



Digital Leadership and Organizational Citizenship Behavior in Healthcare Organizations: A Conceptual Perspective

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ABSTRAK

Transformasi digital organisasi perawatan kesehatan yang cepat telah menciptakan tantangan yang belum pernah terjadi sebelumnya bagi karyawan, termasuk teknostres, kelebihan beban, dan resistensi terhadap perubahan, sekaligus menuntut perilaku peran ekstra diskresioner yang dikenal sebagai perilaku kewarganegaraan organisasi (OCB). Makalah konseptual ini bertujuan untuk mengembangkan kerangka teoritis komprehensif yang menjelaskan hubungan antara kepemimpinan digital dan OCB dalam organisasi perawatan kesehatan. Menggambar pada teori Job Demands-Resources (JD-R) dan Teori Pertukaran Sosial (SET), makalah ini mengusulkan bahwa keterlibatan kerja menengahi hubungan positif antara kepemimpinan digital dan OCB, sementara teknostres memoderasi hubungan kepemimpinan digital-keterlibatan kerja. Kerangka kerja ini memajukan empat proposisi utama: (H1) kepemimpinan digital secara positif memengaruhi keterlibatan kerja; (H2) keterlibatan kerja secara positif mempengaruhi OCB; (H3) keterlibatan kerja menengahi hubungan kepemimpinan digital-OCB; dan (H4) teknostres melemahkan efek positif kepemimpinan digital pada keterlibatan kerja. Makalah ini membuat tiga kontribusi teoretis: memperluas teori JD-R dengan mengkonseptualisasikan kepemimpinan digital sebagai sumber daya pekerjaan yang kritis dan teknostres sebagai kondisi batas; mengintegrasikan kepemimpinan, teknostres, keterlibatan, dan OCB ke dalam model mediasi termoderasi terpadu; dan mengatasi konteks perawatan kesehatan yang kurang dieksplorasi. Implikasi praktis menunjukkan bahwa organisasi perawatan kesehatan harus mengembangkan kompetensi kepemimpinan digital sekaligus mengurangi tekstres melalui pelatihan yang memadai, dukungan teknis, dan desain sistem yang ramah pengguna. Arah penelitian di masa depan mencakup pengujian empiris menggunakan SEM-PLS, desain longitudinal, metode campuran, dan analisis multilevel di berbagai pengaturan perawatan kesehatan seperti rumah sakit, perawat, apoteker, dan petugas kesehatan masyarakat.

ABSTRACT

Keywords

Digital Leadership
Organizational Citizenship
Behavior
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Teknostres
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The rapid digital transformation of healthcare organizations has created unprecedented challenges for employees, including technostress, work overload, and resistance to change, while simultaneously demanding discretionary extra-role behaviors known as organizational citizenship behavior (OCB). This conceptual paper aims to develop a comprehensive theoretical framework explaining the relationship between digital leadership and OCB in healthcare organizations.



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Drawing upon Job Demands-Resources (JD-R) theory and Social Exchange Theory (SET), the paper proposes that work engagement mediates the positive relationship between digital leadership and OCB, while technostress moderates the digital leadership–work engagement relationship. The framework advances four key propositions: (H1) digital leadership positively influences work engagement; (H2) work engagement positively influences OCB; (H3) work engagement mediates the digital leadership–OCB relationship; and (H4) technostress weakens the positive effect of digital leadership on work engagement. The paper makes three theoretical contributions: extending JD-R theory by conceptualizing digital leadership as a critical job resource and technostress as a boundary condition; integrating leadership, technostress, engagement, and OCB into a unified moderated mediation model; and addressing the underexplored healthcare context. Practical implications suggest that healthcare organizations should develop digital leadership competencies while simultaneously mitigating technostress through adequate training, technical support, and user-friendly system design. Future research directions include empirical testing using SEM-PLS, longitudinal designs, mixed methods, and multilevel analysis across diverse healthcare settings such as hospitals, nurses, pharmacists, and public health workers.

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INTRODUCTION

The healthcare sector is currently experiencing an unprecedented wave of digital transformation driven by rapid technological advancement and the increasing demand for efficient, responsive and patient-centered healthcare services. Healthcare organizations across the globe have progressively adopted digital technologies such as telemedicine, artificial intelligence (AI)-based healthcare systems, electronic medical records (EMRs), and integrated hospital information systems. Moreover, digital transformation has accelerated following the COVID-19 pandemic, which forced healthcare organizations to rapidly adapt to digital platforms and remote healthcare services (Agarwal et al., 2020; Keesara et al., 2020). Despite the substantial benefits of digital transformation, healthcare employees face various challenges associated with technological adaptation and increasing work demands. Healthcare professionals are frequently required to manage high workloads while simultaneously adapting to complex digital systems and maintaining the quality of patient care. Technostress, defined as stress caused by the inability to cope with information and communication technologies, has emerged as a critical issue in modern healthcare organizations (Tarafdar et al., 2015). In addition, prolonged exposure to digital workloads and continuous connectivity may lead to emotional exhaustion, reduced work engagement and decreased organizational commitment among healthcare employees.

In this context, digital leadership has become increasingly important in healthcare organizations. Digital leadership refers to leadership capabilities that facilitate organizational adaptation, innovation, and employee empowerment in technology-driven environments. Unlike traditional leadership approaches, digital leadership emphasizes technological agility, digital vision, collaboration, and adaptive organizational culture (El Sawy et al., 2016). Effective digital leaders play a significant role in guiding healthcare employees through technological changes, minimizing uncertainty, and fostering a supportive work environment that encourages innovation and knowledge sharing. Previous studies suggest that digital leadership positively influences employee motivation, innovative work behavior, and organizational adaptability (Cortellazzo et al., 2019). Within healthcare organizations, digital leadership is particularly essential because healthcare services rely heavily on teamwork, rapid decision-making, and the effective integration of digital technologies into clinical and administrative practices.

Furthermore, organizational citizenship behavior (OCB) has become a critical organizational outcome in healthcare institutions. OCB refers to employees' discretionary behaviors that go beyond formal job requirements and contribute positively to organizational effectiveness (Organ, 1988). In healthcare settings, OCB is particularly important because healthcare delivery depends on high levels of collaboration, teamwork, mutual support, and proactive employee behavior. Employees who demonstrate OCB are more likely to assist colleagues, share knowledge, maintain positive interpersonal relationships, and contribute to improved patient care quality. Previous research has consistently demonstrated that OCB enhances organizational effectiveness, employee cooperation, and service quality in healthcare organizations (Podsakoff et al., 2009). As healthcare organizations continue to experience digital transformation, understanding the factors that encourage OCB among healthcare employees becomes increasingly important for maintaining organizational resilience and sustainable healthcare performance.

