

Technostress and Productivity: A Systematic Literature Review Using TCCM (Theory, Context, Characteristics, and Methodology) Framework

Gauri Gupta ¹, , Ashok K. Pokhriyal ¹

1. School of Commerce, HNB Garhwal University, Srinagar, IND

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Abstract

This study systematically examines the relationship between technostress and productivity, addressing the fragmentation present in the existing literature. By applying the TCCM (Theory, Context, Characteristics, and Methodology) framework, the review synthesises diverse empirical perspectives and identifies research gaps to guide both theoretical advancement and practical intervention. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines, a systematic literature review was conducted using the Scopus database, covering publications from 2015 to 2025. Seventy relevant documents were analysed through the TCCM framework to examine theoretical foundations, contextual settings, technostress characteristics, and methodological approaches. The review demonstrates that technostress negatively affects productivity, primarily through stressor pathways such as techno-overload, techno-invasion, and techno-complexity. Nevertheless, emerging evidence suggests that technology demands can also produce positive outcomes, notably enhanced innovation, through the construct of techno-eustress. The principal theoretical frameworks employed across the reviewed studies are the Job Demands-Resources model, the Transactional Theory of Stress and Coping, and the Technostress Model. Research is geographically concentrated in Asia and Europe, with banking, healthcare, and higher education as the most studied sectors. Methodological diversity is evident across the corpus, though longitudinal and cross-cultural studies remain limited. Theoretically, this review advances understanding of technology-induced stressors through an integrated TCCM synthesis. From a practical standpoint, it provides evidence-based guidance for designing technology implementations and support systems that maximise productivity benefits while reducing the adverse consequences of technostress, a concern of particular relevance given the accelerating reliance on digital technologies and emerging paradigms such as artificial intelligence and algorithmic management.

Categories: Strategic Human Resource Management, Organisational Behavior, Sustainable Human Resource

Keywords: technostress, tccm framework, systematic literature review, productivity, digital stress

Introduction And Background

The modern digital age has seen the growth of unparalleled technological change in organisations in different industries. Information and communication technologies (ICTs), such as enterprise resource planning systems, collaborative systems, mobile technologies, artificial intelligence (AI), and cloud computing, are now common in contemporary workplaces (Tarafdar et al., 2015). Although these new technological improvements are expected to bring greater efficiency, better communication, and a higher competitive advantage, they, at the same time, come with new challenges that impact the well-being of employees and their organisational performance (Ragu-Nathan et al., 2008).

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Technostress can be described as stress that is placed on end users within an organisation due to the use of ICTs (Tarafdar et al., 2007). It has become one of the prominent concerns in organisational research. The phenomenon takes a multidimensional approach, which includes techno-overload (ICTs require people to work faster and longer), techno-invasion (reduction of boundaries between personal and professional life), techno-complexity (complicatedness related to ICT use), techno-insecurity (fear of losing a job to technology), and techno-uncertainty (never-ending changes and upgrades in technologies) (Ragu-Nathan et al., 2008) (Ayyagari et al., 2011).

The connection between technostress and productivity is one of the paradoxes of today's organisational life. Although ICTs are applied with the intention of increasing productivity, they may have counterproductive effects when not managed properly or used excessively (Tarafdar et al., 2015). These issues were further exacerbated by the COVID-19 pandemic, as companies quickly shifted to remote work, further increasing work practices mediated by technology and the stressors linked to them (Molino et al., 2020).

The correlation between technology and stress as factors influencing productivity remains under-synthesised despite increasing academic interest in the topic. The available literature is characterised by interdisciplinary, theoretical, and methodological discontinuity, making it difficult to arrive at comprehensive and generalisable conclusions (La Torre et al., 2020). Although a number of narrative reviews have discussed technostress (Brod, 1984) (Weil and Rosen, 1997), there are few systematic reviews that use rigorous frameworks or adopt a multidimensional framework capable of jointly synthesising theory, context, characteristics, and methodology. Existing efforts, which frame technostress through a JD-R model lens (Pansini et al., 2023) and a scientometric mapping of the field (Bondanini et al., 2020), do not offer this integration, nor do they focus specifically on the technostress-productivity relationship. Such a disconnect requires an ordered, holistic synthesis that can be used to inform both theory creation and intervention. The present study applies a systematic literature review based on the TCCM framework, which stands for Theory, Context, Characteristics, and Methodology, allowing a more thorough analysis of the area of study. Through this strategy, this review is improved in breadth, level of analysis, and scope, providing deeper insight into the field. The TCCM framework has some benefits for this review: (1) it is well-organised and thus can be used to compare studies, and (2) it reveals patterns and gaps in several dimensions at the same time.

This systematic literature review aims to (1) synthesise the existing different points of view about the relationship between technostress and productivity within the TCCM framework and (2) identify gaps in the research and suggest future research directions. This review will contribute to the theoretical and practical fields. Theoretically, it contributes to current knowledge of the impact of technology-induced stressors on performance by integrating different viewpoints using the TCCM framework. In practice, the synthesis provides evidence-based information that can guide the design of technological implementations, support systems, and policies that can be used to ensure the greatest productivity while minimising the effects of technostress. Considering the growing dependence on digital technologies and new trends such as AI, metaverse workspaces, and algorithmic management, the study of the technostress-productivity relationship is becoming a necessity to ensure the sustainability of performance.

Technostress: An overview

The term "stress" originated when, in 1926, Hans Selye found that rats (test animals) were showing changes brought about by the injection of a hormone. He defined this non-specific response of the rats' bodies to a demand imposed on them as stress (Alam, 2016). In simple terms, stress may be explained as a psychological condition, i.e., the relationship between the individual and a threatening environment, when it surpasses his or her coping resources (Alam, 2016).

Even though ICT (or technology) has enabled various work activities, a variety of clinical situations associated with its use have also been identified, such as technostress (La Torre et al., 2020). Technostress is not a recent phenomenon; the concept was first described in 1984 by Craig Brod. He coined the term "techno-stress" to refer to a contemporary illness of adaptation resulting from the failure to handle new computer technologies in a healthy way (Brod, 1984). Ragu-Nathan et al. defined technostress as the stress experienced by end users in organisations due to the use of ICT (Ragu-Nathan et al.,

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2008). Within organisations, according to Tarafdar et al., technostress arises from people's efforts and struggles to adjust to ever-changing ICTs and the changing physical, social, and cognitive demands associated with their use (Tarafdar et al., 2007).

Some other researchers (Weil and Rosen, 1997) (Ragu-Nathan et al., 2008) conceptualised technostress as the existence of any negative effect on attitudes, thoughts, behaviours, or the body brought about by technology, directly or indirectly. Tarafdar et al. discussed technostress as the pressure associated with overdependence on digital tools, regular system upgrades, and the risk of losing a job to robots (Tarafdar et al., 2017). Over the decades, technostress has evolved beyond mere computer use, encompassing a broader spectrum of digital technologies, such as AI, mobile banking apps, customer relationship management systems, and cybersecurity protocols (Tarafdar et al., 2015). Technostress has become a multifaceted and ubiquitous challenge today, driven by the constant digital revolution that continues to reshape workplace conditions, communication practices, and daily interactions with technology. Table 1 shows how technostress has changed over time.

The study of technostress has developed significantly since Brod's (Brod, 1984) foundational work (Tarafdar et al., 2017). Initial studies in the 1980s and 1990s focused on technostress as an individual problem of adaptation; technostress was assumed to be resolved through effective training. This viewpoint treated technostress as a short-term phenomenon that would pass as workers became accustomed to computers.

