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Digital Enablement and Digital Exhaustion in Business Research Through the Job Demands Resources Framework

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ABSTRACT

Purpose

The purpose of this conceptual article is to address the fragmented and largely descriptive nature of existing research on digital fatigue by theoretically grounding the phenomenon within core business and management theory. The study explains why digital technologies, while enabling efficiency and flexibility, increasingly contribute to exhaustion and reduced performance. The core argument is that digital fatigue represents a central theoretical mechanism for understanding the shift from digital enablement to digital exhaustion in contemporary organizations.

Design/methodology/approach

The study adopts a conceptual, theory-building approach. It draws on Job Demands–Resources (JD–R) theory and synthesizes interdisciplinary literature on digital work, technostress, and organizational behavior. Based on this synthesis, a multilevel theoretical framework is developed that conceptualizes digital technologies as both job resources and job demands depending on their design, intensity of use, and organizational embeddedness.

Findings

The analysis shows that digitally induced demands such as constant connectivity, cognitive overload, and attention fragmentation systematically deplete individual resources and generate digital fatigue. At the organizational level, the accumulation of these demands undermines employee engagement, sustainable performance, and value creation. The framework explains how unbalanced digitalization processes shift organizations from digital enablement toward digital exhaustion.

Originality/value

The article reconceptualizes digital fatigue as a core theoretical construct, extends JD–R theory to digitally intensive contexts, and provides a structured agenda for future qualitative and empirical research. It offers theoretical foundations for more sustainable approaches to digital transformation.

KEYWORDS: *Digital work, Technostress, Employee well-being, Job Demands–Resources Theory, Digital transformation*

I. INTRODUCTION

The rapid advancement and diffusion of digital technologies have fundamentally reshaped contemporary work environments, altering how tasks are organized, coordinated, and executed across industries. Digital tools such as enterprise platforms, artificial intelligence applications, collaboration software, and mobile technologies are now deeply embedded in everyday work processes, promising increased efficiency, flexibility, and innovation (Vial, 2019; Verhoef et al., 2021; Yoo et al., 2012; Tilson et al., 2010; Lyytinen et al., 2016; Bharadwaj et al., 2013; Nambisan et al., 2019; Sebastian et al., 2017; Kane et al., 2015; Leonardi, 2011; Orlikowski, 2007; Majchrzak et al., 2016; Raisch & Krakowski, 2021; Porter & Heppelmann, 2014; Zuboff, 1988). In parallel, digital transformation has become a central strategic priority for firms seeking to enhance agility, scalability, and competitiveness in increasingly dynamic markets (Bharadwaj et al., 2013; Warner & Wäger, 2019; Kane et al., 2015; Westerman et al., 2014; Hess et al., 2016). Within business research, digitalization is therefore predominantly framed as a strategic enabler that enhances productivity, supports value creation, and strengthens competitive advantage (Sebastian et al., 2017; Nambisan et al., 2019; Hinings et al., 2018; Hanelt et al., 2021; Kraus et al., 2021). As a result, a dominant assumption has emerged that greater digital adoption leads to superior organizational performance (Bharadwaj et al., 2020; Parker et al., 2016).

However, this optimistic narrative captures only one side of the digitalization phenomenon. Alongside efficiency gains, digital technologies have transformed the temporal, cognitive, and social structure of work. Real-time communication systems, continuous information flows, and rapid task switching foster expectations of constant availability, accelerated work pace, and heightened responsiveness (Mazmanian et al., 2013; Perlow, 2012; Orlikowski & Scott, 2008; Leonardi, 2011). Work increasingly unfolds in environments characterized by

frequent interruptions, parallel task demands, and sustained engagement with digital interfaces, particularly in knowledge-intensive and managerial roles (Perlow, 2012; Leroy, 2009; Mark et al., 2018; Zimmermann et al., 2020; Rosen et al., 2013). While digitalization enhances speed, transparency, and coordination, it simultaneously amplifies cognitive load, fragments attention, and constrains opportunities for recovery and reflection (Tarafdar et al., 2019; Appelbaum et al., 2017; Bailey & Konstan, 2006; Luqman et al., 2017). Digital technologies thus function as a double-edged sword, supporting productivity and innovation while introducing new strains that may undermine sustained engagement and long-term performance. Despite mounting evidence of these tensions, much of business research continues to implicitly equate "more digital" with "better performance," paying limited attention to the human costs of digital work (Hinings et al., 2018; Verhoef et al., 2021; Tarafdar et al., 2019; Leonardi, 2021; Kraus et al., 2022).

Against this backdrop, the concept of digital fatigue has gained increasing scholarly attention. Digital fatigue refers to a state of cognitive, emotional, and motivational depletion resulting from prolonged and intensive engagement with digital technologies. Research across information systems, psychology, and occupational health documents experiences of technostress, exhaustion, reduced concentration, emotional disengagement, and diminished intrinsic motivation associated with continuous digital interaction (Ayyagari et al., 2011; Tarafdar et al., 2015; Maier et al., 2015; Wang et al., 2021; Califf et al., 2020). Importantly, such experiences are no longer confined to extreme cases of technology overload but have become commonplace in digitally intensive work environments (Salo et al., 2017; Korzynski et al., 2020; Stich et al., 2019). Although related to burnout and general job stress, digital fatigue is conceptually distinct in that it is directly tied to the characteristics of digital work itself, including interface complexity, information intensity, constant connectivity, and rapid response requirements (Ragu-Nathan et al., 2008; Tarafdar et al., 2017; Thomée et al., 2011; La Torre et al., 2019; Barber & Santuzzi, 2015; Eurofound, 2020).

