The effect of in-store employee retail technology on employee well-being: based on the job demands-resources model

Claire Whang, Chitra Dabas, Lizhu Davis

The effect of in-store employee retail technology on employee well-being: based on the job demands-resources model

Claire Whang and Chitra Dabas*

California State Polytechnic University-Pomona,
3801 W Temple Ave, Pomona, CA 91768, USA
Email: cwhang@cpp.edu
Email: csdabas@cpp.edu
*Corresponding author

Lizhu Davis

California State University, Fresno,
5241 N. Maple Ave. Fresno, CA 93740, USA
Email: lidavis@mail.fresnostate.edu

Abstract: This study investigated the effect of in-store employee retail technology on retail store employees' well-being, using the job demands-resources model. The relationships were tested through structural equation modelling using 456 responses recruited from Amazon MTurk. Findings revealed that technology-specific job demands (cognitive load, information distrust, and public fear) were positively associated with increased burnout, while the job resources (employee training) were positively related to work engagement. In addition, job resources moderated the relationship between job demands (cognitive load) and burnout. Unlike predicted, job demands did not lead to weaker work engagement. Instead, the cognitive load led to increased work engagement, which may be due to the inherently complex nature of stressors that can be both positively challenging and hindering. The study contributes to the job demands-resources model literature by adopting technology-specific job demands. The findings suggest the importance of recognising retail store employees' well-being, which can be supported by appropriate employee training.

Keywords: job demands-resources model; JD-R model; employee-facing technology; in-store technology; retailing.

Biographical notes: Claire Whang is an Associate Professor in the Department of Apparel Merchandising and Management at California State Polytechnic University, Pomona. Her research focuses on how technology influences consumer behaviour, including social media marketing and voice shopping.

Chitra Dabas is a Professor in the Department of Apparel Merchandising and Management at California State Polytechnic University, Pomona. Her research interests include retail employee well-being and turnover, retail store performance, sustainable fashion consumption, and retail pedagogy.

Lizhu Davis is a Professor in the Department of Marketing and Logistics at California State University, Fresno. Her research interests include consumer shopping behaviour, sustainable fashion consumption, and fashion entrepreneurship.

1   Introduction

Retail employee technology, such as mobile price scanners, handheld checkout devices, inventory management systems, advanced analytics software, and other in-store equipment, offers various benefits, such as improving service quality and efficiency of the sales process (Gong et al., 2022), strengthening retailer-customer relationships, and enhancing merchandising strategies. With access to information management tools that enhance employee-customer interactions in-store, these technologies empower retail employees to be in front of the customer instead of behind the register. Because of the benefits that those technologies provide, more onsite retailers are adapting them to compete with online retailing and cater to cross-shopping consumers (Spreer and Rauschnabel, 2016).

The implementation of new technologies is a strategic decision as it requires significant capital investment and access to skilled staff who can be trained to use them effectively (Pantano et al., 2018). Store employees and technology are complementary assets. While in-store technology enhances customer experience, store staff remain the dominant driver of service quality perceptions and customer satisfaction (Sharma et al., 2021). To survive and succeed in an ever-evolving retail landscape, retailers must strengthen the management of their store employees (Taşkan, Karatop, and Kubat, 2020). Therefore, to successfully implement technologies and maximise their potential benefits, it is critical to understand how new technologies impact retail employees, as they are the primary users of these technologies. Analogous to adopting any innovation, the use of new technology in stores can negatively impact employee well-being due to elevated stress from coping with the new task. According to a recent special report by Microsoft on the work trend index (2022), young frontline employees from industries including retail, healthcare, financial services, media and communication, automotive, government and public sector services, manufacturing, and energy, as well as travel, transportation, and hospitality industry feel frustrated from inadequate technology tools while older employees struggle with adapting to new technology. About 46% of frontline workers feel threatened by technology and think they may lose their jobs if they don't adopt it. While there is a strong desire among these employees (46%) for technology tools that can simplify job-related tasks, they often experience a lack of training and support (53%) when using work-related technology (Microsoft, 2022). To conclude, learning and using new technology can be intimidating to retail store employees (Microsoft, 2022), which may also lead to some negative psychological impacts.