However, in the 2000s, more complex dynamics were identified. Weil and Rosen showed that technostress could be found even among experienced technology users, pointing to systemic rather than individual predispositions (Weil and Rosen, 1997). Tarafdar et al. established a detailed conceptual model that defines the effects of certain technological features that cause stress, moderated by the organisational environment and individual differences (Tarafdar et al., 2007). Their contribution established technostress as a valid organisational issue that requires structural adjustments, not just personal adjustments.

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Period	Key Developments
1980s–1990s	Coined by Craig Brod (1984); low technology penetration in India.
	The stress was restricted to IT professionals and academics who used the early computing systems.
2000s	The boom in outsourcing of IT raises the exposure to tech.
	Emergence of techno-overload and techno-complexities within the call centres and software companies.
	Initial studies emerge.
2010–2015	Digital interaction and blurring of work-life space with smartphone adoption.
	Technostress affects banking, education, and healthcare.
	Academic interest increases.
2016–2020	Frontline stress is brought about by CRM systems and mobile banking.
	Scientific studies associate stress and productivity.
	Technostress develops to encompass the issue of data privacy, cybersecurity, and the fact that one has to keep upskilling.
2020–2024	Remote work and online service delivery are caused by the pandemic.
	Techno-invasion and techno-uncertainty take off.
	Spike in Indian research by bibliometrics.
2025 Onward	Technostress as a strategic HR and policy problem.
	Research is concerned with inhibitors and sectoral interventions.
	Technostress audits become of interest.

TABLE 1: Evolution of technostress over the years

Source: Compiled by the authors based on the extant literature.

IT, Information Technology; CRM, Customer Relationship Management; HR, Human Resource

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The 2010s saw greater sophistication in technostress research. Ayyagari et al. distinguished technological features from technostressors, stating that technology does not necessarily cause stress, but the organisational approach to technology and its use contributes to stress (Ayyagari et al., 2011). This distinction was important in formulating effective interventions. Tarafdar et al. further elaborated on this idea by distinguishing between techno-eustress (a positive, motivating technological challenge) and techno-distress (negative, debilitating strain), as technology can energise or weaken employees (Tarafdar et al., 2015).

New studies have broadened the scope to include individual psychological effects, team functioning, organisational culture, and further implications for wider society. La Torre et al. examined the impact of technostress on work-family balance at a time when remote work technologies were eliminating the traditional divisions between work and family life (La Torre et al., 2020). Bondanini et al. carried out a thorough scientometric survey that demonstrated that the field of technostress was growing exponentially and that new themes, such as AI anxiety, cybersecurity issues, and digital surveillance, had emerged (Bondanini et al., 2020).

Contemporary definitions recognise technostress as a multidimensional construct reflecting the problematic relationship between individuals and technology. This relationship involves person-technology misfit, where demands imposed by technology exceed an individual's capabilities or resources to cope effectively (Ayyagari et al., 2011). Technostress is now recognised as both a process (involving constant engagement with technology) and an outcome (the resulting strain and undesirable consequences).

Technostress and productivity

Productivity is one of the core outputs that indicates efficiency and effectiveness in the use of available time, effort, and resources. Traditional definitions focus on output-input ratios: productivity is the amount and quality of work done divided by the resources consumed (Brynjolfsson and Hitt, 2000). Evidence shows that there is a negative correlation between technostress and productivity (Tu et al., 2025). Technostress may result in poor job satisfaction, weak job performance, strong turnover intentions, and poor well-being (Tarafdar et al., 2007) (Pansini et al., 2023) (La Torre et al., 2020). Nevertheless, according to some studies, under special circumstances, technology may become a resource and contribute to increased productivity and cooperation, particularly when organisations provide support and training (Pansini et al., 2023).

Review

Methodology

The Scopus database was selected as the primary source for this review due to its broader journal coverage compared with Web of Science and its higher number of uniquely indexed journals across all disciplines (Pathak and Kaur, 2025). Scopus was chosen because it has consistent criteria for including journals in its index (Pathak and Kaur, 2025). Its multidisciplinary coverage further aligns with the interdisciplinary nature of technostress research, which spans information systems, management, organisational behaviour, psychology, education, healthcare, and finance. Its structured filtering and export functions also facilitated consistent screening and TCCM-based data extraction. In order to select the literature, some keywords were identified for the search query. The search query was as follows:

('technostress' OR 'techno-stress' OR 'technology stress' OR 'ICT stress' OR 'digital stress' OR 'computer stress') and ('productivity' OR 'performance' OR 'job performance' OR 'work performance' OR 'task performance' OR 'efficiency' OR 'effectiveness' OR 'output')

A systematic literature review procedure is presented in Figure 7 to visually indicate the methodological stages used in this study. The database search was carried out on 19 October 2025. The authors used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework (Page et al., 2021) to select the data (see Figure 2), as it enables researchers to record the data extraction process systematically and provides a framework for the review process (Pansini et al., 2023). The PRISMA2020 Shiny application (Haddaway et al., 2022) was used to generate a compliant flow diagram for study selection.

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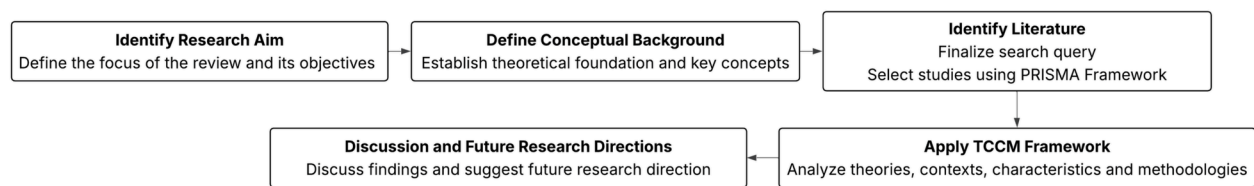


FIGURE 1: Systematic literature review process implemented in the study

Source: Authors' compilation.
PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses; TCCM, Theory, Context, Characteristics, and Methodology

The initial search was conducted using the above keywords and yielded 532 documents. Subsequently, inclusion criteria were applied by limiting the results to English-language publications, journal articles, the final publication stage, open-access documents, and studies published between 2015 and 2025. After applying these filters, 383 documents were excluded, resulting in 149 studies for preliminary screening. During the screening stage, titles, abstracts, and keywords were carefully reviewed, leading to the exclusion of 58 irrelevant studies. Subsequently, 91 articles were sought for retrieval, but 5 studies could not be accessed. The remaining 86 articles were assessed for eligibility through full-text reading. After detailed evaluation, 16 studies were excluded because they did not align with the research objectives. Studies were included if they (1) were empirical studies (quantitative, qualitative, or mixed methods); (2) examined technostress or digital stress as a primary variable; and (3) investigated outcomes related to productivity, performance, engagement, or closely related constructs. Finally, 70 studies were included in the systematic literature review and TCCM framework analysis.

