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Creating supportive technology-enhanced remote work environments: a review of the literature

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Abstract

Purpose – Technology has enabled remote working at an unprecedented scale in recent years, with impacts on workers increasingly recognised. This study reviewed extant literature to investigate knowledge on how organisations support remote workers and types of technology-related supports utilised to improve the working environment for remote workers.

Design/methodology/approach – A scoping literature review, guided by the Arksey and O'Malley framework, included scholarly literature published between 2010 and 2023 with a focus on technology and remote workers. About 42 articles met the inclusion criteria for this review.

Findings – The study reveals an increasing publication trend on the topic from 2021, with most papers reporting cross-sectional, mono-method designs located within Europe or the Asia–Pacific. Published study outcomes were distilled into five discrete themes (equipment, software, training, physical work environment and psychosocial work environment) and two cross-cutting themes (human resources and managers). These themes described characteristics and the inter-relationships that influence the technology-related supports for remote workers.

Practical implications – The findings have practical implications for guiding HR practitioners in utilising technology-related supports to adapt contemporary, technologically evolving working environments that best support the social, economic and environmental needs of a productive and healthy remote workforce.

Originality/value – Despite the increased prevalence of remote working, technology-related supports that best support remote workers are largely unknown. This literature review responds to a call for synthesising evidence-based research to identify and document organisational support mechanisms that support remote workers. The novel study reported here applies the technology-organisation-environment (TOE) framework to determine how individual-, team- and organisation-level technology-related supports assist remote workers.

Keywords Remote work, Technology, Literature review, Technology-related supports

Paper type Literature review

Introduction

The rapid advancement of technology and the global shift towards more flexible working arrangements have reshaped traditional work structures, making remote work an increasingly

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prevalent model. Remote workers perform their duties outside a central office environment, utilising technology to stay connected, productive and aligned with organisational goals (Adekoya *et al.*, 2022). In recent years, the number of employees engaging in remote work has surged, with global surveys indicating that nearly half of the workforce now performs part or all, of their duties remotely (Gallup, 2025). This shift has fundamentally redefined workplace expectations, organisational culture and employee–employer relationships.

Several factors have driven this transformation, including the widespread availability of high-speed Internet, advancements in cloud computing and the growing adoption of digital collaboration tools (Bharat, 2020). A changing economic and social landscape, combined with disruptive global events, has further accelerated the shift to remote working solutions (Shafaei *et al.*, 2023). The recent report by the World Economic Forum shows that businesses in several countries, including Australia, Switzerland and Belgium, are leveraging the current trend to offer cross-border remote work options at a rate higher than the global average (World Economic Forum, 2025).

Remote work is not a new phenomenon. A growing body of evidence supports the utility of remote work in improving worker well-being and broadening the diversity of available talent pools (Adisa *et al.*, 2021). Yet, despite these benefits, there are significant constraints (Bentley *et al.*, 2016; Franken *et al.*, 2021). The primary constraints of remote working involve access to company resources, effective communication and collaboration, provision of technical support and nurturing a sense of belonging among distributed teams (Jogulu *et al.*, 2023; Rudnicka *et al.*, 2022). Gallup (2025) corroborated these propositions, suggesting that being a hybrid worker brings a series of negative corollaries, including increased loneliness due to being distant from work and a perceived lack of social support. The same report also highlighted a drop in engagement scores among remote and hybrid workers to 47% as compared to other forms of workers in contemporary workplaces (Gallup, 2025).

In response to this, human resource (HR) practitioners have enacted changed policies and work conditions to accommodate remote working arrangements (Chaudhuri *et al.*, 2022). Approaches taken by HR may also incorporate supportive technology-related supports, such as workplace initiatives and prescribed work requirements. A key research question concerns whether initiatives and requirements associated with remote worker support facilitate successful and equitable working conditions. To determine the current state of knowledge for this question, this study was designed to synthesise pertinent literature informing technology-related supports for remote workers.

After setting the context, describing the theoretical framework and the methods for the literature review, this paper presents the findings in three sections. First, we describe the attributes of selected literature. Next, we present the impacts of technology on the work experience of remote workers. Then, we explore the support mechanisms reported in the literature and synthesise the findings to identify the factors that influence technology-related supports for remote workers. Finally, in the discussion section, we situate our findings in the contemporary literature and present a future research agenda for technology-related supports for remote workers at the individual, team and organisational levels.

Research gaps

Previously, systematic literature reviews have examined the practice of remote work. For instance, Charalampous *et al.* (2018) synthesised research to understand how remote e-working among knowledge workers relates to five dimensions of work well-being – affective, cognitive, social, professional and psychosomatic. Their review offered a rich account of employee wellbeing outcomes but gave only peripheral attention to the technological infrastructures that shape these experiences. Similarly, Soga *et al.* (2022) concentrated on the downsides and unintended consequences of remote working, such as isolation, blurred boundaries and reduced identification with organisations. Yet, in doing so, their analysis treated technology primarily as a contextual condition enabling remote work

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rather than as a dynamic system of support that mediates these effects. In contrast, the present review positions technology not as a backdrop but as a central mechanism of effective and sustainable remote working. Prior reviews explored what remote work means for well-being or what goes wrong when people work remotely, whereas this review focuses on how technology-related supports facilitate adaptation, productivity and well-being in remote work settings. By foregrounding the technological dimension, this synthesis aims to unpack the breadth, complexity and interdependence of technological supports that help individuals and organisations thrive in distributed work environments, thus addressing a critical yet underexplored gap in the existing literature.

Similarly, while some literature addresses outcomes such as remote worker well-being or productivity, few studies holistically investigate how these supports shape employees' subjective experiences with technology (Yang *et al.*, 2022). One exception, is a study of emerging work models based on the experiences of senior HR professionals which found that technology and infrastructure "that is fit for purpose for this new way of working" underpinned the five pillars of the successful hybrid work reinforced that technology has a significant role in providing and sustaining support for remote workers (Hopkins and Bardoel, 2023, p. 14).

According to Hopkins and Bardoel (2023, p. 18), emerging technologies "are expected to provide increasingly sophisticated environments for online interaction and collaboration, negating the need for face-to-face in-person contact even further". This heightens the challenges for HR practitioners and managers, with key issues such as digital fatigue, adaptability, autonomy, perceptions of fairness and trust in digital systems remain underexamined. Without insight into how workers perceive, engage with or are impacted by these technologies, it is difficult to determine whether current support systems are genuinely effective or merely operational. This limits the field's capacity to respond to the second research question, which explores how technology-related supports influence remote workers' lived experiences, including psychological, relational and performance-related dimensions.