However, despite the increasing use of in-store employee retail technology, research on retail technology-specific job demands and their effect on the well-being of retail store

employees is limited (Vadruccio, Seghezzi, and Tumino, 2024). Existing studies have focused on consumers' responses toward in-store retail technologies; research on store employees' perspectives is scarce (Gong et al., 2022). For example, a comprehensive literature review of studies published from 2005 to 2023 on the implementation of smart technology in physical retail environments reveals that the key research focus in this area was on the perceived benefits for consumers and retailers (Vadruccio, 2024). Although a few studies have identified different types of technologies adopted in stores (Alexander and Kent, 2021) and barriers to employees' new technology usage (e.g., Spreer and Rauschnabel, 2016), its impact on employees' burnout and work engagement is less known and often overlooked (Vadruccio et al., 2024). In addition, there is a lack of research on the technology-specific job demands and resources, as well as how these elements impact retail employees' well-being.

The concept of engagement first emerged in the organisational psychology and business literature in the early 1990s, aiming to better understand employee work roles (Simpson, 2009). Today, work engagement has become an important research topic because of its critical role in organisational success. It enhances job satisfaction and retention (Mansour, 2020) while influencing a wide range of positive behavioral outcomes. In contrast, burnout represents the opposite of work engagement, which leads to harmful psychological states such as emotional exhaustion, depersonalisation (which refers to detached and negative attitudes towards others in the work), and feelings of inability to complete work outcomes (Lee and Ashforth, 1993). Employees who experience a high level of burnout may foster negative attitudes toward and/or feel unable to fully utilise new technology on the job.

The JD-R model is an effective framework for understanding and predicting employee performance and overall well-being (Bakker and Demerouti, 2024). This model highlights how employees' well-being, including work engagement and burnout, is influenced by two fundamental sets of work-related conditions: job demands and job resources (Demerouti et al., 2001). Job demands refer to the sustained physical and/or mental effort required as a part of the physical, organisational, or social aspect of the job (Demerouti et al., 2001). Common external stressors that correspond to job demands include heavy workload and emotional pressures. Conversely, job resources are vital assets that enable employees to achieve work goals, foster personal growth, and alleviate the impact of job demands (Demerouti et al., 2001). These resources can include opportunities for development, task variety, and strong supervisory support. Acknowledging and enhancing job resources is crucial for promoting employee well-being and driving organisational effectiveness, making it essential for businesses to invest in these aspects for sustainable success.

To fill the gap in the literature on the impact of in-store technology on retail employees, this research aims to examine how retail employee technology-specific demands can explain retail store employees' burnout and work engagement and the moderating effects of technology-related organisational support on the job demands-strain relationship by building upon the JD-R model. While many factors may impact work engagement and burnout, this study investigated the effect of cognitive overload, information distrust, and fear of public failure as job demands and employee training as job resources on work engagement and burnout. To answer research questions, a conceptual model was developed first. The quantitative research questionnaire was then designed and delivered online. Then, using the structural equation modelling method, the conceptual model was tested.

This study contributes to the literature by exploring the effects of in-store technology on retail employees' work engagement and burnout through the lens of the JD-R model. Specifically, it investigates how technology-related stressors – such as cognitive overload, information distrust, and fear of public failure – affect employee outcomes. The findings offer valuable insights for retail managers seeking to address these challenges, guiding more effective technology implementation strategies that support employee engagement and reduce burnout. Overall, the study contributes to the JD-R model literature by adopting technology-specific job demands into the model and providing empirical evidence to validate the conceptual model.

Next, the paper begins with the literature review and hypothesis development section, which aims to develop the conceptual model of the study. This is followed by the methodology section, then the results section. The last section presents the discussion and conclusion, highlighting the implications of the study's findings.

2   Literature review and hypothesis development

2.1   Job demands-resources model

The JD-R model (Demerouti et al., 2001) explains how job characteristics influence employee well-being and performance. It distinguishes between job demands, which can cause strain, and job resources, which enhance motivation and engagement (Bakker and Demerouti, 2007). The model identifies two key processes: a health impairment pathway, where excessive demands lead to burnout, and a motivational pathway, where adequate resources foster engagement (Chen et al., 2020; Hagemann et al., 2023).

