Technological Forecasting & Social Change 205 (2024) 123510

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

journal homepage: www.elsevier.com/locate/techfore

High involvement work system and organizational and employee resilience: Impact of digitalisation in crisis situations

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ARTICLE INFO

Keywords:
Digitalisation
AI-enabled platforms, high involvement work systems
Resilience
Transformational leadership

ABSTRACT

This study investigates the mediating role of employee perceptions about their power, information, rewards, and knowledge (PIRK) in the impact of high involvement work systems (HIWS) on organizational resilience and employee outcomes, and the moderating role of transformational leadership in this process. We find support for most of our hypotheses using data collected from 379 employees in a technologically-mediated work context. Specifically, HIWS's focus on teamwork and training enhances employee perceptions of power, information, rewards, and knowledge sharing, which in turn leads to higher organizational resilience and employee outcomes comprising job performance and satisfaction, and positive mental health and retention. The study also confirms the mediating role of employee perceptions of PIRK and the moderating effect of transformational leadership. This study contributes to the growing HIWS literature by extending its conceptual definition and linking it to organizational resilience and employee outcomes through employee perceptions of PIRK. We also discuss that involving employees in decision-making during the digitalization process may help improve organizational and employee resilience in crisis situations.

1. Introduction

The onset of the COVID-19 global pandemic has disrupted conventional business models, prompting organizations to swiftly adapt to the changing landscape through accelerated digitalization and innovative practices (Almeida et al., 2020). This era of transformation has necessitated re-evaluating how new and innovative technologies can reshape various facets of work (Almeida et al., 2020). With an increasing demand for talent transcending geographical boundaries, organizations have been compelled to reconfigure their operations, such as the aviation sector's adoption of ultra-long-haul and point-to-point flights to adapt to lockdowns (Bauer et al., 2020). Similarly, global food chain firms have innovated their business models, enhancing resilience and competitiveness to face the enormous challenges posed by the pandemic (Ali et al., 2022). While this evolving landscape underscores the need for organizational change, it also emphasizes the importance of reimagining work structures and supporting these changes with effective managerial practices. Innovative solutions, especially technology platforms for improved communication, are pivotal to fostering resilience and resource utilization in crisis situations.

The adoption of live-stream promotions and AI-enabled technologies has enhanced information sharing and improved service quality, a critical aspect of customer and stakeholder engagement (Lau, 2020). The increasing prevalence of AI applications for autonomous decision-making, including integrating AI-enabled digital voice assistants in various domains, showcases the ongoing technological evolution (Sharma et al., 2022; Talwar et al., 2021; Talwar et al., 2022). These innovations extend to optimizing work processes and facilitating agile procurement strategies (Bag et al., 2021; Modgil et al., 2021). Digital transformation in the workplace has the potential to drive productivity and business growth, underpinned by speed-to-market enhancements, which are vital in competitive environments (Döhring et al., 2021).

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https://doi.org/10.1016/j.techfore.2024.123510
Received 30 April 2023; Received in revised form 19 May 2024; Accepted 5 June 2024
Available online 14 June 2024

In this context, efficient technologies and technology-enabled communication and collaboration platforms facilitate accessible, faster, and more collaborative employee interactions (Nguyen and Malik, 2021). This, in turn, has led to increased employee satisfaction and retention, aligning with the broader focus on workplace digitalization, encompassing AI, robotics, and cloud technology (Malik et al., 2021; Nguyen and Malik, 2021). However, resistance to change is a prevalent challenge, necessitating the cultivation of organizational and individual resilience as organizations navigate this transformative process (Prentice and Nguyen, 2020).

Yet, the benefits of digitalization in the workplace do not come without their concerns. Digitalization may have significant implications for job design and the allocation of work tasks, with the challenge of distinguishing tasks most suitable for humans from those that can be automated (Prentice and Nguyen, 2020). Workplace innovations driven by digitalization also pressure employees, who must adapt to digitalized work practices and continuously update their skill sets (Budhwar et al., 2022; Prikshat et al., 2021). The fear of job displacement due to the feasibility of automating tasks adds further stress during this critical business transformation phase (Nguyen and Malik, 2021). This research aims to bridge these divides by exploring how organizations and individuals can cultivate resilience, particularly during and after global pandemics, under the influence of transformational leadership and the impact of high-involvement work systems in human resource management practices. Such an understanding is foundational for driving innovation, as resilience is a core resource for engagement in innovative endeavors.

Existing literature highlights the significance of bolstering employee well-being and resilience in innovation processes (Athota and Malik, 2019; Kuntz et al., 2017) and underscores the role of organizational and individual-level resilience in service innovations (Senbeto and Hon, 2020). Recent research accentuates the importance of investing in specific human resource management practices, such as skills development and training, as essential for implementing digital innovations in knowledge-intensive healthcare settings (Garcia-Perez et al., 2022; Hack-Polay et al., 2023). To facilitate the transition to digitalization, organizations often need to invest in bundles of high-performance human resource practices, including introducing high-involvement work practices (HIWSs), to ensure employee alignment and performance enhancement (Nguyen and Malik, 2021).

Nonetheless, the effectiveness of HIWSs, encompassing employee perceptions of their adoption, remains an unknown variable. It represents a significant gap in our understanding of how firms can navigate crisis situations through digitalization and the consequent changes to work practices. The imperative to build organizational and employee resilience to respond effectively to change and disruptions remains central in the wake of the pandemic (Duncan, 2020). Nevertheless, research examining the digitalization of the workplace during the pandemic and its impact on organizations' implementation of HIWSs, as well as the implications for employee and organizational resilience, still needs to be explored. Moreover, the role of transformational leadership in driving substantial change during periods of adversity requires further exploration (Lombardi et al., 2021).

In light of these identified gaps and challenges, this research aims to provide valuable insights into the evolving dynamics of the digitalized workplace and its impact on employees and organizations. The study aims to provide a more comprehensive understanding of the interplay between technology, organizational practices, and resilience, particularly in post-pandemic adaptation and innovation. Therefore, the objectives of this study are threefold: (1) to identify the underlying dimensions of HIWSs, (2) to explore the potential mediating role of employee perceptions of PIRK in the influence of HIWSs on organizational resilience and employee outcomes, and (3) to examine the potential moderating role of transformational leadership on the relationship among these variables. Specifically, we employ the theoretical lens of the HIWSs model (e.g., Boxall and Winterton, 2018) and link this to transformational leadership to provide a fresh perspective of the HIWSs model in the digitalization context.

By comprehensively addressing the impact of HIWSs and their underlying elements, examining all facets of employee perceptions of PIRK, and uncovering the moderating role of transformational leadership, this research not only advances our knowledge of HIWSs and their implications but also paves the way for a more nuanced and extensive exploration of these intricate relationships. Its novel insights and research approach are poised to invigorate future research efforts, offering fresh perspectives and avenues for exploration in human resource management (HRM), organizational resilience, and leadership studies. This study will also help HRM practitioners select appropriate policies and activities to improve organizational resilience and employee outcomes in crisis situations.

2. Literature review and research gaps

2.1. HIWS model

HIWS is a set of HRM practices to enhance employee participation and involvement in their jobs and work environment. According to Boxall and Winterton (2018), HIWSs can be characterized by four dimensions: power, information, rewards, and knowledge sharing (PIRK). These dimensions reflect the degree of employee influence over work processes and associated outcomes. HIWSs are not new to HRM, but they have evolved with the development of information technology. Boxall et al. (2019) argue that HIWSs originated in the late Industrial Revolution when managers tried to improve productivity and efficiency by conducting time-and-motion studies. However, these practices did not specifically involve employees in decision-making and/or provide them with adequate training or feedback. In contrast, modern HIWSs incorporate the introduction and training of information technology in the workplace, enabling employees to have more control, autonomy, and empowerment in their work roles (Boxall and Winterton, 2018). Kilroy et al. (2020) suggest different variants of HIWSs, depending on the context and the combination of practices adopted by organizations.

Besides improving employee outcomes, HIWSs can positively affect organizational outcomes, such as innovation, productivity, team creativity quality, and customer satisfaction (e.g., Malik et al., 2023; Nguyen et al., 2022; Song et al., 2020). These effects can be explained by the resource-based view of the firm, which suggests that HIWSs can create valuable, rare, inimitable, and non-substitutable human capital that can enhance the firm's competitive advantage (Boxall and Winterton, 2018). HIWSs can also foster a learning culture and a climate of trust and cooperation to help facilitate knowledge creation and diffusion within and across organizational boundaries (Balta et al., 2021). HIWSs enable organizations to respond more effectively and efficiently to environmental changes and customer needs by empowering employees to make decisions and take action at the frontline (Kilroy et al., 2020). However, the benefits of HIWSs may not be immediate or automatic, as they invariably depend on contextual factors, such as alignment of HIWSs with the organizational strategy, structure, and culture; support and involvement of managers and leaders; and availability and quality of complementary resources and capabilities (Boxall et al., 2019).