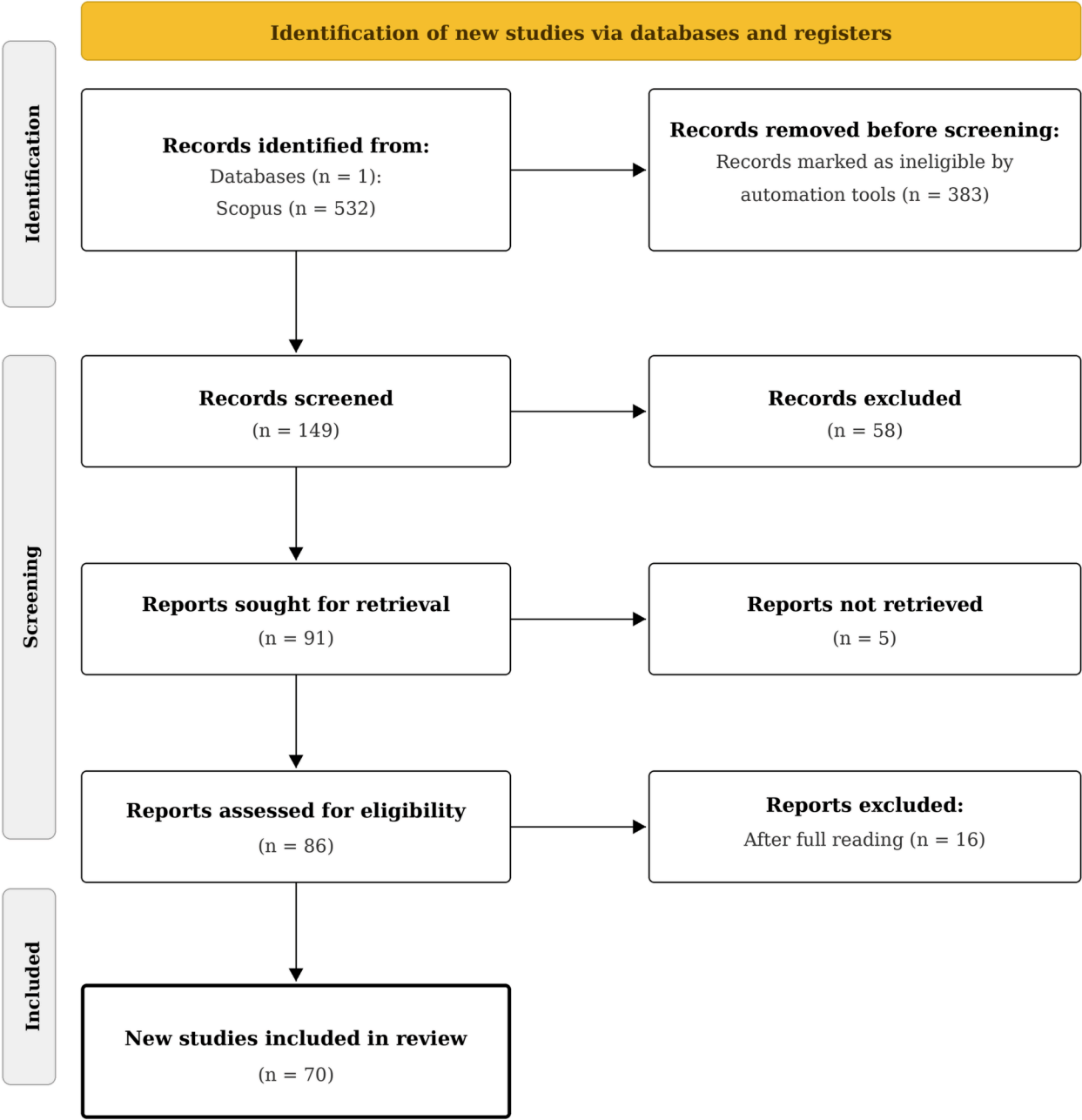


FIGURE 2: PRISMA flow chart generated through Shiny application

Source: Authors' compilation.
The PRISMA 2020-compliant flow diagram was generated using the PRISMA2020 Shiny application ([Haddaway et al., 2022](#)).
PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses

Inclusion and Exclusion Criteria

To ensure transparency and reproducibility, a structured set of inclusion and exclusion criteria was applied during the screening process. Studies were included if they (1) were peer-reviewed empirical studies (quantitative, qualitative, or mixed-methods designs); (2) examined technostress, digital stress, or ICT-related stressors as a primary or central variable; (3) investigated outcomes directly related to productivity, job performance, task performance, work engagement, academic achievement, or closely related constructs; (4) were published in English to preserve consistency in coding and avoid translation bias, consistent with common practice in management systematic reviews; (5) appeared as journal articles at the final publication stage; and (6) were published between 2015 and 2025. Studies were excluded if they (1) were review articles, editorials, conference abstracts, or book chapters; (2) examined stress in relation to technology use without a clear organisational or productivity-related outcome; or (3) were not available in open-access form, to ensure consistent access to the full methods, theoretical foundations, results, tables, and conclusions required for detailed TCCM coding and verification, and to allow any reader to independently retrieve and verify the coded studies without requiring institutional subscriptions. The open-access criterion was therefore adopted primarily to support accessibility, transparency, and reproducibility in the review process.

Data Extraction and Synthesis Process

A structured data extraction template was developed a priori based on the four TCCM dimensions - Theory, Context, Characteristics, and Methodology - following the approach described by Paul and Rosado-Serrano (Paul and Rosado-Serrano, 2019). For each included study, the following information was extracted: theoretical framework(s) employed; country and industry/sector of the study; sample size; research method; technostress constructs; and key findings.

Extraction was conducted by the authors using a structured Microsoft Excel coding sheet and subsequently classified as follows: (1) under Theory, frameworks were coded by name; (2) under Context, studies were coded by country and industry sector; (3) under Characteristics, constructs were classified as creators, inhibitors, mediators, or moderators; and (4) under Methodology, studies were classified by research design and sample size. In cases of ambiguity, the original article was reread to resolve uncertainty and ensure consistency across the corpus. The final decision was made through discussion, and ambiguities were carefully resolved to ensure alignment with the objectives of the study. This approach was adopted to enhance consistency and minimise individual interpretation bias. A formal inter-rater reliability coefficient was therefore not applicable, aligning with established practice in narrative-dominant systematic reviews in management and information systems.

The synthesis followed a narrative approach informed by the TCCM framework, in which themes, patterns, and gaps were identified across the four analytical dimensions through iterative reading and thematic grouping of the extracted data. Table 2 summarises the characteristics of a few studies, covering author(s), publication year, country of data collection, sample, research method, and key findings.

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Authors and Year	Country	Sample (n)	Research Method	Key Findings
(Tarafdar et al., 2015)	United States	n = 237	Quantitative survey	Technostress creators are negatively associated with performance. Building technology competence reduces the impact on technology-enabled innovation/performance; however, developing technology self-efficacy and IS literacy enhancement/involvement in IS initiatives are required to counter declines in overall performance.
(Pirkkalainen et al., 2019)	United States	n = 846	Quantitative survey	Reactive coping (distancing, distress venting) alleviates technostress by reducing the negative effect of technostress creators on IT-enabled productivity. Proactive coping behaviours positively influence the effectiveness of reactive coping and independently contribute positively to IT-enabled productivity.

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(Chandra et al., 2019)	Europe and Asia's leading school's alumni	n = 164	Quantitative survey	Individual technostress creators show nuanced linear and curvilinear relationships with ICT-enabled innovation—not all are uniformly harmful. Some exhibit inverted U-shaped relationships. The results provide a basis for more targeted technostress-management strategies.
(González-López et al., 2021)	Spain	n = 337	Quantitative survey	Technostress has a significant impact on the individual sphere of students. A significant relationship was found between the type of social media user archetype and techno-anxiety. Technostress management strategies are required in higher education and workplace digital environments.
(Hang et al., 2022)	Pakistan	n = 355	Quantitative survey	Technostressors significantly and negatively affect employee well-being. The moderating effects of inhibitors on the stressor-well-being relationship were significant and positive, confirming the buffering role of inhibitors.
(Harunavamwe and Ward, 2022)	South Africa	n = 227	Quantitative survey	Technostress influences workplace flourishing indirectly through POS and work-family conflict. There is no significant direct effect of technostress on flourishing.