Schaufeli and colleagues (2002) described work engagement as a positive, fulfilling, and satisfactory mental state. It is a long-lasting and pervasive affective-cognitive state not limited to an object, individual, behavior, or event (Schaufeli et al., 2002). Work engagement comprises three dimensions: enthusiasm, dedication, and absorption (Schaufeli et al., 2002). It is characterised by high levels of energy, strong involvement in one's work, and a sense of efficacy. Engaged employees are typically enthusiastic about their roles, deeply committed to their organisations, and motivated to exceed job expectations (Jain and Khurana, 2017; Sumlin, Hough, and Green, 2021). Burnout is described as a syndrome characterised by exhaustion, reduced professional efficacy, and cynicism resulting from chronic job stress (Maslach et al., 1996). Some literature posits burnout as the opposite of work engagement (Maslach et al., 1997; Simpson, 2009). However, Schaufei et al. (2002) argue that engagement and burnout are conceptually distinct concepts. Employees experiencing low burnout are not necessarily highly engaged in the workplace (Schaufei et al., 2002).

The JD-R model outlines two key propositions regarding burnout and work engagement (Demerouti et al., 2001). First, excessive job demands, such as high workload and time pressure, lead to strain and exhaustion by requiring sustained physical or mental effort (Scholze and Hecker, 2024). This gradually depletes an employee's energy, leading to burnout. Second, the absence of adequate job resources, such as support, autonomy, or feedback, hinders employees' ability to meet demands effectively, resulting in disengagement. Conversely, when job resources are present, they not only buffer the negative impact of demands but also promote motivation and enhance work engagement (Scholze and Hecker, 2024; Menguc et al., 2013).

2.2 Job demands and retail employee technology

Jobs with high demands, such as emotional labour, work overload, and time pressure, place significant physiological and psychological pressures on employees. Employees attempt to meet these pressures with rapidly depleting energy, which eventually leaves them feeling used up and exhausted. Exhausted employees are more prone to turnover intentions and adverse health outcomes (Park, Rhee, and Lee, 2021). Moreover, exhausted employees may inadvertently contribute to a deteriorating organisational climate through increased complaining and strained interpersonal interactions with colleagues and customers (Scholze and Hecker, 2024; Bakker and Demerouti, 2007; Suvaci, 2018). These challenges are particularly salient in the retail sector, where long hours of store-level jobs demand sustained physical efforts and constant interaction with customers. Retail store employees, including sales associates, supervisors, and managers, encounter job stressors unique to their context that are perceived as threats to their performance. These included role stressors (role conflict, role overload), customer-related stressors, difficult relationships with supervisors/coworkers, irregular working hours, job insecurity, low wages, and benefits (Rubio-Valdehita et al., 2024; Tuckey et al., 2017). These high demands, coupled with a lack of personal skills and job resources (e.g., training, mentoring), can strain employees' mental and physical health.

In recent years, retail stores have increasingly adopted technology to perform job-related tasks, such as customer service, inventory restocking, and inventory management. The adoption of new technology in the work environment often results in increased employee stress from coping with the expectations associated with using the new technology (i.e., increased job demands) (Spreer and Rauschnabel, 2016). While technology can be a resource for reducing work overload and alleviating task-related stress, it can also contribute to stress if the technology does not align with employees' expectations (Scholze and Hecker, 2024; Meyer et al., 2020). Technology can increase workload perception as employees are expected to respond immediately to customer and employer requests (Duxbury et al., 2014). Meyer and colleagues (2020) found that the rapid incorporation of technology created technostress and fear of the public among retail store employees. Technostress refers to the detrimental effects of technology use on individuals' psychological and physical well-being. In retail settings, operational imperfections, such as technological malfunctions or inadequate system support, further exacerbate work-related stress. According to the JD-R framework, such stressors require heightened cognitive and emotional efforts, leading to the increased risk of burnout. Building on this foundation, the present study focuses on three retail technology-specific job stressors: cognitive load, fear of public failure, and information distrust. These stressors have been previously identified as barriers to the adoption of new technology at work by employees (e.g., Meyer et al., 2020; Spreer and Rauschnabel, 2016).