Despite its growing relevance, research on digital fatigue remains fragmented and theoretically underdeveloped. Existing studies are dispersed across multiple literatures, resulting in limited integration and cumulative theory development (La Torre et al., 2019; Tarafdar et al., 2020; Van Laethem et al., 2018). Many contributions remain largely descriptive, focusing on identifying stressors or correlates without embedding these findings in broader explanatory frameworks (Derks et al., 2014; Day et al., 2012). Consequently, digital fatigue is often treated as an individual-level well-being outcome rather than as a central mechanism shaping organizational processes and performance (Sonnentag et al., 2017; Bakker & Demerouti, 2017; Pfeffer, 2018). Within business research, insights into the "dark side" of digitalization remain peripheral to dominant debates on digital transformation, productivity, and value creation (Verhoef et al., 2021; Kraus et al., 2022). A key theoretical gap therefore concerns the absence of a mid-range mechanism linking digital work characteristics to organizational outcomes. While prior research documents both positive and negative effects of digital technologies, it rarely explains how these effects unfold through employees' everyday work experiences. The Job Demands–Resources (JD–R) theory offers a promising foundation for addressing this gap. JD–R theory distinguishes between job demands that require sustained effort and lead to strain, and job resources that support motivation, learning, and performance (Demerouti et al., 2001; Bakker & Demerouti, 2017). Importantly, the framework allows job characteristics to function as demands or resources depending on context (Xanthopoulou et al., 2007; Lesener et al., 2019). Recent studies suggest that digital technologies can simultaneously operate as job demands and job resources (Juyumaya & Torres, 2023; Scholze & Hecker, 2023; Zia et al., 2024). The objective of this conceptual article is therefore to integrate JD–R theory into business research to explain the transition from digital enablement to digital exhaustion. In doing so, the article reconceptualizes digital fatigue as a theoretically meaningful mechanism linking digitalization to employee and organizational outcomes, and develops a multilevel framework to guide future empirical research (Whetten, 1989; Corley & Gioia, 2011; Suddaby et al., 2011).

II. THEORETİCAL BACKGROUND AND FRAMEWORK DEVELOPMENT
2.1 Digital Technologies in Business Research

The proliferation of digital technologies has prompted a substantial re-evaluation of dominant business paradigms, necessitating a comprehensive review of the literature to understand how digitalization unfolds within organizational contexts (Cosa, 2023; Talafidaryani et al., 2023; Vial, 2019; Verhoef et al., 2021; Yoo et al., 2012; Tilson et al., 2010; Lyytinen et al., 2016). Existing research highlights that digital transformation extends beyond the mere adoption of new technologies and entails profound changes in organizational structures, processes, and value creation mechanisms (Aqeel & Mubarak, 2024; Susanti et al., 2022; Chen et al., 2021; García-Murillo & Annabi, 2020; Singh et al., 2023; Oliveira & Martins, 2011; Reis et al., 2018). Digital technologies—including social, mobile, analytics, and cloud-based solutions—have become central drivers of transformation, reshaping how firms operate, collaborate, and interact within broader ecosystems (Monge & Soriano, 2023; Kaur et al., 2022; Li et al., 2021; Müller et al., 2020; Pereira & Romero, 2017; Schwab, 2017; Rüßmann et al., 2015; Frank et al., 2019; Kang et al., 2021). The emergence of Industry 4.0 technologies such as the Internet of Things, Big Data analytics, artificial intelligence, blockchain, and robotics has further accelerated

these changes, fundamentally altering business dynamics, operational processes, and customer interactions (Cosa, 2023; Liao et al., 2017; Xu et al., 2018; Ahmad et al., 2020; Lu, 2017; Zhong et al., 2017; Stock & Seliger, 2016; Ivanov et al., 2021). These technologies disrupt conventional business models and redefine firms' value propositions, influencing core activities and competitive positioning (Ancillai et al., 2023; Rane et al., 2024; Reis et al., 2018; Li et al., 2018; Matt et al., 2015; Berman, 2012). Consequently, scholars emphasize the importance of distinguishing between digitization and digitalization while systematically examining the drivers, barriers, and outcomes of digital transformation initiatives (Mou et al., 2022; Vial, 2019; Sebastian et al., 2017; Kane et al., 2015; Hinings et al., 2018).

In response to increasingly complex and dynamic market environments, firms are required to adopt strategic adaptations and digital communication strategies that extend beyond technological implementation to encompass economic and social transformations (Cosa, 2023; Monge & Soriano, 2023; Susanti et al., 2022; Li et al., 2021; Reis et al., 2020; Matt et al., 2015; Berman, 2012). Through digital initiatives, organizations continuously reconfigure their value-creation activities, structures, and business models, leveraging technologies such as artificial intelligence, cloud computing, and machine learning to adapt processes, products, and services to evolving customer expectations (Jiao et al., 2024; Benga & Elhamma, 2024; Zhang & Zhu, 2022; Nambisan et al., 2019; Hinings et al., 2018; Kane et al., 2015). Digital infrastructures—including the internet, data centers, consumer devices, and open standards serve as foundational elements enabling these transformations (Larsen, 2022; Tilson et al., 2010; Yoo et al., 2012; Lyytinen et al., 2016). However, the holistic impact of such infrastructures on organizational operations and customer experience remains insufficiently understood, warranting further empirical investigation (Kothapalli, 2022; Monge & Soriano, 2023; Zhang & Zhu, 2022; Matt et al., 2015). Recent studies increasingly call for examining the synergistic effects arising from the integration of cloud technologies with artificial intelligence, blockchain, and IoT to deepen understanding of digital transformation mechanisms (Skobiennikov & Boiarynova, 2025; Akter et al., 2020; Nambisan et al., 2019; Reis et al., 2020). Translating digitally driven strategies into actionable organizational practices that generate measurable performance outcomes remains a key managerial challenge (Schneckenberg et al., 2021; Li et al., 2021; Susanti et al., 2022; Hinings et al., 2018). At the same time, scholars highlight how digital objects, platforms, and infrastructures reshape institutional arrangements and societal processes, underscoring the broader implications of digital transformation (Damar et al., 2024; Berman, 2012; Reis et al., 2020; Zhang & Zhu, 2022).