Responding to these gaps, this literature review specifically focused on technology-related supports for remote workers at the individual-, team- and organisational levels. Individual-level support describes the internal (e.g. resilience) and external (e.g. family and personal equipment) resources available to individuals (Franken *et al.*, 2021). Team-level support refers to the support that remote workers perceive from their colleagues, encompassing a belief that their colleagues genuinely care about them and respect their contributions (Simosi, 2012). Organisational-level support refers to the support that employees believe they are receiving from their employer (Bentley *et al.*, 2016). More specifically, this study sought to address three research questions.

(1) What are the technology-related supports reported for remote workers?

(2) How does support influence the remote worker's experience of technology?

(3) How can individuals, teams and organisations use technology-related supports to enhance the remote working experience for future remote workers?

Literature review

Theoretical framework for this study

While several theoretical frameworks could be applied to organise a literature review on remote work, the technology-organisation-environment (TOE) framework offers distinct advantages, particularly for a study focused on technology-related supports. Unlike general strategic tools such as SWOT (which identifies strengths-weaknesses-opportunities-threats) or PRESTO (which considers political, regulatory, economic, social, technological and organisational factors), the TOE framework provides a structured, integrative lens tailored for

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examining how organisations adopt and implement technological innovations (Ng *et al.*, 2022). This framework aligns closely with the aim of our review – to understand how organisations support remote workers through technology at the individual, team and organisational levels. In this regard, the TOE framework captures not only the technological tools used (e.g. platforms, software and infrastructure) but also internal organisational factors (e.g. leadership, culture and HR practices) and external environmental pressures (e.g. regulatory changes and market demands), making it especially suited for analysing the complex, multi-level nature of remote work ecosystems (Sun *et al.*, 2024). As such, TOE offers a more comprehensive and contextually relevant framework for exploring the determinants and effects of technology-related supports in a remote work environment.

The *technology* dimension focuses on the technologies available, technological competence, tools and infrastructure, such as collaboration platforms, cybersecurity measures and cloud technologies. These tools facilitate seamless communication, secure data sharing and real-time collaboration, allowing employees to perform their duties effectively from remote locations (Afota *et al.*, 2024). The ability of an organisation to leverage these technologies determines the robustness and resilience of its remote work model. In all, technology facilitates remote work through seamless communication, data security and access to organisational resources (Ng *et al.*, 2022).

The *organisation* dimension focuses on internal characteristics, including resources, leadership support, policies and organisational culture (Raj and Jeyaraj, 2022). It reflects how leadership prioritises digital transformation and fosters an open, flexible and innovative workplace culture. According to Raj and Jeyaraj (2022) and Khan *et al.* (2022), supportive leadership will encourage experimentation and adaptability, while transparent and inclusive remote work policies establish clear expectations and support structures for a positive remote work experience.

The *environment* dimension captures the external forces and pressures that influence organisational decision-making and the evolution of work models (Awa *et al.*, 2017). These include regulatory compliance mandates, market dynamics, competitive pressure, customer expectations and broader socioeconomic conditions. For instance, industries undergoing rapid digital transformation or facing labour market shifts may be more inclined to adopt flexible working arrangements. Furthermore, external shocks such as global pandemics or technological disruptions can compel organisations to re-evaluate traditional work practices. Monitoring these environmental signals and responding proactively allows organisations to remain agile and resilient in the face of change. As Franken *et al.* (2021) highlight, an organisation's ability to sense and adapt to external changes is crucial in navigating disruptions and sustaining long-term growth. Taken together, the TOE dimensions enable the analysis and diagnosis of elements that may contribute to or reduce employee productivity, well-being and job satisfaction when working in remote locales.

Methods

Arksey and O'Malley (2005) provide a five-stage methodological framework for scoping literature reviews (specify question; identify studies; select included studies; chart data and report results). Through this application, the study provides a synthesis of current knowledge concerning technology-related supports for remote workers. A collaborative process enabled all co-authors to fully engage in the identification, screening and inclusion of literature.

Search strategy

The search strategy incorporated six databases selected for maximum coverage of published peer-reviewed articles from 1 January 2010 to 31 December 2023. Table 1 lists the inclusion (and exclusion) criteria, including restriction to empirical studies published in English. The focus on empirical studies strengthens the relevance of the findings to HR practitioners,

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Table 1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
• peer-reviewed journal articles • published in English • includes an explicit work-related use of technology • empirical studies • sampled remoted workers	• conference papers • conceptual papers • theoretical papers • literature reviews

Source(s): Authors' work

whereby the findings reported synthesise the evidence from research conducted in a real-world setting that included remote workers as a key component of the sample. For example, the whole sample worked remotely or the sample included a combination of remote, hybrid and in-office workers. In addition, our inclusion criteria required the studies to report outcome measures to show the influence of technology on the remote working experience. Systematic and scoping literature reviews were excluded; however, they have informed the study. The majority of documents excluded through the screening process did not have technology as a focus, for example, technology was mentioned, but the study did not include technology-related support measures. In addition, excluded documents included a those that created or described the development process of technology that could be used for remote working but had not been implemented, studies that did not include remote workers and studies that were not work-focused. For example, a study was included if it was about a teacher using technology to teach (i.e. perform work duties) but not when it was about the learning experience from the perspective of children and parents. Limitations inherent to the inclusion criteria are considered later.

Boolean search terms applied to the six database searches were: *remote* AND (*"telework"* OR *"work from home"* OR *"flexible work"* OR *"isolated"* AND (*"tech"* OR *"computer"* OR *"virtual"* OR *"online"*) AND (*"wellbeing"* OR *"wellbeing"* OR *"productivity"* OR *"stress"*). The initial database search (Search 1) identified 424 documents uploaded to Covidence software (see Table 2). In response to anecdotal evidence of an increase in publications on remote working following the COVID-19 pandemic, a second search was conducted, which further identified 108 documents published up to 31 December 2023. Subsequently, a third search was conducted, identifying 155 documents published from 1 January 2024 to 30 September 2025.

A PRISMA flowchart (Figure 1) summarises the document screening process for searches one and two. Three researchers screened document abstracts and full papers independently for

Table 2. Database search results

Search 1 Database	Results	Search 2 Database	Search 3 Results	Database	Results
CINAHL	24	CINAHL	2	CINAHL	3
PsycInfo	26	PsycInfo	7	PsycInfo	25
ProQuest Business	53	ProQuest Business	36	ProQuest Business	23
ProQuest Social Sciences	76	ProQuest Social Sciences	1	ProQuest Social Sciences	11
Web of Science	87	Web of Science	18	Web of Science	34
Scopus	158	Scopus	44	Scopus	59
Total	*424*	*Total*	*108*	*Total*	*155*

