

Work-from-Home in the IT Sector: A Systematic Review of Outcomes, Moderators, and Research Direction

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Abstract

This systematic review synthesizes 30 empirical studies published between 2019 and 2024, structured through PRISMA and the TCCM (Theory, Context, Characteristics, Methodology) framework. The analysis examines outcomes of work-from-home (WFH) in the IT sector, including productivity, engagement, skill utilization, well-being, and innovation. It also identifies mediating mechanisms such as autonomy, trust, and digital readiness, and explores moderating influences including gender, generational differences, and cultural norms.

The evidence indicates that WFH offers advantages—flexibility, enhanced productivity, and improved job satisfaction—while creating challenges related to social isolation, burnout, and unequal access to digital resources. Scholars have typically drawn on frameworks such as JD-R, SDT, TAM, SET, and COR, but often in isolation, limiting integrated theoretical development. Methodologically, the literature relies heavily on cross-sectional survey designs, with relatively limited longitudinal, experimental, or mixed-method approaches, constraining causal inference and generalizability.

This review makes three contributions. First, it synthesizes fragmented evidence into an integrative conceptual model of WFH in the IT sector. Second, it offers practical guidance for managers, HR professionals, and policymakers to strengthen hybrid work practices. Third, it outlines a future research agenda addressing key theoretical, contextual, and methodological gaps. The findings suggest that inclusive, context-sensitive policies and more rigorous research designs can foster resilient, equitable, and sustainable remote and hybrid work arrangements.

Keywords: work-from-home (WFH), IT sector, systematic literature review (SLR), TCCM framework, productivity, employee engagement, remote work, hybrid work, organizational behavior, digital readiness.

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1. Introduction

The COVID-19 pandemic catalysed the rapid adoption of work-from-home (WFH) practices across industries, with the IT sector positioned at the forefront due to its high level of digital preparedness. For many employees, remote work has created clear advantages such as greater flexibility, elimination of daily commuting, and opportunities for improved productivity and well-being. Yet, these benefits are counterbalanced by significant challenges, including reduced opportunities for social interaction, blurred boundaries between personal and professional life, and uneven access to reliable digital infrastructure—problems that are particularly acute in emerging economies.

Although research on WFH has examined dimensions such as productivity (Bloom et al., 2015), engagement (Golden & Veiga, 2005), and employee well-being (Allen, Golden, & Shockley, 2021), the overall body of evidence remains fragmented. Much of what is available is concentrated on narrow outcomes and is drawn largely from studies in developed, urban settings, which limits its applicability in diverse contexts such as the Indian IT sector. Importantly, earlier reviews have often given limited attention to employees in knowledge-intensive industries, where socio-economic, cultural, and infrastructural conditions strongly shape outcomes.

Recent contributions have extended this debate by examining the evolving dynamics of hybrid and remote work in the post-pandemic era. For example, Chatterjee, Rana, Dwivedi, and Sharma (2023) explored the role of digital collaboration tools in sustaining productivity; Zhang, Wang, and Liu (2023) highlighted how social isolation affects IT professionals' well-being; Gibson, Hardy, and Buckley (2024) analyzed knowledge sharing and innovation challenges in hybrid teams; and Rana, Dwivedi, and Hughes (2024) provided insights into employee engagement in hybrid contexts. These studies confirm that WFH continues to evolve and underscore the need for an updated and comprehensive literature synthesis through 2024.

To address these limitations, this study undertakes a systematic literature review (SLR) of WFH in the IT sector. The analysis is guided by the TCCM

framework (Paul & Benito, 2018), which organizes insights across Theory, Context, Characteristics, and Methodology, and is supplemented with thematic synthesis. This dual approach enables the review to examine how WFH influences key outcomes—including productivity, engagement, skill utilization, well-being, and innovation—while also identifying mediating processes such as autonomy, trust, and digital readiness, and moderating influences such as gender, generational differences, and cultural orientation.

The contribution of this paper is threefold. First, it combines dispersed insights to provide a more integrated account of WFH outcomes in the IT sector. Second, it develops a conceptual model that links theoretical perspectives with empirical evidence, thereby overcoming fragmentation in prior research. Third, it outlines a forward-looking research agenda and practical recommendations for managers, HR professionals, and policymakers, particularly relevant for emerging economies where infrastructural and cultural factors strongly shape WFH outcomes. Industry evidence documents the IT-BPM sector's rapid shift to remote/hybrid operations during 2020–2022 (NASSCOM, 2022).

Global evidence shows that remote and hybrid work are not a temporary anomaly but a persistent reoptimization of how knowledge work is organized (Aksoy et al., 2022; Barrero et al., 2021). Early pandemic studies documented the rapid shift to remote tasks and highlighted occupational feasibility constraints that shaped who could work from home (Brynjolfsson et al., 2020; Dingel & Neiman, 2020). Together, these patterns frame our review period (2019–2024) and motivate a focus on productivity, collaboration, well-being, and design choices that determine when hybrid arrangements succeed.

2. Methodology

The review was conducted using the PRISMA approach (Preferred Reporting Items for Systematic Reviews and Meta-Analyses; Moher et al., 2009), which provides clear guidelines for reporting and helps maintain consistency across studies. The TCCM framework—covering Theory, Context, Characteristics, and Methodology (Paul & Benito, 2018)—was applied to organise the synthesis. Using

PRISMA alongside TCCM ensured that the review was not only systematic but also able to highlight where the literature is most developed and where significant gaps remain, particularly in theoretical grounding, contextual coverage, and research design..

2.1. Review Protocol

A review protocol was established before data collection to minimize bias and improve consistency. The guiding research question asked: *How does WFH in the IT sector affect productivity, engagement, skill utilization, well-being, and innovation, and what theoretical, contextual, and methodological gaps remain?* This protocol defined the scope, search strategy, and inclusion/exclusion criteria, which were applied consistently across all stages of the review.

2.2. Data Sources and Search Strategy

The search was conducted across two major databases—Scopus and Google Scholar—between January and February 2024. Articles published between 2019 and 2024 were considered. The Boolean search string applied was:

("Work-from-Home" OR "Remote Work" OR "Telecommuting") AND ("Productivity" OR "Utilization" OR "Engagement") AND ("Information Technology" OR "IT Sector")

To ensure comprehensiveness, backward and forward citation tracking was also performed. Reference management software (Mendeley) was used to organize results and remove duplicates.