Methodologically, emerging analytical approaches—such as machine learning, natural language processing, and large language models—offer new opportunities for developing more precise and context-sensitive digital transformation frameworks (Zhang & Wang, 2024; Brynjolfsson & McAfee, 2017; Jordan & Mitchell, 2015; LeCun et al., 2015). These approaches contribute to the development of dynamic capabilities, enabling organizations to sense, seize, and reconfigure competencies in response to rapidly evolving technologies (Doroiman, 2022; Teece, 2018; Eisenhardt & Martin, 2000; Helfat et al., 2007). Dynamic capabilities are particularly critical for digital service innovation and for understanding how digital technologies contribute to value creation within knowledge-intensive ecosystems (Opazo-Basáez et al., 2024; Pavlou & El Sawy, 2011; Teece, 2007; Barreto, 2010).

Finally, future research should extend beyond firm-level outcomes to explore broader economic and societal implications of digital transformation, including market competition, financial inclusion, consumer behavior, and global economic recovery (Abikoye et al., 2024; Brynjolfsson et al., 2018; Manyika et al., 2016; UNCTAD, 2021). Digital transformation should thus be understood as a strategic and socio-technical process involving technological agency, governance structures, and embedded AI systems that organize, predict, and control data flows (Cosa, 2023; Larsen, 2022; Brynjolfsson & McAfee, 2014; Shrestha et al., 2019; Li et al., 2021). Leveraging converging technologies such as AI, blockchain, cloud computing, and big data analytics presents significant opportunities for innovation and competitive advantage, while simultaneously raising challenges related to governance, ethics, and sustainability (Akter et al., 2020; Chen et al., 2021; Wang et al., 2022; Kaur & Kaur, 2020; Thirunagalingam, 2024). Addressing these challenges requires strategic leadership capable of balancing technological dynamism with organizational stability across both large enterprises and SMEs (Kahre et al., 2017; Kane et al., 2022; Suljic, 2025).

2.2 Job Demands–Resources Theory: Core Assumptions

The Job Demands–Resources (JD–R) theory posits that all job characteristics, irrespective of organizational context, can be systematically classified into two core categories: job demands and job resources (Demerouti et al., 2001; Bakker & Leiter, 2010; Schaufeli & Taris, 2014; Tummers & Bakker, 2021). This dual framework offers a flexible and integrative approach for analyzing diverse work environments and their psychological consequences (Hakanen et al., 2006; Brauchli et al., 2015; Sonnentag, 2018; Raţiu & Dobre, 2020). Job demands refer to physical, psychological, social, or organizational aspects of work that require sustained effort and are associated with physiological or psychological costs (Bon & Shire, 2022). Although demands are not inherently detrimental, they become stressors when recovery opportunities are insufficient

(Demerouti & Bakker, 2011). In contrast, job resources encompass aspects of work that facilitate goal attainment, reduce job demands, and promote personal growth, learning, and development (Schaufeli et al., 2009; Ling, 2025). Extending traditional job design and stress models, the JD–R theory provides a dynamic perspective on how demands and resources interact to shape employee well-being, motivation, and performance (Bakker & Demerouti, 2014; Xanthopoulou et al., 2009). It has been widely applied to explain outcomes such as work engagement, job satisfaction, burnout, and productivity across occupational settings (Bakker et al., 2007; Schaufeli et al., 2002; Halbesleben, 2010; Demerouti et al., 2014). Building on earlier frameworks, including the Job Characteristics Model and Effort–Recovery Theory, the JD–R model posits that excessive demands in the absence of sufficient resources lead to strain and impaired performance, whereas abundant resources foster motivation, engagement, and superior performance (Hackman & Oldham, 1976; Meijman & Mulder, 1998; Hakanen et al., 2006; Taris & Schaufeli, 2018). Central to the JD–R framework are two interrelated yet distinct processes: the health impairment process and the motivational process (Schaufeli & Taris, 2014; Demerouti et al., 2011; Russo et al., 2023). The health impairment process explains how prolonged exposure to high job demands depletes employees' mental and physical energy, leading to strain, exhaustion, and negative health outcomes such as burnout (Demerouti et al., 2001; Leiter & Maslach, 2016; Taris et al., 2017; Dettmers et al., 2023). Sustained effort to meet excessive demands increases psychological and physiological costs, resulting in chronic fatigue and reduced functioning (Hakanen et al., 2006; Xanthopoulou et al., 2007; Sonnentag, 2018; Fan et al., 2018). Empirical research further links high demands to depressive symptoms, absenteeism, and decreased productivity (Schaufeli et al., 2009; Vignoli et al., 2017; Wafa et al., 2023).

Conversely, the motivational process highlights how job resources stimulate intrinsic motivation, personal growth, and learning, while also buffering the negative effects of demands (Bakker et al., 2010; Salanova et al., 2011; Hakanen & Roodt, 2010). Resources enhance work engagement and performance by fulfilling basic psychological needs such as autonomy, competence, and relatedness (Deci et al., 2017; Elst et al., 2019; Demerouti & Bakker, 2022). Moreover, job resources can mitigate the adverse impact of demands within the health impairment process, reducing burnout risk and fostering resilience (Bakker et al., 2007; Krainz et al., 2019). Overall, the JD–R framework offers a nuanced understanding of workplace dynamics by emphasizing that employee well-being and performance result from the interaction between job demands and resources. High demands without sufficient resources increase the likelihood of exhaustion and negative outcomes, whereas strategic deployment of resources can transform potentially stressful conditions into opportunities for engagement, resilience, and sustainable performance (Hakanen et al., 2006; Galanakis & Tsitouri, 2022; Feng & Han, 2023). This balanced perspective underscores the importance of integrating demand management and resource optimization in work design to support long-term organizational effectiveness across diverse contexts (Hobfoll, 2001; Nielsen et al., 2017; Lesener et al., 2019; Schaufeli, 2017).