Source(s): Authors' work

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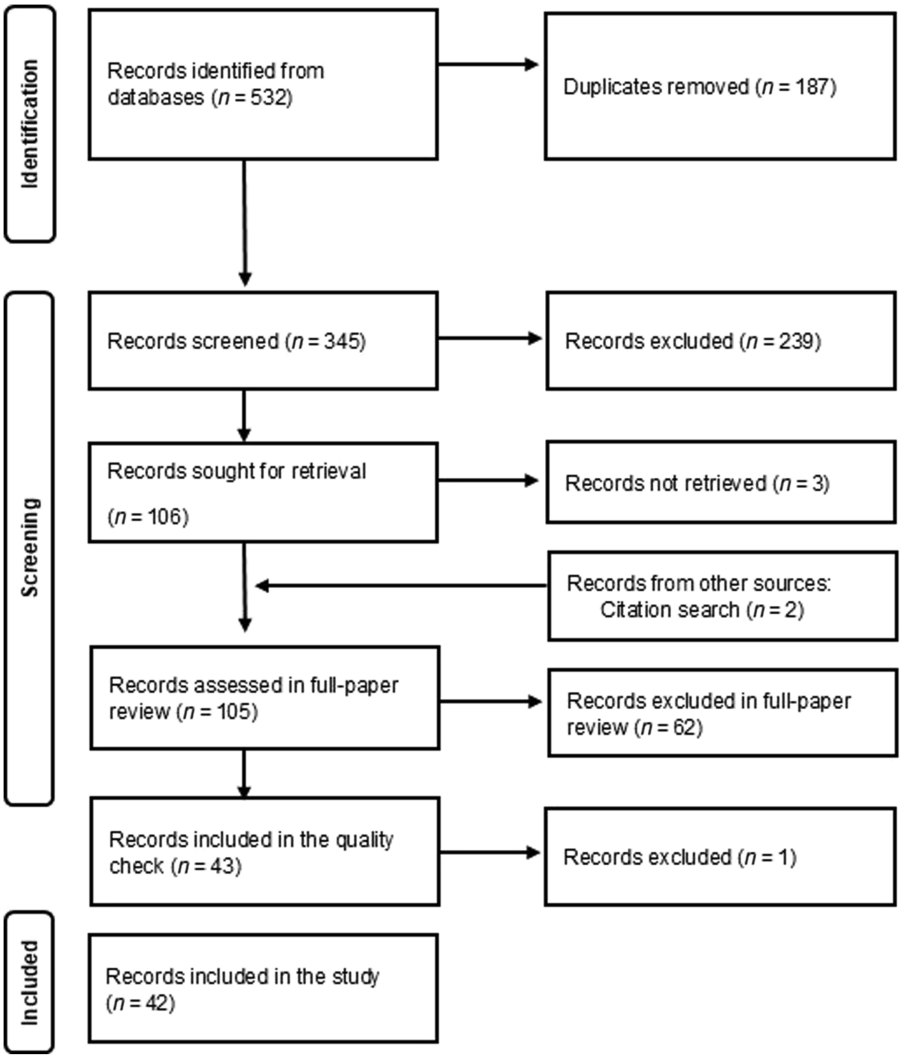

Figure 1. PRISMA flowchart of the literature review. Source: Authors' work

study inclusion using Covidence software. Developed specifically for literature reviews, Covidence software provides for a blinded literature review process where two researchers independently screen abstracts and full papers, then vote on inclusion. Where the votes of two researchers contradict, the conflict is identified by Covidence and a third researcher independently reviews the abstract or full paper (without knowing the prior votes). Using this blinded process, any disagreements were resolved by a third researcher. The Cohen's Kappa for researcher one and researcher two was 0.75 and for researcher one and researcher three was 0.69, signifying that there was substantial inter-rater agreement (McHugh, 2012). From this process, 43 articles were judged to meet the inclusion criteria.

In addition, a modified review process was used to review the documents published in 2024–2025. Of the 155 documents identified in search three, 35 duplicates were removed.

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The 120 abstracts were screened using the study's inclusion criteria, with six documents progressing to full paper review. The intention of the third search was to ensure currency of the review findings; therefore, content analysis was conducted to determine whether there were any technology-related supports that were not already contained in our review that could build on our scoping review findings.

Quality assessments

The included paper quality was, to an extent, assured through the inclusion criteria, which restricted peer-reviewed publications. An additional quality assessment applied the Critical Appraisal Skills Program (CASP) (CASP, 2022; Njau *et al.*, 2019). Papers were scored as "yes" for one point, "partial" for half a point, and "no" for zero points for the ten specified questions. Papers reaching 75% of the possible total score were considered to be of suitable quality. The process excluded one study. The remaining 42 papers met the specified quality criteria.

Data analysis

Quantitative data drawn from studies were entered into the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were produced to identify trends and/or patterns consistent with the research questions. Reported data from qualitative study designs were subject to thematic content analysis. First-level coding, using Covidence software, allowed for mapping against predetermined categories drawn from the research questions. These were impacts of technology (RQ2) and technology-related supports (RQ3). Emerging themes found within these categories, summarising study outcomes, were identified and reported.

Results

The results are presented in two sections. Firstly, the descriptive analysis provides insights into when, where and how research is conducted on technology-related supports for remote workers. Table 3 contains a summary of the characteristics of the 42 included articles. Next, a thematic analysis of the included articles reveals both the negative and positive aspects of technology for remote workers as well as the associated technology-related supports provided to them.

Contexts

The research context is about the circumstances in which studies are conducted. At a regional level, most studies were conducted in Europe ($n = 16$), followed by the Asia Pacific ($n = 14$), North America ($n = 10$) and the Middle East ($n = 1$) (Figure 2). In three studies, the country was unspecified. The research samples are predominantly from developed countries, with a limited number from developing countries in Southeast Asia, Africa and Latin America.

Regarding industry, Table 4 shows that 16 out of 42 studies (38%) did not specify the industries involved. Of those that did report industries, some referred to multiple industries (Table 3). Consumer Discretionary ($n = 10$) was the most frequently reported sector, followed by healthcare ($n = 8$), financials ($n = 4$) and information technology ($n = 4$). Some industries have been the focus of more research that includes technology-related supports than others.

Methodological choice

The methodological choices observed in this review show a predominance of mono-method quantitative studies (36%) focused on measurable outcomes, which is valuable for assessing the impact of technology on productivity, efficiency and other quantifiable factors (Table 5). The presence of mono-method qualitative studies (24%) suggests an interest in exploring the more subjective experiences of remote workers. Finally, mixed-methods approaches, simple

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Table 3. Characteristics of included papers ($n = 42$)