2.2. Digitalisation in the workplace in crisis situations

The digitalization of workplaces has emerged as a critical concern for organizations, particularly in the aftermath of crisis situations, such as the COVID-19 pandemic, which disrupted normal business operations and necessitated rapid adaptation to the changing landscape (Ivanov and Dolgui, 2020; Malik and Sanders, 2021). Managing human resources effectively in the digital era and fostering organizational and employee resilience amidst uncertainty and volatility pose significant challenges for organizations. One potential solution lies in implementing high involvement work systems (HIWSs), comprising a set of HRM

practices designed to enhance employee participation and engagement in their roles and work environment (Boxall and Winterton, 2018). HIWSs are anticipated to enhance various employee outcomes, including motivation, performance, satisfaction, mental health, and retention, by increasing their sense of control, autonomy, and empowerment in their job roles (Gao and Jiang, 2019; Zaraket et al., 2018; Safari et al., 2020; Laker et al., 2020; Boxall et al., 2019). These practices symbolize the onset of digitalization in the workplace, emphasizing the importance of "working smarter" rather than "working harder" to cope with rapid environmental changes (Boxall et al., 2019). Such a model often results in favorable employee perceptions of PIRK (Participation in Decision-Making, Influence, Responsibility, and Knowledge) because employees with greater involvement in decision-making feel more empowered in their roles (Balta et al., 2021). Increased job autonomy, an essential aspect of workplace empowerment, fosters employee motivation, performance, and satisfaction (Gao and Jiang, 2019). This phenomenon is supported by action theories in work psychology, which suggest that greater employee control over their roles encourages learning, skill development, and engagement in activities that contribute to personal growth (Zaraket et al., 2018).

Moreover, those that offer "active jobs" where employees have high levels of control have also resulted in them being able to cope far better with stress (Safari et al., 2020). In contrast, Oldham and Hackman (2010) suggest high-strain jobs with low control and high pressure often lead to mental health issues. Therefore, the initiative to provide more job control helps employees adjust to their work via "job crafting" (Laker et al., 2020), resulting in positive employee outcomes such as elevated job satisfaction, positive mental health, and higher job retention (Boxall et al., 2019). Conversely, work intensification, even in the presence of high-involvement work processes, can still adversely affect the well-being of employees (Boxall and Macky, 2014). However, job control is regarded as a form of job resource that fosters engagement and buffers the negative influence of job demands on employee well-being (Oldham and Hackman, 2010). Where high involvement work practices are implemented in the workplace, including training and team support, employees tend to perceive positive benefits at the workplace and consequently perform better, are more satisfied with their job, and have positive mental health, and this results in higher employee retention (Boxall et al., 2019).

Conceptually, high levels of employee autonomy ensure "minimal critical specification" of how their tasks should be done (Klein, 2014), which needs to be considered when roles also use digital technologies. In the first instance, a job design based on digitalization should be configured to ensure it fits the work humans perform (Balsmeier and Woerter, 2019) but also provide enough scope and flexibility to enable employees to be effective in their roles. Thus, the nature and extent of digitalization levels are crucial for choices between anthropocentric and technocentric approaches that decide which human skills or tasks should be kept or replaced by disruptive technology (Moşteanu, 2020). Unfortunately, the literature examining the digitalization process in the workplace is somewhat limited, especially in investigating the impact of such digitalization on employee perceptions of PIRK and resilience during the pandemic. Despite the potential benefits of HIWSs, several gaps in the existing literature still need to be addressed. First, a clear and consistent definition and measurement of HIWSs is lacking because organizations seemingly adopt different combinations and levels of practices that constitute HIWSs (Balta et al., 2021). While this makes it difficult to compare and generalize the role of HIWSs across different contexts and settings, this study includes both teamwork and training elements as HIWS practices.

Second, there needs to be a comprehensive and holistic examination of the impact of HIWSs on employee perceptions of PIRK; which comprise four key dimensions that reflect the degree of employee involvement and empowerment in the workplace (Boxall et al., 2019). To date, most studies have focused on one or two PIRK dimensions, but to the best of our knowledge, they have yet to simultaneously examine all four (e.g., Li et al., 2018; Song et al., 2020). This limits our understanding of how HIWSs affect employee perceptions of PIRK as a whole, and how these perceptions potentially mediate the relationship between HIWSs and organizational resilience and employee outcomes.

Third, there needs to be a thorough investigation of the role of transformational leadership in moderating the mediating role of the employee perceptions of PIRK in relation to the impact of HIWSs on organizational resilience and employee outcomes. This is important to understand because transformational leadership is a particular style of leadership that inspires and motivates employees to achieve higher levels of performance and commitment by providing them with a clear vision, intellectual stimulation, individualized consideration, and idealized influence (Le and Lei, 2019; Nguyen et al., 2023). Transformational leadership may enhance or diminish the effects of HIWSs depending on how it aligns with the employee and the organization's goals and values. In this paper, we address these knowledge gaps by drawing on HIWS theory (Boxall et al., 2019) to develop a conceptual framework (Fig. 1) that highlights the role of teamwork and training in the workplace in influencing critical employee perceptions of PIRK about their participation in decision-making. We also discuss how this process may lead to higher organizational resilience and employee outcomes, such as job performance, job satisfaction, positive mental health and employee retention.

3. Conceptual model and hypotheses development

3.1. High-involvement work practices and employee perceptions of PIRK

Digitalizing the workplace necessitates ongoing training for employees to become proficient in utilizing new technologies and forming effective teams, which is a critical precursor to HIWS (Gahlawat and Kundu, 2020). Training is crucial because while new technologies offer numerous benefits, they can also be intricate and challenging. Moreover, investing in staff education and suitable training programs also enhances employees' confidence in fulfilling their job responsibilities (Behery, 2011). Consequently, continuous learning aids employees in overcoming digitalization challenges by regularly updating their skills through effective training, ensuring their continual engagement in the workplace. Additionally, the level of support employees receive from their teams is another factor that enhances their involvement in the organization's digitalization process (Farh et al., 2012). Typically, being surrounded by likeminded colleagues means employees can rely on support as needed, allowing them to maintain a degree of autonomy within their workgroups (Ingvaldsen and Rolfsen, 2012). This is supported by the theory of socio-technical systems (STS: Pasmore, 1988; Pasmore and Sherwood, 1978), which emphasizes how the organization's technical and social systems optimize interactions between employees and their work environment (Taysom and Crilly, 2017). Thus, we anticipate workplaces fostering high team involvement and technology use will exhibit an inherent interplay between these systems, leading to positive organizational and individual employee outcomes.

HIWSs influence employee perceptions of the PIRK model, wherein **P** refers to power and autonomy in structuring one's job; **I** is the extent of information sharing that occurs; **R** refers to the nature of rewards to engage and motivate employees; and **K** reflects the knowledge employees possess to successfully carry out their tasks, individually and collectively (Boxall et al., 2019). The PIRK model, therefore, provides a foundation for a favorable working climate for employees. Having job autonomy, sharing information, participating in the decisions that affect their work, and having the knowledge and skills needed to perform their work with the necessary rewards ensures high employee involvement (Rubel et al., 2020). The literature indicates that these conditions positively affect employees in undertaking their roles. For instance, the theory of planned behaviour (PTB) helps explain employee perceptions of the critical elements of the PIRK model by emphasizing the importance of perceived behavioural control (Ajzen, 1991). In that regard,