2.3 Digital Technologies as Dual Job Characteristics

The proliferation of digital technologies has profoundly transformed industries by reshaping competitive dynamics and fundamentally altering the nature of work and employment (Lechevalier & Mofakhami, 2025; Bharadwaj et al., 2013; Hinings et al., 2018; Nambisan et al., 2019; Vial, 2019). Digitalization no longer merely supports organizational processes; rather, it actively reconfigures how work is organized, experienced, and governed (Orlikowski, 2007; Leonardi, 2011). This shift necessitates a deeper examination of digital technologies as dual job characteristics that simultaneously create opportunities and risks for employees (Tarafdar et al., 2019; Scholze & Hecker, 2023; Zhou et al., 2025). Frequently characterized as a "double-edged sword," digital technologies can enhance productivity, coordination, and efficiency while concurrently intensifying psychological strain, occupational uncertainty, and work demands (Mazmanian et al., 2013; Leonardi, 2011; Tarafdar et al., 2019; Sha & Chai, 2025).

Digital transformation initiatives particularly those involving artificial intelligence (AI), big data analytics, and automation—are widely adopted to optimize business processes and strengthen competitive advantage (Bharadwaj et al., 2013; Vial, 2019; Verhoef et al., 2021). However, these technologies also generate complex human–organization–technology dynamics that shape employees' job perceptions, identities, and workplace outcomes (Barley et al., 2017; Kellogg et al., 2020; Leonardi & Barley, 2010; Zhou et al., 2025). Such dynamics challenge one-sided narratives that portray digitalization as inherently performance-enhancing and underscore the need for theoretical frameworks capable of capturing its multifaceted implications for working conditions (Hinings et al., 2018; Scholze & Hecker, 2023; Kraus et al., 2021). While earlier research examined how information and communication technologies reshaped work relations and employee identity, it largely focused on earlier technological waves rather than contemporary systems characterized by algorithmic decision-making and advanced analytics (Zuboff, 1988; Orlikowski, 2007; Kellogg et al., 2020; Bailey & Barley, 2020). As a result, theoretical ambiguity persists regarding how emerging digital technologies fundamentally alter work characteristics and employee experiences (Cosa, 2023; Parker & Grote, 2022; Orlikowski & Scott, 2016). Addressing this ambiguity requires integrative models that explicitly conceptualize digital technologies as simultaneously shaping job demands and job resources (Bondarouk & Brewster, 2016;

Scholze & Hecker, 2023; Zacher et al., 2023). Technologies such as AI and big data analytics augment human capabilities while also competing with them, disrupting established work arrangements and intensifying tensions between efficiency gains and workforce precarity (Raisch & Krakowski, 2021; Fréour et al., 2021; Davenport & Miller, 2022). These paradoxes highlight the need for organizational ambidexterity in managing digital change (Leonardi & Treem, 2020; Miranda et al., 2022; Wang & Lin, 2025).Within this context, digital technologies may function as job resources by enhancing access to information, autonomy, and learning opportunities, while simultaneously operating as job demands by increasing cognitive load, electronic monitoring, and continuous adaptation requirements (Tarafdar et al., 2020; Day et al., 2019; Zhou et al., 2025). The diffusion of AI, robotics, and immersive technologies further intensifies concerns related to job insecurity, skill obsolescence, and potential labor displacement (Brougham & Haar, 2018; Felten et al., 2019; Ciminaghi & Balconi, 2025). Understanding how these technologies interact with institutional arrangements—particularly those shaped by algorithmic management and AI-driven governance—is therefore critical for assessing their implications for work design and employment relations (Kellogg et al., 2020; Meijerink & Bondarouk, 2021; Larsen, 2022).

Digital technologies introduce organizational changes that may exceed those of previous industrial revolutions by enabling adaptive automation, algorithmic coordination, and data-driven problem-solving (Brynjolfsson & McAfee, 2014; Schwab, 2016; Autor et al., 2023). Despite growing scholarly attention, empirical evidence on their effects on job quality and employee well-being remains fragmented and context-dependent, revealing substantial gaps across occupations and institutional settings (De Stefano et al., 2022; Eurofound, 2023; Blanc et al., 2024). Organizations are accelerating workplace digitalization in response to intensified competition and global disruptions, yet these technologies increase task complexity, learning demands, and performance surveillance alongside efficiency gains (Chaumon et al., 2022; Moore, 2020; Scholze & Hecker, 2023).

A socio-technical systems perspective emphasizes that successful digital integration depends on aligning technological design with social and organizational contexts (Trist & Bamforth, 1951; Baxter & Sommerville, 2011; Islind & Hult, 2024). Ethical challenges related to algorithmic bias, data privacy, and accountability further complicate digital transformation, while regulatory frameworks often lag behind technological developments, creating a persistent "pacing problem" (Mittelstadt et al., 2016; Floridi et al., 2018; Larsen, 2022). Consequently, a proactive, human-centric approach to digitalization is essential, prioritizing employee well-being alongside technological advancement (Parker & Grote, 2020; Grote & Zacher, 2022; Kim & Lee, 2024). Conceptualizing digital technologies as dynamic work elements rather than neutral tools allows for a more systematic integration of digitalization into established work design models such as the Job Demands–Resources framework (Bakker & Demerouti, 2017; Nielsen et al., 2017; Zacher & Rudolph, 2024). This perspective highlights that while digital tools can enrich work, their effects depend critically on ethical governance, data protection, and sustained human oversight (Martin et al., 2019; Thirunagalingam, 2024). Ultimately, digitalization necessitates a revision of socio-technical principles for a digital-first reality, recognizing digital technologies as ambivalent yet integral components of contemporary work systems that shape productivity, decision quality, and employee well-being (Carayon et al., 2015; Fischer et al., 2023; Söllner et al., 2025).

2.3.1 Digital Technologies as Job Resources

Digital technologies encompass a wide range of tools and systems that increasingly function as critical job resources in contemporary work environments (Scholze & Hecker, 2023; Wolf et al., 2024; Vial, 2019; Parker & Grote, 2022). Beyond supporting task execution, these technologies contribute to organizational adaptability and employee well-being, aligning closely with the Job Demands–Resources (JD–R) framework, which defines job resources as aspects of work that facilitate goal attainment, buffer demands, and promote learning and development (Bakker & Demerouti, 2017; Demerouti et al., 2001). Digital resources—such as advanced communication platforms, collaborative tools, and data analytics systems—can help employees manage task complexity, coordinate activities, and make informed decisions, thereby reducing the cognitive and emotional costs associated with demanding work conditions (Tarafdar et al., 2019; Trenerry et al., 2021; Parker & Grote, 2022). When effectively designed and embedded, these technologies enhance autonomy, transparency, and skill utilization, reinforcing their role as enabling job resources rather than sources of strain (Vial, 2019; Scholze & Hecker, 2023).