Cognitive overload theory (CLT) suggests that human memory has a limited mental capacity to process information and perform associated tasks. When the human brain is subjected to high amounts of information processing needed to perform a task, it creates stress on cognitive functions like decision-making (Phillips-Wrenb and Adya, 2020). The complex nature of retail technology can create a cognitive overload for employees as they find it challenging to learn and adapt. The stress created by cognitive overload can further exacerbate job demand perception, leading to burnout among retail store employees. Information distrust refers to employees' doubts regarding the correctness of the data presented by retail employee technology (Spreer and Rauschnabel, 2016). Relationship

with customers is an important part of sales employees' jobs, and they tend to avoid any action that can deteriorate their interactions with customers. Lack of trust in the information provided by retail technology can pose a threat to employee-customer relationships, thereby acting as a stressor (Spreer and Rauschnabel, 2016). The third retail technology-related factor that can amplify job stress is fear of public failure. It refers to the level of anxiety associated with the potential failure of operating the technology in front of the customer (Oyedele and Simpson, 2007). Meyer et al. (2020) found that retail employees can feel humiliated when they fear unexpected technology malfunctions during customer encounters. Such fear can enhance stress caused by technology (technostress) amongst employees, leading to burnout. Therefore, the following hypotheses are posited:

H1 Job demands

    a   cognitive overload

    b   information distrust

    c   fear of public failure) imposed by retail employee technology usage lead to increased burnout of retail store employees.

H2 Job demands

    a   cognitive overload

    b   information distrust

    c   fear of public failure) imposed by retail technology usage negatively influence the work engagement of retail store employees.

2.3   Technology training as a job resource

Job resources are critical for motivating employees toward their growth, learning, and development (Crawford et al., 2010; Guha and Chakrabarti, 2014). Job resources can enhance job satisfaction and work engagement. They can also buffer the impact of job demands on burnout (Demerouti et al., 2001). One important job resource is training. Job training can be defined as an organisation's structured effort to offer employees job-related learning, skills, and competencies (Huang and Su, 2016). A lack of sufficient training can cause anxiety, stress, loss of productivity, and technology overload (Rasool et al., 2022). Efficient training increases employees' willingness to use technology and reduces information overload (Harris et al., 2013). Training motivates employees to complete complicated tasks (Delpechitre et al., 2019). Adequate and proper training, as well as learning new skills, also make employees more engaged with their job and the organisation (Andrew and Sofian, 2012). Numerous studies (e.g., Sumlin et al., 2021) have revealed that training has a significant impact on employees' job satisfaction, commitment, performance, and retention.

Technology, when perceived as a resource, can reduce perceived psychological pressures related to work and mitigate job demands (Subramony et al., 2021). However, adequate training is required for employees to understand the advantages of technology in achieving work objectives. Studies on technology adoption have consistently reported that sufficient training can reduce the stress associated with using new technology (Scholze and Hecker, 2024). Techno-training can enhance employees' self-efficacy toward technology (Rayburn et al., 2021). Improvement in self-efficacy can moderate

technostress and reduce burnout, as employees feel more confident in handling technology. Thus, technology training can serve as a valuable resource, helping employees better cope with job demands related to technology. Thus, the following hypothesis is posited:
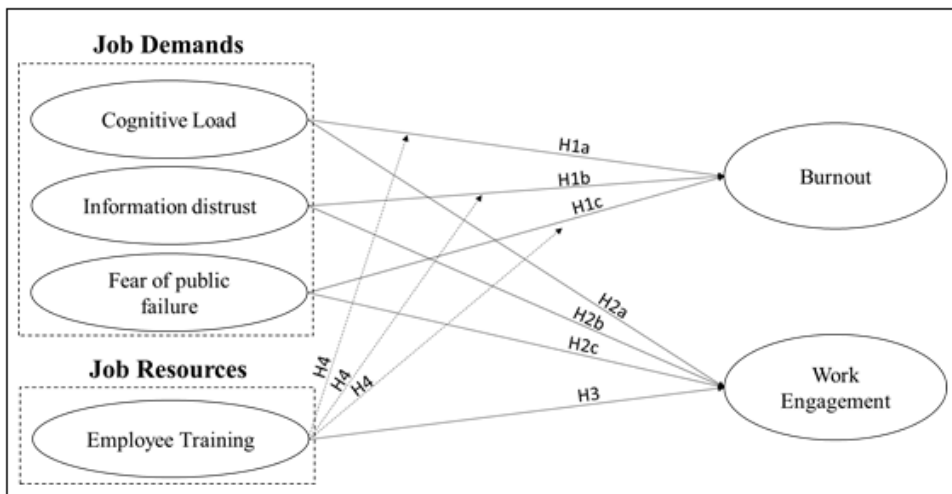
H3   Provision of adequate technical training can increase the work engagement of retail store employees.

H4   Provision of adequate technical training can positively moderate the influence of job demands

   a   cognitive overload

   b   information distrust

   c   fear of public failure) on burnout.