Based on these considerations, this conceptual paper aims to develop a comprehensive theoretical framework explaining the relationship between digital leadership and organizational citizenship behavior in healthcare organizations. Specifically, this paper proposes work engagement as a mediating mechanism linking digital leadership and OCB, while technostress is conceptualized as a moderating factor that may influence the effectiveness of digital leadership in fostering positive employee behaviors. By integrating the perspectives of Social Exchange Theory and Job Demands-Resources Theory, this conceptual paper seeks to contribute to the development of human resource management and organizational behavior literature within the context of digital healthcare transformation. In addition, this paper offers future research directions and practical implications for healthcare organizations seeking to strengthen employee engagement, reduce technostress, and enhance organizational citizenship behavior in the digital era.

LITERATURE REVIEW

Digital Leadership in Healthcare

The rapid digital transformation of healthcare organizations has elevated the importance of leadership capable of navigating technology-driven environments. Digital leadership can be broadly defined as a set of leadership capabilities that enable organizations to adapt, innovate, and empower employees in contexts characterized by pervasive digital technologies and continuous technological change. Unlike traditional leadership models that

emphasize hierarchical authority and stability, digital leadership prioritizes technological agility, strategic digital vision, cross-functional collaboration, and the cultivation of an adaptive organizational culture (El Sawy et al., 2016). In the healthcare sector, digital leadership has become increasingly critical as organizations integrate technologies such as electronic medical records, telemedicine platforms, artificial intelligence-based diagnostic tools, and integrated hospital information systems into daily clinical and administrative practices (Putra et al., 2025). A systematic review of digital leadership in healthcare identified 37 attributes required by digital leaders, grouped around six themes: leadership and learning, working with others, using technology, understanding informatics, research and innovation, and digital analytics (Abbu et al., 2022). These attributes suggest that digital leadership extends beyond mere technological proficiency to encompass relational, strategic, and change-oriented competencies. Furthermore, the concept of Leadership 4.0 has emerged as a framework that integrates digital literacy, strategic foresight, and emotional intelligence, requiring leaders to exhibit adaptability, drive innovation, and foster a culture of continuous learning to successfully navigate the complexities of digital transformation in healthcare (Tsekouropoulos et al., 2025).

The emergence of digital leadership has prompted scholars to distinguish it from traditional leadership paradigms. Transformational leadership, which focuses on inspiring followers through idealized influence, intellectual stimulation, and individualized consideration, has long been recognized as effective in fostering innovation and organizational change (Bass & Avolio, 1994). However, recent evidence suggests that digital leadership has a more significant impact on digital transformation outcomes than transformational leadership does (Alamsyah & Suwarno, 2023). While transformational leaders inspire commitment and creativity, digital leaders possess specific competencies related to digital technologies, data-driven decision-making, and the management of technology-enabled work environments. In contrast to transactional leadership, which emphasizes contingent rewards and management by exception to ensure compliance and stability, digital leadership involves proactive technology adoption, strategic alignment of digital tools with organizational goals, and the facilitation of continuous learning (Pratiwi & Sujoko, 2025). Adaptive leadership, which emphasizes the capacity to adjust strategies and behaviors in response to changing circumstances, shares conceptual overlap with digital leadership; however, digital leadership explicitly incorporates technological agility and digital literacy as core competencies (Lemak et al., 2024). Technology-oriented leadership, a related but narrower concept, focuses primarily on the integration and management of technological systems but often lacks the relational and empowering dimensions central to digital leadership (Fauziah, 2023). Similarly, agile leadership which emphasizes flexibility, rapid response to change, and iterative problem-solving has gained prominence in the digital era and is particularly relevant in healthcare settings, where health managers must be agile due to the specific characteristics of health services (Şahin & Alp, 2020). Bibliometric analysis reveals that the intersection between innovation and digital transformation has given rise to agile leadership as a distinct leadership structure, characterized by increased agility and adaptive capacity (Idha et al., 2025). A systematic review of leadership types found that transformational leadership fosters innovation and acceptance during adoption phases, adaptive leadership enables flexibility during assimilation, and digital leadership drives continuous innovation during extension phases, suggesting that digital leadership complements rather than replaces traditional approaches (Pratiwi & Sujoko, 2025). Collectively, these distinctions underscore that digital leadership represents an evolution of leadership paradigms to address the unique demands of technology-driven organizational contexts.

Within healthcare organizations, the practical manifestations of digital leadership are increasingly evident. Digital hospitals fully integrated healthcare facilities that rely on digital systems for patient care, clinical decision-making, and administrative processes require leaders

who can align technological investments with patient safety and quality improvement goals. Effective digital leaders in healthcare settings are responsible for guiding the implementation of electronic health records, ensuring interoperability among disparate systems, and leveraging data analytics to inform clinical and operational decisions (Putra et al., 2025). Moreover, healthcare innovation, including the adoption of AI-assisted diagnostic services, robotic surgery systems, and remote patient monitoring technologies, demands leaders who can balance the promise of technological advancement with the realities of workforce readiness and patient acceptance.

Research demonstrates that digital leadership enhances employee empowerment, which subsequently boosts techno-work engagement and sustainability performance in the public healthcare sector (Abbas et al., 2025). Empowered healthcare employees are more likely to embrace digital innovations, take initiative in problem-solving, and contribute proactively to organizational improvements. Second, *facilitating adaptation* requires digital leaders to guide healthcare employees through continuous technological changes by providing adequate training, creating psychologically safe environments for experimentation, and recognizing adaptive efforts. A mixed-methods systematic review identified that healthcare leaders' digital competence experiences include the need for developing leaders' own, professionals', and patients' competence in the digitalization of healthcare, as well as the ability to act as an advocate to implement technology into practice (Laakkonen et al., 2024). Third, *reducing uncertainty* involves digital leaders proactively communicating digital visions, clarifying expectations regarding technology use, and mitigating the ambiguities associated with digital transformation. Leaders who provide clear guidance and consistent support help alleviate the technostress and role ambiguity that often accompany digitalization. Digital leadership facilitates a supportive work environment that encourages innovation, knowledge sharing, and collective problem-solving (Cortellazzo et al., 2019). Thus, digital leadership is fundamentally about people; empowering them to adapt and thrive amid technological change rather than merely about technological mastery. In healthcare organizations, where the ultimate goal remains high-quality patient care, digital leadership must therefore integrate human-centered values with technological capabilities to foster sustainable organizational performance.