Scopus and Google Scholar served as the primary databases for article identification. Table 4 reports core metadata (authors, context, method, key findings, and outlet) to support transparency and replicability. The final corpus includes several studies published in 2023 and 2024 (e.g., Chatterjee, Rana, Dwivedi, & Sharma, 2023; Zhang, Wang, & Liu, 2023; Gibson, Hardy, & Buckley, 2024; Rana, Dwivedi, & Hughes, 2024; Bloom, Han, & Liang, 2024; Jaiswal & Arun, 2024), ensuring that the review captures the most recent contributions to the WFH discourse.

Articles were identified exclusively from Scopus and Google Scholar to ensure comprehensiveness and

replicability. For additional transparency, Table 4 not only summarizes the core metadata of the reviewed studies (authors, context, method, key findings, and outlet) but also indicates the ABDC ranking of the journals as a supplementary quality marker. Importantly, the ABDC classification was not used as an inclusion criterion; it is reported only to provide contextual reference regarding journal quality."

2.3. Inclusion and Exclusion Criteria

Studies were included if they met four conditions: (1) published between 2019–2024; (2) peer-reviewed and empirical in nature (qualitative, quantitative, or mixed-methods); (3) written in English; and (4) focused directly on WFH in the IT sector or other knowledge-intensive industries. Exclusions applied to editorials, commentaries, book reviews, purely conceptual papers, and studies outside the defined timeframe or scope.

2.4. Screening and Selection

The database search across Scopus and Google Scholar initially yielded 645 articles on work-from-home (WFH) and remote work in the IT sector. After removing duplicates, 530 unique records were screened on titles and abstracts. Articles that were conceptual notes, opinion pieces, conference papers, or outside the IT/knowledge-work context were excluded at this stage. The remaining 230 full-text articles were then assessed against the inclusion and exclusion criteria outlined in Section 2.3.

Following this structured screening process, 30 high-impact empirical studies published between 2019 and 2024 were retained as the final review corpus. These studies provided substantive empirical evidence on outcomes such as productivity, engagement, well-being, skill utilization, and innovation in remote and hybrid work. The complete set of these 30 studies is summarized in Table 4, and formed the basis for the thematic synthesis and TCCM analysis.

In addition to these 30 empirical studies, a small set of theoretical and methodological works (e.g., Social Exchange Theory; Self-Determination Theory; Conservation of Resources; Job Demands–Resources; Technology Acceptance Model; TCCM framework) were cited to guide the conceptual framing. These references were not part of the 30 analyzed studies

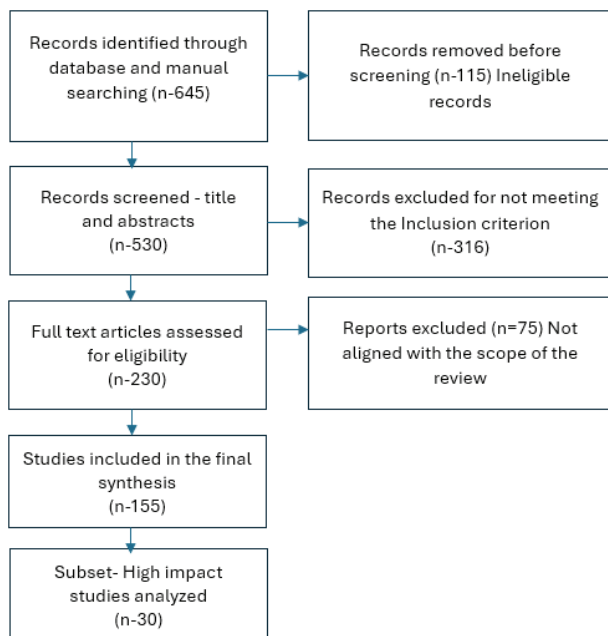
but were employed to provide the theoretical scaffolding for interpretation and discussion.

Accordingly, the evidence base rests on two complementary layers:

1. the empirical corpus of 30 studies, which constitutes the analyzed dataset; and
2. Supporting theoretical works, which enrich interpretation and strengthen the conceptual contributions.

Figure 1.

PRISMA Flow of Study Selection



2.5. Data Extraction and Synthesis

A structured extraction sheet captured details such as author(s), year, theoretical framework, context, research design, and findings. These details were then synthesized using two complementary approaches: (1) TCCM analysis, which categorized studies along theoretical, contextual, and methodological dimensions; and (2) thematic analysis, which identified recurring outcomes and moderators across the literature. This dual approach ensured that both breadth (via TCCM) and depth (via thematic analysis) were incorporated into the final synthesis.

3. Findings: TCCM-Based Synthesis

The analysis of the selected studies is presented through the TCCM framework, which provides a structured view of how WFH has been studied in the IT sector. This approach reveals not only the main findings but also the gaps that remain in the literature.

3.1. Theory

Research on WFH has drawn on various theoretical perspectives, but these are often applied in isolation rather than in combination. The Job Demands–Resources (JD-R) model, for instance, has been widely used to examine how employees balance heavy workloads with resources such as autonomy, showing that remote work may ease certain physical pressures while at the same time increasing emotional strain (Banerjee & Rathi, 2021). Self-Determination Theory (SDT) is also common in this literature, highlighting autonomy, competence, and relatedness as the foundations of motivation. While WFH can strengthen autonomy, it frequently undermines employees' sense of relatedness (Deci & Ryan, 2000; Venkat & Rao, 2020). Other perspectives add further nuance: the Technology Acceptance Model (TAM) explains the uptake of digital tools (Davis, 1989; Chatterjee, Chaudhuri, & Vrontis, 2021); Social Exchange Theory (SET) emphasizes the role of trust and reciprocity in virtual teams (Banerjee & Kapoor, 2022); and Conservation of Resources (COR) theory conceptualizes stress as a response to resource loss and motivation as a result of resource gain (Hobfoll, 1989). Together these frameworks provide rich but fragmented insights, as few studies attempt to combine them into a more integrated theoretical explanation of WFH.

3.2. Context

Most reviewed studies are set in developed, urban environments, leaving emerging economies and rural contexts underexplored. In India, challenges such as unreliable internet connections, frequent power outages, and lack of ergonomic home workspaces remain significant barriers to effective WFH (Kapoor & Kaur, 2021). Cultural influences also play an important role: in collectivist societies, employees often prefer close managerial guidance, which can

be disrupted in remote work settings (Thomas & Sen, 2021). Moreover, certain groups—such as SMEs, startups, gig workers, and employees working across cultural boundaries—remain largely absent from the current literature, even though they are critical to developing a more inclusive understanding of remote work.