The conceptual model is provided in Figure 1.

Figure 1   Conceptual model

3   Methodology

3.1   Research design

A quantitative method was adopted to test the hypotheses. An online survey, created using Qualtrics, was conducted to test the research model. Three job demands (cognitive load, information distrust, and public fear) and job resources (employee training) were used as predictors for burnout and work engagement.

3.1.1 Measurement

All measurement items were adapted from studies using previously validated ones to ensure the scale's validity. The nine items to measure job demands (cognitive load,

information distrust, public fear) were adopted from Spreer and Rauschnabel (2016). Cognitive load was operationalised as the level of mental effort required to use retail technology (Spreer and Rauschnabel, 2006), which was measured using 3 items. Information distrust was defined as the retail employee's doubts regarding the accuracy of the data provided by the retail technology (Spreer and Rauschnabel, 2006), and was measured using 3 items. Public fear refers to the fear of public failure associated with the use of retail technology (Oyedele and Simpson, 2007; Spreer and Rauschnabel, 2006), which was measured using 3 items.

Job resources (employee training) captured the degree of employee training and development programs provided by the company and was assessed using 4 items from Hanaysha (2016). Job burnout, which refers to physical, emotional, and mental exhaustion and disengagement at work, was measured using 5 items adopted from Maslach and Jackson (1981). Lastly, work engagement, which referred to the degree of engagement at work, was measured using 4 items adopted from Mowday, Steers, and Porter (1979).

All constructs were measured on a 7-point rating scale. A pilot test with a small sample sise of 40 qualifying participants (recruited from Amazon MTurk; 59.5% male, 57.1% 25–29 years old, 85.7% Caucasian) was conducted to refine the questions and evaluate the reliability and validity of the measurement scales. Given that the results were satisfactory, the questionnaire was subsequently distributed to a wider population. The pilot test sample was not for final hypothesis testing.

Table 1   Summary of the measurement items

Variable	Operational definition	Questionnaire	Reference
Cognitive load	The level of mental effort required to use retail technology	Handling the in-store mobile device requires much effort	Spreer and Rauschnabel (2006)
		Handling the in-store mobile device is hard to learn	
		Handling the in-store mobile device needs a lot of attention	
Information distrust	The retail employee's doubts regarding the accuracy of the data provided by the retail technology	The digital information I get from the in-store mobile device could sometimes be faulty	Spreer and Rauschnabel (2006)
		The digital information I get from the in-store mobile device may not match up with the facts	
		Product facts could be shown distorted through the in-store mobile device	
Public fear	The fear of public failure associated with the use of retail technology	I feel ashamed when facing challenges in the operation of the in-store mobile device when a customer is watching	Spreer and Rauschnabel (2006), Oyedele and Simpson (2007)
		When the in-store mobile device has technical problems in front of customers, it sheds a bad light on me	
		It is embarrassing for me when the in-store mobile device does not properly work in a sales conversation	

Table 1 Summary of the measurement items (continued)

Variable	Operational definition	Questionnaire	Reference
Employee training	The degree of employee training and development programs provided by the company	My company provides learning/training opportunities to effectively use the in-store mobile device	Hanaysha (2016)
		Overall, the on-the-job training I received for using in-store mobile device is applicable to my job.	
		Overall, I am satisfied with the amount of training I received for using in-store mobile device on the job	
		Overall, the training I received on the job meets my needs for using in-store mobile device	
Job burnout	Physical, emotional, and mental exhaustion and disengagement at work	I feel emotionally drained from my work	Maslach and Jackson (1981)
		I feel I am working too hard on my job	
		I feel frustrated by my job	
		My job puts too much stress on me	
		I feel burned out from my work	
Work engagement	The degree of engagement at work	I enjoy giving individual attention to each customer	Mowday, Steers, and Porter (1979)
		I enjoy giving individual attention to each customer	
		I try to provide more information to customers for their needs	
		I try to determine how I can best help a customer solve his/her problem	
		I generally know what customers want before they ask	

3.1.2 *Population and sample*

The population of interest for this study was retail store employees (sales associates, category managers, store managers) who were using in-store technologies to fulfill day-to-day job responsibilities like customer service and inventory management in the US. The USA plays a leading role in retail technology innovation and exerts significant influence on global retail practices. Given that technology-related job demands are increasingly universal, the findings offer insights applicable to international contexts where frontline retail technology adoption is expanding.