OCB in Healthcare Organizations

Conscientiousness encompasses discretionary behaviors that exceed minimum role requirements, including punctuality, adherence to organizational rules even when unobserved, avoiding unnecessary breaks, and consistently performing tasks with greater care and diligence than formally expected (Tambe & Shanker, 2014). *Sportsmanship* reflects an employee's willingness to tolerate inevitable inconveniences and frustrations without excessive complaining, making mountains out of molehills, or constantly focusing on negative aspects of the work environment (Tambe & Shanker, 2014). *Civic virtue* signifies responsible participation in the organizational life, including attending non-mandatory meetings, keeping abreast of organizational changes, and participating in activities that help the organization's image even when not formally required (Podsakoff & MacKenzie, 1989). Together, these five dimensions form a comprehensive taxonomy of extra-role behaviors that have been extensively validated across organizational contexts (Organ et al., 2005).

Healthcare delivery is inherently complex and interdependent, requiring seamless coordination among physicians, nurses, technicians, pharmacists, and administrative staff. A scoping review of OCB in healthcare settings found that healthcare services require OCB to meet the demand for patient-centered, cost-effective and high-quality care against a background of increasing complexity and growing competition (El-Shaer et al., 2022). The review systematically identified that OCB has significant correlations and predictive effects with a wide range of organizational outcomes, including social capital, team performance, and

service quality across healthcare providers. In the context of *teamwork*, OCB facilitates collaborative behaviors such as voluntarily assisting colleagues during peak workloads, sharing critical patient information, and covering for absent teammates all of which contribute to smoother clinical operations and reduced medical errors (Chang & Chang, 2010). Research on nurses' workplace behaviors has demonstrated that OCB positively influences individual-level task performance and organizational performance as measured by productivity, efficiency, and safety outcomes (Podsakoff et al., 2013). In critical care units, the relational or social functioning of team members manifested through citizenship behaviors such as helping and courtesy, is a critical factor in achieving safe patient outcomes and unit-level performance (Ervin et al., 2018). Furthermore, *service quality* in healthcare is enhanced when employees demonstrate civic virtue by proactively identifying process improvements, and sportsmanship by maintaining positive attitudes even under stressful clinical conditions (Perreira & Berta, 2015). Healthcare professionals experiencing technostress defined as psychological strain resulting from the use of complex digital systems may prioritize mandatory digital tasks over voluntary helping behaviors, thereby reducing OCB (Tarafdar et al., 2015; Ragu-Nathan et al., 2008). Moreover, the concept of *change-oriented OCB* has been proposed as particularly relevant in healthcare technology adoption contexts, where employees may voluntarily champion new digital systems, train less tech-savvy colleagues, or provide constructive feedback for system improvements (Mehrjerdi et al., 2016). However, empirical research examining how digital leadership, technostress, and work engagement interact to influence OCB in digitally saturated healthcare workplaces is conspicuously limited.

Work Engagement Perspective

The conceptual mediator framework in this article is grounded in the Job Demands Resources (JD R) theory, one of the most influential theoretical frameworks for understanding employee well being, work behavior, and organizational performance (Bakker & Demerouti, 2024). Initially introduced by Demerouti et al. (2001), the JD R theory has undergone significant development over the past two decades. The theory categorizes job characteristics into two main dimensions: job demands and job resources. The JD R theory subsequently proposes that job demands trigger a health impairment process leading to burnout, while job resources trigger a motivational process leading to work engagement (Schaufeli, 2017). In the context of digital transformation in healthcare organizations, the JD R theory has been widely applied to explain how technological factors affect the well being and performance of healthcare workers (Zhang et al., 2025).

Within the JD R framework, digital leadership can be conceptualized as a critical job resource in the digital transformation era. A systematic review by Montenegro Méndez et al. (2025) firmly established that leadership is a significant resource promoting work engagement among nurses. Analyzing 38 observational quantitative studies on nurses, they found that transformational, authentic, and servant leadership styles consistently exhibited protective effects against burnout and promoted engagement (Montenegro Méndez et al., 2025). Moreover, their findings indicate that effective leadership is a critical resource for enhancing nurse well being and performance while reducing burnout. Importantly, the study also noted that existing literature largely focuses on traditional leadership styles, making the integration of digital leadership as a job resource a necessary extension in the context of healthcare digitalization. Recent research by Rochmatulaili et al. (2026) explicitly extends the JD R framework by incorporating digital leadership as a critical job resource in the digital era. Effective digital leaders provide digital vision clarity, adequate technical support, continuous training, and a safe space for employees to adapt to new technologies (Zia & Memon, 2024). In their study of 307 technology professionals, Zia and Memon (2024) found that digital engagement positively influenced digital leadership, which subsequently drove innovative

work behavior. This finding suggests a reciprocal relationship between engagement and digital leadership, wherein effective digital leadership creates a positive motivational cycle that reinforces employee commitment and enthusiasm for their work. In healthcare organizations, strong digital leadership helps healthcare workers, who often face high psychological pressure from clinical work and technological demands, remain motivated, focus on patient care goals, and develop adaptive capacity toward digital innovations such as electronic medical records, telemedicine, and integrated hospital information systems (Zhang et al., 2025).

Work engagement is defined as a positive, fulfilling, work related state of mind characterized by three main dimensions: vigor, dedication, and absorption (Schaufeli et al., 2002). This definition has become the standard benchmark in organizational psychology and human resource management literature. Vigor describes high levels of energy and mental resilience while working, willingness to invest effort in one's work, and persistence in the face of difficulties. A healthcare worker with high vigor possesses strong mental stamina to handle high clinical workloads and remains enthusiastic despite complex digital systems. Dedication refers to strong involvement in one's work, accompanied by feelings of significance, enthusiasm, inspiration, pride, and challenge. Highly dedicated nurses or doctors find meaning and pride in their work, even when adapting to new technologies that demand continuous learning. Absorption is a state of complete concentration and deep immersion in one's work, whereby time passes quickly and individuals have difficulty detaching from work (Schaufeli et al., 2002). In recent research, Zhang et al. (2025) confirmed that nurses' work engagement in China, within the context of information and communication technology (ICT) demands, is significantly influenced by resource factors such as harmonious work passion, positive affect, and self efficacy. Their cross sectional study of 1,612 nurses found that resource loss, such as ego depletion and job insecurity, contributed to burnout rather than merely representing the opposite of engagement. This indicates that work engagement has unique predictors distinct from burnout.

The central argument of this conceptual mediator section is built on the premise that digital leadership enhances healthcare workers' work engagement, which in turn drives organizational citizenship behavior (OCB). First, digital leadership positively affects work engagement. Drawing on JD R theory, digital leadership functions as a job resource that fulfills employees' basic psychological needs and mitigates the negative impact of job demands associated with digital technology. Rochmatulaili et al. (2026) empirically confirmed that digital leadership has a significant positive effect on work engagement. This finding aligns with previous research by Zia and Memon (2024), who showed that digital engagement, which is closely related to work engagement, is significantly influenced by digital resources such as digital communication.