However, digital technologies do not inherently function as job resources. Their effects depend critically on how they are designed, implemented, and integrated into everyday work practices (Abildgaard et al., 2024; Parker & Grote, 2022; Davis et al., 2023). Factors such as usability, task–technology fit, intensity of use, employee involvement, and access to technical support shape whether digital tools are perceived as enabling or constraining (Goodhue & Thompson, 1995; Tarafdar et al., 2019; Molino et al., 2020). Consequently, organizations must deliberately align digital infrastructures with job design to ensure that technological innovations support employees' capacity to manage demands and sustain performance (Vial, 2019; Roczniewska et al., 2024). When supported by training, participatory implementation, and leadership

support, digital tools can enhance flexibility, productivity, autonomy, and work–life balance, thereby fostering engagement and long-term well-being (Karlsen et al., 2024; Parker et al., 2023; Wang et al., 2021; Sardeshmukh et al., 2018). Perceived usefulness and organizational support are particularly important in determining whether digital technologies buffer or amplify digital stressors. When employees view digital tools as reliable and supportive of task accomplishment, these technologies are more likely to function as job resources that mitigate strain and promote engagement (Abildgaard et al., 2024; Tarafdar et al., 2019; Parker & Grote, 2022). In contrast, poorly aligned or intrusive systems may undermine their resource potential, increasing technostress, emotional exhaustion, and disengagement (Ragu-Nathan et al., 2008; Day et al., 2012; Toscanelli et al., 2022). These findings underscore that the effects of digital technologies are contingent on both subjective appraisals and organizational contexts (Nielsen et al., 2022; Roczniewska et al., 2024).

This conditionality reflects the inherently dual nature of digital technologies. The same tools that enhance efficiency and autonomy may simultaneously intensify cognitive load, monitoring pressures, and expectations of constant availability (Abildgaard et al., 2024; Scholze & Hecker, 2023). Integrating digitalization into established work design frameworks such as the JD–R model enables a systematic understanding of when digital technologies operate as resources versus demands (Zacher & Rudolph, 2024; Zhou et al., 2025). This perspective has become especially salient following the COVID-19 pandemic, which accelerated digital transformation and exposed employees to uneven and intensified digital work conditions (Cosa, 2023; Kniffin et al., 2021; Spurk & Straub, 2020). Accordingly, a multidimensional conceptualization of digital work—capturing information processing, interaction, integration, and task automation—is essential for understanding how digital technologies function as job resources and for informing sustainable work design interventions (Agrell et al., 2024; Karlsen et al., 2024).

2.3.2 Digital Technologies as Job Demands

The pervasive integration of digital technologies into contemporary workplaces has profoundly reshaped the nature of work, introducing novel job demands that require systematic investigation (Marsh et al., 2024; Parker & Grote, 2022; Tarafdar et al., 2019). As digital working becomes increasingly normalized, traditional conceptions of work characteristics must be updated to capture the complexities introduced by digitalization (Fréour et al., 2021; Marsh et al., 2024; Nielsen et al., 2022). These emerging demands—often conceptualized as digital or "e-demands"—refer to electronically mediated work requirements that necessitate sustained physical and/or mental effort and may generate physiological or psychological strain (Cabarcos et al., 2025; Tarafdar et al., 2015). Such demands frequently manifest as cognitive overload, hyperconnectivity, accelerated work pace, and blurred work–life boundaries, which have become central concerns in research on digital well-being (Agrell et al., 2024; Molino et al., 2020; Wang et al., 2021).

In response to these developments, robust theoretical and conceptual frameworks are required to guide empirical research and safeguard employee mental health in increasingly digitalized work environments (Scholze & Hecker, 2023; Parker & Grote, 2022; Zacher & Rudolph, 2024). Job demands such as constant connectivity, work intensification, and time pressure are often amplified in digital workplaces, increasing the risk of stress, emotional exhaustion, and burnout (Marsh et al., 2024; Tarafdar et al., 2019; Molino et al., 2020). The Job Demands–Resources (JD–R) model provides a valuable lens for examining these dynamics by distinguishing between job demands that deplete energy and job resources that foster motivation, learning, and resilience (Trenerry et al., 2021; Bakker & Demerouti, 2017; Nielsen et al., 2022).

Research grounded in the JD–R framework demonstrates that digital technologies can simultaneously function as job demands and job resources, exerting both positive and negative effects on employee well-being depending on how digital work is conceptualized, operationalized, and embedded in organizational contexts (Abildgaard et al., 2024; Bakker & Demerouti, 2017; Parker & Grote, 2022; Karlsen et al., 2024; Nielsen et al., 2022). Integrating digitalization explicitly into work design models enables a more nuanced understanding of how specific technologies contribute to technostress, exhaustion, or, alternatively, enhance performance, engagement, and well-being (Zacher & Rudolph, 2024; Roczniewska et al., 2024; Cabarcos et al., 2025; Molino et al., 2020). Despite increasing scholarly attention, the limited availability of validated constructs capturing digitally specific work characteristics remains a key gap (Eurofound, 2023; Leso et al., 2024). Addressing this gap requires theory-driven empirical research capable of disentangling the complex interplay between digital demands, digital resources, and employee well-being in contemporary organizations (Baptista et al., 2023; Väänänen et al., 2022; Parent-Rocheleau & Parker, 2022; Tams et al., 2023; Ipsen & Kirchner, 2024).