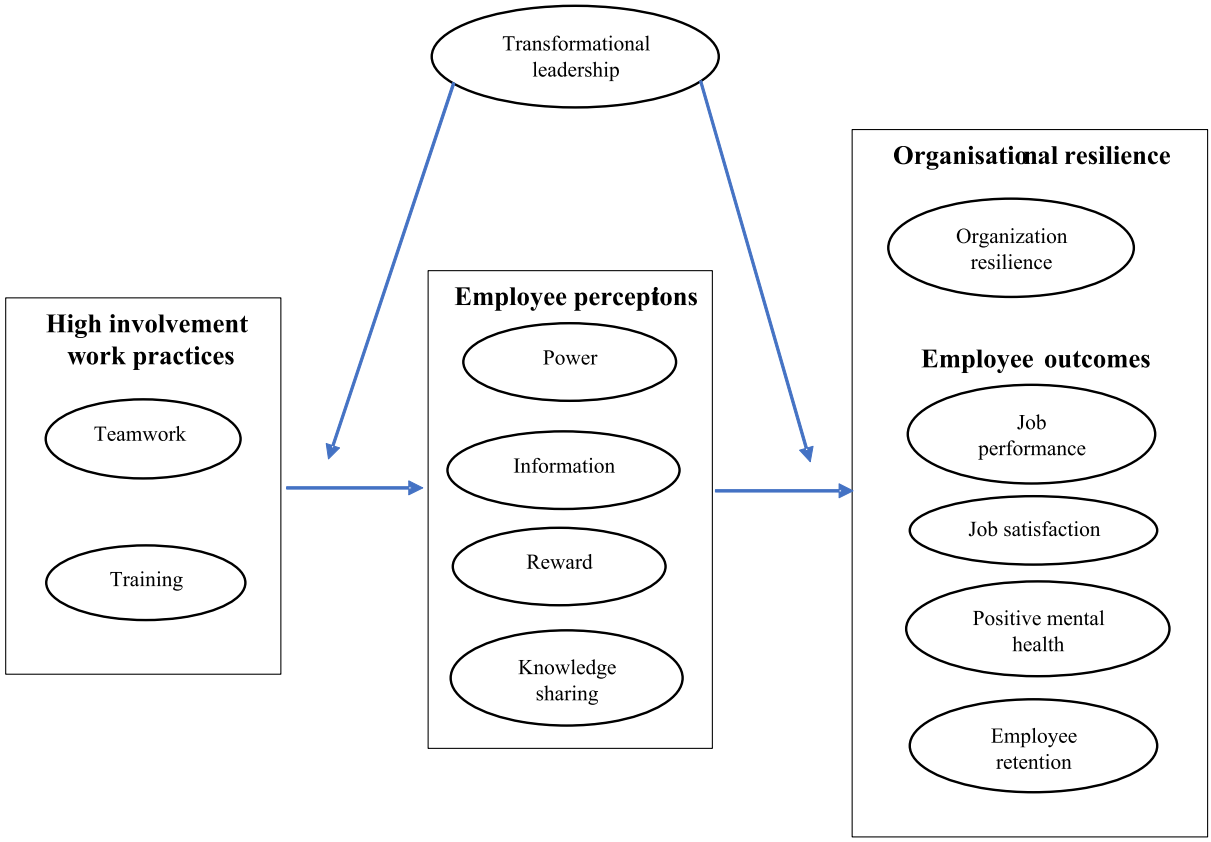

Fig. 1. Conceptual model.

Ajzen (1991) argues that the more individuals perceive that resources, opportunities, and capabilities required to carry out specific behaviors are readily accessible, the more control they will sense they have over that behaviour. Thus, we infer from this that the employees' attitude towards the PIRK behaviour will become more favorable. Therefore, since employee perceptions of elements of the PIRK can be viewed as a rubric to reflect the effectiveness of HIWSs (Boxall et al., 2019), we anticipate that positive perceptions will correspondingly have positive work consequences.

Specifically, HIWSs help reinforce employees to open up communication channels, which influences their desire to contribute further to the organization. This means that when the digitalisation process happens within an organization, the level of staff training and teamwork support becomes crucial to getting employees used to the necessary changes regarding the application of new information technologies for workforce digitalisation (Börner et al., 2012). In addition, employees need training to acquire the skills and knowledge required for work tasks that involve new ways of doing things (Vinodkumar and Bhasi, 2011). Therefore, we anticipate that if employees receive sufficient training and support from team members, they will also feel an increased level of care from the organization, thus increasing their overall perceptions of PIRK (Boxall et al., 2019). Moreover, the literature also indicates that HIWSs will provide a favorable working climate in which employees have a sense of job autonomy. Typically, social exchange theory (e.g. Blau, 1964) dictates that when employees perceive their organization to support them through both training and fostering an environment of team-related activities, then, in addition to increased perceptions about autonomy in their workplace, these conditions also translate into them having more confidence about their abilities. Based on this, we hypothesize as follows:

H1. High-involvement work practices are positively related to power, information, rewards, and knowledge sharing (PIRK).

3.2. *Employee perceptions of PIRK and organizational resilience*

The literature indicates the presence of crucial PIRK elements may influence organizational resilience. The concept of organizational resilience typically refers to the capacity for organizational longevity and employee commitment to thrive, despite adversity (Burnard and Bhamra, 2019). Such adversity is akin to the presence of crisis situations and its overall impact on organizations and their stakeholders. The concept of 'resilience' encapsulates the fundamental nature of organizational structures that can react rapidly in an organizational crisis (Vogus & Sutcliffe, 2012). For example, Luthans et al. (2010) refer to resilience as the capacity for employees to rebound and adapt to significant changes in their working environment. Resilience research in business contexts has drawn on evolutionary theory to help better explain the digitalisation process as an organizational action to respond to external threats (i.e., COVID-19 pandemic) that result in either functional or dysfunctional (or successful or unsuccessful) outcomes (Gössling, 2020). Organizations attempting to become more risk-averse in the face of shocks during the crisis situations, such as responding to the pandemic through digitalization by undergoing change and learning ('resiliency'), making use of resources, and adopting new technologies (Zouari et al., 2020), need to draw on their internal processes to help ensure the success of such strategies.

To enhance organizational resilience, Hu et al. (2009) argue the vital role that employee perceptions of the key PIRK elements play in that process. Typically, Yang and Hsu (2018) point out that when employees perceive a high level of decision-making responsibility, they become more responsive to contributing to organizational resilience. Fundamentally, we argue herein that the more positive employee perceptions of PIRK are, the more capable the organization becomes of managing risks and vulnerabilities and its overall adaption to crises.

Christopher and Peck (2004), for example, emphasize employee perceptions of PIRK in maintaining supply chain resilience. More

recently, Blackhurst et al. (2011) found that six out of seven enterprises developed predefined communication protocols to help minimize the disruption effect through active knowledge sharing. Elsewhere, Melnyk et al. (2014) demonstrate that knowledge sharing and performance help identify potential issues in a supply chain; hence, such actions contribute directly to enhanced organization resilience. Similarly, Scholten and Schilder (2015) explore how collaboration influences organizational resilience and reveal that collaborative activities such as knowledge sharing enhance organizational resilience through increased visibility, velocity, and flexibility. More specific to the context of this research, Wieland and Wallenburg (2013) found that employee perceptions of PIRW positively influences an organization's proactive and reactive resilience. In contrast, both Godwin and Amah (2013) and Do et al. (2022) find employee perceptions of PIRK helped to enhance organizational resilience. Hence, we posit:

H2. Employee perceptions of power, information, rewards, and knowledge (PIRK) are positively related to organizational resilience.

3.3. Employee perceptions of PIRK and employee resilience

The literature reveals a direct correlation between knowledge sharing and the enhancement of employee resilience through job performance, job satisfaction, positive mental health, and retention (Boxall et al., 2019; Kilroy et al., 2020; Nguyen, 2023). Employee resilience, in this context, pertains to an individual's emotional endurance characterized by courage and adaptability in the face of crises and adversity (Bardoel et al., 2014). It is closely related to an adaptive and resource-exploiting capability that empowers employees to navigate workplace challenges better (Näswall et al., 2019). Employee perceptions about PIRK impact their resilience through two pathways (Boxall et al., 2019; Lombardi et al., 2021). The first pathway largely addresses employees' needs, such as support and recognition (Lombardi et al., 2021). In contrast, the second involves the intellectual experience of work that provides opportunities for employees to learn and apply skills in their daily tasks (Boxall et al., 2019).

In response to external challenges, by drawing upon their resilience, employees find added value in their workplace (Levenson, 2018), which comprises a process that often involves reconciling with knowledge management (Yao et al., 2021). Employee perceptions of PIRK enable them to transfer accurate and timely knowledge, thereby preparing their colleague employees to navigate uncertainty and adapt effectively to change (De Boeck et al., 2018). Support for the association between employee perceptions of PIRK and employee outcomes is found throughout the literature. For example, employee sensitivities to PIRK have been shown to enhance individual task completion, problem-solving, and decision-making efficiency, leading to improved employee performance (Nguyen and Prentice, 2020).

