ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 11| November 2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2026: 8.753 || ISI Value: 1.188

DIGITAL TRANSFORMATION AND AI, ITS IMPACT ON EMPLOYEE WELL-BEING AND ENGAGEMENT: EVIDENCE FROM EMPIRICAL STUDIES

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Article DOI: https://doi.org/10.36713/epra32238
DOI No: 10.36713/epra32238

ABSTRACT

Digital transformation has become one of the defining forces reshaping contemporary workplaces, altering not only how organizations create value but also how employees experience their day-to-day work. This paper reviews empirical evidence on the relationship between digital transformation and two closely linked outcomes: employee well-being and employee engagement. Drawing on quantitative surveys, qualitative case studies, and mixed-method investigations conducted across manufacturing, healthcare, education, hospitality, and corporate service settings, the review is organized around the Job Demands-Resources model and Conservation of Resources theory. The evidence suggests that digital transformation carries a dual character: it can function as a resource that enables autonomy, flexibility, and meaningful engagement, while simultaneously acting as a demand that produces techno stress, work exhaustion, and disengagement when introduced without adequate support. Mediating mechanisms such as digital self-efficacy, supervisor support, work-life balance, and participative change management appear to determine which of these pathways dominates. The paper concludes with practical implications for managing digital change and outlines directions for future empirical research.

KEYWORDS: *Digital Transformation, Employee Well-Being, Employee Engagement, Techno Stress, Job Demands-Resources Model*

1. INTRODUCTION

Organizations across nearly every industry are in the midst of an accelerating shift toward digitally enabled operations. Cloud computing, artificial intelligence, automation, enterprise platforms, and remote collaboration tools have moved from optional add-ons to core infrastructure, changing how work is designed, coordinated, and evaluated. This shift, commonly labeled digital transformation, is rarely confined to technology alone; it reorganizes roles, redefines skill requirements, and reshapes the daily rhythms of work for millions of employees. Because these changes touch the lived experience of work so directly, researchers and practitioners have increasingly asked a pointed question: does digital transformation make working life better or worse for the people carrying it out?

The answer emerging from empirical research is neither uniformly positive nor uniformly negative. On one hand, digital tools can remove repetitive burdens, expand employee autonomy, and open new channels for feedback and recognition, all of which are associated with stronger engagement. On the other hand, the same tools can generate a persistent sense of being electronically tethered to work, expose employees to techno-overload and techno-invasion, and displace valued skills, producing stress and withdrawal instead of engagement. Empirical work has found that different aspects of digital transformation are good predictors of employee engagement, offering managers insight into how these components strengthen or weaken engagement over time. At the same time, other studies caution that digital initiatives frequently provoke resistance and psychological strain, particularly when employees are not adequately prepared for the change (Valtonen & Holopainen, 2025).

This tension between opportunity and strain is the central theme of the present paper. Rather than treating digital transformation as an unambiguous good or an unambiguous threat, this review synthesizes empirical studies that examine both sides of the relationship, with particular attention to the psychological mechanisms that tip the balance one way or the other.

Understanding this relationship is not simply an academic exercise. Employee well-being and engagement are consistently linked to organizational outcomes such as productivity, retention, innovation, and customer satisfaction. As digital transformation continues to accelerate, organizations that fail to manage its human dimension risk undermining the very workforce capabilities that the transformation is meant to unlock. A clear, evidence-based picture of how digital change affects employees is therefore essential for both scholars and practitioners seeking to design more humane and effective digital workplaces.

2. OBJECTIVES OF THE STUDY

Building on the motivation outlined above, this review is guided by the following specific objectives:

1. To examine the empirical relationship between digital transformation and employee engagement, and to identify the conditions under which this relationship is positive.

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2. To analyze how digital transformation contributes to technostress and, in turn, affects employee well-being across occupational settings.
3. To identify and synthesize the mediating and moderating mechanisms — including employee resistance, supervisor support, digital self-efficacy and leadership, and work-life balance — that shape whether digital transformation is experienced as enabling or depleting.
4. To compare sector-specific evidence from healthcare, manufacturing, education, and maritime/specialized industries in order to assess how digital transformation's effects vary by occupational context.
5. To derive practical implications that organizations can apply when planning and managing digital transformation initiatives to protect employee well-being and sustain engagement.
6. To evaluate the limitations of the existing empirical evidence base and to propose directions for future research on digital transformation and employee outcomes.

3. THEORETICAL FRAMEWORK

Two theoretical traditions dominate empirical research on digital transformation and employee outcomes. The first is the Job Demands-Resources model, which proposes that every occupation carries demands, the aspects of a job that require sustained physical or psychological effort, and resources, the aspects that help employees achieve goals, reduce demands, or stimulate growth (Bakker & Demerouti, 2007). When resources are sufficient relative to demands, employees experience motivation and engagement; when demands exceed available resources, employees experience strain, exhaustion, and eventually withdrawal. Digital technologies fit uneasily into this framework because they can function as either demands or resources depending on how they are implemented, a point that recent reviews have made explicit by showing that information and communication technology can simultaneously reduce the burden of routine tasks while introducing new sources of overload, complexity, and insecurity (Pansini et al., 2023).