3.3. Characteristics

Outcomes of WFH vary considerably depending on employee attributes and job roles. Structured and task-focused roles often adapt more easily to remote settings than creative or client-facing jobs that depend on face-to-face interaction (Sharma & Verma, 2021). Gender is also influential: women tend to report higher stress and burnout, largely due to the dual responsibility of managing work and caregiving (Malhotra & Dev, 2021). Generational differences are also visible—while younger employees may be more digitally skilled, they often report loneliness and weaker team connections (Sinha & Rajan, 2022). Socio-economic factors further complicate outcomes; employees from lower-income households are more likely to face poor infrastructure, limited digital access, and cramped living conditions, all affecting their remote work experience (Ahmed et al., 2021). Few studies adopt an intersectional approach that considers how gender, socio-economic background, and role characteristics combine to shape outcomes, representing a clear research gap.

3.4. Methodology

Methodological approaches in WFH research are often narrow. A heavy reliance on cross-sectional surveys and self-reported data creates risks of recall bias and social desirability bias. This over-reliance limits the ability to establish causality or capture how employee experiences evolve. Longitudinal and experimental designs remain rare, despite their potential to strengthen causal inference. Similarly, mixed-methods approaches that could combine the depth of qualitative insights with the generalizability of quantitative data are seldom used. More objective forms of evidence, such as behavioral and digital trace data, are underutilized, even though they could offer valuable insights into productivity and collaboration patterns (Chatterjee, Chaudhuri, & Vrontis, 2021). Addressing these methodological gaps would

improve validity and increase the practical relevance of findings for managers and policymakers.

Table 1.

Mapping of WFH Studies Using the TCCM Framework

Dimension	Key Findings	Identified Gaps
Theory	JD-R, SDT, TAM, SET, COR applied separately	Lack of integrative, multi-level models
Context	Focus on urban, developed settings	Limited study of SMEs, rural, cross-cultural
Characteristics	Outcomes vary by role, gender, generation, SES	Lack of intersectional analyses
Methodology	Mostly cross-sectional, self-reported	Need longitudinal, experimental, mixed-method

This synthesis highlights the literature's richness and fragmentation, setting the stage for thematic insights and a future research agenda.

4. Thematic Discussion of WFH Outcomes

The thematic analysis of selected studies highlights six major themes through which WFH affects employees and organizations in the IT sector: productivity, engagement, skill utilization, well-being, knowledge sharing and innovation, and contextual moderators. Each theme reflects opportunities and constraints, demonstrating remote work's complex and often contradictory nature.

4.1. Productivity

Research on productivity outcomes points to both positive and negative effects. Several studies report that the removal of daily commuting and workplace interruptions enables employees to focus more effectively (Bloom & Davis, 2022; Choudhury, Foroughi, & Larson, 2021; Chatterjee, Rana, Dwivedi, & Sharma, 2023). In the Indian context, these benefits are strongly dependent on infrastructural support

such as stable internet connections and ergonomic work setups (Kapoor & Kaur, 2021). However, other evidence suggests that productivity gains are fragile. Prolonged WFH has been linked to higher stress, role ambiguity, and digital fatigue, which may erode efficiency over time (Banerjee & Rathi, 2021; Toscano & Zappalà, 2020). Managerial practices also play a decisive role: autonomy tends to sustain performance, whereas intrusive monitoring undermines trust and intrinsic motivation (Banerjee & Kapoor, 2022). Importantly, outcomes are not uniform across job types. Routine, task-based work often adapts well to remote environments, but creative and collaborative roles—dependent on face-to-face exchange—are more vulnerable to productivity declines (Sharma & Verma, 2021). Taken together, productivity is best viewed not as a guaranteed benefit of WFH, but as a conditional outcome shaped by infrastructure, role characteristics, and managerial style.

Causal and quasi-experimental evidence suggests hybrid designs can sustain or improve outcomes. A large randomized field experiment shows hybrid policies increase retention without harming performance (Bloom, Han, & Liang, 2024), while personnel-analytics data indicate higher output among IT professionals working from home (Gibbs, Mengel, & Siemroth, 2023). Firm-level surveys and natural experiments point to task and job type heterogeneity, with productivity gains when work is well matched to remote execution (Kitagawa, Kuroda, Okudaira, & Owan, 2021; Shen, 2023). Time-use and wage studies also show meaningful reallocations of effort under telework, with mixed implications across groups and roles (Pablonia & Vernon, 2022; Etheridge, Tang, & Wang, 2020). Where geographic flexibility is viable, work-from-anywhere policies can raise productivity by expanding choice sets and reducing commuting frictions (Choudhury, Foroughi, & Larson, 2021).

Recent evidence also shows that employee selection into remote roles and organisations' treatment of such roles significantly influence productivity outcomes (Emanuel & Harrington, 2023). Work-from-anywhere policies can enhance productivity by leveraging geographic flexibility (Choudhury, Foroughi, & Larson, 2021).

4.2. Engagement

Both relational and structural factors shape employee engagement in remote work settings. Positive drivers include empathetic leadership, clear role expectations, and timely feedback, creating a sense of connection and purpose (Ramaswamy & D'Souza, 2021; Rana, Dwivedi, & Hughes, 2024). Even when conducted virtually, informal exchanges have also been shown to sustain engagement and motivation (Golden & Veiga, 2005). Conversely, engagement declines when employees experience social isolation, micromanagement, or weak organizational support—issues that disproportionately affect women and younger employees (Malhotra & Dev, 2021; Sinha & Rajan, 2022). Cultural context adds further complexity: in collectivist societies, where employees often prefer structured supervision, the autonomy of WFH can be destabilising and reduce engagement (Thomas & Sen, 2021). Psychological safety emerges as a key factor, enabling employees to express concerns or ideas without fear of negative consequences (Banerjee & Kapoor, 2022). Overall, sustaining engagement in WFH environments requires organizations to balance flexibility with structured interaction while fostering trust and informal connection.