Author (Year)	Methodological choice	Data collection method	Sample size	Industries[a]	Country
Adisa *et al.* (2021)	Mono-method Qualitative	Interview	32	Consumer Discretionary, Financials	UK
Al-Madadha *et al.* (2022)	Mono-method Quantitative	Survey	675	Financials	Jordon
Alotaibi (2023)	Mixed method simple	Social media posts	n/a	–	Saudi Arabia
Arslan *et al.* (2022)	Mono-method Quantitative	Survey	435	Consumer Discretionary	Turkey
Bergmann *et al.* (2022)	Mixed methods complex	Survey Diary study	372	Information Technology	UK, Europe, New Zealand, India, South Middle East, Africa, North and South America, East Asia, Australia
Chen *et al.* (2022)	Mixed Method complex	Survey Administrative data	41	Health Care	US
Chow *et al.* (2022)	Mono-method Qualitative	Social media posts	1,852 posts 8,299 comments	–	Online
Chow *et al.* (2022)	Mixed Method simple	Survey	143	Health Care	Australia
Durakovic *et al.* (2023)	Mixed Method simple	Survey	1,579	Various	Australia
Elbogen *et al.* (2022)	Mono-method Quantitative	Survey	902	–	US
Franken *et al.* (2021)	Multi-method Qualitative	Diary study, Survey, Interviews	11(Diary) 15(Survey) 7 (interviews)	Materials	Australia
Gabr *et al.* (2021)	Multi-method Quantitative	Survey Blood cortisol level	142	Consumer Discretionary	Egypt
Galanti *et al.* (2021)	Mono-method Quantitative	Survey	209	–	Italy
George and Thomas (2023)	Mono-method Qualitative	Interview	39	Consumer Discretionary, Health Care, Information Technology, Industrials	India
Ghislieri *et al.* (2021)	Mono-method Quantitative	Survey	211	Health Care	Italy
Griffith *et al.* (2023)	Mono-method Qualitative	Interview	20	Health Care	UK
He *et al.* (2023)	Mixed Method simple	Survey	783	Health Care	US

(*continued*)

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Table 3. Continued

Author (Year)	Methodological choice	Data collection method	Sample size	Industries[a]	Country
Leonardi *et al.* (2010)	Mono-method Qualitative	Interview	36	Information Technology, Consumer Discretionary Finance, Communications Services	US
Lorentzon *et al.* (2023)	Mono-method Qualitative	Survey	98	Finance	Sweden
Mäkelä *et al.* (2022)	Mixed method simple	Survey	297(Spring) 246 (Autumn)	Consumer Discretionary	Finland
Molino *et al.* (2020)	Mono-method Quantitative	Survey	878(Study 1) 749(Study 2)	Consumer Discretionary	Italy
Mukherjee and Narang (2023)	Mono-method Quantitative	Survey	96	–	India
Nakayama and Chen (2022)	Mono-method Quantitative	Survey	87	Various	US
Prieto-González *et al.* (2021)	Mixed Method simple	Survey	782	Consumer Discretionary	Slovakia
Robertson *et al.* (2022)	Mixed Method complex	Survey Focus groups	222(85: remote; 137 - office)	–	US
Rudnicka *et al.* (2022)	Mixed Method simple	Survey	426	–	UK
Ruiller *et al.* (2019)	Mono-method Qualitative	Interview	22	Communication Services	France
Sârbu *et al.* (2021)	Mono-method Quantitative	Survey	208	Consumer Discretionary	Romania
Shahriar *et al.* (2022)	Multi-method Qualitative	Interview Documentary analysis	17	–	Bangladesh
Sharma (2023)	Mixed Method simple	Survey	135	Consumer Discretionary	Canada
Shipman *et al.* (2023)	Mono-method Qualitative	Interview	20	Real estate	US
Singh *et al.* (2023)	Mono-method Qualitative	Interview	19	Health Care	US; UK
Somasundram *et al.* (2022)	Mono-method Quantitative	Survey	1,617 (Survey 1) 382(Survey 2)	Various	Canada
Sousa *et al.* (2023)	Mono-method Quantitative	Survey	70	Industrials	Portugal
Subha *et al.* (2021)	Mono-method Quantitative	Survey	400	Communications Technology	India
Suh and Lee (2017)	Mono-method Quantitative	Survey	258	Communication Technology	South Korea
Tolland and Drysdale (2023)	Mixed Method simple	Survey	161	Health Care	UK

(*continued*)

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Table 3. Continued

Author (Year)	Methodological choice	Data collection method	Sample size	Industries[a]	Country
Tønnessen *et al.* (2021)	Mixed Method simple	Survey	237	–	Norway
Uddin *et al.* (2022)	Mono-method Qualitative	Social media posts	825 posts	–	online
Wang *et al.* (2021)	Mixed Method complex	Interview Survey	39(Study 1) 522(Study 2)	Various	China
Yee *et al.* (2023)	Mono-method Quantitative	Survey	288	–	China; Malaysia
Zalat *et al.* (2022)	Mono-method Quantitative	Survey	413	–	Saudi Arabia

Note(s): [a]Industry is categorised using the Global Industry Classification Standard (GICS) (Source: https://www.msci.com/our-solutions/indexes/gics)

Source(s): Authors' work

Figure 2. Study location. Source: Authors' work

Table 4. Industries ($n = 50$)

Industries	Frequency reported
Not stated	16
Consumer discretionary	10
Healthcare	8
Financial	4
Information technology	4
Industrial	2
Communication technologies	2
Communication services	2
Materials	1
Real estate	1

Source(s): Authors' work

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Table 5. Methodological choice for included studies

Methodological choice	Count (n = 42)	Percentage
Mono-method (Qualitative)	10	23.81%
Mono-method (Quantitative)	15	35.71%
Multi-method (Qualitative)	2	4.76%
Multi-method (Quantitative)	1	2.38%
Mixed-method (Simple)	10	23.81%
Mixed-method (Complex)	4	9.52%

Source(s): Authors' work

(24%) and complex (10%), demonstrated the value of integrating qualitative and quantitative insights. There were a few multi-method studies (6%). Therefore, there is still room for broader methodological diversity in exploring this area of research.

Distribution of publications by year

There was a notable increase in publications since 2021, with relatively few publications before 2021 about technology-related supports for remote workers, indicating that research in this area is nascent (Figure 3). Most publications appeared in 2021, 2022 and 2023, with 2022 and 2023 showing the highest number of studies. This finding aligns with the growing interest in remote work, digital transformation and related fields during this period. The global shift towards remote work and technology-driven solutions during and after the COVID-19 pandemic likely spurred more research in these areas.