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				Technostress is a strong determinant of work-family conflict.
(Bencsik and Juhász, 2023)	Hungary	n = 237	Quantitative survey	Three factors have the greatest impact on work-life balance and work performance: techno-overload (loss of leisure time), techno-invasion, and techno-uncertainty (lack of ICT competence).
(Tafesse et al., 2024)	United Arab Emirates	n = 142	Quantitative survey	Digital overload causes technostress and exhaustion as psychological strains, which in turn encourage the adoption of coping mechanisms.
(Würtenberger et al., 2025)	Germany	n = 114	Mixed methods (quantitative online questionnaire + qualitative components)	Moderate levels of technostress perception among GPs; a substantial level of technostress inhibitors is present. ICT use leads to heightened stress, increased burnout symptoms, and reduced job satisfaction.

TABLE 2: Characteristics of representative included studies

Note: This table summarises the characteristics of a representative subset of the included studies, covering author(s), publication year, country of data collection, sample characteristics, research method, and key findings.
Source: Authors' compilation.
IS, Information Systems; IT, Information Technology; ICT, Information and Communication Technology; POS, Perceived Organisational Support; GP, General Practitioner

Reviewer Bias

Consistent with established practice in management and information systems systematic reviews (Patgiri and Ramakrishna, 2026), this review paper does not apply a formal risk-of-bias or quality appraisal instrument/tool. Instead, study-level credibility was assured through the systematic enforcement of predefined eligibility criteria, restricting inclusion to Scopus-indexed, peer-reviewed empirical studies published between 2015 and 2025, alongside the use of

the PRISMA 2020-compliant flow diagram as the primary instrument for selection transparency and accountability. While this approach ensures thematic alignment, future systematic reviews could be strengthened by adopting formal quality appraisal frameworks to enhance methodological rigour.

TCCM framework

The TCCM framework (Paul and Rosado-Serrano, 2019) is used throughout management, information systems, and social sciences to allow rigorous synthesis of data by arranging it into four dimensions: the Theory dimension covers underlying models and foundations; the Context dimension covers country, sector, and organisational information; the Characteristics dimension identifies variables such as moderators and mediators; and the Methodology dimension reports research design, data collection, sample size, data collection instruments, and methods of analysis.

Theories

Table 3 maps the principal theoretical frameworks present in the 70-article corpus, indicating their relative frequency and representative studies. The Job Demands-Resources (JD-R) model and the Transactional Theory of Stress and Coping have been widely used in the literature. Models such as Conservation of Resources (COR) and the Technology Acceptance Model have been moderately used in the literature. Multiple theoretical lenses have been employed to understand technostress:

Transactional Theory of Stress and Coping (Lazarus and Folkman, 1984): This theoretical framework assumes that stress is a product of interactions between an individual and the environment when demands are perceived to be too high to be managed effectively. Khalequzzaman et al. drew on the Transactional Theory of Stress and Coping alongside the JD-R model to examine how digital overload and perceived digital surveillance in the Bangladeshi banking sector led to technostress and subsequently affected job performance (Khalequzzaman et al., 2025). Camacho and Barrios applied the framework in the context of teleworking during the COVID-19 lockdown in Spain, finding that the sudden and forced transition to remote work triggered widespread primary appraisals of overload and invasion, with consequent technostress impairing work quality and satisfaction (Camacho and Barrios, 2022). Tarafdar et al., in a study drawing on a sample of salespeople, invoked transactional stress theory to explain how technostress creators, particularly techno-overload and techno-invasion, translated through role stress into diminished sales performance (Tarafdar et al., 2015). The Transactional Theory of Stress and Coping, which emphasises cognitive appraisal, provides important insights into the heterogeneity of individual responses to identical technological demands.

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Framework	Frequency	Illustrative Studies From the Corpus
Job Demands-Resources (JD-R) Model	High (≥ 12 studies)	(Wirkkala et al., 2024) (Andrulli and Gerards, 2023) (Ingusci et al., 2023) (Raj and Goute, 2025) (Tu et al., 2025) (Kutlutürk et al., 2024)
Transactional Theory of Stress and Coping	High (≥ 10 studies)	(Khalequzzaman et al., 2025) (Schoch, 2023) (Saidy et al., 2022) (Pirkkalainen et al., 2019) (Yang et al., 2025)
Technostress Model	High (≥ 10 studies)	(Tarafdar et al., 2015) (Würtenberger et al., 2025) (Tu et al., 2025) (Hang et al., 2022) (Cahapay and Bangoc, 2021)
Conservation of Resources (COR) Theory	Moderate (≥ 5 studies)	(Kutlutürk et al., 2024) (Deng et al., 2023) (Shin et al., 2024)
Challenge-Hindrance Stressor (CHS) Framework	Moderate (≥ 4 studies)	(Chandra et al., 2019) (Schoch, 2023) (Verma et al., 2024) (Pflügner et al., 2024)
Technology Acceptance Model (TAM)	Moderate (≥ 4 studies)	(Su and Chao, 2022) (Bulduk and Unal, 2025) (Chen and Hsiao, 2021) (Hossain et al., 2019)
Stressor-Strain-Outcome (SSO) Model	Moderate (≥ 3 studies)	(Tafesse et al., 2024) (Kasim et al., 2022) (Adekanmbi and Isioma, 2022)
Self-Efficacy Theory (Bandura)	Moderate (≥ 5 studies)	(Zhang, 2023) (Saidy et al., 2022) (Ingusci et al., 2023) (Song et al., 2023) (Schoch, 2023)
Configurational/General Systems Theory	Emerging	(Pflügner et al., 2024)
Organisational Resilience Frameworks	Emerging	(Fettahoglu and Yikilmaz, 2025) (Yang et al., 2025)

TABLE 3: Theoretical frameworks employed in the reviewed studies

Note: Studies may employ more than one theoretical framework.

Source: Authors' compilation.

JD-R Theory (Demerouti et al., 2001): In the context of technology, this theory divides ICT characteristics into demands (aspects that necessitate sustained effort and incur physiological or psychological costs) and resources (aspects that enable goal accomplishment and stimulate growth). Wirkkala et al. applied the JD-R framework to Swedish healthcare staff, demonstrating that technology frustration, operationalised as a job demand, was positively associated with stress and emotional exhaustion, while system support served as a moderating resource (Wirkkala et al., 2024). Würtenberger et

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al., similarly employed the JD-R model in a study of German general practitioners, finding that technostress creators elevated burnout symptoms and reduced job satisfaction, while technostress inhibitors partially buffered these negative effects (Würtenberger et al., 2025). Shin et al. adopted the model to examine sales technologies, conceptualising techno-demands and techno-resources as distinct drivers of salesperson performance outcomes (Shin et al., 2024). Technostress is a consequence of a misalignment between technological demands and available resources, whereby the available resources do not meet the technological demands, which triggers a health impairment process that reduces productivity (Tarafdar et al., 2017).

COR Theory (Hobfoll, 1989): This theory assumes that people attempt to acquire, maintain, and defend resources they value (time, energy, and attention). Technostress is a form of resource depletion, as technology constantly consumes cognitive, emotional, and temporal resources, forming a loss spiral that affects performance. There are three studies in the corpus that provide a resource-centred explanation for technostress outcomes. Harunavamwe and Ward applied COR theory to examine how technostress, work-family conflict, and perceived organisational support interacted in predicting workplace flourishing among South African employees during the COVID-19 pandemic (Harunavamwe and Ward, 2022). Their findings demonstrated that technostress represented a significant resource drain that eroded employees' psychological capital, while organisational support served as a compensatory resource. Hang et al. similarly drew on COR theory to examine the moderating effects of technostress inhibitors on technostressors and employee well-being in Pakistan (Hang et al., 2022). Kutlutürk et al. integrated COR theory with the JD-R model and the person-environment fit approach to examine the role of musculoskeletal disorders as moderators of the technostress-burnout relationship among bank employees in Turkey (Kutlutürk et al., 2024).