Masa'deh et al. (2016) demonstrate that leaders acting as coaches or mentors, fostering employee contributions in an engaging and encouraging climate, contribute to overall individual employee performance. Furthermore, engaging in communication within the organization has numerous benefits. For instance, the works of Nguyen and Malik (2020) and Reychav and Weisberg (2009) reveal that employees perceive explicit knowledge sharing has a positive effect on monetary rewards, performance, and a reduced likelihood of leaving their organizations. Similarly, Zhu (2017) indicates employee perceptions of PIRK are crucial for nurturing job performance and job satisfaction within an R&D engineering context. Accordingly, we hypothesize as follows:

H3. Employee perceptions of PIRK are positively related to employee job performance, job satisfaction, positive mental health and employee retention.

3.4. Mediating effect of employee perceptions of PIRK

The existing body of literature demonstrates a prevailing consensus on the pivotal mediating role of factors, such as innovation processes and the adoption of knowledge management-related technology, in shaping the link between employee perceptions of PIRK and resilience. Wieland and Wallenburg (2013) highlight the significance of employee perceptions of PIRK in upholding organizational and employee resilience, thus offering a foundational perspective within organizational resilience theory. Moreover, Mandal (2012) explores the enriching effects of investments in training and teamwork on augmenting employee perceptions of PIRK, thereby fortifying the broader constructs of organizational and employee resilience.

Nguyen et al. (2023), and Melnyk et al. (2014) show the intricate interplay between digitalization initiatives in the workplace, training, and team support – emphasizing their capacity to stimulate employee involvement in decision-making and bolster resilience by improving employee engagement in decision-making. Scholten and Schilder (2015) navigate the nexus between HIWSs and organizational and employee resilience, emphasizing the pivotal role of employee perceptions of the PIRK model. Their insights posit that employees who receive continuous training and sustained team support engage in knowledge-sharing and collaborative efforts, fostering greater visibility, agility, and adaptability. This cascade of effects contributes substantially to the organization's and its workforce's resilience.

Moving towards a more digitalization-centric perspective, Boxall et al. (2019) accentuate the role of training and teamwork in promoting organizational and employee resilience, emphasizing the role of employee involvement in decision-making through their perceptions of HIWSs. Meanwhile, Mafabi et al. (2012) explore the intricate relationships between HIWSs, employee perceptions of PIRK, organizational resilience, and employee resilience. Their findings highlight the positive and statistically significant connections between HIWSs, knowledge management, and a creative climate, which fuel employee perceptions of PIRK, fostering innovation abilities and, in turn, augmenting both organizational and employee resilience. The research conducted by Sabahi and Parast (2020) reaffirms these insights, focusing on the resilience of innovative firms amidst disruptions. They underscore the role of HIWSs in facilitating knowledge sharing among employees, thereby strengthening resilience. The study by Godwin and Amah (2013) resonates with these findings, highlighting how training and team support engender employees' active participation in various elements of resilience, encompassing knowledge acquisition, retention, and dissemination.

Hosseini and Jafari Bazyar (2019) further explore the mediating role of employee perceptions of PIRK, particularly knowledge sharing, in the context of psychological contract fulfillment. Their research highlights the substantial impact of fulfilling psychological contracts on the attitudes, willingness, and knowledge-sharing behaviors of employees, ultimately bolstering organizational resilience. Additionally, Malik and Garg (2017) illuminate the positive relationship between learning culture and the structural elements of knowledge-sharing, reinforcing employee resilience. They highlight the critical importance of fostering positive organizational climates, amplifying positive emotions, thereby reinforcing organizational resilience. Based on the above discussion, we thus argue that employee perceptions of PIRK will likely mediate between high-involvement work practices and resilience. Hence, we hypothesize as follows:

H4a. Employee perceptions of PIRK positively mediate the relationship between high-involvement work practices and organizational resilience.

H4b. Employee perceptions of PIRK positively mediate between high-involvement work practices and employee outcomes (job performance, job satisfaction, positive mental health and employee retention).

3.5. Moderating effect of transformational leadership

Understanding the profound impact of HIWSs necessitates an

examination of transformational leadership, as extant literature underscores its pivotal role in shaping employee participation in decision-making processes (Le and Lei, 2019). This participative dynamic is a linchpin in fostering employee engagement and underpinning the effectiveness of high-involvement work practices, molding employee perceptions of participative and innovative role behaviors (PIRK) across various dimensions of the PIRK framework. Transformational leadership is characterized by a style that motivates employees towards creativity and innovation within their roles while also fostering a conducive working environment aligned with critical elements within the PIRK framework (Le and Lei, 2019). Additionally, it facilitates the implementation of HIWSs and amplifies their impact on employee perceptions of their PIRK (Yang et al., 2018). Differential levels of transformational leadership can augment employee involvement, as higher levels correlate with increased perceived autonomy within job roles (Rubel et al., 2020).

Consequently, a primary challenge lies in establishing high-involvement work contexts within the management domain, where the responsibility of shaping HIWS systems and organizing employee work tasks primarily resides (Yang et al., 2018). Given that the dispersion of HIWSs is contingent upon variations in levels of transformational leadership, these systems must be not solely designed based on management's discretion but are grounded in fostering a collaborative and conducive work environment (Yang et al., 2018). Moreover, current evidence suggests that the transformational leadership style can moderate the impact of HIWSs on employee perceptions of PIRK, thereby influencing organizational and employee resilience. Transformational leadership motivates employees to actively contribute to organizational objectives, particularly crucial during change and uncertainty such as those induced by crisis situations (Siangchokyoo et al., 2020).

In environments marked by high transformational leadership, employees are more likely to engage in training and collaborative efforts within teams, fostering knowledge sharing and enhancing job performance (Nguyen et al., 2023). Conversely, in low transformational leadership environments, employee enthusiasm for work tasks may diminish (Siangchokyoo et al., 2020). Transformational leaders leverage employee perceptions of PIRK, resulting in elevated job performance and reinforcing organizational and employee resilience (Khan et al., 2019). Additionally, transformational leadership significantly contributes to positive mental health by reinforcing the connection between employee perceptions of PIRK, facilitated by knowledge sharing, and improvements in mental well-being (Montano et al., 2017; Arnold, 2017). This leadership style fosters a favorable working environment that promotes knowledge sharing through fostering connections among employees, thereby enhancing social integration and trust within digitalization (Yin et al., 2019). Based on the above discussion, we hypothesize as follows:

H5a. Transformational leadership moderates the relationship between HIWS and employee perceptions of PIRK elements.

H5b. Transformational leadership moderates the link between employee perceptions of PIRK elements and organization resilience and employee outcomes (job performance, job satisfaction, positive mental health and employee retention).

4. Methodology

4.1. Sample and data collection

The target respondents were employees in Vietnam who had worked in organizations that had implemented digitalisation in their work during the last 12 months. Respondents were 18 years old or older and employed in these organizations during the COVID-19 pandemic. Data collection procedures involved three stages. In line with the standard back-translation method (i.e., Brislin, 1970), stage one involved translating the instrument into the local language to suit the research context. Specifically, the original questionnaire (comprising existing scales) was initially developed in English, translated into Vietnamese by a linguistic professional, and then translated back to English by another professional to compare with the original version. This procedure helped assess the accuracy of the translation.

The second stage of our study involved conducting a pilot study with 25 employees in Vietnamese organizations. The primary purpose of this pilot study was to assess the clarity of the survey questions. By doing so, we aimed to refine and improve the wording of the questions to ensure that our target participants understood them easily. The decision to conduct a pilot study with 25 employees was based on the need to ensure the effectiveness and comprehension of the survey instrument. Such a sample size was deemed adequate to assess the initial clarity of the questions and identify any potential issues with the survey. It allowed us to make minor question wording and structure adjustments, ensuring that the survey would yield reliable and meaningful responses during the main data collection phase.

Stage three comprised the main survey, administered using the online Qualtrics platform. Several factors influenced our choice of this data collection method. First, online surveys provide a high degree of convenience for respondents, allowing them to participate at their convenience and from various devices. This accessibility was especially important during crisis situations when in-person data collection was challenging due to government restrictions, including lockdowns and social distancing measures. Since we used the "force response" feature in the Qualtrics to avoid missing data, those respondents identified as comprising missing data were in effect incomplete surveys. We thus optimized response ratesby assuring participants of anonymity, and implemented some screening questions at the start of the survey.