Impacts of technology

Ten themes were identified to represent the studies on the impact of technology. Five themes may be considered positive and five negative regarding employee use and application (Table 6). Overall, 38 of 42 included studies (90%) reported positive impacts of technology

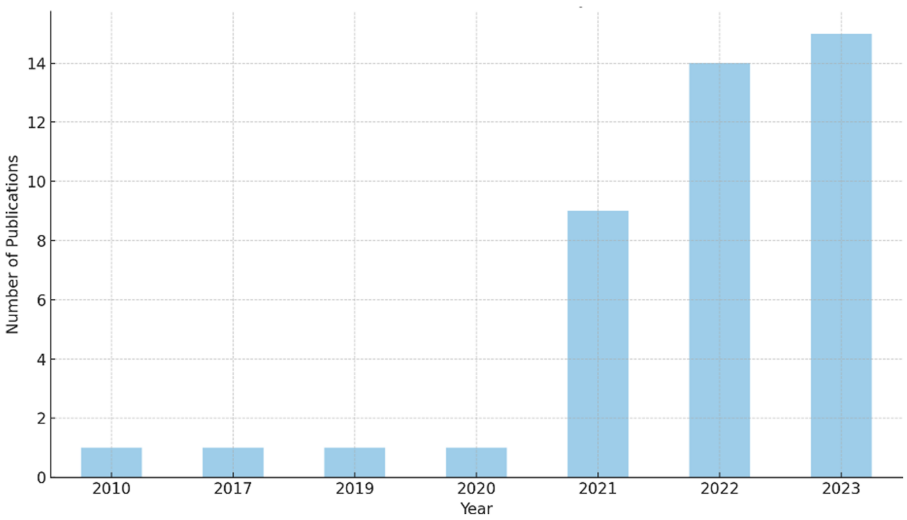

Figure 3. Distribution of publications by year (n = 42). Source: Authors' work

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use, 40 (95%) reported negative impacts and two (5%) reported neither. Regarding overlap, 37 studies (88%) reported both positive and negative impacts of technology.

Positive aspects. A central theme in many studies is the role of technology in enhancing efficiency and inclusivity within the workplace (Adekoya *et al.*, 2022). Remote technologies, such as video conferencing, were described as creating a more inclusive environment, increasing efficiency and saving commute time (Bergmann *et al.*, 2022). Chow *et al.* (2022) highlighted the use of technologies to bring individuals together who would not have otherwise met in person, underscoring the accessibility benefits of remote technologies. Having said that, our review showed that the impact varied across different roles and levels of *technological specialisation*. For instance, Gabr *et al.* (2021) and Durakovic *et al.* (2023) highlighted that those with greater technological expertise or access to specialised tools were more likely to experience productivity gains. In contrast, others faced a steeper learning curve or technological challenges.

Similarly, technologies have created opportunities by *providing accessibility* to many workers who are constrained due to financial, geographical or other constraints. For instance, Adisa *et al.* (2021) highlighted that remote working benefits most employees by offering the flexibility for people to work from anywhere at any time. At the same time, the study found that working from home lowered business costs, making it a more affordable option. This democratisation of access enabled broader participation, particularly for individuals from under-represented regions or sectors who previously faced barriers to entry.

Studies, such as Chow *et al.* (2022), reported that adopting remote technologies increased *freedom and autonomy.* Sharma (2023) posited the notion of "Techno liberation", saying remote workers had more freedom and gained time by not commuting. This newfound flexibility enabled workers to manage their time and personal commitments more effectively, leading to a more positive work–life balance. Notably, the shift to virtual tools represented a cultural change within organisations, as many tools available before the pandemic were underutilised.

Evidence from studies such as Zalat *et al.* (2022) suggests that the prerequisite for the capability for effective remote working across many job functions is for organisations to adapt their technological and managerial frameworks. However, technological infrastructure alone is not sufficient. These studies also emphasise that organisations must rethink and adapt their managerial frameworks. This includes reconfiguring workflows, setting clear performance expectations, enabling digital collaboration and fostering trust in distributed teams. Successful remote work implementation requires a shift in management style – from supervision to empowerment – supported by strong leadership, transparent communication and a culture of accountability (Khan *et al.*, 2022).

Negative aspects. First, *increased isolation*. Technology-mediated communication often lacked the depth of in-person interactions, suggesting that virtual tools are inadequate for building deep, meaningful connections (Robertson *et al.*, 2022). This disconnect can result in feelings of loneliness, particularly when technology replaces traditional office interactions. Further, Chow *et al.* (2022) reported that remote workers had difficulty engaging with

Table 6. Positive and negative aspects of technology in remote work

Positive aspects of technology in remote work	Negative aspects of technology in remote work
Increased efficiency and inclusivity	Increased isolation
Enhanced accessibility to information	Digital fatigue
Freedom and flexibility	Privacy concerns
Supporting effective remote work	Disrupted work–life balance
Productivity and technological specialisation	Inequitable access to technology

Source(s): Authors' work

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coworkers without face-to-face interaction, suggesting that remote communication may not foster the same collaborative spirit and team dynamics, possibly impacting remote workers' mental health.

Second, *digital fatigue.* Technology reliance can contribute to a phenomenon known as *digital fatigue*, where prolonged use of digital platforms leads to mental and physical exhaustion. Elbogen *et al.* (2022) referred to *Zoom fatigue*, describing the significant tiredness remote workers experienced from continuous video calls. Similarly, Tolland and Drysdale (2023) spotlighted health problems associated with remote work, suggesting that extended screen time and sedentary behaviour contributed to physical discomforts (e.g. musculoskeletal issues). The cumulative factors demonstrate how constant engagement with digital platforms can lead to burnout and decreased well-being.

At the same time, the increased use of technology has raised privacy concerns, such as surveillance. Galanti *et al.* (2021) highlighted workers' concerns about their actions being constantly scrutinised. These fears can increase stress and discomfort as employees feel their privacy is invaded. Additionally, Suh and Lee (2017) note that in a remote working environment, the presence of technology could not assure any form of confidentiality. The inability to guarantee secure information exchanges creates further unease and apprehension in the virtual workspace. These privacy concerns affect employees' sense of security and contribute to the growing mistrust of technology-mediated communication tools.

The pervasive use of technology has *blurred the boundaries between work and personal life*, making it harder for employees to maintain a healthy work-life balance (Franken *et al.*, 2021). This review found that the over-reliance on digital tools contributed to this disruption. For example, Arslan *et al.* (2022) suggested that technology-facilitated remote work has eroded personal time as employees remain connected beyond regular working hours. Leonardi *et al.* (2010) reported that a lack of flexibility and control in managing personal time due to a constant influx of work-related notifications made it difficult to balance professional and personal responsibilities. Similarly, Rudnicka *et al.* (2022) echoed these views, highlighting that the over-reliance on technology has led to a sedentary lifestyle.

Disparities in access to technology created significant challenges, leaving some workers disadvantaged. Tolland and Drysdale (2023) noted that many workers could not access a work laptop, underscoring the basic technological inequities impeding productivity. Similarly, Shipman *et al.* (2023) reported that some remote workers lacked the necessary equipment, while others needed more equipment or more support. Mukherjee and Narang (2023) found that 49% of remote workers received no technological support from their organisation, highlighting how inequitable access to technology can limit an individual's ability to work efficiently and remain connected.

Support mechanisms

There were 33 articles that included information about the support mechanisms reported by remote workers. The five key emergent themes were equipment ($n = 12$), software ($n = 10$), training ($n = 10$), physical work environment ($n = 5$) and psychosocial work environment ($n = 19$) (Table 7). Tables 8–10 summarise the key support mechanisms reported at the individual-, team- and organisational levels, stratified by the TOE Framework domains.