4.3. Skill Utilization

How effectively employees can use their skills in remote settings is shaped by several factors, most notably their level of digital literacy, the availability of mentoring, and the support they receive from the organization. Those who are more digitally proficient tend to take greater advantage of online mentoring, virtual training opportunities, and collaboration platforms, which in turn enhances both their learning and their ability to apply competencies in practice (Mukherjee & Das, 2021; Chatterjee et al., 2021). By contrast, employees with limited digital skills or restricted access to technology often struggle to put their expertise to full use, which can widen existing inequalities within the workforce (Kapoor & Kaur, 2021). Organizational feedback mechanisms also play a decisive role. Structured virtual mentoring initiatives have been shown to strengthen professional growth and align employee skills with organizational priorities (Mukherjee & Das, 2021). In contrast, weak or delayed feedback can lead to

frustration, underutilization of capabilities, and disengagement (Banerjee & Rath, 2021). In short, skill utilization in WFH arrangements is uneven and highly dependent on whether organizations invest in digital training, mentoring networks, and equitable resource access.

Digital-trace analyses reveal that remote work can reshape collaboration structures: cross-team ties decline and networks become more siloed, even when overall communication volume increases (Yang et al., 2022; DeFilippis, Impink, Singell, Polzer, & Sadun, 2020). Laboratory and field evidence further suggests that video-mediated communication may curb idea generation during early-stage ideation, highlighting the value of modality fit (Brucks & Levav, 2022). At the same time, adaptation and managerial support practices help maintain routines and performance in telework settings (Carillo, Cachat-Rosset, Marsan, Saba, & Klarsfeld, 2021).

4.4. Well-Being

The relationship between WFH and employee well-being is highly ambivalent. On one side, remote work reduces commuting and rigid schedules, improving work-life balance and lowering stress levels (Allen, Golden, & Shockley, 2021). On the other hand, extended remote work has been associated with increased burnout, emotional exhaustion, and ergonomic discomfort (Malhotra & Dev, 2021; Deshmukh & Rao, 2021; Zhang, Wang, & Liu, 2023). Gender plays a significant role: women frequently report higher levels of stress, mainly because of the dual burden of professional and domestic responsibilities (Malhotra & Dev, 2021). Social isolation is another recurring challenge, strongly linked to stress and reduced productivity (Toscano & Zappalà, 2020; Ahmed, Verma, & Das, 2021). Video-conferencing fatigue has become a salient stressor during WFH (Balakrishnan & Nair, 2021). Wellness initiatives—from digital detox programs to structured wellness sessions and organizational support for ergonomics—have been shown to mitigate some of these risks (Ghosh & Singh, 2021). Overall, employee well-being in WFH contexts depends on whether organizations balance flexibility with proactive health-oriented support.

Studies consistently link remote work experiences with simultaneous shifts in productivity, engagement, and stress, underscoring the need to manage boundaries deliberately (Galanti, Guidetti, Mazzei, Zappalà, & Toscano, 2021; Darouei & Pluut, 2021). Evidence from public and private sectors shows that without supportive norms and design, work-life balance can erode even as flexibility rises (Palumbo, 2020; Vyas & Butakhieo, 2021). In the Indian context, remote work relates to higher stress and mixed creativity outcomes, reinforcing the role of context-specific support (Jaiswal & Arun, 2024).

4.5. Knowledge Sharing and Innovation

One of the most persistent concerns in WFH environments is the disruption of informal, serendipitous interactions that facilitate knowledge exchange and innovation. Evidence suggests that tacit knowledge transfer declines when teams are dispersed (Sundar & Mathur, 2022; Carillo et al., 2021; Gibson, Hardy, & Buckley, 2024). While collaboration platforms provide partial solutions, they rarely offer the richness of in-person interactions. Some organizations have experimented with online hackathons, digital brainstorming, and cross-functional virtual projects to counter this deficit, with promising results (Sundar & Mathur, 2022). Leadership style is critical here: leaders who encourage open communication and foster cross-team collaborations can reduce the innovation gap that often arises in remote settings (Ramaswamy & D'Souza, 2021). The evidence suggests that knowledge sharing and innovation in WFH contexts depend less on the technology itself and more on whether organizations cultivate the right culture and leadership practices.

4.6. Contextual Moderators

The outcomes of WFH are strongly conditioned by context. In India, employees in tier-2 and tier-3 cities face infrastructural barriers such as poor internet and inadequate workspace, which reduce productivity and engagement (Kapoor & Kaur, 2021; George & Rao, 2021). Socio-economic status further shapes experiences, with lower-income employees more likely to suffer from digital exclusion and constrained living conditions (Ahmed, Verma, & Das, 2021). Demographic factors add additional layers:

younger employees often report loneliness despite digital fluency, whereas older employees may adapt better to structured routines (Sinha & Rajan, 2022). Cultural factors also exert influence: collectivist norms emphasize structured supervision and frequent interaction, sometimes clashing with the autonomy inherent in WFH (Thomas & Sen, 2021). Cross-national reviews confirm that infrastructure, culture, and demographics all moderate outcomes, leading to highly uneven experiences across populations (Allen, Golden, & Shockley, 2021). These findings emphasise the need for organisations to adopt localised, inclusive, and flexible approaches to remote work policy.

The effectiveness of hybrid arrangements depends on work-design features—autonomy, interdependence, monitoring, and support—as well as task–technology fit (Wang, Liu, Qian, & Parker, 2021; Prodanova & Kocarev, 2021). Where tasks are suitable and managerial practices are supportive, productivity and engagement are more likely to be sustained (Choudhury et al., 2021; Carillo et al., 2021). Employee-reported pros and cons further underscore that design choices—not just location—determine outcomes (Ipsen et al., 2021).

Overall, the evidence shows that the interaction of organizational support, individual capacity, and contextual realities shape WFH effectiveness. Flexibility and autonomy offer short-term gains but require trust, role clarity, and inclusive leadership. Inequalities in digital access and the erosion of informal knowledge sharing remain critical risks, while demographic and cultural factors further condition outcomes. Effective strategies must therefore balance autonomy with accountability, address infrastructural and socio-economic gaps, and foster inclusive, collaborative practices.

Integrative Insights

The six themes together illustrate that WFH in the IT sector is not a uniform experience but a complex, multidimensional phenomenon shaped by interdependent factors. When the evidence is synthesized, several cross-cutting patterns emerge.