2.4 From Digital Enablement to Digital Exhaustion

Digital transformation represents a fundamental paradigm shift that compels organizations to integrate digital technologies not only to innovate existing business models and processes but also to reconfigure organizational structures and external relationships (Ceccotti et al., 2024; Plekhanov et al., 2022; Vial, 2019; Warner & Wäger, 2019; Verhoef et al., 2021). This comprehensive integration is widely pursued to enhance operational efficiency, generate new revenue streams, and sustain competitive advantage in an increasingly

digitalized global economy (Volpentesta et al., 2023; Kraus et al., 2022; Bharadwaj et al., 2013; Wessel et al., 2021). The pervasive adoption of technologies such as artificial intelligence, cloud computing, and big data analytics has fundamentally reshaped industrial practices and stimulated extensive research across disciplines including management and information systems (Mou et al., 2022; Nambisan et al., 2019; Bresciani et al., 2021; Yoo et al., 2012). Characterized by flexibility, scalability, and interoperability, these technologies offer organizations unprecedented opportunities to transform products, services, and operational frameworks in pursuit of long-term viability (Egodawele et al., 2022; Svahn et al., 2017; Hinings et al., 2018; Teece, 2018). At the same time, the rapid and continuous acceleration of digital technologies introduces a complex array of organizational challenges (Vial, 2019; Verhoef et al., 2021; Hinings et al., 2018). Alongside opportunities for innovation and growth, digital transformation amplifies security risks, deepens digital divides, and increases organizational dependence on technological infrastructures (Benga & Elhamma, 2024; Bharadwaj et al., 2013; Nambisan et al., 2019; Wade & Shan, 2020). As firms increasingly rely on digital transformation as a critical survival mechanism, they face mounting pressures to adapt strategies, capabilities, and governance structures under conditions of heightened uncertainty (Carroll et al., 2023; Gouveia et al., 2024; Warner & Wäger, 2019; Teece, 2018; Kraus et al., 2022). Importantly, digital transformation extends well beyond incremental digitalization; it entails fundamental changes to business models and value creation logics, requiring organizations to reconsider long-standing assumptions about implementation, management, and sustainability in rapidly evolving technological environments (Trischler, 2022; Carroll et al., 2023; Li et al., 2025; Berman, 2012; Wessel et al., 2021; Svahn et al., 2017).

Despite the strategic and economic emphasis dominating much of the digital transformation literature, a growing body of research highlights that human and social consequences remain insufficiently addressed (Fischer & Monod, 2023; Tarafdar et al., 2019; Molino et al., 2020; Väänänen et al., 2022). The deep integration of digital systems into everyday work processes has given rise to an emergent phenomenon often described as digital exhaustion, characterized by excessive cognitive load, persistent connectivity, and declining employee well-being (Qureshi & Soomro, 2024; Molino et al., 2020; Ragu-Nathan et al., 2008; Day et al., 2012). This condition reflects not isolated technological stressors but the cumulative effects of sustained digital engagement and continuous information inflows that increasingly define contemporary work environments (Zhou et al., 2025; Ayyagari et al., 2011; Wang et al., 2021; Sardeshmukh et al., 2018). As such, digital exhaustion represents a critical yet underexplored outcome of digital enablement, necessitating systematic empirical investigation into its psychological and physiological consequences (Li et al., 2025; "Technologies for Digital Transformation," 2024; Rosen et al., 2013; Spreitzer et al., 2017; Tarafdar et al., 2020). Understanding this tension between enablement and exhaustion requires moving beyond technology-centric perspectives toward a more holistic view of organizational disruption. Digital transformation reshapes not only workflows and decision-making processes but also employee roles, identities, and expectations, thereby influencing how work is experienced and sustained over time (Lei et al., 2023; Vial, 2019; Verhoef et al., 2021; Hinings et al., 2018). While digital initiatives promise agility and performance gains, they simultaneously intensify demands related to continuous learning, rapid adaptation, and constant availability, particularly in environments shaped by AI-driven systems and evolving digital infrastructures (Aleid & Almisned, 2024; Larsen, 2022; Bharadwaj et al., 2013; Tarafdar et al., 2019; Wang et al., 2021). This dynamic places organizations at a critical juncture, where the pursuit of efficiency and innovation must be balanced against the risk of fostering digital fatigue and disengagement (Molino et al., 2020; Ayyagari et al., 2011; Nielsen et al., 2022).

Accordingly, scholars increasingly argue for a shift from purely technology-focused implementations toward strategies that explicitly prioritize the human element of digital transformation (Agrifoglio et al., 2024; Kane et al., 2019; Jonathan & Kuika Watat, 2020; Recker & Von Briel, 2021). Fostering digital literacy, resilience, and adaptive capacity among employees emerges as a central mechanism for enabling sustainable engagement with digital tools rather than overwhelming individuals with their demands (Schneider & Kokshagina, 2021; Bondarouk et al., 2017; Liang et al., 2021; Venkatesh et al., 2022). However, organizational resistance to change and difficulties in adopting new technologies frequently undermine these efforts, contributing to heightened stress levels and, in some cases, transformation failure (Valtonen & Holopainen, 2025; Oreg et al., 2011; Pollock & Cornford, 2020; Peppard, 2016). Such resistance is often rooted in inadequate training, fear of job displacement, or skepticism regarding the perceived benefits of new systems, thereby exacerbating experiences of technostress (Fleron & Stana, 2024; Tarafdar et al., 2019; Molino et al., 2020; Ayyagari et al., 2011).

Empirical evidence suggests that proactive organizational strategies can mitigate these risks. Supportive work environments, effective change management practices, and targeted stress management interventions have been shown to reduce technostress and improve employee adaptation during digital transformation processes (Aydınlı & Erkasap, 2023; Abildgaard et al., 2024; Molino et al., 2020; Nielsen et al., 2022; Tarafdar et al., 2019). Well-executed transformation initiatives not only facilitate smoother technological integration but also safeguard employee well-being, which is essential for sustained productivity and innovation in digitally intensive workplaces (Aydınlı & Erkasap, 2023; Nkomo & Kalisz, 2024; Sardeshmukh et al., 2018;

Wang et al., 2021; Spreitzer et al., 2017). Nonetheless, many organizations continue to struggle with legacy systems and the complexities of integrating them with contemporary digital solutions, often diverting substantial time and resources away from strategic priorities (Omol, 2023; Verhoef et al., 2021; Westerman et al., 2014; Kane et al., 2019). These challenges are further compounded by stringent cybersecurity and data privacy requirements, which add additional layers of complexity to digital initiatives (Mou et al., 2022; Ponemon Institute et al., 2023; Riek & Kuk, 2020; Romanosky, 2016).