Equipment (technology domain): For workers without employer-provided equipment, their own personal equipment was utilised. Remote workers experienced challenges, such as: "difficulties with getting onto the network drives [. . .] bandwidth issues of home Internet;" access issues with "shared drive and printers" (Chow *et al.*, 2022, p. 8) and a lack of portable technology (He *et al.*, 2023). Despite the challenges, there were opportunities for workers to develop new technology-related skills through remote work (Chow *et al.*, 2022) (see Table 8).

Software (*technology domain*): There were mixed findings with some studies reporting that software was suitable for remote work (Robertson *et al.*, 2022). Others reported that it was unsuitable (e.g. screens freezing, audio issues) (Singh *et al.*, 2023). Galanti *et al.* (2021) and

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Table 7. Technology-related supports for remote workers

	Technology		Organisation Training		Environment	
	Equipment	Software	Digital literacy	Managing with technology	Physical environment	Psychosocial environment
Adisa *et al.* (2021)	✓				✓	
Arslan *et al.* (2022)		✓				✓
Chen *et al.* (2022)	✓		✓		✓	✓
Chow *et al.* (2022)	✓					
Cho *et al.* (2022)						✓
Durakovic *et al.* (2023)		✓				
Elbogen *et al.* (2022)						✓
Franken *et al.* (2021)	✓	✓	✓	✓		
Gabr *et al.* (2021)			✓	✓		✓
Galanti *et al.* (2021)		✓		✓		✓
Ghislieri *et al.* (2021)						✓
George *et al.* (2023)		✓	✓			✓
Griffith *et al.* (2023)	✓					✓
He *et al.* (2023)	✓	✓				
Leonardi *et al.* (2010)				✓		✓
Lorentzon *et al.* (2023)						✓
Mukherjee *et al.* (2022)	✓					
Mäkelä *et al.* (2022)						✓
Nakayama and Chen (2022)	✓					
Prieto-Gonzailez *et al.* (2021)					✓	
Robertson *et al.* (2022)	✓	✓	✓	✓	✓	✓
Ruiller *et al.* (2019)		✓		✓		
Shahriar *et al.* (2022)			✓	✓		✓
Sharma (2023)						✓
Shipman *et al.* (2023)				✓		✓
Singh *et al.* (2023)	✓	✓	✓	✓		✓
Somasundram *et al.* (2022)	✓	✓	✓		✓	
Sousa *et al.* (2023)				✓		✓
Subha *et al.* (2021)						✓
Suh *et al.* (2017)				✓		
Tolland *et al.* (2023)	✓		✓			✓
Wang *et al.* (2021)						✓
Zalat *et al.* (2022)						✓

Source(s): Authors' work

George and Thomas (2023) discussed the use of software to address the new HR challenges arising from the increased prevalence of remote work.

Training (organisation dimension): HR's role in supporting remote workers was key, with Shahriar *et al.* (2022) reporting that it was essential for training to improve digital literacy to address digital skills gaps. Tolland and Drysdale (2023), Ghislieri *et al.* (2021), Franken *et al.* (2021), Chen *et al.* (2022) and Robertson *et al.* (2022) identified a need for training in how to use online systems and how to perform as a remote worker. George and Thomas (2023) discussed a learning management systems application and Singh *et al.* (2023, p. 18) found that workers needed training in the relational aspects of online working, and in technical aspects, such as "using encrypted videoconferencing services or setting webcams [. . .] to facilitate eye contact" (see Table 9).

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Table 8. Summary of supports from the technology dimension

Level	Description of supports
Organisation level	Equipment Support for technical issues Access (via software andvirtual private networks) Technology-based work solutions
Team level	Communication with colleagues Collaboration
Individual level	Digital distractions Personal equipment and Internet availability Self-support Staying connected

Source(s): Authors' work

Table 9. Summary of technology-related supports from the organisation dimension

Level	Description of supports
Organisation level	Training to adapt to remote working Addressing digital skills gaps Training managers to manage remote teams Training about the disconnecting
Team level	Training supervisors to manage performance Training to support managers of remote teams
Individual level	Technical capability

Source(s): Authors' work

Table 10. Summary of supports from the environment dimension

Level	Description of supports
Organisation level	Ergonomic information Virtual social events
Team level	Virtual team building Virtual tea/coffee breaks Virtual social connections with colleagues
Individual level	Reminders to stay active Include physical activity in the workday Participation in online communities Regularly disconnecting from technology

Source(s): Authors' work

Psychosocial work environment (Environment dimension): Table 10 shows that, in addition to macro environmental factors, the informal workplace environment also creates an impetus for the implementation of remote work arrangements. For instance, the activities encouraged virtual social connections, such as virtual tea/coffee breaks, virtual social events and online supportive communities (George and Thomas, 2023; Ghislieri *et al.*, 2021; Lorentzon *et al.*, 2023; Subha *et al.*, 2021). While some workers were able to derive benefits from remote working, such as reduced feelings of isolation (Leonardi *et al.*, 2010; Tolland and Drysdale, 2023), others found it hard to cope with it (Sousa *et al.*, 2023).

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Results from the third search

An additional search of the literature published since the completion of this scoping review (i.e. 2024-2025 publications) was conducted using the search terms from the original study (see the methods section) to ensure that findings discussed in this article are current at the time of publishing. The three studies that met the inclusion criteria contained samples and authors from Europe, Australia, India and Canada. None were from the previously identified under-represented counties.

The new studies investigated technostress, work–life balance, musculoskeletal pain and psychological injuries associated with technology use (Banerjee and Gupta, 2024; Vassiley *et al.*, 2025). Banerjee and Gupta (2024) investigated two aspects of technostress: techno-overload and techno-invasion factors, exploring how these two aspects of technostress impact remote workers in India. The technology-related supports described in the study were consistent with those reported in this literature review (e.g. infrastructure, support with technology issues, technical literacy and training). However, Banerjee and Gupta's (2024, p. 11) study, despite being conducted in COVID-19 pandemic conditions, provides insights for where to focus effort to improve supports for remote workers and managers of remote workers (e.g. "virtual competencies" to mitigate technostress and "competencies for managing virtual teams"). Similarly, in their European-based study investigating the role of social supports through communication "on 'teleworkers' stress from technological complexity", Wahl *et al.* (2024, p.331) advocated for social supports to mitigate the impacts of technostress. Some studies found that organisations used surveillance measures to monitor productivity; however, remote workers believed these measures invaded their privacy and compromised trust (Banerjee and Gupta, 2024; Vassiley *et al.*, 2025). Finally, Vassiley *et al.* (2025) explored the contemporary challenges of remote working for HR and management practices, reporting a perceived increase in productivity.

Aligned to the findings of this review, the 2024–2025 literature supports the use of the TOE framework where a holistic approach is needed to understand the impact of technology-related supports for remote workers. Overall, the 2024–2025 literature did not add or extend, the technology-related supports for remote workers reported in our scoping review.