We employed the virtual snowball sampling method (Parker et al., 2019) to collect the study data. Given the difficulties in data collection during COVID-19, with many government restrictions, including a lockdown or social distancing, virtual snowball sampling was deemed the most suitable method to solicit critical informants. We initially distributed an anonymous survey link via social media networks such as Facebook and LinkedIn to implement the virtual snowball sampling technique. Participants were encouraged to share the survey link within their networks, thereby expanding our reach and ensuring a diverse set of respondents. Using this method, we gathered data effectively and overcame the limitations imposed by the pandemic-related restrictions. To minimize non-response bias, we employed several strategies. One such approach involved designing the survey with clear, concise, and engaging questions, which enhanced respondent interest and reduced survey fatigue, consequently increasing the likelihood of completion. Additionally, conducting a pilot test of the survey instrument helped identify any ambiguities or potential issues with the questionnaire, allowing for refinement before full-scale implementation. Furthermore, assuring participants of the confidentiality and anonymity of their responses was paramount, as it served to alleviate privacy concerns and foster trust in the research process. Finally, providing clear instructions on completing the survey, including an estimated time for completion, helped minimize confusion and enhance response rates by facilitating a smoother survey experience for participants.

After three months of data collection from April to June 2021, 411 questionnaires were collected, but 32 were eliminated due to missing data. Consequently, 379 usable questionnaires were generated for data analysis, resulting in a response rate of 92 % - a high response rate enhanced the representativeness and generalizability of the findings, as it reduced the likelihood of non-response bias. The survey yielded 46.8 % males and 53.2 % females. The majority of respondents were aged from 26 to 35 (54.4 %), followed by the 36–45-year-old group (22.7 %) and the 18–25-year-old group (19.8 %). Many respondents hold a university Bachelor's degree (49.3 %) or higher (45.6 %). More than half of the respondents (57.0 %) were married, whereas 40.9 % of the participants were single. Twenty percent of respondents were managers, and 15.3 % were supervisors.

4.2. Measures

All the measures in this study were adapted from previous studies (see Table 1). *High involvement work practices*: Teamwork (6 items) was measured using Coyle-Shapiro and Morrow (2003), and training (3 items) was adapted from Vinodkumar and Bhasi's (2011) instrument. *Employee perceptions of PIRK*: The four elements in the PIRK model were measured using scales from various sources. Power (5 items) was measured using Ahuja et al.'s (2007) scale; information sharing (4 items) was measured using De Vries et al. (2006); reward (4 items) was measured by Lin (2007); and information sharing (4-items) was measured by De Vries et al.'s (2006) scale. *Resilience*: Organizational resilience (3 items) was measured using Mafabi et al.'s (2012) scale. The four elements of employee resilience were measured using several scales. Job performance (5 items) adopted from O'Reilly and Chatman's (1986) scale; job satisfaction (6 items) from Chawla and Guda's (2010) scale; positive mental health (6 items) using Lukat et al.'s (2016) scale, and, employee retention (5 items) using the Kyndt et al. (2009) scale. Finally, the mediator *transformational leadership* (8-items) was measured using the scale developed by Jouny-Rivier et al. (2017). All scales were measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

4.3. Common method variance

This study took some remedies to help minimize common method variance during data collection. First, the initial clarity of the questionnaire was checked via a pilot survey. To reduce the potential for CMV, respondents were reassured anonymity of their responses, items in the questionnaire were randomly spread throughout the instrument. We employed well-developed scales from the literature in the survey. Following the data collection process, several ex-post statistics procedures were applied following Podsakoff et al.'s (2003) suggestions to help determine if the data collection strategies used to deal with CMV were effective in their application. The first step involved Harman's single-factor test, where exploratory factor analysis was conducted. The results reveal that the first factor comprised less than 50 % of the variance. The second step involved the inclusion of a marker variable, which was added to the correlation table, and the results indicated that with and without the marker variable, the correlation value and significance among variables did not change. The third step was related to controlling the influences of unmeasured latent methods, which led to minor adjustments in the measurement model. Finally, we checked multicollinearity issues by assessing the variance inflation factor, which resulted in no variance inflation factor being above 3.0 (Hair et al., 2010). Overall, since the results of the tests indicate that common method bias was not an issue in this study, we were confident of the integrity of responses.

5. Data analysis and results

5.1. Measurement model

In line with Anderson and Gerbing (1988), we adopt the two-stepped approach to test the measurement and structural models. Accordingly, confirmatory factor analysis helped to initially assess the measurement model whereby the data showed reasonable fit indices: $\chi^2/df = 2.32$, $p < .001$; CFI = 0.92; TLI = 0.91; RMSEA = 0.06 (see e.g., Tabachnick et al., 2013). Factor loadings of all items were above 0.70, and composite reliabilities of all variables were above 0.70 (Hair et al., 2010). Each construct's average variance extracted (AVE) was over 0.50, indicating adequate convergent validity (Fornell and Larcker, 1981). Discriminant validity was achieved with the square root of the AVE of each construct higher than its correlations with other constructs (see Tables 1 and 2). The analysis indicates that discriminant and convergent validity are present concerning the variables of interest in the proposed

Table 1
Scale items and descriptives.

Scale items	M	SD	λ	α
Team (Coyle-Shapiro and Morrow, 2003)				
Employees in my workgroup work together effectively	3.73	0.97	0.87	
There is a strong team spirit in my workgroup	3.78	0.99	0.92	
There is a lot of cooperation in my workgroup	3.76	1.01	0.91	
Employees in my workgroup are willing to put themselves out for the sake of the group	3.49	1.08	0.88	
Employees in my workgroup encourage each other to work as a team	3.70	1.03	0.90	**0.94**
Training (Vinodkumar and Bhasi, 2011)				
Staff training is given high priority in my company in COVID-19	3.79	1.07	0.92	
My company gives comprehensive training to the employees in working during the pandemic	3.80	1.02	0.93	
Management encourages the employees to attend staff training programs for working during the pandemic	3.91	1.02	0.92	**0.91**
Power (Ahuja et al., 2007)				
I have job autonomy	3.86	0.96	0.89	
I control the content of my job.	3.89	0.91	0.91	
I have a lot of freedom to decide how I perform assigned tasks	3.75	0.96	0.88	
I set my own schedule for completing assigned tasks	3.94	0.89	0.85	
I have the authority to initiate projects at my job	3.69	1.01	0.87	**0.93**
Information (De Vries et al., 2006)				
When I need certain information, I ask my colleagues	3.73	0.95	0.86	
I ask my colleagues about their abilities when I need to learn something	3.88	0.90	0.89	
When a colleague is good at something, I ask him or her to teach me how to do it	3.78	0.95	0.89	
I ask my colleagues about their abilities when I need to learn something	3.63	1.05	0.79	**0.88**
Reward (Lin, 2007)				
I can receive a higher salary	4.04	1.00	0.89	
I can receive a higher bonus	4.14	0.94	0.92	
I can receive increased promotion opportunities	4.01	1.01	0.84	
I can receive increased job security	4.04	0.98	0.80	**0.89**
Knowledge sharing (De Vries et al., 2006)				
I share my information, skills and experiences with my colleagues	3.87	0.96	0.83	
When I know any new information, I tell my colleagues about it	3.80	0.97	0.87	
When I learn something new, I tell my colleagues about it	3.72	0.94	0.91	
I keep my colleagues informed of my work tasks on a regular basis	3.45	1.08	0.86	
I often keep my colleagues informed of my work tasks	3.36	1.14	0.80	**0.91**
Organization resilience (Mafabi et al., 2012)				
My organization will achieve a new equilibrium by adapting to changes in the new environment	3.77	0.92	0.94	
My organization recovers and strengthens at a strategic and operational level	3.78	0.89	0.93	
My organization adapts strategically and operationally to new environmental conditions	3.85	0.89	0.94	**0.93**
Job performance (O'Reilly & Chatman, 1986)				
I generally fulfill my job responsibilities	4.06	0.92	0.86	
I generally meet performance standards and expectations of the job	3.88	0.85	0.90	
My performance level satisfies my manager in general	3.78	0.86	0.88	
I was effective in my job	3.83	0.89	0.91	
I generally produce high-quality work	3.84	0.92	0.85	**0.93**
Job satisfaction (Chawla and Guda, 2010)				
Overall I am satisfied with my job	3.83	0.97	0.82	
I am satisfied with my remuneration	3.59	1.03	0.85	
I am satisfied with the opportunities that my company give to me for advancement	3.60	1.01	0.86	
I am satisfied with my company policies	3.59	1.03	0.89	
I am satisfied with my supervisor overall	3.72	1.01	0.87	
I am satisfied with my colleagues/workers overall	3.82	0.93	0.83	**0.93**