The second major framework is Conservation of Resources theory, which holds that individuals strive to protect, retain, and build the resources they value, including time, energy, skill, and a sense of control, and that stress arises when these resources are threatened, lost, or invested without adequate return (Hobfoll, 1989). Applied to digital transformation, COR theory suggests that employees who perceive new technologies as threatening their existing competence or autonomy are likely to resist the change and experience it as depleting, whereas employees who perceive the same technologies as expanding their capability are more likely to invest energy willingly and experience engagement as a result.

A third concept, engagement itself, deserves separate theoretical grounding. Engagement is typically understood as the simultaneous investment of physical, cognitive, and emotional energy in one's work role, producing a sense of personal presence and meaning rather than mere compliance (Kahn, 1990). This distinction matters for digital transformation research because engagement is not simply the absence of stress; an employee can be free of technostress yet still disengaged if digital systems strip work of autonomy or meaning. Conversely, an employee can be highly engaged in a demanding digital environment if they perceive sufficient resources, such as supervisor support or opportunities for mastery, to meet those demands.

Taken together, these frameworks explain why digital transformation research so often reports mixed or even contradictory findings. The technology itself is rarely the sole determinant of employee outcomes; rather, outcomes depend on the balance between the demands introduced by new digital tools and the resources, organizational, social, and personal, that employees can draw upon to meet those demands.

4. LITERATURE REVIEW AND EMPIRICAL EVIDENCE

4.1 Digital Transformation and Employee Engagement

Several empirical studies have examined the direct association between the adoption of digital tools and employee engagement, generally finding a positive relationship when digital initiatives are implemented deliberately. In an early empirical investigation, digital technologies were found to be more heavily used in front-office management functions than in supply chain or operations management, and different dimensions of digital transformation served as good predictors of employee engagement (Goswami & Upadhyay, 2019). This finding suggests the effect of digital transformation on engagement is not uniform across business functions.

More recent work has taken a configurational approach to understanding engagement under digital transformation. Using fuzzy-set qualitative comparative analysis grounded in the JD-R model and trait activation theory, a study of enterprise employees found that technological pressure created by digital transformation affects employee well-being through five distinct mechanisms — techno-overload, uncertainty, invasion, complexity, and insecurity (Ye et al., 2024). Inhibiting these specific technostress creators, combined with high self-efficacy and favorable personality traits, produces the conditions under which employees sustain high work engagement despite ongoing digital change.

A separate strand of research links engagement to the psychological resources that digital transformation either strengthens or depletes. A large-scale survey of corporate employees in Korea found that job autonomy and psychological well-being influenced both in-role and extra-role performance, with employee engagement acting as the mediating mechanism (Lee, 2023).

4.2 Digital Transformation, Technostress, and Well-Being

While the engagement literature tends to emphasize the motivational potential of digital tools, a parallel and arguably larger body of empirical work has focused on the strain-inducing side of digital transformation, most often under the label of technostress. A systematic literature review applying the JD-R model to technostress research concluded that information and communication technology is most often treated as a job demand

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that negatively affects employees' behavior, thoughts, and attitudes, although a smaller subset of studies treats it as a job resource (Pansini et al., 2023).

Consistent with this pattern, a quantitative study of workplace digitization among finance employees in a multinational business group reported that higher levels of digital anxiety were associated with lower work engagement, and that a stronger digital work atmosphere was associated with reduced digital anxiety (Han et al., 2025). Job demands and digital anxiety operated as parallel mediators linking workplace digitization to workplace well-being.

Occupation-specific research reinforces the salience of technostress as a mechanism linking digital transformation to reduced well-being. A structural equation modeling study of STEM teachers in China found that technostress creators significantly increased teacher burnout and negatively affected organizational commitment and work performance, while technostress inhibitors alleviated burnout and mitigated technostress creators directly (Tu et al., 2025).

4.3 Mediating and Moderating Mechanisms

A recurring theme across the empirical literature is that the relationship between digital transformation and employee outcomes is rarely direct; it is channeled through mediating psychological states and shaped by moderating organizational conditions. A qualitative multiple case study of ten industrial companies in Finland found that resistance to digital transformation arose from factors operating at the individual, organizational, and technological levels, and was directly linked to reduced employee well-being (Valtonen & Holopainen, 2025). Learning, communication, and participation each functioned to reduce resistance and simultaneously protect employee well-being.

Supervisor and organizational support represent another well-documented moderator. Research examining technostress, digital work overload, and supervisor support among professionals in hybrid and digitally integrated organizations found that supervisor support served as a critical job resource capable of buffering these negative effects. Digital self-efficacy and digital leadership constitute a third mechanism: leaders who model confident, exploratory use of digital tools help employees build competence with technology, which in turn strengthens work engagement.

Work-life balance has also emerged as an important mediating construct. Evidence from the information technology sector indicates that digital HRM strategies are most beneficial for employee well-being when deliberately aligned with work-life balance initiatives, since digital tools that blur the boundary between work and personal time can otherwise convert efficiency gains into additional psychological burden.