Cross-cutting themes

Our synthesis of the literature identified technology-related supports for remote workers and two cross-cutting themes – HR and managers. The analysis found that both HR and managers contributed to improving the interface between the technological, organisational and environmental factors that influence technology-related supports for remote workers.

Figure 4 illustrates the role of HR and managers as foundational supports for remote workers, demonstrating that the technology-related supports provided by HR and managers are crucial for supporting remote workers. Our analysis highlights the importance of cross-cutting themes and for organisations to find effective ways to support remote workers

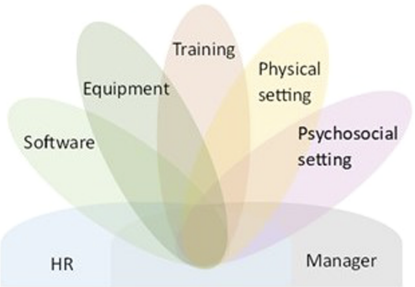

Figure 4. Factors that influence the technology-related supports for remote workers. Source: Authors' work

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through HR policies/systems as well as management practices that provide support for remote workers to achieve positive organisational outcomes. Our study found that negative health impacts were observed in workers who lacked the necessary experience and support to complete work activities remotely. Therefore, HR and managers provide the foundational support as well as facilitating other social and professional supports for remote workers.

Discussion

Technology has impacted traditional working models, with emerging technologies, such as generative artificial intelligence, signalling continued disruption (Jansson and Kangas, 2024). The COVID-19 pandemic was instrumental in shifting views about where and how, work is conducted, utilising the flexibility afforded by technology and shifts in mindset (Vassiley *et al.*, 2025). This period of widespread adoption of remote working highlighted HRM issues consistent with the findings in this review about the impact of remote working on the physical and psychological health of workers.

That said, opportunities are created by technology-enhanced work environments, which remove many traditional barriers and improve access to workforce participation. Remote workers have reported improved access to professional development (Franken *et al*., 2021). Further, Vassiley *et al.* (2025, p. 374) found that "in the online world" discussion about not being able to "hear or understand others was normalised", improving access for workers where English was not their first language who otherwise experienced challenges at in-person group meetings. At the organisational level, remote work provides flexibility and an opportunity to retain workers who desire more freedom in how, when and where they work (Tan *et al.*, 2025a).

From an economic and commercial perspective, technology-enabled remote working models have delivered significant cost efficiencies and productivity gains for both organisations and employees. For employers, reductions in overhead expenses – such as office space, utilities, on-site amenities and travel reimbursements – translate into measurable cost savings (McPhail *et al.*, 2023). Further Forbes reported savings of up to US $11,000 per employee in real estate and facilities management by adopting hybrid or fully remote models (Forbes, 2025). These cost reductions allow companies to reallocate resources towards other priorities such as digital infrastructure, employee well-being initiatives and innovation investments that support long-term competitiveness.

Besides, productivity gains have been widely reported in post-pandemic research, with remote workers often demonstrating higher output and greater task efficiency due to fewer workplace distractions and increased autonomy (Tan *et al.*, 2025a). As argued earlier, technology facilitates asynchronous communication and collaboration, enabling global teams to operate across time zones and maintain productivity around the clock. For many industries, especially in knowledge and service sectors, it has enhanced workflow integration, data sharing and performance monitoring, all of which collectively boost organisational productivity and innovation capacity (Alvarez-Torres and Schiuma, 2022). Besides, remote work can stimulate regional economic growth by redistributing employment opportunities outside urban centres, allowing organisations to access a wider pool of qualified candidates (The Straits Times, 2023). This capacity to access global labour markets enhances commercial agility, allowing firms to recruit talent based on skill rather than geography, which is a source of competitive advantage in the digital economy (Gibbs *et al.*, 2024).

However, while remote work creates commercial efficiencies, it also introduces new forms of inequality in access to technology and digital infrastructure. Workers in regions with poor connectivity or inadequate equipment may experience productivity constraints, potentially widening the gap between urban and rural labour markets (Franken *et al*., 2021). Thus, sustained economic and commercial benefits depend on inclusive technology strategies that ensure equitable access to digital resources. Besides at the individual level, the same technologies that support remote working can result in blurred boundaries, with remote workers often working more hours over a great span of time than their office-based counterparts (Adisa *et al.*, 2021).

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In Australia, the Right to Disconnect laws protect workers' rights for personal time. In other countries, including France, Portugal, Belgium and Kenya, similar laws have been enacted (World Economic Forum, 2025). These laws serve as exemplars of HR–technology policy alignment, demonstrating how regulation can complement organisational policies and digital systems to safeguard worker well-being. For example, technology can be leveraged to support compliance such as through automated communication curfews, email scheduling features and system alerts that discourage after-hours work engagement. Beyond compliance, HR can leverage these legal frameworks to embed digital wellbeing principles into workforce policies that align technological capabilities with human-centred management practices. This includes designing policies that set clear expectations for digital availability, integrating well-being analytics into HR dashboards and providing training for managers to model healthy technology use.

At the team level, Jansson and Kangas (2024) highlight the changes to communication patterns for remote workers. The physical aspects of communication are missing in "ICT-mediated communication, since nonverbal cues such as facial expressions and body language are not there to assist in interpreting expectations and reactions and creating mutual understanding" (Jansson and Kangas, 2024, p. 664). The absence of these nonverbal cues can hamper team-level communications and may result in role ambiguity, a known psychosocial hazard (Vassiley *et al.*, 2025). Beyond policies and legislation, HR leadership is essential for developing managers' capabilities in managing distributed teams and navigating the remote working environment to ensure compliance and providing the technological, organisational and environmental supports required for remote workers to thrive.

For remote workers to feel supported by the organisation, they need equitable access to information and training in the capabilities needed to work effectively (Tan *et al.*, 2025b). HR can leverage the inclusivity that technologies provide through broader participation by workers who may have a locational disadvantage or other barriers that prevent in-person participation (Tan *et al.*, 2024). In contrast, for some remote workers the disparities in access to technologies, restricted access to information created inequities for professional development and exacerbated feeling of isolation (Franken *et al.*, 2021).

Therefore, proactive HR and management approaches that ensure more equitable access and inclusive practices that create a supportive work environment can improve remote workers' productivity and well-being, as well as mitigate safety risks. However, improving managers' capabilities in recognising and responding to the support needs of remote workers as well as the capacity to ensure a safe and healthy working environment, are essential. The provision of a physically and psychologically safe work environment for all workers will inform HR policy development and health and safety systems adaptation for remote work environments. However, it is important that capabilities are further developed to enable leadership using technology rather than technology driving changes that require HR and managers to respond.