First, **flexibility and autonomy** appear consistently as the strongest advantages of remote work. Eliminating

commuting and allowing employees greater control over time management are widely associated with short-term productivity and satisfaction gains (Bloom & Davis, 2022; Choudhury, Foroughi, & Larson, 2021). However, these benefits are fragile: role ambiguity, constant digital surveillance, and weak managerial support can quickly undermine motivation and performance (Banerjee & Rath, 2021; Banerjee & Kapoor, 2022). This suggests that autonomy yields positive outcomes only when balanced with clear expectations and supportive leadership (Ramaswamy & D’Souza, 2021).

Second, the evidence highlights **interconnections between engagement, well-being, and productivity**. Psychological safety and empathetic leadership foster trust, sustaining engagement and buffering against burnout (Golden & Veiga, 2005; Malhotra & Dev, 2021). Well-being challenges such as isolation and stress affect health, weaken engagement, and reduce overall productivity (Allen, Golden, & Shockley, 2021; Toscano & Zappalà, 2020). Similarly, strong mentoring structures help employees deploy their skills more effectively, contributing to professional growth, innovation, and long-term retention (Mukherjee & Das, 2021; Chatterjee et al., 2021).

Third, **digital access and socio-economic status inequalities** run across almost all outcomes. Employees in smaller cities or from lower-income households report more frequent infrastructure barriers, fewer opportunities for skill development, and higher risks of stress and disengagement (Kapoor & Kaur, 2021; George & Rao, 2021; Ahmed, Verma, & Das, 2021). This “digital divide” underscores that organizational interventions must go beyond individual well-being programs and include structural investments in infrastructure and equitable access to resources.

Fourth, the **erosion of tacit knowledge sharing** poses a serious challenge for innovation. The absence of informal, spontaneous exchanges significantly restricts collaboration and creativity in remote settings (Sundar & Mathur, 2022; Carillo et al., 2021). While virtual brainstorming and hackathons have shown promise, their effectiveness depends heavily on leadership styles encouraging experimentation

and cross-team collaboration (Ramaswamy & D'Souza, 2021).

Finally, **cultural and demographic moderators** cut across all outcomes. In collectivist societies, the preference for structured supervision often clashes with the autonomy inherent in WFH, making engagement and productivity harder to sustain (Thomas & Sen, 2021). Generational differences also matter: younger employees value flexibility but often feel disconnected, while older employees appreciate routine and stability (Sinha & Rajan, 2022). Broader comparative reviews confirm that cultural orientation and infrastructural capacity shape WFH experiences in different national settings (Allen, Golden, & Shockley, 2021).

The evidence indicates that WFH strategies cannot be designed as one-size-fits-all solutions. Practical approaches must integrate flexibility with accountability, address inequalities in digital access, and remain sensitive to demographic and cultural differences. By combining organisational support with inclusive leadership and structural investments, firms can mitigate the risks of burnout, isolation, and innovation loss while maximising the long-term potential of distributed work models.

Conceptual Model

Drawing on the TCCM synthesis and thematic analysis, an integrative conceptual model (Figure 2) is proposed to explain how WFH outcomes in the IT sector are shaped by a combination of organizational, individual, and contextual factors. The model illustrates how inputs operate through mediating mechanisms and are further conditioned by moderators, eventually influencing key employee outcomes.

Organizational and Individual Inputs.

Both organizational practices and individual attributes shape how employees experience WFH. At the organizational level, factors such as leadership approach, managerial style, and the quality of digital infrastructure are especially influential. Evidence shows that supportive leadership and reliable infrastructure are associated with stronger productivity, engagement, and well-being (Kapoor

& Kaur, 2021; Ramaswamy & D'Souza, 2021). Employees differ in their ability to adapt to remote work at the individual level. Digital literacy, flexibility, and the type of role performed all affect how workers respond. For example, those with higher digital maturity can use mentoring opportunities and collaboration platforms more effectively than their less digitally confident peers (Chatterjee et al., 2021; Mukherjee & Das, 2021).

A practical implication is to design hybrid policies that balance retention and performance while acknowledging persistence in employee preferences (Bloom et al., 2024; Barrero, Bloom, & Davis, 2021). Selection and treatment in remote labor markets also matter—who opts into remote roles and how firms structure those roles shape outcomes (Emanuel & Harrington, 2023). Managers should monitor collaboration load and network health, as remote work can lengthen coordination cycles and reduce cross-team ties without careful stewardship (DeFilippis et al., 2020; Yang et al., 2022).

Mediating Mechanisms.

The relationship between inputs and outcomes is not direct but shaped by three recurring mechanisms: autonomy, trust, and digital readiness. Autonomy generally enhances engagement and productivity, but when employees lack role clarity or organizational support, it can contribute to overload and stress (Deci & Ryan, 2000; Banerjee & Rathi, 2021). Trust is equally critical: it tends to be strengthened by empathetic leadership but undermined by excessive monitoring, which erodes psychological safety (Banerjee & Kapoor, 2022; Golden & Veiga, 2005). Digital readiness combines infrastructure and employee capability, allowing workers to use their skills and contribute to innovation fully. Where this readiness is missing, inequalities widen and disengagement becomes more likely (Kapoor & Kaur, 2021; Chatterjee et al., 2021).

Moderating Factors.

The model also emphasizes the role of moderators such as gender, generation, socio-economic background, and cultural orientation. Women and caregivers often experience higher stress due to overlapping professional and domestic duties

(Malhotra & Dev, 2021; Deshmukh & Rao, 2021). Younger employees, despite being digitally skilled, frequently report loneliness and weak social ties, while older employees are more comfortable with structure and routine (Sinha & Rajan, 2022). Cultural preferences also matter: collectivist contexts value structured supervision, which may conflict with the autonomy embedded in remote work (Thomas & Sen, 2021). Infrastructure gaps, particularly in smaller cities, further moderate outcomes by limiting productivity and engagement (Ahmed, Verma, & Das, 2021; George & Rao, 2021).

Employee Outcomes.