4.4 Sector-Specific Evidence

Because digital transformation unfolds differently across industries, sector-specific empirical studies provide an important complement to the general mechanisms described above. In healthcare, digital innovations such as electronic health records and remote monitoring tools introduce distinctive job demands; digital job demands relate to workplace well-being through the mediating roles of digital innovation support, autonomy, and individual resilience.

In manufacturing and industrial contexts, the Finnish case study illustrates how digital transformation initiatives can simultaneously threaten and, if well managed, protect employee well-being, depending on investment in learning, communication, and participatory change processes (Valtonen & Holopainen, 2025). In education, the STEM teacher study from Zhejiang Province demonstrates that rapid digitalization of teaching and administrative tasks introduces occupation-specific technostress creators, with consequences for burnout, commitment, and performance (Tu et al., 2025). In maritime and other technically specialized industries, digital culture, leadership, capability, and knowledge management have been linked to the mitigation of technostress and burnout, extending JD-R-based findings beyond conventional office environments.

Across these varied sectors, a consistent pattern emerges: the specific technologies and tasks differ substantially, but the underlying psychological mechanism — the balance between digital demands and the resources available to meet them — recurs as the central explanatory factor for whether employees experience digital transformation as engaging or exhausting.

5. DISCUSSION

Reading across these empirical studies, several patterns stand out. First, digital transformation does not have a single, fixed effect on employee well-being or engagement; its effects are conditional on implementation choices, available resources, and individual differences, reflecting a genuine duality in how digital tools function within the JD-R framework (Bakker & Demerouti, 2007; Pansini et al., 2023).

Second, technostress has emerged as the single most consistently documented mechanism linking digital transformation to reduced well-being, appearing across studies of corporate employees, teachers, healthcare workers, and industrial employees alike (Han et al., 2025; Tu et al., 2025).

Third, the studies reviewed here converge on the idea that organizational and psychological resources, rather than the technology itself, determine whether digital transformation strengthens or undermines engagement. This is consistent with configurational findings that specific combinations of low technostress and high self-efficacy, rather than either factor alone, are needed to sustain high engagement during digital change (Ye et al., 2024).

Fourth, employee resistance, often treated by managers as an obstacle to be overcome quickly, appears in the empirical literature as a meaningful signal of unmet psychological needs rather than simple obstinacy (Valtonen & Holopainen, 2025).

Finally, while the general pattern of findings is fairly consistent, there remains considerable variation in how strongly digital transformation is associated with positive versus negative outcomes across studies, likely reflecting differences in the pace of change, employee involvement, and cultural and institutional context.

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6. PRACTICAL IMPLICATIONS

The empirical evidence reviewed in this paper carries several implications for organizations undergoing digital transformation. First, organizations should treat digital initiatives as changes to the psychological contract of work, not merely as technical upgrades, investing in training, digital self-efficacy building, and clear communication about the purpose of new systems.

Second, supervisors and line managers play an outsized role in shaping how digital transformation is experienced on the ground; organizations should equip managers with the skills and time needed to support their teams through digital transitions.

Third, organizations should build participation into the design and rollout of digital initiatives rather than treating employees as passive recipients of change, since learning opportunities, transparent communication, and genuine participation reduce resistance and protect well-being simultaneously (Valtonen & Holopainen, 2025).

Fourth, because digital tools can blur the boundary between work and personal life, organizations should pair digital HRM and digital workplace initiatives with explicit work-life balance safeguards.

Finally, organizations should recognize that the benefits of digital transformation for engagement are unlikely to be uniform across roles and functions, and should tailor engagement strategies to the specific demands and resources present in each function (Goswami & Upadhyay, 2019).

7. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Several limitations of the existing empirical base should be acknowledged. Much of the available research relies on cross-sectional survey designs, which limit the ability to draw firm causal conclusions about the direction of effects between digital transformation, technostress, and well-being or engagement outcomes.

Second, much of the sector-specific evidence, including studies of Chinese STEM teachers, Korean corporate employees, and Finnish industrial firms, is drawn from single-country contexts, raising questions about generalizability across different cultural, regulatory, and labor-market settings.

Third, the qualitative case study literature, while rich in contextual detail, typically draws on a small number of organizations, which limits statistical generalizability even as it provides valuable depth (Valtonen & Holopainen, 2025).

Finally, relatively few studies have examined how the effects of digital transformation on well-being and engagement evolve over the lifecycle of a digital initiative, from initial announcement through implementation to routine use.

8. CONCLUSION

Digital transformation is reshaping the experience of work in ways that carry real consequences for employee well-being and engagement. The empirical evidence reviewed here indicates that these consequences are not predetermined by technology alone but are shaped by the balance between the demands digital tools introduce and the resources — organizational, social, and personal — that employees can draw upon to meet them. Technostress emerges repeatedly as the central mechanism through which digital transformation can erode well-being, while supervisor support, digital self-efficacy, participative change management, and work-life balance protections consistently emerge as the resources that allow employees to remain engaged despite ongoing digital demands. For organizations, the clearest lesson from this body of research is that managing the human side of digital transformation — through communication, participation, training, and support — is not a peripheral concern but a central determinant of whether digital initiatives ultimately succeed or fail.

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