Second, work engagement positively affects OCB. Employees who are fully engaged in their work possess sufficient psychological resources to engage in voluntary, extra role behaviors (Organ, 2018). Research by Bardhan and Haque (2025), conducted on 414 healthcare workers across eight private hospitals in West Bengal, India, found that employee engagement significantly mediated the relationship between occupational self efficacy and OCB. Theoretically, this relationship is explained by Social Exchange Theory (Cropanzano & Mitchell, 2005): employees who feel supported and valued by the organization through empowering digital leadership develop a sense of reciprocal obligation to repay that support by going beyond their formal job duties. Engagement serves as the affective and motivational bridge between perceived support, delivered via digital leadership, and reciprocal action, expressed through OCB. Engaged employees not only work according to their job descriptions but also voluntarily help others, maintain positive attitudes, and contribute to overall organizational effectiveness.

Third, work engagement mediates the relationship between digital leadership and OCB. By integrating JD R theory and Social Exchange Theory, this article proposes that the influence of digital leadership on OCB is not direct but rather operates through the mechanism of work engagement. In other words, digital leadership creates psychological conditions, namely engagement, that subsequently facilitate OCB. This mediation model is important because it explains why and how digital leadership affects employees' voluntary behaviors, not merely that such a relationship exists. For instance, research by Zhu et al. (2018), which examined the relationship between transformational leadership and OCB through work engagement among healthcare workers in China, demonstrated that work engagement served as a partial mediator. In our proposed conceptual model, we argue that digital leadership, with its unique characteristics in the context of digital transformation, will be more strongly predictive of OCB through engagement compared to traditional leadership styles. This is because digital leadership directly addresses specific technological demands that are major sources of stress and disengagement in today's digital workplace.

Technostress as a Contemporary Challenge

Technostress represents one of the most significant contemporary challenges faced by healthcare workers in the digital transformation era. The term was first introduced by American psychologist Craig Brod in 1984, who defined it as a modern disease of adaptation caused by an inability to cope with new technologies in a healthy manner (Brod, 1984, as cited in Ragu Nathan et al., 2008). In organizational contexts, Ragu Nathan et al. (2008) provided a more operational definition, describing technostress as the stress experienced by end users in organizations as a result of their use of information and communication technologies. This phenomenon, often termed digital stress, emerges when individuals experience information overload and constant contact with digital devices, and is marked by clinical symptoms at coronary, mental, and neurological levels (Malhotra & Singh, 2023). A systematic literature review using the Job Demands Resources (JD R) model found that most studies categorize ICT as a job demand that negatively affects human behavior, thoughts, and attitudes in the workplace (Molinillo et al., 2023).

Technostress has serious consequences for three key aspects of healthcare organizations: work engagement, organizational citizenship behavior (OCB), and the effectiveness of digital leadership itself. Based on the JD R theory framework outlined in the previous section, technostress functions as a job demand that depletes employees' psychological resources. This aligns with the findings of Molinillo et al. (2023), who showed that most studies categorize ICT as a job demand that negatively affects human behavior, thoughts, and attitudes. In empirical studies using the JD R model, researchers found that technostress creators are positively associated with burnout, which in turn is positively associated with disengagement from knowledge sharing (Molino et al., 2020, as cited in Tarafdar et al., 2021). These findings indicate that technostress not only causes emotional exhaustion but also reduces employees' willingness to share knowledge and collaborate, behaviors that are critically important in healthcare contexts that rely on interprofessional teamwork. The qualitative study by Köbler et al. (2024) also confirmed that EHR adoption leads to increased administrative burden and workplace stress, which in turn affects healthcare workers' well being and job satisfaction.

First, technostress directly weakens work engagement. The basic principle of JD R theory states that when job demands, in this case technostress, are high and job resources, such as support from digital leadership, are low, work engagement decreases. Healthcare workers experiencing high levels of technostress will experience reduced vigor, as their mental energy is depleted coping with technological frustrations; reduced dedication, as they begin to question the meaning of their work amidst increasing administrative burdens; and reduced absorption,

as they struggle to focus fully on patient care when their minds are constantly distracted by technical difficulties or concerns about digital systems (Schaufeli et al., 2002). Empirical evidence from Molinillo et al. (2023) shows that when ICT tools are strategically planned and used within organizations, they can enrich employees' workplace experiences. Conversely, when ICT is implemented without careful planning, it becomes a source of stress that erodes engagement. In the healthcare context, the research by Yanto et al. (2026) explicitly states that technological stressors contribute to decreased work efficiency, reduced job satisfaction, and potential risks to patient care quality, all of which are indicators and consequences of low work engagement.

Second, technostress significantly reduces organizational citizenship behavior (OCB). Employees experiencing high levels of technostress tend to have limited psychological resources to engage in voluntary, extra role behaviors. The principle of resource depletion in organizational psychology explains that when individuals expend their cognitive and emotional energy coping with stressors, they have less remaining capacity for altruism, conscientiousness, sportsmanship, courtesy, or civic virtue. Empirical findings from a study conducted in South Africa by Nkomo et al. (2023) show that workplace technostress is negatively associated with OCB, such that employees with higher levels of technostress tend to exhibit lower organizational citizenship behavior. The study also found a stronger relationship between technostress and deviant workplace behavior than with OCB, indicating that technostress not only reduces positive behaviors but may also trigger negative ones. In the healthcare context, these findings are highly relevant because OCB is foundational to effective teamwork and patient safety. When nurses or doctors are mentally exhausted due to technostress, for example from spending hours inputting data into EMRs outside of their regular shifts, they may no longer have the energy to help overwhelmed colleagues (altruism), attend non mandatory quality improvement meetings (civic virtue), or maintain patience when dealing with demanding patients (sportsmanship). This can ultimately negatively affect patient care quality and overall organizational effectiveness.

Third, technostress can significantly reduce the effectiveness of digital leadership. This moderation argument represents the strongest novelty in this conceptual paper. Digital leadership is designed to empower employees, facilitate adaptation, and reduce uncertainty in the digital transformation era (El Sawy et al., 2016; Cortellazzo et al., 2019). However, the effectiveness of digital leadership heavily depends on employees' psychological conditions. When healthcare workers experience very high levels of technostress, such as extreme digital fatigue, debilitating techno anxiety, or feelings of overwhelm due to the complexity of digital systems, digital leaders' efforts to provide support, training, or other resources may be ineffective. In other words, technostress acts as a boundary condition that constrains the positive effects of digital leadership on work engagement and OCB. From the perspective of JD R theory, even when digital leadership provides job resources, excessively high job demands, such as extreme technostress, can overwhelm those resources. This aligns with the findings of Molinillo et al. (2023) that individual characteristics and organizational procedures can shape employees' interpretations of their ICT related experiences. When technostress is high, employees tend to interpret digital leadership efforts as insufficient or irrelevant because they are already too exhausted and frustrated.

