (2.53%). Most were 20–29 years old. The age distribution likely reflects the reach of digital recruitment and a higher comfort with online participation among younger managers. Older professionals were less visible, which fits the channels used. Even so, mid-to-senior cohorts (30–49) contributed in meaningful numbers. Future work could broaden recruitment through professional associations or direct outreach to firms to capture a wider age range. Responses came mainly from Asia and Europe, signaling regional variation in the uptake of remote work.

Technical difficulties were common. The logistic models identified region and gender identity as the strongest predictors of technical problems (*Fig. 2*). Cybersecurity exposure also mattered. More experience and higher education are aligned with fewer such issues. Participants most often cited unstable internet, unfamiliar software, and inadequate equipment.

Time-zone differences created coordination strain that went beyond scheduling. Gender identity and communication barriers had the most significant effects in these models (*Fig. 2*). Resource access and distractions added pressure, suggesting that logistical and communication frictions compound.

Communication barriers were widespread. Gender identity and work–life balance were the main correlates (*Fig. 2*). Infrastructure limits and regional context played moderate roles. Distractions, age, and education showed little influence.

Work–life balance was shaped by region and educational background (*Fig. 2*). Time-zone complexity and cybersecurity concerns had moderate effects. Distractions and technical glitches also contributed. Industry and other demographics were less salient.

Home distractions affected 78.5% of respondents. Communication barriers and technical issues were the primary predictors, with time-zone gaps adding to the problem (*Fig. 2*). Work experience and region had moderate weight. Other demographic factors mattered little.

Access to essential resources proved difficult for 84.8% of participants. Education was a strong predictor of better access. Cybersecurity threats and communication barriers also featured prominently (*Fig. 2*). Experience, industry setting, distractions, and time zones showed moderate effects.

Cybersecurity risks were acknowledged by 86% of the sample. Work–life balance was the most powerful correlate of cybersecurity awareness and response (*Fig. 2*). Regional context and day-to-day communication practices also influenced outcomes. Demographic variables had a limited impact.

Clear patterns emerged across gender and region. Women reported more challenges with work–life balance and technical issues, particularly in places with weaker digital infrastructure. Men in those same regions also reported frequent difficulties. Participants in regions with more mature digital systems, such as Europe and the Americas, reported fewer problems. These patterns indicate that gender and regional context shape both the type and the intensity of challenges in digital work.

Taken together, the results point to regional, demographic, and logistical factors as central predictors of remote work strain.

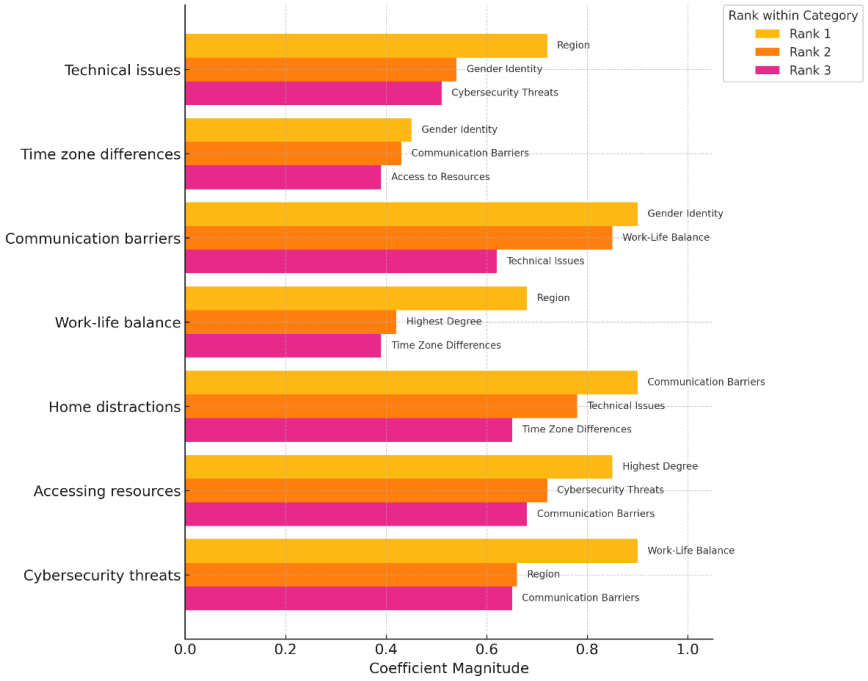

Fig. 2. Predictors of remote-work challenges across seven domains (N = 79, bootstrapped logistic regression).

5 | Discussion: Recommendations

Remote project performance hinged on seven pressure points: technical disruptions, time-zone coordination, communication barriers, work–life boundaries, home distractions, resource access, and cybersecurity. Their intensity varied by context and demographics, including region and gender. To guide action, we introduce the triad model for remote project success, which aligns psychological, technological, and managerial levers. The recommendations below translate our mixed-methods findings into practice.

5.1 | Reduce Technical Disruptions with Fit-for-Purpose Infrastructure

Regional disparities and gender effects pointed to uneven digital foundations. Consolidate tools through unified communications and collaboration platforms such as Microsoft Teams or Google Workspace to integrate meetings, messaging, tasks, and files. Replace traditional VPNs with Zero Trust Network Access (ZTNA) for smoother and safer connectivity. Where gaps persist, establish regional digital hubs equipped with reliable bandwidth and standardized hardware to reduce avoidable outages.