Taken together, these dynamics underscore the importance of developing a comprehensive understanding of organizational fitness in the digital age. Firms must cultivate embedded capabilities and holistic change management practices that address both technological implementation and its profound psychological implications for the workforce (Ates et al., 2024; Borghouts et al., 2021; Colbert et al., 2016; Lyytinen et al., 2016). Such an approach is essential to ensure that digital enablement does not gradually devolve into digital exhaustion, eroding employee well-being and undermining long-term organizational performance (Lu, 2024; Stana & Nicolajsen, 2024; Molino et al., 2020; Ayyagari et al., 2011; Tarafdar et al., 2019).Indeed, despite widespread acknowledgment of the strategic potential of digital technologies, many organizations have yet to translate intent into effective practice, revealing a persistent gap between digital ambition and sustainable implementation (Cosa, 2023; Kane et al., 2019; Sebastian et al., 2017; Verhoef et al., 2021).

2.5 A Multilevel Framework of Digital Fatigue and Business Outcomes

This section synthesizes existing research on digital fatigue by outlining its multidimensional structure, antecedents, and consequences across diverse organizational and technological contexts (Roy, 2025; Supriyadi et al., 2025; Wang et al., 2023). Digital fatigue is commonly defined as a state emerging from prolonged and intensive engagement with information and communication technologies (ICTs), resulting in diminished energy, impaired cognitive functioning, and reduced vitality (Korunovska & Spiekermann, 2022; Salanova et al., 2013; Supriyadi et al., 2025). Characterized by subjective exhaustion, lowered vigor, and mental depletion, digital fatigue affects a substantial proportion of the working population, exceeding 25% in some estimates depending on measurement approaches (Eurofound, 2022; Korunovska & Spiekermann, 2022; Spagnoli et al., 2020). The growing body of literature on digital fatigue spans multiple disciplines, including human–computer interaction, organizational behavior, and educational psychology, underscoring its complex and multifaceted nature (Bennett et al., 2022; Roy, 2025; Tarafdar et al., 2019).

Prior research identifies several interrelated drivers of digital fatigue, including cognitive overload, excessive multitasking, pressures stemming from synchronous and asynchronous communication, and the progressive erosion of work–life boundaries (Mazzei et al., 2023; Supriyadi et al., 2025; Tarafdar et al., 2019). These factors collectively intensify sustained mental effort, reduce attentional capacity, and contribute to declines in job performance and emotional exhaustion (Hilty et al., 2022; Marsh et al., 2024; Spagnoli et al., 2020). The rapid expansion of digital transformation initiatives further amplifies these dynamics by increasing the pace of work, information flow, and expectations of continuous availability, thereby necessitating organizational redesigns of communication practices and work structures to mitigate the adverse effects of persistent digital engagement (Cosa, 2023; Schneider & Kokshagina, 2021; Stana & Nicolajsen, 2024). While digital technologies can intensify work demands through extended working hours, accelerated workflows, and constant connectivity—often resulting in heightened stress and fatigue—they may simultaneously enhance employee well-being when they support meaningful, creative, and autonomous work arrangements (Lehmann & Beckmann, 2024; Kupang et al., 2024; Rademaker et al., 2023). This duality underscores the fundamentally ambivalent nature of ICT use, wherein digital tools can function both as job demands that deplete resources and as job resources that foster motivation, engagement, and personal growth, depending on how they are designed and managed within organizational contexts (Tarafdar et al., 2019; Wang et al., 2023; Marsh et al., 2024).

A central concept closely associated with digital fatigue is technostress, defined as a negative psychological state arising from individuals' difficulties in coping with technological demands (Cazan, 2020). Technostress manifests through multiple dimensions, including techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty (Ramesh et al., 2021; Wang et al., 2023). Techno-overload compels employees to work faster and longer while processing excessive volumes of information, often surpassing cognitive limits and leading to mental exhaustion (Harunavamwe & Ward, 2022; Sevic et al., 2024). Techno-invasion, by contrast, blurs the boundaries between work and private life through expectations of constant availability, hindering recovery and increasing work–life conflict (Cavicchioli et al., 2025; Jimmy et al., 2023).

Additional stressors arise from techno-complexity and techno-insecurity, which demand continuous learning and adaptation while fostering fears of inadequacy or job displacement due to automation (D'Arcy et al., 2014; Hessari et al., 2024). Techno-uncertainty further exacerbates strain by generating apprehension about the pace and unpredictability of technological change (Alfehaid et al., 2024). Collectively, these technostressors deplete individuals' cognitive and emotional resources, leading to reduced job satisfaction, impaired

performance, burnout, and adverse health outcomes such as anxiety, sleep disturbances, and chronic fatigue (Bondanini et al., 2025; Kupang et al., 2024). From a Job Demands–Resources (JD–R) perspective, technostressors function primarily as hindrance demands that obstruct goal attainment and personal growth while accelerating resource depletion (Nuutinen & Bordi, 2024). Persistent exposure to such demands activates psychophysiological stress responses, including heightened cortisol levels and cardiovascular strain, providing a physiological basis for the observed deterioration in mental and physical health (Porcari et al., 2023; Sommovigo et al., 2023). Consequently, technostress not only undermines individual well-being but also generates detrimental organizational outcomes, such as reduced productivity, lower innovation capacity, and increased turnover intentions (Atrian & Ghobbeh, 2023; Martínez-Navalón et al., 2023). Overall, the literature highlights that while digital technologies can serve as valuable resources when appropriately managed, their unchecked and intensive use transforms them into significant sources of strain. Understanding digital fatigue and technostress as interconnected phenomena is therefore essential for developing effective organizational interventions aimed at safeguarding employee well-being and sustaining performance in increasingly digitalized work environments (Berger et al., 2023; Marsh et al., 2024).