Research by Ertiö et al. (2024) indicates that digital leaders' emotional intelligence is an essential characteristic for reducing employee technostress through communication, transparency, and trust. However, when technostress has reached very high levels, even digital leaders with high emotional intelligence may face significant challenges in restoring employee engagement and OCB. Thus, this conceptual paper proposes that technostress serves as a moderator that weakens the positive relationship between digital leadership and work engagement, and indirectly weakens the mediating effect of work engagement on the

relationship between digital leadership and OCB. This novelty makes an important contribution to the literature by showing that digital leadership cannot be understood as a universal solution to the challenges of digital transformation in healthcare organizations; its effectiveness is highly dependent on the level of technostress experienced by healthcare workers. Technostress reduction strategies, such as adequate training, responsive technical support, user friendly system design, and right to disconnect policies that protect employees' rest time, should be integrated into digital leadership approaches to maximize their positive impact on engagement and OCB (Yanto et al., 2026; Solé Casals et al., 2025).

Proposed Conceptual Framework

Building on the theoretical integration of Social Exchange Theory (SET) and the Job Demands Resources (JD R) theory outlined in the preceding sections, this section presents a conceptual framework that integrates digital leadership, work engagement, organizational citizenship behavior (OCB), and technostress as a moderator. This framework is designed to explain how digital leadership can influence the voluntary behaviors of healthcare workers in the digital transformation era, as well as the conditions that limit its effectiveness.

The proposed conceptual model has the following structure. The independent variable is digital leadership. The mediator is work engagement. The dependent variable is organizational citizenship behavior (OCB). The moderator is technostress. The relationships among these variables follow the pathway: digital leadership influences work engagement, which in turn influences OCB, with technostress acting as a moderator that weakens the positive effect of digital leadership on work engagement.

The conceptual model is built on the premise that digital leadership is an essential organizational job resource in the context of digital transformation in healthcare organizations. Its influence on OCB is not direct but rather operates through the mediating mechanism of work engagement. Recent empirical research by Li et al. (2026), using Conservation of Resources (COR) theory with 352 employees across various companies in China through a two wave time lagged design, significantly found that digital leadership positively and significantly enhances employee work engagement. This study also revealed that digital self efficacy partially mediates this relationship. More importantly, the positive effect of digital leadership on digital self efficacy substantially weakened when technostress was high. These findings provide strong empirical evidence for the role of technology as a boundary condition. Meanwhile, empirical evidence for the mediating role of work engagement in the relationship between leadership and OCB has been documented in the healthcare literature. Research by Türkmen and Mete (2024) showed that inclusive leadership has a significant positive effect on both work engagement and OCB among healthcare workers, with work engagement positively correlated with OCB. Furthermore, research by Bardhan and Haque (2025), involving 414 healthcare workers across eight private hospitals in India, found that employee engagement significantly mediates the relationship between occupational self efficacy and OCB. Another study by Khan et al. (2025) in Pakistani public health institutions demonstrated that digital leadership positively influences sense of empowerment, which in turn enhances techno work engagement and sustainability performance.

The main novelty of the proposed conceptual model lies in positioning technostress as a moderating variable that weakens the influence of digital leadership on work engagement. As extensively explained in the previous section, technostress represents the most significant contemporary challenge in the digital transformation era. Research by Li et al. (2026) empirically demonstrates that the positive effect of digital leadership on digital self efficacy substantially weakens when technostress is high. Based on these findings and the argument that technostress acts as a job demand that depletes employees' psychological resources and limits their capacity to respond positively to digital leadership efforts, this model proposes

technostress as a moderator that weakens the relationship between digital leadership and work engagement. In other words, when healthcare workers experience very high levels of technostress, the effectiveness of digital leadership in enhancing work engagement diminishes because their mental and emotional energy has already been depleted by coping with technological frustrations, digital fatigue, and techno anxiety. This novelty makes an important contribution to the literature by demonstrating that digital leadership cannot be understood as a universal solution to the challenges of digital transformation in healthcare organizations; its effectiveness depends heavily on the level of technostress experienced by healthcare workers. Based on the conceptual framework outlined above, this paper proposes four main hypotheses to guide future empirical research.

Hypothesis 1 (H1): Digital leadership positively influences work engagement among healthcare employees. The argument for H1 is grounded in JD R theory, which positions digital leadership as a critical job resource that stimulates the motivational process leading to work engagement. In healthcare organizations, effective digital leaders provide resources such as digital vision clarity, adequate technical support, continuous training, and digital autonomy that enable healthcare workers to feel competent and valued. Research by Khan et al. (2025) in Pakistani public health institutions empirically shows that digital leadership positively influences sense of empowerment, which in turn enhances techno work engagement. Furthermore, research by Li et al. (2026) using COR theory directly found that digital leadership significantly increases employee work engagement ($p < 0.001$). In the context of Italian healthcare organizations, research by Ficco et al. (2026) also showed that supportive leadership is positively associated with job autonomy, team task cohesion, and digital literacy, which significantly mediate the relationship with engagement, with findings consistent across contexts. Therefore, digital leadership is predicted to enhance healthcare workers' vigor, dedication, and absorption in the workplace.

Hypothesis 2 (H2): Work engagement positively influences organizational citizenship behavior (OCB) among healthcare employees. The argument for H2 is grounded in Social Exchange Theory, whereby employees who feel supported and valued by the organization through the resources provided develop a sense of reciprocal obligation to exhibit behaviors that exceed formal job requirements. Employees with high work engagement possess sufficient psychological energy to perform altruism, conscientiousness, sportsmanship, courtesy, and civic virtue. Research by Bardhan and Haque (2025) showed that employee engagement significantly mediates the relationship between occupational self efficacy and OCB, such that fostering employee engagement can significantly contribute to achieving OCB in the healthcare sector. Research by Türkmen and Mete (2024) also found that inclusive leadership has a significant positive effect on both work engagement and OCB among healthcare workers, with work engagement and OCB significantly positively correlated. Therefore, work engagement is predicted to enhance healthcare workers' OCB.