The recent research shows growing theoretical sophistication through the integration of theories. Some studies integrated stress and coping theory with JD-R theory to investigate the processes of stress generation and their interaction with job resources (Tarafdar et al., 2015). Others combined Technology Acceptance Model or Unified Theory of Acceptance and Use of Technology with stress models to describe the impacts of technostress on technology acceptance and use behaviours that mediate productivity effects.

Although increased attention has been given to technostress and its implications, there are still some theoretical gaps in the literature. Positive psychology and digital ethics are significantly underrepresented among the frameworks used, which might provide more insight into well-being, resilience, and responsible use of technology. Also, the inadequate integration of cognitive resource theories limits our understanding of how people change and learn in digitally intensive settings when stressed. Moreover, there is a lack of interdisciplinary, cross-theory synthesis that integrates knowledge from IT, management, and behavioural science, which may produce more holistic, context-sensitive conceptualisations of technostress in current work environments.

Contexts

The empirical research largely involved higher education, medical, and business digital environments, which are experiencing rapid technological change. A study among faculty members at higher education institutions in Portugal and Indonesia (Nascimento et al., 2025) associated distance learning technologies with increased efficiency and emotional tension at work, while medical research (Wirkkala et al., 2024) identified similarities between workloads in medical institutions and digital overload. Industries with high levels of digital interdependence, including IT consulting and aviation, showed that technological complexity tends to decrease well-being but increase accuracy in skill-based simulations (Lopes et al., 2025).

Geographical Distribution

As shown in Table 4, Europe accounts for the largest share of empirical studies ($n = 37$), followed by Asia-Pacific ($n = 18$), the Middle East and Africa ($n = 8$), and Latin America and North America ($n = 3$ each). Within Europe, Germany contributes the highest number of studies of any country in the entire corpus, with eight studies. Asia-Pacific is the second most represented region, with 18 studies drawn from 11 countries. China leads the region with four studies. India, Taiwan, Bangladesh, and Pakistan each contribute two studies.

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Region	Number of Papers	Countries (Studies per Country)
Europe	37	Germany (8), Turkey (6), Italy (4), Spain (2), Portugal (2), Romania (2), Netherlands (2), United Kingdom (2), Finland (1), Norway (1), Sweden (1), Hungary (1), Switzerland (1), unspecified European context (2), multi-country (2)
Asia-Pacific	18	China (4), India (2), Taiwan (2), Bangladesh (2), Pakistan (2), South Korea (1), Indonesia (1), Philippines (1), Malaysia (1), Vietnam (1), multi-country South Korea/China (1)
Middle East & Africa	8	South Africa (2), Saudi Arabia (1), United Arab Emirates (1), Ghana (1), Nigeria (1), Israel (1), Lebanon (1)
Latin America	3	Colombia (2), Peru (1)
North America	3	USA (3)
No country	1	(Bastida et al., 2025) —conceptual study
TOTAL	70	

TABLE 4: Geographical distribution of the studies

Note: Two studies reported only 'Europe' as the geographic context without specifying a country and are counted within the European total.

Source: Authors' compilation.

The distribution reveals several important patterns. The underrepresentation of Latin America and North America relative to the scale of digital transformation in those regions points to a notable geographical gap in the literature. While Asia-Pacific demonstrates broad, multi-country engagement, individual country contributions remain modest. Africa and the Middle East remain significantly under-represented. These gaps highlight the need for future research to expand the geographical scope of technostress research, particularly in digitally emerging economies where the phenomenon is acutely felt but empirically underexplored.

Industry/Organisational Contexts

As shown in Table 5, the variety of sectors and occupational environments where technostress has been examined indicates its universal applicability in industries and professional activities.

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Sector/Context	Representative Studies
Education (Higher & K-12)	(Cahapay and Bangoc, 2021) (Andrade et al., 2023) (Tu et al., 2025) (Baabdullah et al., 2022) (Cook and Van-Belle, 2022) (Reyes and Libaque-Sáenz, 2023) (Tobia et al., 2024) (Fernandez et al., 2022)
Healthcare & Medical	(Wirkkala et al., 2024) (Dakin et al., 2025) (Deng et al., 2023) (Ackermans et al., 2025)
Finance, Banking & Insurance	(Khalequzzaman et al., 2025) (Hang et al., 2022) (Shin et al., 2024)
IT/Knowledge Workers	(Pirkkalainen et al., 2019) (Chandra et al., 2019) (Kasim et al., 2022)
Public Sector/Government	(Çini et al., 2023) (Bulduk and Unal, 2025)
Sales & Frontline Workers	(Tarafdar et al., 2015) (Saidy et al., 2022) (Shin et al., 2024)
Cross-sector/Multi-context	(Pflügner et al., 2024) (Bencsik and Juhász, 2023) (Andrulli and Gerards, 2023)

TABLE 5: Sectoral distribution of studies

Source: Authors' compilation.

The education sector dominates the literature, accounting for the largest proportion of studies. This dominance reflects the extensive technological transition experienced during and after the COVID-19 pandemic. Cahapay and Bangoc found that although teachers experienced moderate technostress, work performance and job satisfaction remained high due to strong professional commitment during crisis conditions (Cahapay and Bangoc, 2021). Andrade et al. reported that transformational leadership reduced the negative influence of technostress on academic performance among university students (Andrade et al., 2023). Similarly, Essel et al. observed that digital literacy lowered technostress among higher education students, whereas technology dependence increased stress and negatively affected academic productivity (Essel et al., 2021). Studies involving teachers further showed that technostress contributes to burnout, reduced job satisfaction, and weaker job performance (Aktan and Toraman, 2022) (Can Yalçin et al., 2022) (Tu et al., 2025). Maipita et al. demonstrated that organisational support and Technological Pedagogical Content Knowledge could buffer the negative effects of technostress (Maipita et al., 2023). Moreover, Nascimento et al. introduced the concept of techno-eustress, showing that ICT self-efficacy and digital organisational support may positively enhance performance over time (Nascimento et al., 2024) (Nascimento et al., 2025).

Healthcare represents another major context in technostress research. The increasing use of electronic health records, telemedicine, digital monitoring systems, and AI-supported technologies has significantly transformed healthcare operations. Wirkkala et al. found that technology frustration increased emotional exhaustion and stress and reduced staff satisfaction among healthcare professionals (Wirkkala et al., 2024). Dakin et al. introduced the concept of “technosuffering”, describing the persistent psychological burden caused by continuous digital demands in healthcare settings (Dakin et al., 2025). Their longitudinal findings, supported by Greenhalgh et al. (Greenhalgh et al., 2025), further indicated that digital healthcare systems intensified workloads and negatively affected staff well-being. Bernburg et al. identified strong associations between digital stressors and poor mental health among emergency physicians (Bernburg et al., 2024). Likewise, Gebhardt et al. revealed that inadequate training and poor system quality reduced job satisfaction

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among dentists, despite the workflow improvements offered by digitisation (Gebhardt et al., 2025b). Additional studies demonstrated that technostress negatively affects mobile learning adoption, internet hospital acceptance, and electronic medical record usage among healthcare workers (Chen and Hsiao, 2021) (Deng et al., 2023) (Su and Chao, 2022).

The finance, banking, and insurance sectors also constitute significant contexts within the reviewed literature. Khalequzzaman et al. reported that digital overload and digital surveillance increased technostress among banking employees, which subsequently reduced job performance (Khalequzzaman et al., 2025). Kutlutürk et al. further found that musculoskeletal pain intensified technostress-induced burnout (Kutlutürk et al., 2024). Hang et al. demonstrated that technostress inhibitors helped reduce negative outcomes among banking employees (Hang et al., 2022). In accounting and financial reporting environments, Fettahoglu and Yikilmaz observed that techno-eustress mediated the positive effects on professional performance (Fettahoglu and Yikilmaz, 2025). Similarly, Shin et al. found that techno-demands increased burnout among sales professionals, whereas techno-resources improved satisfaction and performance (Shin et al., 2024). Köhne and Köhne additionally noted that excessive digitisation in insurance distribution reduced productivity once stress levels exceeded manageable limits (Köhne and Köhne, 2024).