(*continued on next page*)

Table 1 (*continued*)

Scale items	M	SD	λ	α
Positive mental health (Lukat et al., 2016)				
I feel happy working	3.79	0.97	0.86	
I feel calm and peaceful	3.67	0.92	0.82	
I enjoy my work	3.90	0.95	0.88	
It's wonderful for me in working	3.76	0.98	0.92	
I feel cheerful, light-hearted	3.67	0.98	0.87	
I find full of things interesting at work	3.82	0.98	0.89	**0.94**
Employee retention (Kyndt et al., 2009)				
I am able to keep my present job as long as I wish	3.96	1.27	0.89	
My job will be there as long as I want it	3.89	1.32	0.91	
If my job was eliminated, I would be offered another job in my company	3.75	1.27	0.88	
Regardless of financial conditions, I will have a job at my company	4.00	1.22	0.93	
Overall I am secure in my job	3.84	1.27	0.88	**0.94**
Transformational leadership (Jouny-Rivier et al., 2017)				
My supervisors can understand my situation and give me encouragement and assistance	3.74	1.01	0.83	
My supervisors encourage me to update new technology trends and applications	3.82	1.00	0.84	
My supervisors encourage us to make efforts towards fulfilling the company vision	3.96	1.00	0.85	
My supervisors encourage me to think about the changes of technology trends and applications from a new perspective	3.69	1.04	0.86	
My supervisors encourage me to rethink opinions that have never been doubted in the past	3.73	1.05	0.84	
My supervisors spend time to understand my needs	3.35	1.06	0.76	
I believe my supervisors can overcome the challenge at work	3.94	0.99	0.83	
I believe I can complete my work under the leadership of my supervisors	3.94	0.99	0.80	**0.93**

M = Mean, SD = Standard deviation, λ = Standardized loading, α = Cronbach's alpha.

conceptual model.

5.2. Hypotheses testing

Structural equation modeling was assessed to test each hypothesis (Table 3). An acceptable model fit was found $\chi^2/df = 2.46$; $p < .001$; CFI = 0.90; TLI = 0.90; RMSEA = 0.06. The results showed that teamwork and skills training significantly affected power (team: $\beta = 0.57$, $p < .001$; training: $\beta = 0.21$, $p < .001$), information (team: $\beta = 0.34$, $p < .001$; training: $\beta = 0.20$, $p < .001$), rewards (team: $\beta = 0.18$, $p < .001$; training: $\beta = 0.18$, $p < .001$) and knowledge sharing (team: $\beta = 0.44$, $p < .001$; training: $\beta = 0.16$, $p < .001$); therefore, H1 was supported. Power ($\beta = 0.43$, $p < .001$), information ($\beta = 0.18$, $p < .001$), rewards ($\beta = 0.22$, $p < .001$) and knowledge sharing ($\beta = 0.19$, $p < .001$) significantly influenced organization resilience. Power ($\beta = 0.38$, $p < .001$), information ($\beta = 0.13$, $p < .001$), rewards ($\beta = 0.21$, $p < .001$) and knowledge sharing ($\beta = 0.17$, $p < .001$) were found to significantly impact job performance. While power ($\beta = 0.56$, $p < .001$), information ($\beta = 0.21$, $p < .001$) and knowledge sharing ($\beta = 0.15$, $p < .001$) were positively related to job satisfaction, rewards ($\beta = -0.16$, $p < .001$) were negatively related to job satisfaction. Only power ($\beta = 0.62$, $p < .001$) and knowledge sharing ($\beta = 0.16$, $p < .001$) significantly influenced job satisfaction while information ($\beta = 0.01$, $p > .05$) and rewards ($\beta = 0.05$, $p > .05$) did not. None of power ($\beta = 0.00$, $p > .05$), information ($\beta = -0.08$, $p > .05$), rewards ($\beta = 0.06$, $p > .05$) and knowledge sharing ($\beta = -0.08$, $p > .05$) significantly impacted employee retention. Thus, H2 was partially supported.

Hayes PROCESS SPSS macro was adopted to test the mediation and moderation effects (Tables 4 and 5). The results show that the teamwork – organization resilience relationship was indirectly mediated by power ($\beta = 0.29$, $p < .05$), information ($\beta = 0.19$, $p < .05$), rewards ($\beta = 0.15$, $p < .05$), and knowledge sharing ($\beta = 0.19$, $p < .05$). The impact of team on job performance was indirectly mediated by power ($\beta = 0.28$, $p < .05$), information ($\beta = 0.15$, $p < .05$), rewards ($\beta = 0.15$, $p < .05$), and knowledge sharing ($\beta = 0.18$, $p < .05$). The indirect mediation effect of power ($\beta = 0.26$, $p < .05$), information ($\beta = 0.14$, $p < .05$), rewards ($\beta = 0.05$, $p < .05$), and knowledge sharing ($\beta = 0.17$, $p < .05$) was found in the team – job satisfaction relationship. Power ($\beta = 0.20$, $p < .05$) and knowledge sharing ($\beta = 0.09$, $p < .05$) indirectly mediated the impact of the team on positive mental health. Therefore, H3a was supported.

The association between training and organization resilience was indirectly mediated by power ($\beta = 0.21$, $p < .05$), information ($\beta = 0.13$, $p < .05$), rewards ($\beta = 0.12$, $p < .05$), and knowledge sharing ($\beta = 0.14$, $p < .05$). The indirect mediation effect by power ($\beta = 0.22$, $p < .05$), information ($\beta = 0.19$, $p < .05$), rewards ($\beta = 0.13$, $p < .05$), and knowledge sharing ($\beta = 0.15$, $p < .05$) was found in the training – job performance relationship. The training–job satisfaction relationship was indirectly mediated by power ($\beta = 0.23$, $p < .05$), information ($\beta = 0.15$, $p < .05$), rewards ($\beta = 0.06$, $p < .05$), and knowledge sharing ($\beta = 0.16$, $p < .05$). Power ($\beta = 0.19$, $p < .05$) and knowledge sharing ($\beta = 0.11$, $p < .05$) indirectly mediated the impact of training on positive mental health. Therefore, H3b was supported. Transformational leadership moderated the relationship of team – power ($\beta = 0.01$, $p < .05$), team – information ($\beta = 0.01$, $p < .01$), team – knowledge sharing ($\beta = 0.18$, $p < .001$), training – power ($\beta = 0.13$, $p < .001$), training – information ($\beta = 0.17$, $p < .001$), and training – knowledge sharing ($\beta = 0.22$, $p < .001$), thus, H4a was partially supported. Transformational leadership moderated only the impact of power on organizational resilience ($\beta =$

Table 2
Correlations table.

Constructs	1	2	3	4	5	6	7	8	9	10	11	12
1. Team	**0.89**											
2. Training	0.56*	**0.92**										
3. Power	0.61*	0.47*	**0.88**									
4. Information	0.46*	0.41*	0.59*	**0.86**								
5. Reward	0.35*	0.36*	0.52*	0.47*	**0.87**							
6. Knowledge sharing	0.54*	0.41*	0.61*	0.72*	0.39*	**0.85**						
7. Organization resilience	0.55*	0.58*	0.66*	0.55*	0.54*	0.57*	**0.94**					
8. Job performance	0.50*	0.41*	0.65*	0.53*	0.52*	0.54*	0.54*	**0.88**				
9. Job satisfaction	0.65*	0.52*	0.68*	0.56*	0.34*	0.58*	0.61*	0.60*	**0.85**			
10. Positive mental health	0.73*	0.65*	0.67*	0.47*	0.43*	0.53*	0.62*	0.56*	0.68*	**0.87**		
11. Employee retention	−0.06	−0.01	−0.03	−0.07	−0.01	−0.07	−0.09	−0.02	−0.04	−0.01	**0.90**	
12. Transformational leadership	0.63*	0.70*	0.54*	0.43*	0.32*	0.46*	0.56*	0.40*	0.59*	0.68*	0.04	**0.82**
Mean	3.69	3.83	3.82	3.75	4.05	3.64	3.80	3.88	3.69	3.77	3.89	3.77
Standard deviation	0.91	0.96	0.83	0.82	0.85	0.87	0.85	0.78	0.85	0.84	1.14	0.84
Average variance extracted (AVE)	0.80	0.84	0.78	0.74	0.75	0.73	0.88	0.78	0.73	0.76	0.81	0.68
Composite reliability (CR)	0.94	0.96	0.95	0.92	0.92	0.93	0.96	0.95	0.94	0.95	0.95	0.95

* $p < .01$, the numbers in the diagonal row are the square roots of AVE.