5.2|Coordinate Across Time Zones without Constant Meetings

Global scheduling friction remained a consistent drag [40]. Favor asynchronous workflows in Slack, Notion, or Asana, so progress continues while colleagues are offline. Add AI scheduling assistants like Clockwise or Reclaim.ai to align calendars and produce summaries. Set a team communication charter that spells out response norms, handover windows, and escalation paths. Clear rules reduce rework and help include quieter voices.

5.3|Strengthen Communication and Cohesion

Cultural distance and thin nonverbal cues still complicate collaboration [41]. Short virtual co-working sessions in Zoom or Gather create a low-pressure space for quick questions and informal bonding. Pair this with concise communication guidelines and selective cultural awareness training. The aim is not heavy etiquette manuals. Teams need a few shared habits they will actually use.

5.4|Manage Work–Life Boundaries with Rhythm and Foresight

The most persistent strain was temporal spillover. 61% struggled to switch off, and after-hours activity rose by 32% during peak delivery phases. Prior work ties this to ubiquitous tech [42], [43]. Our data point to an additional mechanism: teams running two-week sprints with daily stand-ups reported the highest burnout, suggesting that micro-regulation without macro-recovery amplifies cognitive load.

Caregiving status intensified this pattern. Each additional after-hours interaction corresponded to a 1.8 times steeper rise in exhaustion for employees with dependent-care duties ($p < .01$). Blanket "right to disconnect" rules miss that nuance.

Practical fixes were straightforward. Teams that combined rhythmic autonomy, locally chosen flexible micro-breaks, and digital sunsets tied to sprint ends cut weekly overtime by 14% without reducing throughput. Co-design mattered. When managers scheduled breaks unilaterally, adherence fell. When teams shaped the cadence, compliance exceeded 80 percent.

Several sites piloted predictive fatigue analytics that merged light telemetry, such as meeting density and keyboard latency, with one-minute pulse checks. The composite index predicted self-reported burnout 1 week in advance with 73% accuracy. That was enough time to redistribute work. Ethical guardrails were essential: anonymization, opt-in consent, and clear limits on use. Participants valued the early warning, especially in high-intensity roles. Two principles emerge. Match work cadence to recovery cadence. Supplement autonomy with simple, data-informed foresight.

5.5|Cut Home Distractions at the Source

Distractions correlated with lower focus and throughput, echoing Marzolla et al. [44]. Offer a basic "workspace starter kit" for remote staff: An adjustable desk, an external monitor, and a quality headset. Provide a short virtual consultation in Miro or Mural to tune layout and workflow. Share one-page guidance on temperature, lighting, and noise. Small changes add up.

5.6|Make Access Both Secure and Friction-Light

Access friction proved socio-technical. 41% used unsanctioned cloud tools when prescribed steps required more than two authentications, with higher rates among non-technical contributors and remote contractors. Heavy SSO and blanket VPN policies coincided with the highest levels of unauthorized sharing. By contrast, context-adaptive trust, requirements that adjust to role, device health, and real-time risk, lowered breach incidence and raised satisfaction. Zero Trust works best when its granularity fits the diversity of users.

Short "scarcity windows" also mattered. Deadline work often needs temporary access beyond regular roles. Time-boxed elevation that grants narrow, auto-expiring privileges cuts informal credential sharing by 63% without raising incidents. Treat access as an ephemeral service rather than a fixed entitlement.

We also observed a gender-moderated usability gap. Women in the sample were twice as likely to abandon prescribed channels when an interface demanded more than three decision points. Causality needs more study, yet the design implication is clear: evaluate security workflows through an equity lens as well as a risk lens.

5.7 | Raise Cybersecurity Readiness without Fatigue

Cybersecurity remained a central concern, consistent with Škiljić [45]. Favor micro-learning delivered through an LMS such as Udemy Business or Coursera for Business. Keep modules short and periodic. Add quarterly "innovation labs" to test updated endpoint controls and phishing defenses in a safe environment. Habit beats fear in the long run.

5.8 | Putting the Triad Model to work

I. Psychological levers: Rhythmic autonomy, team-designed cadences, brief pulse checks.

II. Technological levers: UCC platforms, ZTNA with context-adaptive policies, time-boxed elevation, light telemetry with strict privacy.

III. Managerial levers: Communication charters, selective cultural training, asynchronous standards, focused ergonomics support.

6 | Conclusion

This study shows that combining advanced digital tools with targeted training and human-centered policies can strengthen remote project management, especially during crises such as COVID-19. The survey identified core obstacles: Technical failures, communication frictions, and strains on work–life boundaries. We outlined responses that join technology with empathetic leadership. Asynchronous platforms, flexible scheduling, and strong cybersecurity are effective when supported by reliable infrastructure and ongoing workforce development.

The main contribution is a holistic view. Technical fixes alone are insufficient; they must be accompanied by a culture that supports trust, autonomy, and well-being. The evidence comes from a single survey conducted during a pandemic, which limits generalizability. Future research should test these interventions over time and across varied sectors and regions, and examine how they adapt as market conditions shift. The aim is durable, resilient practices for distributed work.

Conflicts of Interest

The authors declare no conflicts of interest.

Use of AI-assisted tools. The authors used AI-based software to check grammar and refine expression. The manuscript was conceived and written by the authors, who take full responsibility for the analyses and conclusions.

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