Hypothesis 3 (H3): Work engagement mediates the positive relationship between digital leadership and organizational citizenship behavior (OCB) among healthcare employees. The argument for H3 is grounded in the integration of JD R theory and Social Exchange Theory, which explains that the influence of digital leadership on OCB is not direct but rather operates through work engagement as a mediating mechanism. In other words, digital leadership creates psychological conditions, namely work engagement, that subsequently facilitate OCB. This mediation model is important because it explains why and how digital leadership affects employees' voluntary behaviors, not merely that such a relationship exists. Digital leadership provides job resources that trigger a motivational process, namely work engagement, based on JD R theory, which in turn encourages employees to reciprocate through OCB based on Social Exchange Theory. Research by Turangan and Kailola (2024) in Vietnam explicitly investigated the relationship between digital leadership and multidimensional OCB

with employee empowerment and affective commitment as mediators. Research by Ficco et al. (2026) also showed that supportive leadership is related to work engagement through the mediation of job autonomy, team task cohesion, and digital literacy, where engagement is an outcome predicted by leadership. Further research by Kurniawan et al. (2024) found that digital leadership enhances prohibitive voice behavior through work engagement, indicating that work engagement significantly mediates the relationship between digital leadership and relevant extra role behaviors, although not OCB specifically. Therefore, work engagement is predicted to mediate the positive relationship between digital leadership and OCB.

Hypothesis 4 (H4): Technostress moderates the relationship between digital leadership and work engagement, such that the positive influence of digital leadership on work engagement is weaker when technostress is high. The argument for H4 represents the strongest novelty in this conceptual paper. Based on JD R theory, technostress functions as a job demand that depletes employees' psychological resources, while digital leadership functions as a job resource that supports engagement. When technostress is high, extreme job demands can overwhelm the resource effects provided by digital leadership. In other words, technostress acts as a boundary condition that limits the effectiveness of digital leadership. Research by Li et al. (2026) empirically found that the positive effect of digital leadership on digital self efficacy substantially weakens when technostress is high. Although this study examined the moderating role of technostress on the relationship between digital leadership and digital self efficacy, its implications for work engagement are highly relevant because digital self efficacy is an important antecedent of work engagement. These findings indicate that when employees experience high levels of technostress, their psychological resources are depleted, making digital leadership efforts to enhance engagement less effective. Research by Molinillo et al. (2023) within the JD R model framework also showed that most studies categorize ICT as a job demand that negatively affects employee behavior, thoughts, and attitudes, and that technostress creators are positively associated with burnout and disengagement from knowledge sharing. Therefore, technostress is predicted to weaken the positive relationship between digital leadership and work engagement.

Based on the conceptual framework and hypotheses proposed, this paper advances five key propositions that can be empirically tested in future research.

Proposition 1: Digital leadership positively influences work engagement among healthcare workers in healthcare organizations (H1).

Proposition 2: Work engagement positively influences organizational citizenship behavior (OCB) among healthcare workers in healthcare organizations (H2).

Proposition 3: Work engagement significantly mediates the positive relationship between digital leadership and OCB among healthcare workers in healthcare organizations (H3).

Proposition 4: Technostress moderates the relationship between digital leadership and work engagement, such that the positive influence of digital leadership on work engagement is weaker when technostress is high (H4).

Proposition 5: The indirect effect of digital leadership on OCB through work engagement is conditional on the level of technostress, representing moderated mediation, whereby the mediating effect is stronger when technostress is low and weaker or non significant when technostress is high.

Overall, the conceptual framework proposed in this paper provides a comprehensive understanding of how digital leadership can influence the voluntary behaviors of healthcare workers in the digital transformation era, taking into account the critical role of work engagement as a mediating mechanism and technostress as a contextual factor that limits the effectiveness of digital leadership. This model acknowledges that digital leadership is not a universal solution; its effectiveness depends heavily on the level of technostress experienced by healthcare workers and the psychological conditions that mediate the relationship. Thus,

this framework makes a significant theoretical contribution to the human resource management and organizational behavior literature in the context of healthcare digital transformation, and offers clear directions for future empirical research.

Theoretical Implications

This section presents the theoretical contributions of the conceptual framework proposed in this paper. Specifically, this paper makes three main contributions to the human resource management and organizational behavior literature, particularly in the context of digital transformation in healthcare organizations. These contributions are: (A) the extension of Job Demands Resources (JD R) theory through the conceptualization of digital leadership as a job resource; (B) the integration of four key variables previously studied largely in isolation, namely leadership, technostress, engagement, and OCB, into a single comprehensive moderated mediation model; and (C) the focus on the healthcare context, which remains underexplored in the digital leadership and OCB literature.

The first theoretical contribution of this paper lies in extending Job Demands Resources (JD R) theory through the conceptualization of digital leadership as a critical job resource in the digital transformation era. JD R theory, first introduced by Demerouti et al. (2001) and significantly developed over the past two decades, has been consistently used to predict employee well being, work behavior, and organizational performance (Bakker & Demerouti, 2024). In its development, JD R theory has been extended to various organizational contexts, including virtual and hybrid teams, where researchers have found that social resources such as communication quality, knowledge sharing, and trust are the strongest predictors of team performance (Coulston et al., 2025). However, the integration of digital leadership as a job resource within the JD R framework remains limited, especially in the context of healthcare organizations.

This paper explicitly conceptualizes digital leadership as a job resource that functions through three main mechanisms based on JD R theory. First, digital leadership functions as a resource that helps achieve work goals. Effective digital leaders provide digital vision clarity, adequate technical support, continuous training, and reliable technological infrastructure. All of these help healthcare workers complete their clinical and administrative tasks more efficiently amidst the complexity of digital systems. Second, digital leadership functions as a resource that reduces job demands and their associated physiological and psychological costs. Recent research by Zhang et al. (2025) showed that leadership style, in this case transformational leadership, can weaken the negative relationship between digital fatigue and work engagement. These findings indicate that supportive leadership can protect employees from the detrimental effects of digital job demands. In our framework, digital leadership is extended in its role as a job resource that specifically reduces the negative impact of technostress, including techno overload, techno complexity, techno invasion, and techno uncertainty, which are typical job demands in the digital transformation era.

Third, digital leadership functions as a resource that stimulates personal growth, learning, and development. As identified in a systematic review by Abbu et al. (2022), digital leaders in the healthcare industry possess attributes related to leadership and learning, including the ability to continuously learn about new technologies and facilitate learning for their teams. From the JD R perspective, these resources that stimulate personal growth are essential for triggering the motivational process leading to work engagement. Empirical research by Ye (2025) using JD R theory explicitly showed that digital leadership enhances organizational resilience through the mediation of job crafting, a finding that supports the view that digital leadership functions as a job resource that encourages proactive employee behaviors in reshaping their work in the digital era. By conceptualizing digital leadership as a job resource within the JD R framework, this paper extends the scope of JD R theory into the domain of

digital leadership, an area previously dominated by research on transformational leadership or supportive leadership in non digital contexts.