Table 3
Results of the structural model.

	Power	Information	Reward	Knowledge sharing	Organization resilience	Job performance	Job satisfaction	Positive mental health	Employee retention
Teamwork*	0.57***	0.34***	0.18***	0.44***					
Training	0.21***	0.20***	0.18***	0.16**					
Power					0.43***	0.38***	0.56***	0.62***	0.00
Information					0.18***	0.13**	0.21***	0.01	−0.08
Reward					0.22****	0.21***	−0.16***	0.05	0.06
Knowledge sharing					0.19***	0.17***	0.15***	0.16***	−0.08
R^2	0.56	0.35	0.17	0.41	0.56	0.52	0.62	0.58	0.04

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 4
Mediating effect.

Relationship	Mediating effect			
	Power	Information	Reward	Knowledge
Teamwork – organization resilience	0.29*	0.19*	0.15*	0.19*
Teamwork – job performance	0.28*	0.15*	0.15*	0.18*
Teamwork – job satisfaction	0.26*	0.14*	0.05*	0.17*
Teamwork – positive mental health	0.20*	NA	NA	0.09*
Training – organization resilience	0.21*	0.13*	0.12*	0.14*
Training – job performance	0.22*	0.19*	0.13*	0.15*
Training – job satisfaction	0.23*	0.15*	0.06*	0.16*
Training – positive mental health	0.19*	NA	NA	0.11*

* $p < .05$.

Table 5
Moderating effect of transformational leadership.

IV	DV	Moderator effect	IV→DV	Moderator→DV
Team	Power	0.01*	0.08	−0.06
Team	Information	0.01**	−0.14	−0.20
Team	Reward	0.00	−0.03	−0.08
Team	Knowledge sharing	0.18***	−0.23	−0.44**
Training	Power	0.13***	−0.31*	−0.09
Training	Information	0.17***	−0.43**	−0.39*
Training	Reward	0.05	0.04	−0.06
Training	Knowledge sharing	0.22***	−0.61***	−0.50**
Power	Organization resilience	0.10*	0.14	−0.09
Power	Job performance	0.04	0.40	−0.11
Power	Job satisfaction	0.02	0.45**	0.26
Power	Positive mental health	−0.01	0.45**	0.47**
Information	Organization resilience	0.00	0.38*	0.39*
Information	Job performance	−0.07	0.68***	0.45*
Information	Job satisfaction	−0.02	0.46*	0.50**
Reward	Organization resilience	0.05	0.21	0.21
Reward	Job performance	0.03	0.31	0.12
Reward	Job satisfaction	0.01	0.12	0.49*
Knowledge sharing	Organization resilience	0.00	0.37*	0.37*

* $p < .05$.
** $p < .01$.
*** $p < .001$.

0.10, $p < .05$). Thus, H4b was partially supported.

6. Discussion

This study examines the impact of HIWSs on organizational resilience and employee outcomes, namely job performance, job satisfaction, positive mental health and employee retention in a technologically-mediated work context. The findings show that skills training and teamwork in a digitalization context are crucial and influence employee perceptions of PIRK of their involvement in decision-making in their jobs. In line with HIWSs, employee perceptions of PIRK in our setting encompassed power, information, reward, and knowledge. Training and teamwork were found to help employees develop the skills and confidence needed to work effectively. This finding is aligned with previous studies (e.g., Vinodkumar and Bhasi, 2011), who found staff training is crucial for getting employees familiar with new work conditions or situations, thus, facilitating the adoption of new work practices and reducing uncertainty. Employee perceptions of PIRK can also impact organizational resilience. When employees feel more involved in decision-making, they contribute to organization resilience, helping organizations cope with various changes and challenges. Power has the most decisive impact on organization resilience, as job autonomy plays a crucial role as it provides freedom for employees to perform their work tasks, which helps organizations adapt to changes flexibly. Specifically, job autonomy allows employees to exercise discretion and decision-making authority in performing their work tasks. This autonomy empowers individuals to respond promptly and effectively to emerging challenges or changes, fostering a culture of innovation and resourcefulness within the organization. By decentralizing decision-making processes and distributing power across various levels, organizations can tap into their workforce's diverse expertise and perspectives, thereby enhancing their capacity to navigate uncertainties and capitalize on opportunities.

Moreover, job autonomy fosters a sense of ownership and accountability among employees, motivating them to proactively seek solutions and contribute to the collective resilience of the organization. Furthermore, job autonomy also facilitates the development of adaptive capabilities. It promotes continuous learning and skill development among employees, equipping them with the tools and autonomy to adjust strategies and approaches in response to evolving circumstances. In essence, job autonomy is a cornerstone of organizational resilience by empowering employees to embrace change, innovate, and navigate complexities with agility and resilience.

All elements of employee perceptions within the PIRK framework are also found to affect employee job performance significantly. These findings imply that if employees have a high level of involvement in their job, they will be more motivated to improve their job performance by fulfilling job responsibilities and producing high-quality work. However, power is the most decisive element contributing to an employee's job performance. This means that employees who want the

freedom to decide how they complete assigned tasks and have job autonomy have a better psychological contract with the workplace. Therefore, they should be allowed to improve their performance to give them more power to improve their job performance. These results echo Kwahk and Park's (2016) findings, who note that employee perceptions of PIRK, such as knowledge sharing, facilitate knowledge transfer among employees and this enhances job performance.

This study also found that power, information, and knowledge sharing positively influenced job satisfaction. Surprisingly though, rewards were found to have a negative impact on job satisfaction. One explanation is that rewards can motivate employees to work hard, but not everyone can get rewards when they work hard, thus leading to some negative feelings towards job satisfaction. Another possibility, is that some employees are likely to value different rewards, for example, intrinsic, more than extrinsic rewards, so the link between rewards and job satisfaction is not linear. This was reflected in our data. Nevertheless, this result supports the earlier work of Bock et al. (2005) and Olatokun and Nwafor (2012), who found no impact or even a negative impact of rewards on knowledge sharing. However, in line with the literature (e.g., Montano et al., 2017; Tubre and Collins, 2016), power and information sharing are found to have a positive impact on an employee's mental health, suggesting that employees feel less stressed if they have the authority to schedule their work tasks, as well as have mutual support through knowledge sharing.

Interestingly, employee perceptions of PIRK were not found to affect employee retention. This result can explain that in the digitalization process, employee perceptions of PIRK do not affect job design or work allocation, and employees will not know if their position is secure. Therefore, job security is hard to predict. The mediation effect of employee perceptions of PIRK was found in the impact of HIWSs on organizational resilience and those employee outcomes of job performance, job satisfaction, positive mental health and employee retention. This result implies that HR practices that involve employees in decision-making contribute to these critical organizational and employee outcomes, mainly through the changes in employee perceptions of PIRK. The mediating effect of employee perceptions of PIRK reaffirms the findings of Melnyk et al. (2014), who found HIWSs are crucial to employee perceptions of PIRK, which leads to resilience in the digitalization process.

Our study found that transformational leadership moderates the impact of HIWSs on employee perceptions of power, information, and knowledge and the impact of power on organizational resilience. These findings indicate that transformational leadership is crucial in providing a favorable working environment, and thus echo the earlier works of Montano et al. (2017) and Lei et al. (2019), who found that transformational leadership helps build an organizational culture of collaboration, assisting in establishing emotional links among employees and through that inspired them to share knowledge with their work colleagues.

6.1. Theoretical implications

Our study contributes to the field of organizational studies, underpinned by the HIWSs model, which emphasizes the importance of involving employees in decision-making processes during the digitalization of the workplace. The novelty herein lies in its comprehensive exploration of the impact of HIWSs, including training and teamwork, within the digitalization context. This examination extends the HIWSs framework by revealing the essential nature of its constituent elements in reshaping employee perceptions of the PIRK framework, thereby leading to heightened levels of organizational resilience and employee outcomes (namely, job performance, job satisfaction, positive mental health and employee retention). What sets this study apart is its distinctive focus on the entire spectrum of PIRK, which comprises power, information, rewards, and knowledge sharing.

Few studies (e.g., Li et al., 2018; Song et al., 2020) have ventured into empirically investigating all four dimensions of employee perceptions of PIRK concurrently, making this research not only pioneering but also offers a more holistic understanding of the role of HIWSs in organizations. This comprehensive approach opens up new avenues for enriching the HRM literature and advancing our comprehension of HIWSs, particularly in the face of organizational crises, such as the disruptive backdrop of the COVID-19 pandemic. The significance is underscored by the realization that all elements of PIRK must be considered simultaneously for a more accurate diagnosis of the mediating capacity of employee perceptions of PIRK, as any omission may limit the depth of understanding of their role.