Studies involving IT professionals, government employees, and cross-sector knowledge workers highlighted communication overload, work interruptions, social media invasion, and work-life imbalance as major contributors to technostress. Kasim et al. found that WhatsApp overload reduced innovative job performance among government employees (Kasim et al., 2022). Oksa et al. demonstrated that professional social media invasion increased work exhaustion, while work engagement buffered the negative effects (Oksa et al., 2022). Whelan and Turel revealed that restrictive smartphone policies created additional stress and work-life conflict (Whelan and Turel, 2023). Similarly, Hurbean et al. identified instant messaging interruptions as a major determinant of reduced work performance (Hurbean et al., 2025). Collectively, these studies confirm that technostress is a multidimensional issue across industries, with organisational support and digital competencies playing critical moderating roles.

Temporal Considerations

The initial years (2015-2021) were characterised by relatively low publication output, with occasional publications ranging from 1 to 6 documents per year, indicating growing research attention. Table 6 presents the number of documents published over the years. There was a significant upsurge from 2021 onward, as the number of publications increased to 14 documents in 2022, compared to 6 documents in 2021, indicating heightened awareness of technostress as a serious organisational phenomenon. Such a dramatic increase coincided with organisational experiences of remote work, accelerated digital transformation, and greater sensitivity to technology-related workplace stressors following the COVID-19 pandemic. The years 2024 and 2025 were highly productive, with 13 and 19 documents, respectively, indicating the continuation of research momentum.

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Year	Number of Studies	Percentage (%)	Cumulative %
2015	1	1.43	1.43
2019	3	4.29	5.71
2021	6	8.57	14.29
2022	14	20.00	34.29
2023	14	20.00	54.29
2024	13	18.57	72.86
2025	19	27.14	100.00
Total	70	100.00	—

TABLE 6: Distribution of studies by publication year

Source: Authors' compilation.

Overall, publications emerging during the 2022-2025 period indicate that technostress-productivity research has reached maturity and gained mainstream acceptance within organisational and information systems scholarship. However, the predominance of cross-sectional designs limits our understanding of temporal dynamics and longitudinal adaptation processes.

Characteristics

The reviewed literature identifies technostress creators as the primary technological conditions that generate psychological strain and negatively influence productivity and well-being. Across the 70 studies, the most frequently examined technostress creators include techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty, consistent with the foundational framework proposed by (Tarafdar et al., 2007). Among these dimensions, techno-overload emerges as the most dominant stressor. It refers to situations in which employees are compelled to work faster, handle excessive digital communication, and continuously respond to technological demands. Saidy et al. identified techno-overload as the strongest predictor of reduced job performance among frontline employees in Gulf organisations, although self-efficacy partially reduced this negative effect (Saidy et al., 2022). Similarly, Kasim et al. demonstrated that excessive WhatsApp communication created communication overload and significantly weakened innovative work performance among Malaysian employees (Kasim et al., 2022).

Techno-invasion, another widely examined construct, reflects employees' inability to disconnect from work because of persistent digital connectivity. This dimension frequently contributes to emotional exhaustion, work-life imbalance, and declining productivity. Hurbean et al. found that instant messaging interruptions increased stress levels and reduced employee performance in Romanian and Portuguese organisations (Hurbean et al., 2025). Likewise, Whelan and Turel showed that unrestricted smartphone use in workplaces intensified work-life conflict and increased psychological strain (Whelan and Turel, 2023). Although techno-complexity and techno-insecurity received comparatively less attention when examined in isolation, these dimensions often appeared within broader technostress measurement scales. Çini et al. found that employee perspectives on digital transformation in public institutions significantly influenced technostress

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levels and performance, with those perceiving transformation more negatively experiencing higher technostress (Çini et al., 2023). Pflügner et al. used a configurational perspective to demonstrate that combinations of techno-complexity and techno-insecurity produced severe burnout and substantial performance deterioration among employees (Pflügner et al., 2024).

Recent studies have also expanded the traditional technostress framework by introducing broader digital stress concepts. Sevic et al. validated the Digital Stressors Scale in Norway and identified dimensions such as availability pressure, uncertainty, performance pressure, and work-home conflict as major digital stressors (Sevic et al., 2024). Similarly, Avtalion et al. introduced the concept of digital climate, emphasising that organisational-level digital environments significantly influence employee perceptions of stress and well-being (Avtalion et al., 2025). Table 7 illustrates the key constructs in the reviewed literature.

Construct Category	Key Variables	Representative Studies	Direction of Effect
Technostress Creators	Techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty	(Tarafdar et al., 2015) (Saidy et al., 2022) (Pflügner et al., 2024) (Can Yalçın et al., 2022)	Negative → Performance
Technostress Inhibitors	Organisational support, technical literacy, involvement, digital leadership	(Hang et al., 2022) (Harunavamwe and Ward, 2022) (Yang et al., 2025)	Positive (buffering)
Mediators	Burnout, role stress, work engagement, need for recovery, organisational cynicism	(Kutlutürk et al., 2024) (Can Yalçın et al., 2022) (Andrulli and Gerards, 2023)	Negative mediating
Moderators	Self-efficacy, organisational support, mindfulness, musculoskeletal pain, digital leadership	(Saidy et al., 2022) (Khalequzzaman et al., 2025) (Yang et al., 2025)	Buffering/amplifying
Productivity Outcomes	Job performance, task performance, work engagement, academic achievement, innovation	(Tarafdar et al., 2015) (Cahapay and Bangoc, 2021) (Picazo Rodríguez et al., 2024)	Varied
Positive Outcomes	Techno-eustress, creative performance, engagement	(Nascimento et al., 2024) (Fettahoglu and Yikilmaz, 2025) (Song and Ma, 2025)	Positive → Performance

TABLE 7: Key constructs in the reviewed literature

Source: Authors' compilation.

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The literature further highlights the importance of mediating mechanisms through which technostress affects productivity outcomes. Burnout consistently emerges as the most prominent mediator across sectors and occupational groups. Kutlutürk et al. demonstrated that technostress significantly increased burnout among bank employees, ultimately impairing performance outcomes (Kutlutürk et al., 2024). Tu et al. similarly found that burnout mediated the negative relationship between technostress, job satisfaction, and work performance among Science, Technology, Engineering, and Mathematics (STEM) teachers in China (Tu et al., 2025). Role stress, including role ambiguity, overload, and conflict, also functions as a major mediating pathway. Tarafdar et al. confirmed that technostress increases role stress, which subsequently reduces sales performance (Tarafdar et al., 2015). Feng further observed that technostress generated role-related pressure that weakened managerial effectiveness among proximity managers (Feng, 2021).

Work engagement also appears as an important mediator in several studies. Andrulli and Gerards as well as Nguyen et al. examined New Ways of Working (a flexible, technology-enabled approach to work organisation) in detail, with the former (Andrulli and Gerards, 2023) showing that New Ways of Working reduced technostress in the Dutch context, while the latter (Nguyen et al., 2024) found that it increased technostress in Vietnam, suggesting that the relationship is culturally and contextually contingent (Andrulli and Gerards, 2023) (Nguyen et al., 2024). Studies also found that technostress reduced work engagement and increased employees' need for recovery under New Ways of Working arrangements during COVID-19. Conversely, Picazo Rodríguez et al. demonstrated that work engagement positively mediated the relationship between digital transformation and perceptions of organisational productivity in Spanish firms (Picazo Rodríguez et al., 2024). Organisational cynicism was identified as another critical mediator. Can Yalçın et al. reported that technostress indirectly reduced teacher performance by increasing negative organisational attitudes and cynicism among Turkish teachers (Can Yalçın et al., 2022).