Furthermore, this paper enriches JD R theory by introducing technostress as a moderator that weakens the effectiveness of job resources. In the classic JD R model, job demands and job resources are often treated as independent or interactive predictors of burnout and engagement. However, recent research by Ren et al. (2025) using the JD R model found that techno overload has a nonlinear, specifically inverted U shaped, effect on digital creativity, and that digital leadership acts as a boundary condition that strengthens the positive effect of moderate techno overload. These findings indicate that the relationship between technological demands and work outcomes is not always linear, and that leadership plays a critical role in shaping how employees respond to those demands. Our paper proposes that technostress, when excessively high, can overwhelm the positive effects of digital leadership as a job resource, a moderating mechanism rarely explored in the JD R literature. Thus, this paper contributes to the development of JD R theory by showing that the effectiveness of job resources is conditional on the level of job demands, and that extreme technostress can be a boundary condition limiting the effectiveness of digital leadership.

The second theoretical contribution of this paper lies in integrating four key variables previously studied largely in isolation, namely digital leadership, technostress, work engagement, and organizational citizenship behavior (OCB), into a single comprehensive moderated mediation model. This integration addresses a gap in the existing literature, where most studies have only examined bivariate relationships or simple mediation without considering the complex interactions among variables in the context of digital transformation. First, this paper integrates digital leadership with work engagement and OCB in a mediation model. Previous research has examined the relationship between transformational leadership and OCB through work engagement (Zhu et al., 2018), but research on digital leadership and OCB remains very limited. Research by Turangan and Kailola (2024) in Vietnam began investigating the relationship between digital leadership and multidimensional OCB, finding that employee empowerment and affective commitment mediate that relationship. Research by Kurniawan et al. (2024) also showed that digital leadership enhances prohibitive voice behavior through work engagement, indicating that work engagement is an important mediating mechanism for various forms of extra role behaviors. Our paper extends these findings by specifically proposing work engagement as a mediator between digital leadership and OCB in the context of healthcare organizations. This integration is important because it explains the internal psychological mechanism, namely vigor, dedication, and absorption, that explains how digital leadership translates into employees' voluntary behaviors, rather than merely assuming a direct effect of digital leadership.

Second, this paper integrates technostress as a moderating variable that affects the relationship between digital leadership and work engagement. The integration of technostress as a moderator represents the strongest novelty in this paper. Research by Li et al. (2026) empirically shows that the positive effect of digital leadership on digital self efficacy substantially weakens when technostress is high. Although that study examined the moderating role of technostress on the relationship between digital leadership and digital self efficacy, rather than directly on work engagement, these findings provide initial evidence that technostress can limit the effectiveness of digital leadership. In a broader context, research by Ertiö et al. (2024) in Business Horizons showed that digital leaders' emotional intelligence is an essential characteristic for reducing employee technostress, indicating that technostress and digital leadership are closely related. Our paper extends these findings by theoretically proposing that technostress is a boundary condition that weakens the relationship between digital leadership and work engagement. By including technostress as a moderator, our model becomes more realistic and contextual, as it acknowledges that digital leadership is not always

effective under all conditions; its effectiveness depends heavily on the level of technological pressure experienced by employees.

Third, this paper integrates all four variables into a single unified moderated mediation model. A moderated mediation model, in which the mediating effect of work engagement on the relationship between digital leadership and OCB is conditional on the level of technostress, has not been explicitly proposed in previous literature. Research by Khan et al. (2025) in Pakistani public health institutions showed that digital leadership positively influences sense of empowerment, which in turn enhances techno work engagement and sustainability performance, but that study did not examine the moderating role of technostress. Research by Türkmen and Mete (2024) showed that inclusive leadership has a positive effect on both work engagement and OCB among healthcare workers, but also did not examine conditional mechanisms. By simultaneously integrating mediation and moderation, our paper provides a more nuanced understanding of when, with technostress as a moderator, and how, with work engagement as a mediator, digital leadership influences OCB. This integration is crucial because healthcare organizations cannot apply a one size fits all approach to digital leadership development; strategies must be tailored to the level of technostress experienced by healthcare workers in specific units or departments.

Additionally, this integration brings together two different yet complementary theoretical frameworks: JD R theory and Social Exchange Theory (SET). JD R theory explains why digital leadership enhances work engagement, through the provision of job resources that trigger a motivational process, while SET explains why work engagement leads to OCB, through the norm of reciprocity, whereby engaged employees feel motivated to reciprocate organizational support with extra role behaviors. The integration of two theories in a single model is rarely undertaken in the digital leadership literature, which tends to rely on only one theoretical framework. By combining JD R and SET, our paper provides a more robust and comprehensive theoretical foundation to explain the causal chain from digital leadership to OCB. This aligns with recent developments in the literature, where research by Coulston et al. (2025) also emphasizes the need for multi theoretical approaches to understanding phenomena in digital workplaces.

The third theoretical contribution of this paper is its focus on the healthcare context, which remains underexplored in the digital leadership and OCB literature. Although digital leadership has become an increasingly popular topic across various industries, research on digital leadership in the healthcare sector remains relatively limited and fragmented. A systematic review by Abbu et al. (2022) on digital leadership in the healthcare industry identified 37 digital leader attributes, but the review acknowledged that the healthcare industry has been slow in the adaptation of digital leadership along with the gap in research present. Similarly, a systematic review by Putra et al. (2025), analyzing 18 articles from Scopus, Web of Science, PubMed, and Google Scholar, found that the role of digital leadership in optimizing human resource management in healthcare still has many gaps, especially in the context of AI integration and its accompanying ethical challenges. Research by Tsekouropoulos et al. (2025) developed a Leadership 4.0 framework for healthcare and identified that Leadership 4.0 in the healthcare sector requires a unique combination of digital literacy, strategic foresight, emotional intelligence, adaptability, and the ability to drive innovation in an environment laden with regulation and high risk. However, that framework did not specifically integrate technostress, work engagement, or OCB.

This paper fills this gap by specifically adapting the digital leadership OCB model to the unique characteristics of healthcare organizations. First, healthcare organizations have a high stakes environment that differs from other industries. Errors in healthcare can be fatal for patients, so the pressure to use digital technology correctly and quickly is very high. This makes technostress, which in the healthcare context includes concerns about data entry errors in

electronic medical records, difficulty navigating hospital information systems, and pressure from telemedicine, a more critical issue than in other industries. Second, healthcare organizations heavily depend on interprofessional collaboration among doctors, nurses, technicians, pharmacists, and administrative staff. OCB in the healthcare context, such as altruism, civic virtue, and courtesy, is essential for patient safety and service quality. Research by El Shaer et al. (2022) in a scoping review on OCB in healthcare settings explicitly stated that healthcare services require OCB to meet the demands of patient centered, cost effective, and high quality care amidst increasing complexity and competition. However, that scoping review did not specifically address how digital transformation affects the expression of OCB. Our paper fills this gap by proposing that in digital environments, healthcare workers may face trade offs between digital task demands, such as EHR data entry, and OCB, and that digital leadership is needed to balance these demands.