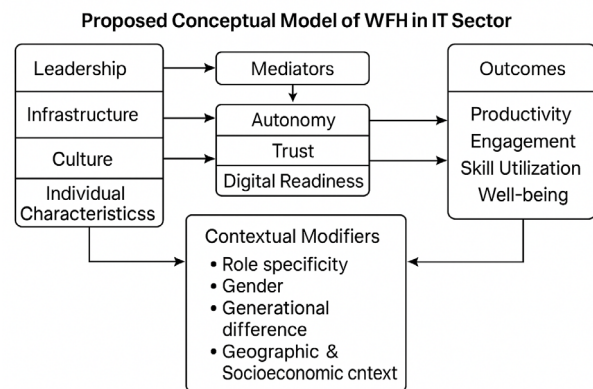
Four main outcomes are highlighted: productivity, engagement, skill utilization, and well-being. Productivity improves when autonomy is matched with task clarity but declines in collaborative or innovation-heavy roles (Bloom & Davis, 2022; Sharma & Verma, 2021). Engagement is strengthened by trust and role clarity but suffers in contexts of micromanagement or weak social ties (Ramaswamy & D'Souza, 2021; Golden & Veiga, 2005). Skill utilization improves when mentoring and digital platforms are effectively deployed (Mukherjee & Das, 2021), while well-being is contingent on organizational strategies to counteract stress and burnout (Allen, Golden, & Shockley, 2021; Ghosh & Singh, 2021).

Holistic Perspective.

The model emphasizes that WFH effectiveness cannot be attributed to single factors. Instead, it arises from organizational support, individual capacity, and contextual realities. Integrating theoretical perspectives such as JD-R, SDT, TAM, SET, and COR provides a richer understanding of these dynamics (Hobfoll, 1989; Deci & Ryan, 2000; Davis, 1989). By highlighting mediators and moderators, the model explains why WFH produces uneven outcomes across employees and organizations. This framework bridges fragmented insights and offers practical guidance for designing more inclusive, resilient, and sustainable remote and hybrid work strategies.

Figure 2.

Conceptual Model of WFH Outcomes in the IT Sector



5. Research Gaps & Future Agenda

The review highlights several gaps in the existing WFH literature and sets a research agenda around the TCCM framework. Addressing these gaps will allow scholars to develop more nuanced insights and provide organizations with actionable strategies for navigating remote and hybrid work.

5.1. Theory

Most studies have drawn on frameworks such as JD-R, SDT, TAM, SET, and COR, but these have typically been applied in isolation. As a result, theoretical explanations remain fragmented. For example, while JD-R explains the balance of demands and resources, it overlooks the role of trust, which SET captures more effectively. Similarly, TAM explains technology use but neglects the motivational drivers emphasized by SDT (Deci & Ryan, 2000; Davis, 1989; Hobfoll, 1989). Future work should therefore move toward integrative frameworks that combine psychological, organizational, and technological perspectives. There is also scope to develop dynamic models that capture how outcomes evolve as organizations shift from fully remote to hybrid systems. Incorporating cultural-level theories, such as Hofstede's cultural dimensions, would further enrich understanding of how national values shape WFH experiences.

5.2. Context

The literature remains heavily skewed toward developed and urban contexts, creating a partial view of WFH. Infrastructural challenges in emerging

economies—such as unreliable internet and limited workspace—are insufficiently represented, despite their strong influence on productivity and engagement (Kapoor & Kaur, 2021; George & Rao, 2021). Future studies should pay greater attention to small and medium-sized enterprises (SMEs), startups, and the gig economy, as these contexts differ significantly from large corporations regarding resources and structures. Cross-cultural comparisons would also add value, particularly studies contrasting collectivist and individualist societies to understand how cultural orientations moderate WFH outcomes (Thomas & Sen, 2021).

Feasibility and outcomes vary widely across countries and occupations: developing economies face structural constraints around occupational mix and digital access that limit remote options (Gottlieb, Grobovšek, & Poschke, 2021). Even within advanced economies, telework shifts time allocation and wage dynamics in ways that differ by demographic and role (Pabilonia & Vernon, 2022). Global surveys likewise show persistent heterogeneity in preferences and adoption levels across regions (Aksoy et al., 2022).

5.3. Characteristics

Most studies examine attributes such as gender, role type, or generation in isolation. What is missing are **intersectional analyses** that consider how these characteristics combine to produce unique outcomes. For example, the experiences of younger women working in client-facing roles within lower-income households remain underexplored. Similarly, the perspectives of employees with disabilities or those in non-traditional family structures, such as single parents or caregivers, receive little attention. Psychological traits like resilience, adaptability, and openness to technology remain under-researched, even though they are likely to shape remote work effectiveness powerfully. Addressing these gaps would produce a more inclusive and representative body of evidence.

5.4. Methodology

Methodological limitations are one of the most apparent weaknesses in the literature. Most studies rely on cross-sectional surveys and self-reported data, which are vulnerable to bias and do not capture change over time. There is a pressing need for **longitudinal studies** that track employee experiences across different phases of remote work adoption. Experimental designs could help establish causal relationships, while mixed-methods approaches would allow for deeper contextual insights. Objective data sources such as digital traces and behavioural data remain underutilised but could provide fine-grained evidence of productivity and collaboration patterns (Chatterjee, Chaudhuri, & Vrontis, 2021). Advanced analytical techniques, including structural equation and multi-level modelling, would also allow researchers to test complex, multi-layered hypotheses that span individual, team, and organisational levels.

Overall, the future of WFH research requires moving away from isolated perspectives and adopting **integrative, intersectional, and methodologically diverse approaches**. By doing so, scholars can capture the real complexity of remote work and provide organizations with evidence-based strategies that are both context-sensitive and equitable.

Table 2.

Future Research Agenda Based on TCCM Dimensions

Dimension	Identified Gap	Future Research Directions
Theory	Isolated, single-theory applications	Develop integrative, dynamic, multi-level models
Context	Focus on developed, urban settings	Study SMEs, rural, hybrid, and cross-cultural contexts
Characteristics	Limited intersectional analysis	Investigate overlapping identities and marginalized groups
Methodology	Cross-sectional, self-reported data	Use longitudinal, experimental, mixed, and behavioral methods

This research agenda provides a roadmap for advancing scholarly understanding of WFH by addressing its theoretical, contextual, individual, and methodological gaps. By embracing these directions, future studies can help organizations develop inclusive, resilient, and evidence-based strategies for navigating the evolving landscape of remote and hybrid work.

6. Practical Implications

This review offers practical guidance for managers, HR professionals, and policymakers shaping the future of remote and hybrid work in the IT sector. The recommendations are grounded in the evidence synthesized through this study and connect directly to broader societal priorities, including the United Nations Sustainable Development Goals (SDGs).