The reviewed studies also reveal several moderating factors that influence the strength and direction of the technostress-productivity relationship. Self-efficacy is among the most frequently examined moderators. Saidy et al. found that employees with higher self-efficacy were less negatively affected by techno-overload and techno-invasion (Saidy et al., 2022). Similarly, Schoch demonstrated that self-efficacy improved remote working performance by strengthening challenge appraisal mechanisms among Australian remote workers (Schoch, 2023). Perceived organisational support also emerged as a significant buffering mechanism. Khalequzzaman et al. reported that strong organisational support transformed moderate technostress into a motivational challenge among banking employees in Bangladesh (Khalequzzaman et al., 2025). Harunavamwe and Ward similarly showed that organisational support reduced the harmful effects of technostress on workplace flourishing in South Africa (Harunavamwe and Ward, 2022). González-López et al. identified distinct student archetypes with varying levels of vulnerability to technostress, suggesting that organisational support interventions should be targeted based on individual vulnerability profiles (González-López et al., 2021).

Digital leadership, mindfulness, emotional regulation, and personal coping resources also emerged as important moderators across several studies. Yang et al. demonstrated that digital leadership encouraged employees to develop effective coping routines that reduced the negative influence of technostress on performance (Yang et al., 2025). Another emerging moderating concept is techno-eustress, which reflects positive psychological responses to technology use. Fettahoglu and Yikilmaz found that techno-eustress enhanced professional performance among accounting and financial reporting professionals in Turkey (Fettahoglu and Yikilmaz, 2025). Likewise, Nascimento et al. established that techno-eustress positively influenced teaching performance and personal accomplishment among higher education faculty members (Nascimento et al., 2024) (Nascimento et al., 2025).

Regarding productivity outcomes, the literature primarily focuses on job performance, work engagement, academic achievement, innovative behaviour, knowledge sharing, and organisational citizenship behaviour. Most studies consistently conclude that technostress negatively affects productivity-related outcomes across sectors and countries. However, emerging evidence suggests that the effects of technostress are not universally negative. Song et al. found that learning orientation and supportive team climates moderated the relationship between technostress and innovative behaviour in ICT-enabled teams (Song et al., 2023). Song and Ma further demonstrated that personality traits and knowledge exchange behaviours influenced how technostress affected creative performance among experienced newcomers (Song and Ma, 2025). Similar patterns were observed in educational settings. Andrade et al. found that

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technostress negatively affected academic performance, although transformational leadership partially reduced this effect (Andrade et al., 2023). Essel et al. also reported that technology-related stress reduced academic productivity among Ghanaian university students, with digital access and demographic conditions influencing the relationship (Essel et al., 2021).

Methodology

Quantitative methods dominate the technostress literature, with Structural Equation Modelling (SEM) emerging as the most widely used analytical technique. Both covariance-based SEM and variance-based Partial Least Squares SEM are frequently employed, with SmartPLS increasingly preferred for handling non-normal data and smaller samples. For instance, Kutlutürk et al. used SmartPLS 4.0 to examine the moderating role of musculoskeletal disorders in the technostress-burnout relationship (Kutlutürk et al., 2024). Methodological innovation is also evident in a study by Pflügner et al., who applied fuzzy-set Qualitative Comparative Analysis to identify necessary and sufficient conditions for burnout and performance outcomes (Pflügner et al., 2024).

Sample sizes varied substantially, ranging from 114 respondents in a study of general practitioners (Würtenberger et al., 2025) to 850 respondents in a Romanian study (Nemteanu & Dabija, 2021). Specialised occupational groups were also examined, including emergency physicians (Bernburg et al., 2024) and radiation therapists (Ackermans et al., 2025).

Longitudinal designs remain limited but methodologically important. Oksa et al. conducted a five-wave study on professional social media invasion (Oksa et al., 2022), while Nascimento et al. examined techno-eustress among teachers (Nascimento et al., 2025). Qualitative and mixed-methods studies also contribute valuable contextual insights. Examples include interview-based research (Gebhardt et al., 2025a) (Gebhardt et al., 2025b) and the multi-method design (Dakin et al., 2025) (Kerr et al., 2023). Measurement approaches are largely based on technostress scales (Tarafdar et al., 2007), which Ragu-Nathan et al. have been subsequently validated (Ragu-Nathan et al., 2008), although recent refinements include the Norwegian Digital Stressors Scale (Sevic et al., 2024) and aging workforce validation studies (Comotti et al., 2025). Bonzini et al. conducted a longitudinal study on work ability and productivity among aging workers, incorporating biological age markers alongside psychosocial measurements (Bonzini et al., 2023).

In most studies, surveys are conducted at a single point in time. This complicates the interpretation of cause-and-effect connections, resulting in biased outcomes due to the failure to recollect things in the most accurate way or interpret questions differently. There are very few experiments or brain-based studies that observe how individuals respond to technostress in real-time, i.e., behavioural or physical changes.

Furthermore, researchers rarely use advanced data analysis techniques that combine behavioural and physiological signals. This limits the ability to identify deeper and more sophisticated patterns in how technostress affects individuals over time. The current state of research needs to be improved through greater methodological diversification, integrating longitudinal, experimental, and mixed-methods approaches to monitor the dynamic and changing nature of technostress in digital workplaces.

Discussion

This systematic literature review synthesised 70 peer-reviewed empirical studies on technostress and productivity through the TCCM framework, providing a structured account of the theoretical, contextual, characteristic, and methodological dimensions of the field. Table 8 presents an integrated summary of these key findings. With respect to the first research objective - to synthesise diverse empirical perspectives on the technostress-productivity relationship through the TCCM framework - the review yields a clear and consistent finding: technostress negatively affects productivity across sectors, cultures, and measurement approaches, with burnout, organisational cynicism, and reduced work engagement serving as primary mechanisms. The JD-R model provides the most widely applied theoretical foundation, while the Transactional Theory of Stress and Coping and the challenge-hindrance framework offer complementary appraisal-based perspectives. Organisational support, self-efficacy, leadership, and digital literacy are the most consistently identified buffers.

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Dimension	Category	Key Findings	Representative Studies
Theory	Technostress Model	Most studies ground technostress in the creators–inhibitors–outcomes framework; techno-overload, techno-complexity, techno-insecurity, techno-invasion, and techno-uncertainty reduce productivity	(Tarafdar et al., 2015) (Tu et al., 2025) (Can Yalçın et al., 2022)
Theory	JD-R Theory	Technology-induced job demands deplete resources and increase burnout, while job resources buffer the negative effects on performance	(Wirkkala et al., 2024) (Andrulli and Gerards, 2023) (Ingusci et al., 2023)
Theory	Transactional/Appraisal	Individual cognitive appraisal mediates how technology stressors translate into performance outcomes; challenge vs. hindrance appraisals produce divergent outcomes	(Saidy et al., 2022) (Schoch, 2023) (Yang et al., 2025)
Context	Education	Teachers and students experience technostress from rapid digital transitions, COVID-19 forcing online learning, and ICT overload; performance outcomes include academic achievement and teaching effectiveness	(Cahapay and Bangoc, 2021) (Essel et al., 2021) (Andrade et al., 2023) (Maipita et al., 2023)
Context	Healthcare	Digital health record systems and telemedicine tools create distinct technostress among physicians and nurses, reducing care quality and work engagement	(Wirkkala et al., 2024) (Dakin et al., 2025) (Bernburg et al., 2024)
Context	Finance and Banking	High-tech adoption in banking generates techno-overload and surveillance stress; techno-eustress can reframe stress as performance-enhancing	(Khalequzzaman et al., 2025) (Fettahoglu and Yikilmaz, 2025) (Kutlutürk et al., 2024)