Further, where technology-enhanced remote working has wider societal benefits, such as empowering women, alleviating the pressure on public transport systems, geographically redistributing commerce, reducing commute times and improved work–life balance (Bergmann *et al.*, 2022; Chow *et al.*, 2022; Moglia *et al.*, 2021; Sharma, 2023). Moreover, with adequate infrastructure, workers are no longer restricted to employment opportunity within their local geographical areas. Hence, technology-related supports for remote workers indirectly impact economic, social and public policy and the future directions of education, commerce and public services.

Research contribution

While some studies such as Ng *et al.* (2022) have applied the TOE framework to explore how individual workers adapt to new technologies or how they gain access to technological tools, this is the first study (to our best knowledge) that utilise the TOE framework to systematically

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investigate how technology-related supports enable workers to adapt to new working environments –environments fundamentally shaped and facilitated by technology. In that respect, this literature review makes a novel contribution to the HRM literature by synthesising what are currently known about the technological, organisational and environmental support systems required by remote workers. In doing so, it shifts the analytical lens from individual adaptation to a broader systems-level understanding of support mechanisms.

Our analysis revealed a number of critical insights into the interplay between TOE factors. These insights will deepen our understanding of how remote work is supported and sustained, and they highlight the essential role of integrated support systems in ensuring employee well-being, productivity and engagement in virtual settings. By illuminating the factors that contribute to effective technology-enhanced remote work environments, this study provides a foundation for developing strategic, evidence-based HR policies and practices that are inclusive, scalable and adaptable to future workplace transformations.

Future research agenda

Figure 5 depicts the proposed research directions for further research to better understand the social, environmental and economic impacts of using technology-related supports to assist workers to adapt to remote working environments. Drawing on the findings from this literature review, future research directions are suggested.

First, there is a need to focus on measurable outcomes, which is conducive to understanding more about the impact of technology on productivity, well-being and similar quantifiable factors. However, given that the qualitative and mixed-methods studies provided more in-depth understanding about the technology-related supports utilised by remote workers, we further propose more complex research designs investigating the long-term impacts of remote work on workers, organisations and health systems across the globe. Additionally,

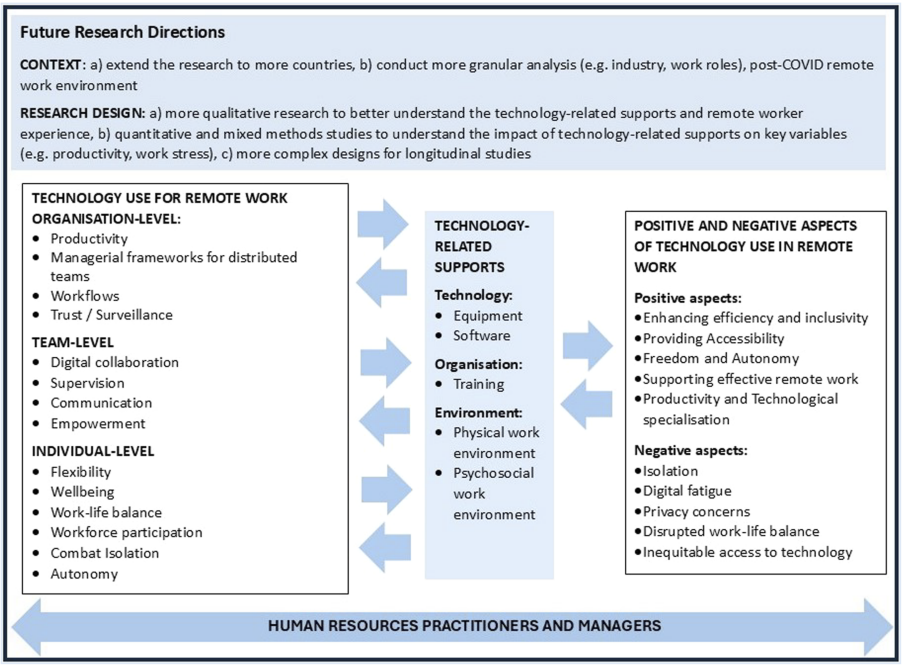

Figure 5. Future research agenda. Source: Authors' work

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experimental research-design studies would enable researchers to investigate interactions between variables and to explore cause-and-effect relationships to better understand how individual-, team- and organisation-level technology-related supports lead to more desirable outcomes. Fourth, longitudinal, complex mixed methods studies will better inform HR practitioners about the technology-related supports that are effective in supporting the creation of healthy and productive remote work environments and support public policy in improving access to workforce participation, provide social benefits from reduced commute times and economic benefits through a more dispersed workforce engaged for skills and capabilities rather than proximity to employment opportunities (Bergmann *et al.*, 2022; Chow *et al.*, 2022). Finally, the analysis revealed that despite the increase in publications about remote work since 2021, a high proportion is concentrated in European and Asia–Pacific countries. As a result, the findings are aligned with technology-related supports suited to the cultures and workplace legislation of these countries. It is possible that research is more readily conducted and published from these countries, suggesting that researchers consider broader study samples, including under-represented regions, such as Africa, Southeast Asia and Latin America, to determine whether the technology-related supports are comparable, doing so will provide a more comprehensive and nuanced understanding of global remote work experiences, capturing the diverse cultural, economic and infrastructural factors that shape how remote work is implemented and experienced across different regions. It will also help identify unique challenges and opportunities faced by workers in under-represented areas, thereby informing the development of more equitable, inclusive and contextually appropriate technology-related supports and policies that address the needs of a truly global remote workforce.

Limitations

While every precaution was taken, it is acknowledged that there was potentially selection bias and interrater bias in the screening, review and data extraction. To minimise potential bias, the software programme Covidence was used so that the abstracts and full papers were anonymously screened. Also, by limiting the review to publications in English, findings from studies published in other languages were not considered, potentially impacting our findings about the countries where studies had been conducted. In addition, these findings may not be generalisable to remote workers in countries not included in the articles comprising this review.

Conclusion

This study set out to identify the technology-related supports for remote workers that influence the remote work experience. Our research shows five supports and two cross-cutting themes highlighting that the technology-related supports for remote workers are dependent on the capabilities of HR and managers. Specifically, capabilities to develop strategies, polices and to implement technology-related supports in ways that improve the overall working environment for remote workers. Globally, the contemporary work environment is impacted by disruptive technologies and unpredictable social and environmental change. HR practitioners have a choice; they can respond or they can be more proactive in preparing workforces with the flexibility to be adaptive to this widespread disruption. HR leadership is essential if organisations are to use technology for competitive advantage rather than letting the technology drive the change. The technology-related supports identified in this review guide HR practitioners in developing and implementing the technology-related supports for their remote workers. With the foundational support of HR and managers, organisations that provide technology-related supports for remote workers will be better placed to have healthy and productive remote workforces. Therefore, this literature review provides insight for HR practices, especially in highlighting some of the challenges for remote workers that HR-facilitated support could mitigate. In addition, the findings inform future HR research directions to inform the HR industry of evidence-based strategies and impacts for policy development.

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