6.1. For Managers: Leading Remote Teams

Managers remain central to the success of WFH arrangements. A leadership approach based on **structured autonomy**—granting employees flexibility while ensuring clarity of deliverables—has been shown to sustain productivity and engagement (Ramaswamy & D’Souza, 2021). Excessive micromanagement and digital surveillance, by contrast, damage trust and reduce motivation (Banerjee & Kapoor, 2022). Outcome-based performance measures should be prioritised instead of evaluating employees based on online presence (Choudhury, Foroughi, & Larson, 2021). Managers also play a role in encouraging innovation by creating digital spaces for brainstorming and cross-functional collaboration (Sundar & Mathur, 2022). These practices align with **SDG 8 (Decent Work and Economic Growth)** by ensuring that remote employees work under fair and productive conditions.

6.2. For HR Professionals: Inclusive and Resilient Policies

HR professionals need to design policies that recognize the diversity of employee experiences. Tailored policies are required to address differences in job roles, caregiving responsibilities, and digital access (Malhotra & Dev, 2021). Mentorship programs, wellness initiatives, and professional development opportunities should be embedded into remote work strategies. Proactive steps to counter biases such

as “proximity bias” are essential to ensure remote workers are not disadvantaged compared to office-based colleagues. These measures contribute directly to **SDG 10 (Reduced Inequalities)** by addressing organisational, structural, and demographic inequities. At the same time, wellness programs and mental health support advance **SDG 3 (Good Health and Well-Being)**.

Rapid and systematic reviews identify physical and mental-health risks accompanying extended telework (Oakman, Kinsman, Stuckey, Graham, & Weale, 2020; Oakman, Neupane, Proper, Kinsman, & Nygård, 2022). Employees report clear advantages and disadvantages—from autonomy and focus to isolation and strain—suggesting interventions must address both sides of the ledger (Ipsen, van Veldhoven, Kirchner, & Hansen, 2021). Technostressors and social isolation are salient predictors of lower satisfaction and perceived productivity, pointing to practical design levers for organisations (Toscano & Zappalà, 2020; Al-Habaibeh, Watkins, Waried, & Javareshkian, 2021).

6.3. For Policymakers: Creating Enabling Environments

The role of government and regulatory bodies is equally important. Investments in reliable digital infrastructure are critical to reducing the digital divide between urban and non-urban areas (Kapoor & Kaur, 2021). Policies such as the “right to disconnect” can safeguard employee well-being, while programs that expand digital literacy will enable broader participation in remote work. Public–private partnerships could be used to extend training and technology access to underrepresented communities. Such interventions advance **SDG 9 (Industry, Innovation, and Infrastructure)** and reinforce inclusive participation in the digital economy.

6.4. For Organizations: Toward Sustainable Hybrid Models

For most companies, the future of work will not be exclusively remote or entirely office-based, but a hybrid arrangement that blends the two. To make such models effective, organizations may need to rethink how their physical spaces are used—designing

offices to support collaboration, creativity, and team-building, while allowing routine or individual tasks to be handled remotely. At the same time, equity must remain a priority. Remote staff should have the same access to career opportunities, recognition, and resources as colleagues who are present on site. Approaches of this kind not only advance SDG 8 (Decent Work) and SDG 9 (Industry, Innovation, and Infrastructure), but can also generate environmental benefits by reducing the time and energy costs associated with daily commuting.

Viewed more broadly, hybrid work is not simply a matter of organizational logistics. It reflects a wider shift in how work is structured within society. Aligning managerial practices, HR policies, and government initiatives with the SDGs on well-being, decent work, innovation, and inequality reduction will be critical if hybrid work is to support outcomes that are both equitable and sustainable.

Table 3.
Actionable Recommendations for Key Stakeholders

Stakeholder	Recommended Actions
Managers	Foster autonomy, focus on outcomes, communicate empathetically, and support innovation.
HR Professionals	Develop inclusive policies, promote wellness and learning, and ensure equity for remote employees.
Policymakers	Invest in infrastructure, regulate employee rights, foster digital literacy, and encourage regional inclusion.
Organizations	Transition to balanced, inclusive, and sustainable hybrid work models.

These recommendations highlight the importance of coordinated and deliberate actions at organizational and societal levels to create equitable, resilient, and productive work environments that leverage the full potential of remote and hybrid work arrangements.

7. Conclusion

This review integrates findings from 30 empirical studies (2019–2024) to examine how WFH reshapes productivity, engagement, skill utilization, well-being, and innovation. It identifies autonomy, trust, and digital readiness as key mediators, and gender, generation, and culture as important moderators. The findings point to the dual character of remote work. For some employees, WFH increases flexibility, satisfaction, and efficiency, but it also brings risks of stress, isolation, inequality, and diminished innovation due to the loss of informal knowledge exchange. These contradictions make clear that the success of WFH depends less on the model itself and more on the organizational systems, leadership practices, and policy frameworks that support it.

The paper contributes in three ways. First, it develops an integrative conceptual model that links organizational and individual inputs with outcomes through mediating and moderating processes. Second, it identifies gaps in theory, context, and methodology, calling for future work that combines frameworks, adopts intersectional perspectives, and employs more rigorous longitudinal and mixed-method designs. Third, it sets practical recommendations for managers, HR professionals, and policymakers, aligning these with the Sustainable Development Goals (SDGs) to highlight their wider societal relevance.

Unique Contribution. Unlike earlier reviews that examined remote work broadly, this study focuses specifically on the IT sector, particularly on employees’ experiences in emerging economies. By combining the TCCM framework with thematic analysis, it produces a more context-sensitive and comprehensive account of WFH. This framing helps distinguish the study from prior literature and offers a roadmap for researchers and practitioners seeking to design equitable and resilient hybrid work strategies.

Ultimately, unlocking WFH's potential requires striking the right balance between flexibility and structure, autonomy and trust, and inclusivity and innovation. Addressing infrastructural, cultural, and methodological shortcomings will be essential if future work practices are to become productive and sustainable.

Future work should integrate governance and process readiness with employee-level design levers to sustain engagement in hybrid settings (Rana, Dwivedi, & Hughes, 2024; Wang et al., 2021). Health effects warrant longitudinal evaluation and targeted interventions, given accumulating evidence on physical and psychosocial risks (Oakman et al., 2022; Oakman et al., 2020). Research should also probe causal mechanisms behind creativity and collaboration trade-offs, and test sector-specific heterogeneity—mainly where tasks differ sharply in measurability and interdependence (Brucks & Levav, 2022; Shen, 2023; Kitagawa et al., 2021).