Moreover, this study explores the intricate dynamics of inclusive transformational leadership, a vital element in digitalization. It uncovers the moderating effect of transformational leadership within the intricate interplay of HIWSs, the PIRK framework, and organizational resilience. These findings not only provide a fresh perspective on the role of managers in creating a conducive work environment but also present a novel area of exploration for future scholars. The dynamic role of transformational leadership in various contexts emerges as a promising avenue for further research (Le and Lei, 2019; Nguyen et al., 2023), adding a further layer of complexity and relevance to leadership studies.

6.2. Practical implications

In crisis situations, the widespread adoption of digital technologies and workplace digitalization has become an imperative strategy for organizations striving to enhance resilience and mitigate the disruptive effects of the ongoing crisis. As we transition into the post-COVID operational era, the focus on organizational and employee resilience remains paramount, necessitating a more profound understanding of the practical implications derived from our study. The findings of this research underscore the pivotal role of HIWSs in fostering employee engagement in decision-making processes, a key driver of organizational and employee resilience. To translate these insights into practical recommendations, organizations must make concerted efforts to cultivate environments where employees are empowered to support their colleagues and collaborate effectively. Team-building events and activities can serve as valuable tools to enhance team cohesion and spirit. Furthermore, managers should consider establishing informal communication platforms that facilitate connections among employees, fostering a sense of belonging to their teams and the organization as a whole.

At a broader organizational level, HRM decision makers should proactively provide training programs that equip employees with the skills needed to adapt to new technologies in the workplace. This is of paramount importance as the absence of staff training can lead to a cascade of issues, including incompetence, inefficiency, and ineffectiveness, which, in turn, hamper an organization's ability to build resilience. To ensure the effective deployment of training programs, HRM decision-makers should consider conducting surveys to gauge the specific training needs of their employees, tailoring these programs to address existing skill gaps (Nguyen et al., 2023; Vinodkumar and Bhasi, 2011). Encouraging employees to actively participate in staff training programs, especially those focused on technology integration, can further enhance their digital capabilities.

In light of our findings, transformational leadership emerges as a critical factor in shaping a favorable working environment (Le and Lei, 2019). HRM decision-makers should prioritize effective communication with employees, actively listening to their voices, demonstrating care for their well-being, and considering their goals and values. By aligning their leadership styles with the principles of transformational leadership, managers can foster a work environment that enhances resilience and bolsters employee morale and commitment. The practical implications drawn from our study emphasize the need for organizations to invest in teamwork, training, and effective leadership to navigate the digitalization landscape in crisis situations. These strategies not only

enhance the resilience of organizations and their employees but also contribute to the overall well-being and productivity of the workforce.

7. Limitations and future research

This study exhibits several limitations that should be considered in the context of future research, each of which serves as a foundation for valuable exploration in the field. First, it is essential to acknowledge that this study was exclusively conducted within the borders of Vietnam, which raises the question of whether the relationships and findings extend to other geographical and cultural contexts. The study primarily focused on two research objectives and the testing of proposed hypotheses within this specific cultural setting. To enhance the robustness and generalizability of the findings, future research should aim to conduct cross-cultural studies, incorporating data collection from multiple countries. Such an approach would enable a comprehensive examination of whether the observed relationships remain consistent across diverse cultural backgrounds, contributing to the broader understanding of the applicability of HIWSs and their impact on employee perceptions of the PIRK framework and resilience on a global scale (Hofstede, 2001).

Second, this study's temporal dimension of data collection should be addressed. The study gathered data at a single point in time, primarily due to the constraints imposed by the pandemic. While this approach provided valuable insights, it limits our understanding of how the effectiveness of HIWSs may evolve. A longitudinal study design would be beneficial for exploring the dynamic nature of HIWSs and their influence on employee perceptions of PIRK. Future scholars can capture changes and fluctuations in these relationships by conducting research at multiple time points, offering a more comprehensive understanding of the temporal aspects of HIWSs and their consequences. This will enable researchers to explore how organizations can adapt and fine-tune their HIWS practices in response to evolving environmental factors and disruptions.

Third, the reduction in sample size from 411 initial questionnaires to 379 usable questionnaires, attributed to missing data, potentially represents a limitation that merits careful consideration. Despite diligent efforts to address missing data during the data collection process, the resultant decrease in sample size has potential implications for the robustness and generalizability of our study outcomes. This reduction may introduce sampling bias and compromise the sample's representativeness, potentially influencing our findings' reliability and validity. Consequently, interpretations drawn from the data should be cautiously approached, recognizing the inherent limitations imposed by the reduced sample size. Addressing this limitation necessitates a comprehensive acknowledgment of its potential impact on the study's outcomes and warrants transparency in reporting such constraints. Additionally, future research endeavors could explore alternative methodologies or employ strategies to minimize missing data, thereby mitigating the impact on the study's validity and enhancing the credibility of subsequent findings.

Fourth, despite efforts to mitigate potential temporal variations that may impact the study variables, such as standardized data collection procedures and controls for confounding factors, it is essential to acknowledge that certain external events or environmental changes may still influence the results. While the study timeframe was carefully selected to minimize the impact of such variations, unforeseen events or fluctuations in external conditions could introduce bias or confound the relationships between variables. Thus, caution should be exercised when interpreting the findings, and future research may benefit from incorporating additional measures to address temporal variations more effectively.

Finally, leadership is a multifaceted construct characterized by various styles and orientations, including creative, authentic, and transactional leadership. To enrich the existing body of knowledge, future research should delve into the moderating role of distinct leadership styles within the context of HIWSs and their impact on employee perceptions of PIRK. Examining how different leadership styles interact with and potentially amplify or attenuate the relationships explored in this study can provide invaluable insights for organizations. For instance, research may focus on the role of authentic leadership, which emphasizes transparency, ethical behaviour, and fostering positive relationships, in shaping employees' perceptions regarding HIWSs and the PIRK framework. Alternatively, examining transactional leadership, characterized by a focus on contingent rewards and performance monitoring, can shed light on its interplay with HIWSs in influencing employee perceptions of PIRK and resilience. These investigations will contribute to a deeper understanding of the nuanced leadership dynamics organizations must consider when implementing HIWSs in the digital workplace (Nguyen et al., 2023).

Author statement

The authors of this research are deeply committed to advancing the understanding of the intricate dynamics at the intersection of digitalization, human resource management, and organizational resilience. Their motivation stems from a collective interest in exploring the factors that underpin the successful adoption of digital technologies within the healthcare industry, particularly in emerging market settings.

This study explores the intricate dynamics of high involvement work systems (HIWS) in a technologically-mediated work context, examining their influence on organizational resilience and employee outcomes. Their investigation focuses on the mediating role of employee perceptions regarding power, information, rewards, and knowledge (PIRK) in the relationship between HIWS and its impact on organizational resilience and employee outcomes. Additionally, they explore the moderating effect of transformational leadership in this process.

Drawing on data collected from 379 employees, their findings provide robust support for the majority of our hypotheses, establishing a nuanced understanding of how HIWS, particularly those emphasizing teamwork and training, shapes employee perceptions of PIRK. These perceptions, in turn, contribute significantly to higher levels of organizational resilience and positive employee outcomes. Their study not only extends the conceptual definition of HIWS but also elucidates its connection to organizational resilience and employee outcomes through the lens of employee perceptions of PIRK.

Furthermore, their research highlights the crucial role of transformational leadership as a moderator in this process, emphasizing its impact on shaping the relationship between HIWS, employee perceptions, and organizational outcomes.

Given the implications of their findings, they believe that their study aligns well with the objectives and scope of Technological Forecasting and Social Change. In particular, their research contributes to the ongoing discourse on the impact of workplace practices on organizational dynamics, resilience, and employee well-being in the context of technological advancements.

They look forward to the opportunity for their work to be considered for publication in Technological Forecasting and Social Change.

CRediT authorship contribution statement

Mai Nguyen: Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Ashish Malik:** Writing – review & editing, Supervision, Investigation, Conceptualization. **Piyush Sharma:** Writing – review & editing, Visualization. **Russel Kingshott:** Writing – review & editing, Visualization. **Ritika Gugnani:** Writing – review & editing.

Data availability

Data will be made available on request.

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