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Characteristics	Antecedents	Primary antecedents: techno-overload, techno-invasion, techno-complexity, techno-insecurity, digital surveillance, remote work, and new ways of working	(Chandra et al., 2019) (Pflügner et al., 2024) (Camacho and Barrios, 2022)
Characteristics	Consequences	Technostress reduces task performance, job satisfaction, innovative work behaviour, and well-being; burnout and organisational cynicism serve as mediators	(Can Yalçın et al., 2022) (Adekanmbi and Isioma, 2022) (Oksa et al., 2022)
Methodology	Quantitative	Dominant approach; most use SEM-PLS with cross-sectional surveys; sample sizes range from 100 to 2,272	(Saidy et al., 2022) (Hang et al., 2022) (Cahapay and Bangoc, 2021)
Methodology	Qualitative/Mixed	Emerging use of ethnography, interviews, and mixed methods, particularly in healthcare; 9 studies use qualitative or mixed designs	(Dakin et al., 2025) (Deng et al., 2023) (Gebhardt et al., 2025a) (Gebhardt et al., 2025b)

TABLE 8: TCCM framework summary of key findings

Source: Authors' compilation.

ICT, Information and Communication Technology; JD–R, Job Demands–Resources; PLS–SEM, Partial Least Squares Structural Equation Modelling; TCCM, Theory, Context, Characteristics, and Methodology

At the construct level, techno-eustress remains understudied. The contributions of Nascimento et al., as well as Fettahoglu and Yikilmaz, require replication across contexts (Nascimento et al., 2024) (Fettahoglu and Yikilmaz, 2025). Similarly, AI-related technostress - including techno-insecurity and techno-uncertainty - has only recently emerged in studies (Bastida et al., 2025) (Verma et al., 2024). Physiological and biomarker-based evidence also remains limited beyond the work of Becker et al. (Becker et al., 2022). Methodologically, future research should adopt longitudinal, experimental, and experience sampling method (a diary-based method that captures real-time psychological states through repeated momentary assessments) approaches, as well as configurational approaches such as Pflügner et al.'s fuzzy-set Qualitative Comparative Analysis (Pflügner et al., 2024).

Three conceptually significant developments mark the evolution of the literature: the positive reframing of technostress as techno-eustress; the post-pandemic consolidation of evidence across diverse contexts; and the emerging application of technostress frameworks to AI-enabled work environments. Methodologically, the field's strengths in survey-based SEM research should be complemented by longitudinal, experimental, qualitative, and biophysiological approaches to advance causal understanding.

With respect to the second objective - to identify research gaps and propose future directions - the synthesis reveals persistent gaps in geographic coverage, longitudinal research designs, positive-outcome constructs (particularly techno-eustress), and emerging technology contexts such as AI. Despite extensive research, the technostress literature remains

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theoretically fragmented, lacking an integrated framework that explains both negative strain and positive technoeustress outcomes. Future studies should integrate technostress theory with motivational perspectives, such as self-determination theory, to examine how challenge versus threat appraisals shape productivity. Longitudinal questions regarding adaptation, habituation, and burnout trajectories also remain insufficiently explored. Contextually, developing economies and sectors such as manufacturing, logistics, retail, and public administration are under-represented, despite rapid digitisation in these settings. Research should further investigate organisational digital climate, team norms, and collective coping mechanisms, extending the work of Avtalion et al. (Avtalion et al., 2025).

For practitioners, the review underscores that proactive management of technostress is not merely a well-being concern but also a productivity imperative. Organisations should invest in digital competence development, design technology implementations to provide sufficient resources alongside demands, cultivate digital leadership, and create psychological conditions that foster challenge rather than hindrance appraisals of digital work. As digital transformation accelerates, the capacity to manage technostress effectively will increasingly differentiate high-performing organisations from their competitors.

Limitations and future research directions

This review makes a systematic and theoretically grounded contribution to the technostress literature; however, several reflections on the review process are warranted. First, reliance on a single database (Scopus) may have introduced coverage bias, potentially excluding relevant studies indexed solely in Web of Science, PubMed, or grey literature sources. Second, the restriction to open-access publications may have inadvertently excluded influential studies published in subscription-based journals, resulting in a form of publication and access bias. Third, the language restriction to English-language publications may have excluded relevant research conducted within non-English-speaking research traditions, particularly in East Asian and Latin American contexts, where technostress is a growing concern. Fourth, the predominance of cross-sectional designs among the included studies inherently limits the causal conclusions that can be drawn from this synthesis; the review can identify associations and mediating mechanisms but cannot definitively establish directionality or long-term trajectories.

These limitations are characteristic of systematic literature reviews in management and information systems and are not unique to the present study. They nonetheless limit the generalisability of the conclusions and should be explicitly acknowledged when applying the findings. Future reviews should incorporate multiple databases, include non-English publications through translation, and consider grey literature sources to achieve more comprehensive coverage of global technostress research.

Further studies are required to embrace geographic diversity in terms of socio-economic and technological backgrounds. Longitudinal, experimental, and mixed-methods designs are necessary to ensure methodological diversification and capture real-time and developmental trends in technostress. Combining behavioural or physiological analytics with self-reported measures may contribute to a better understanding of the mechanisms of technostress. There is also the possibility of considering the frameworks of positive psychology when examining the phenomenon of technoeustress, the positive side of digital pressure, and for studying emerging technologies such as AI, metaverse work, and algorithmic management. More interdisciplinarity (management, psychology, and data science perspectives) will provide more actionable insights on the technostress-productivity nexus.

Conclusions

This systematic literature review applied the TCCM framework to synthesise 70 peer-reviewed empirical studies on technostress and productivity published between 2015 and 2025. The review was undertaken to address the fragmented and theoretically inconsistent state of existing scholarship, with the aim of providing an integrated, evidence-based account of how technology-induced stress shapes performance in contemporary settings. Across the reviewed corpus, technostress is consistently associated with reduced productivity through stressor pathways - particularly techn overload, techno-invasion, and techno-complexity - mediated by burnout, organisational cynicism, and diminished work engagement. Because the included studies are predominantly cross-sectional and no formal quality-weighting or meta-

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analytic synthesis was applied, this pattern should be interpreted as a consistent association across the reviewed literature rather than as causal evidence of the effect of technostress on productivity. At the same time, the construct of techno-eustress represents an empirically meaningful positive counterpart: under conditions of adequate organisational support and digital leadership, technology demands can function as performance-enhancing challenges. Organisational support, digital literacy, and leadership quality are the most consistently identified moderating variables, offering clear leverage points for intervention.

Methodologically, the field is characterised by a reliance on cross-sectional, self-report survey designs, limiting causal inference and our understanding of temporal dynamics. The TCCM-based synthesis presented here provides a foundation for more rigorous, integrative, and contextually diverse future research, with the goal of generating actionable insights commensurate with the pace and scale of digital transformation in contemporary work.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Acquisition, analysis, or interpretation of data: Gauri Gupta

Drafting of the manuscript: Gauri Gupta

Concept and design: Ashok K. Pokhriyal

Critical review of the manuscript for important intellectual content: Ashok K. Pokhriyal

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Conflicts of interest: In compliance with [the ICMJE uniform disclosure form](#), all authors declare the following:

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- **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.
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Data Availability Statements

The datasets (and/or code) supporting this study are available from the corresponding author upon reasonable request.

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