Table 4.

Summary of Reviewed Articles with Theoretical Lens, Context, and Methodology

Author(s) & Year	Theory / Lens	Context	Methodology	Key Findings	Journal
Aksoy, Barrero, Bloom, Davis, Dolls & Zarate (2022)	Global adoption & preferences	Global, multi-country	Large-scale surveys (cross-country)	WFH adoption is persistent; strong hybrid preference with cross-country heterogeneity	<i>Brookings Papers on Economic Activity</i>
Barrero, Bloom & Davis (2021)	Persistence of WFH	United States	Repeated representative surveys (NBER WP)	WFH share remains elevated post-pandemic due to tech, re-optimization, and preferences	<i>NBER Working Paper</i>
Bloom, Han & Liang (2024)	Retention & performance	Large tech firm (field)	Randomized controlled trial	Hybrid policy improves retention without harming performance	<i>Nature</i>
Yang et al. (2022)	Collaboration networks	Information workers	Digital trace analysis (enterprise data)	Remote work reduces cross-team ties; collaboration becomes more siloed	<i>Nature Human Behaviour</i>
Gibbs, Mengel & Siemroth (2023)	Productivity measurement	IT professionals	Personnel + analytics data	WFH increases measured output; effects vary by task and monitoring	<i>JPE Microeconomics</i>
Emanuel & Harrington (2023)	Selection & treatment	Remote labor market	Employer/platform data (Staff Report)	Who selects into remote and how firms treat them both shape outcomes	<i>NY Fed Staff Report</i>
Choudhury, Foroughi & Larson (2021)	Work-from-anywhere	US Patent examiners	Natural experiment (WFA policy)	Geographic flexibility raises productivity under suitable tasks	<i>Strategic Management Journal</i>
Carillo, Cachat-Rosset, Marsan, Saba & Klarsfeld (2021)	Adaptation to telework	France	Survey + qualitative insights	Routine adaptation and managerial support underpin sustained output	<i>European Journal of Information Systems</i>

Wang, Liu, Qian & Parker (2021)	Work design	Global / cross-sector	Integrative empirical review	Autonomy, interdependence, monitoring, and support condition WFH effectiveness	<i>Applied Psychology</i>
Galanti, Guidetti, Mazzei, Zappalà & Toscano (2021)	Productivity–stress–engagement	Italy	Employee survey	WFH affects productivity, engagement, and stress simultaneously	<i>Journal of Occupational & Environmental Medicine</i>
Ipsen, van Veldhoven, Kirchner & Hansen (2021)	Pros/cons of WFH	Europe	Multi-country survey	Six salient advantages and disadvantages reported by employees	<i>Int. J. Environmental Research & Public Health</i>
Darouei & Pluut (2021)	Boundary theory	Netherlands	Daily diary study	Boundary blurring predicts next-day strain and WFC	<i>Stress and Health</i>
Palumbo (2020)	Work–life balance	Italy public sector	Employee survey	WFH can erode WLB without supportive design and norms	<i>Int. J. Public Sector Management</i>
Oakman, Kinsman, Stuckey, Graham & Weale (2020)	Occupational health	Global	Rapid review	Physical/mental health risks identifiable; guidance to optimize health	<i>BMC Public Health</i>
Prodanova & Kocarev (2021)	Demands–resources	Europe	Employee survey	WFH demands/ resources shape job performance perceptions	<i>Technology in Society</i>
Vyas & Butakhieo (2021)	Contextual constraints	Hong Kong	Exploratory survey	WFH impacts work and life domains; local context matters	<i>Policy Design and Practice</i>
Toscano & Zappalà (2020)	Techno-stress & isolation	Italy	Employee survey	Isolation and stress lower satisfaction/ productivity	<i>Sustainability</i>
Kitagawa, Kuroda, Okudaira & Owan (2021)	Productivity under WFH	Japan (4 firms)	Firm surveys	Measurable productivity shifts; task differences matter	<i>PLOS ONE</i>
Brynjolfsson, Horton, Ozimek, Rock, Sharma & TuYe (2020)	Early US remote shift	United States	Large online survey (NBER WP)	Rapid, sizable shift to remote tasks; uneven across sectors	<i>NBER Working Paper</i>
Dingel & Neiman (2020)	Task feasibility	United States (O*NET)	Occupational/ task mapping	~37% of jobs can be done at home; feasibility drives disparities	<i>Journal of Public Economics</i>
Pabilonia & Vernon (2022)	Wages & time use	United States	ATUS microdata	Telework linked to time reallocation and wage differences	<i>Review of Economics of the Household</i>

Shen (2023)	Natural experiment	Europe (lockdowns)	Difference-in-differences	WFH boosts productivity where tasks suit remote execution	<i>European Economic Review</i>
Jaiswal & Arun (2024)	Stress & creativity	India	Employee survey	WFH linked to higher stress and mixed effects on creativity	<i>Asian Business & Management</i>
Rana, Dwivedi & Hughes (2024)	Hybrid & digital transformation	Global knowledge work	Systematic evidence synthesis	Governance/process readiness critical for engagement in hybrid	<i>International Journal of Information Management</i>
Brucks & Levav (2022)	Creativity in virtual teams	Lab experiments	Randomized lab/field experiments	Video calls reduce idea generation vs. face-to-face	<i>Nature</i>
DeFilippis, Impink, Singell, Polzer & Sadun (2020)	Collaboration/ time use	Large firms	Digital trace analysis (NBER WP)	Meetings increased, workday lengthened, coordination patterns shifted	<i>NBER Working Paper</i>
Etheridge, Tang & Wang (2020)	Self-reported productivity	United Kingdom	National survey (working paper)	Mixed productivity effects; heterogeneity by task and home setup	<i>ISER Working Paper (Univ. of Essex)</i>
Gottlieb, Grobovšek & Poschke (2021)	Developing economies	Multiple LMICs	Cross-country analysis	Limited WFH feasibility given occupation and digital access	<i>European Economic Review</i>
Al-Habaibeh, Watkins, Waried & Javareshkian (2021)	Challenges & opportunities	UK & global	Multi-sector survey	Identifies barriers/ benefits; guidance for remote operations	<i>Heliyon</i>
Oakman, Neupane, Proper, Kinsman & Nygård (2022)	Health impacts of telework	Global	Systematic review	Telework affects physical and mental health; practical recommendations	<i>BMC Public Health</i>

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