This study develops a theoretically grounded understanding of how digitalization reshapes contemporary work by integrating digital enablement and digital exhaustion within the Job Demands–Resources (JD–R) framework (Bakker & Demerouti, 2017; Tarafdar et al., 2019). In line with recent calls in business research to move beyond techno-deterministic views, the findings highlight digital technologies as inherently ambivalent organizational mechanisms that may function as either job resources or job demands depending on their intensity and contextual embeddedness (Wang et al., 2023; Kupang et al., 2024). From a JD–R perspective, the transition from digital enablement to digital exhaustion reflects a progressive imbalance between escalating digital job demands and finite individual resources. Persistent connectivity, accelerated communication cycles, and information overload intensify cognitive and emotional strain, thereby activating the health impairment process described in the JD–R model (Marsh et al., 2024; Nuutinen & Bordi, 2024). In this context, digital fatigue and technostress emerge as cumulative outcomes of sustained exposure to digitally intensified work rather than short-term reactions to isolated technological stressors (Spagnoli et al., 2020; Berger et al., 2023).

Importantly, the findings suggest that digital exhaustion is not an inevitable consequence of digitalization itself but rather a function of how digital work is structured and governed. When digital tools are embedded in supportive organizational contexts characterized by autonomy, role clarity, and adequate digital competencies, they may activate the motivational pathway of the JD–R model, fostering engagement and learning (Tarafdar et al., 2019; Lehmann & Beckmann, 2024). Conversely, poorly regulated digital environments amplify techno-overload and techno-invasion, positioning digital demands as hindrance stressors that undermine well-being and sustainable performance (Rademaker et al., 2023; Cavicchioli et al., 2025).
By conceptually integrating digital fatigue and technostress into the JD–R framework, this study bridges fragmented research streams across organizational behavior, information systems, and human resource management. In doing so, it contributes to Journal of Business Research by offering a coherent, theory-driven explanation of how digitally intensified work environments affect both employee well-being and organizational outcomes (Bondanini et al., 2025; Kupang et al., 2024).

III. DİSCUSSİON

This study develops a theoretically grounded understanding of how digitalization reshapes contemporary work by integrating digital enablement and digital exhaustion within the Job Demands–Resources (JD–R) framework (Bakker & Demerouti, 2017; Tarafdar et al., 2019). In line with recent calls in business research to move beyond techno-deterministic views, the findings highlight digital technologies as inherently ambivalent organizational mechanisms that may function as either job resources or job demands depending on their intensity and contextual embeddedness (Wang et al., 2023; Kupang et al., 2024). From a JD–R perspective, the transition from digital enablement to digital exhaustion reflects a progressive imbalance between escalating digital job demands and finite individual resources. Persistent connectivity, accelerated communication cycles, and information overload intensify cognitive and emotional strain, thereby activating the health impairment process described in the JD–R model (Marsh et al., 2024; Nuutinen & Bordi, 2024). In this context, digital fatigue and technostress emerge as cumulative outcomes of sustained exposure to digitally intensified work rather than short-term reactions to isolated technological stressors (Spagnoli et al., 2020; Berger et al., 2023).

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IV. IMPLİCATİONS

4.1. Theoretical Implications

This study extends the JD–R theory by explicitly conceptualizing digital demands (e.g., techno-overload, techno-invasion, information overload) and digital resources (e.g., autonomy, digital competence, technological support) as central components of contemporary work design (Bakker & Demerouti, 2017; Tarafdar et al., 2019). This advances prior research that has largely treated technology as a background condition, positioning ICTs instead as dynamic drivers of both strain and motivation.

Furthermore, integrating digital fatigue into the JD–R framework refines existing conceptualizations of exhaustion by emphasizing cognitive depletion, attentional fragmentation, and impaired recovery as defining mechanisms in digital work contexts (Marsh et al., 2024; Spagnoli et al., 2020). This perspective complements traditional burnout models and aligns with emerging business research highlighting the cognitive costs of sustained digital engagement (Wang et al., 2023).

Finally, embedding technostress dimensions within the challenge–hindrance demand distinction offers a theoretical explanation for the heterogeneous outcomes of digitalization reported in prior studies. This distinction provides a parsimonious framework for understanding when digital technologies enhance performance and when they undermine well-being, thereby addressing inconsistencies in the literature (Ramesh et al., 2021; Nuutinen & Bordi, 2024).

4.2. Managerial Implications

From a managerial perspective, the findings indicate that digital transformation initiatives should be evaluated not only in terms of efficiency gains but also in relation to their impact on employee well-being. Excessive digital demands—such as constant availability expectations and unfiltered information flows—can erode psychological resources and ultimately diminish performance (Bondanini et al., 2025; Cosa, 2023).

Managers can mitigate digital exhaustion by establishing clear norms around digital availability, reducing unnecessary communication, and protecting recovery periods. Investments in digital skills development and supportive leadership practices further enable digital technologies to function as job resources rather than stressors (Tarafdar et al., 2019; Lehmann & Beckmann, 2024). From a strategic standpoint, integrating well-being considerations into digital transformation efforts represents a critical pathway toward sustainable competitive advantage.

V. FUTURE RESEARCH

Several avenues for future research emerge from this study. First, empirical testing of the proposed framework across industries, occupational groups, and cultural contexts would enhance its generalizability. Longitudinal designs are particularly needed to capture the dynamic transition from digital enablement to digital exhaustion over time (Wang et al., 2023; Berger et al., 2023).

Second, future research should examine boundary conditions that shape the relationship between digital demands and exhaustion, such as leadership style, organizational culture, digital maturity, and individual digital resilience (Kupang et al., 2024; Rademaker et al., 2023). Identifying these moderators would deepen understanding of why similar technologies produce divergent outcomes across organizations.

Finally, further investigation into digital resources—such as autonomy-supportive technologies, AI-enabled decision aids, and intelligent work design—would advance knowledge on how the motivational pathway of the JD–R model can be activated in digital work environments, contributing to more sustainable models of digitalization (Lehmann & Beckmann, 2024; Tarafdar et al., 2019).

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