Third, healthcare organizations in Indonesia and other developing countries face unique digital infrastructure and digital literacy challenges. A systematic review by Putra et al. (2025) identified regional disparities whereby developed countries prioritize AI ethics and data governance, while developing countries face challenges of inadequate digital infrastructure and low digital literacy. This means that digital leadership in healthcare contexts in developing countries may require a greater focus on basic training and technical support, rather than advanced digital innovation. Our paper, although conceptual in nature, provides a foundation for empirical research across various national and cultural contexts, including Indonesia. Fourth, research on OCB in healthcare organizations shows that OCB is closely related to patient safety and quality of care. A study by Ervin et al. (2018) showed that the social or relational functions of team members, manifested through citizenship behaviors such as helping and courtesy, are critical factors in achieving safe patient outcomes and unit performance in critical care units. Another study by Perreira and Berta (2015) found that civic virtue, such as proactively identifying process improvements, and sportsmanship, maintaining a positive attitude even under stressful clinical conditions, are significantly related to service quality in hospitals.

Future Research Directions

Future empirical research is advised to employ SEM PLS to test the moderated mediation model, given its capacity to handle complex constructs and non normal distributions (Hair et al., 2019), as has been applied in Indonesian hospitals (Haloho et al., 2025; Saragi et al., 2025). Longitudinal studies with at least three waves are necessary to establish causality, as most current research remains cross sectional (Heponiemi et al., 2017; Li et al., 2026). Mixed methods, combining quantitative and qualitative approaches, can explore healthcare workers' lived experiences of technostress and digital leadership (Bardhan & Haque, 2025). Multilevel analysis is recommended because healthcare organizations are hierarchical in nature, involving individuals, teams, and hospitals, with contextual variables such as organizational digital culture (Hussain et al., 2025). Action research is suitable for testing interventions aimed at enhancing digital leadership capacity in primary health centers or hospitals, as demonstrated by the SPHERES initiative in Indonesia (Tenggono & Soetjipto, 2025).

The model can be enriched by incorporating burnout as an outcome or mediator. Research indicates that technostress is positively correlated with burnout, which in turn reduces OCB (Molino et al., 2020; Gualano et al., 2024). Digital competency, or digital literacy, functions as a personal resource that strengthens the relationship between digital leadership and work engagement (Li et al., 2026). Resilience may serve as a moderator that protects engagement in the face of high technostress (Afshin et al., 2025; Hussain et al., 2025). AI readiness needs to be explored given the rapid adoption of artificial intelligence in healthcare services (Li et al., 2026; Arboh et al., 2025). Psychological well being is also relevant as an

ultimate outcome of digital leadership and engagement (Arboh et al., 2025; Molinillo et al., 2023).

Research should be conducted across different types of hospitals, including public and private, various classification levels, and urban and rural settings, because unit characteristics, such as intensive care units versus administrative departments, moderate the relationships within the model (Widyastuti et al., 2025; Hussain et al., 2025). Nurses represent a key population as they are the most intensive users of EMR or EHR systems and are particularly vulnerable to technostress (Yanto et al., 2026; Wulandari et al., 2023). Pharmacists in clinical, hospital, and industrial settings face pressures from e prescribing and automated dispensing, yet remain severely understudied (Febriani, 2018). Public health workers at primary health centers and district health offices face challenges of limited digital infrastructure alongside demands for accurate data reporting, thus requiring specific model testing.

Future research can test this model using SEM PLS or CB SEM with longitudinal data or mixed methods, incorporate additional variables such as burnout, digital competency, resilience, AI readiness, and psychological well being, and extend the scope to include hospital contexts as well as nurses, pharmacists, and public health workers.

Conclusion

This conceptual paper has developed a comprehensive theoretical framework to explain the relationship between digital leadership and organizational citizenship behavior (OCB) in healthcare organizations undergoing digital transformation. By integrating Job Demands-Resources (JD-R) theory and Social Exchange Theory (SET), the paper proposes that work engagement serves as a mediating mechanism linking digital leadership to OCB, while technostress acts as a moderating factor that weakens the positive influence of digital leadership on work engagement. The framework advances four key propositions: digital leadership positively influences work engagement (H1); work engagement positively influences OCB (H2); work engagement mediates the digital leadership–OCB relationship (H3); and technostress moderates the digital leadership–work engagement relationship (H4).

Several theoretical contributions emerge from this paper. First, it extends JD-R theory by conceptualizing digital leadership as a critical *job resource* that stimulates motivational processes and by introducing technostress as a *boundary condition* that constrains leadership effectiveness. Second, it integrates four previously siloed variables digital leadership, technostress, work engagement, and OCB into a unified moderated mediation model, offering a more nuanced understanding of employee behavior in digital healthcare environments. Third, it addresses the underexplored healthcare context, recognizing unique characteristics such as high emotional labor, interprofessional collaboration, patient safety imperatives, and the specific challenges of digital system adoption in hospitals, pharmacies, and primary care settings.

From a practical perspective, healthcare organizations should invest in developing digital leadership competencies among managers and supervisors. Digital leaders need not only technological proficiency but also the ability to empower employees, facilitate adaptation to digital systems, and reduce uncertainty during technological change. Organizations should simultaneously address technostress by providing adequate training, responsive technical support, user-friendly system design, and policies that protect work–life boundaries (e.g., right to disconnect). Without mitigating technostress, even the most effective digital leadership may fail to enhance work engagement and OCB. Human resource management strategies should also consider individual differences in digital competency and resilience, tailoring support to younger and older healthcare professionals alike.

The paper acknowledges several limitations inherent to conceptual work. The proposed relationships require empirical testing using rigorous methods such as longitudinal designs,

multilevel analysis, and mixed methods. Future research should examine the model across diverse healthcare settings (public vs. private hospitals, rural vs. urban facilities) and professional groups (nurses, physicians, pharmacists, public health workers). Additional variables including burnout, digital competency, resilience, AI readiness, and psychological well-being could enrich the framework. Comparative cross-cultural studies are also needed to assess the generalizability of findings across different national and regulatory contexts.

In conclusion, as healthcare organizations worldwide accelerate their digital transformation, understanding how digital leadership can foster positive employee behaviors while mitigating technostress becomes imperative. This conceptual paper provides a foundational roadmap for researchers and practitioners alike, emphasizing that sustainable digital transformation in healthcare requires not only advanced technologies but also human-centered leadership that engages employees, supports their well-being, and inspires voluntary contributions beyond formal job descriptions. The proposed framework invites empirical scrutiny and offers actionable insights for building resilient, engaged, and citizenship-oriented healthcare workforces in the digital era.

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