The Amazon MTurk was utilised to recruit participants who were working as retail store employees in the US and were using in-store technology as part of their work. To ensure that all respondents understood what the 'in-store mobile devices' were, a brief introductory description and visual examples of in-store mobile devices were provided at the beginning of the survey. Two filter questions ('Do you currently work as a store employee in the US?' and 'Do you currently use any of these or similar devices on an

ongoing basis at your current retail job?') were used to check the qualifications of the participants.

3.1.3   Data collection

A total of 487 usable responses from qualifying participants were collected through Amazon MTurk. After removing invalid responses (e.g., uniform answers on all items, incomplete answers), a total of 456 valid samples were obtained.

- Procedure: once participants accepted the survey task on Amazon MTurk, they were redirected to a qualtrics survey. Before beginning, they reviewed a consent form. Once they agreed to the consent form, they completed two screening questions that determined their eligibility. Eligible participants proceeded to the main survey, which was divided into three sections. First, they reported their experiences with using retail technology as part of their work. Second, they answered questions related to key study variables, including work engagement, burnout, employee training, and job demands. Finally, they completed demographic questions.

- Sample description: the participants were mostly between 25 and 29 years old (33.9%), and their average work years were 3.63 years (SD: 2.88). Among the participants, 42.1% were female, and 65.8% were Caucasian. More than 60% of the participants indicated that retail technology was important for accomplishing their job responsibilities.

- In-store devices: according to survey results, some of the popular in-store technology devices used by participants included Zebra, Telxon, Blackbird, and Bluebird devices. The majority of the respondents indicated that they accessed enterprise software through tablets or mobile phones. iPads and Samsung devices were popular choices for tablets or mobile phones.

3.1.4   Data analysis

To test the hypotheses, a partial least squares-based structural equation model (SEM-PLS) was used to assess the measurement model. For the analysis, SmartPLS 3.3.9 was used. First, the validity and reliability were examined using Cronbach's alpha and confirmatory factor analysis (factor loadings, composite reliability (CR), average variance extracted (AVE). Then, the model fit was assessed using the normed-fit index and standardised root mean square residual. Lastly, the hypotheses were tested using bootstrapping analysis in SmartPLS.

4   Results

4.1   Preliminary analysis

To begin with, the convergent validity was examined using the CR, factor loadings, and AVE (Fornell and Larcker, 1981). All factor loadings were above 0.8, and all AVE values exceeded 0.50, demonstrating satisfactory convergent validity (Hair et al., 2019). Furthermore, the heterotrait-monotrait (HTMT) ratio and the arithmetic square root of each AVE were used to evaluate the discriminant validity (Fornell and Larcker, 1981).

The HTMT ratio values ranged from 0.10 to 0.64, which is below the threshold of 0.90 (Henseler et al., 2015), indicating the study's discriminant validity was confirmed. Additionally, the measurement reliability was assessed using Cronbach's alpha value, which was found to be higher than 0.80 for all constructs, which confirms satisfactory reliability. The results are summarised in Table 1, Table 2, and Table 3.

Table 2   Summary of the factor loadings, composite reliability, AVE

Construct	Item	Factor loading	Cronbach's α	CR	AVE
Cog load	Cognitive load1	0.915	0.882	0.927	0.809
	Cognitive load2	0.921			
	Cognitive load3	0.861			
Info distrust	InfoDistrust1	0.915	0.891	0.932	0.821
	Info Distrust2	0.907			
	Info Distrust3	0.896			
Public fear	Public Fear1	0.861	0.862	0.916	0.784
	Public Fear2	0.901			
	Public Fear3	0.894			
Employee training	Training1	0.846	0.893	0.926	0.758
	Training2	0.861			
	Training3	0.881			
	Training4	0.894			
Burnout	Burnout1	0.906	0.941	0.957	0.849
	Burnout2	0.920			
	Burnout3	0.932			
	Burnout4	0.928			
Work engagement	Engagement1	0.874	0.893	0.945	0.775
	Engagement2	0.887			
	Engagement3	0.883			
	Engagement4	0.877			
	Engagement5	0.880			

Table 3   Inter-construct correlations (Fornell-Larcker criterion)

	Cog load	Info distrust	Public fear	Training	Burnout	Engagement
Cog load	*0.899*					
Info distrust	0.744	*0.906*				
Public fear	0.547	0.614	*0.885*			
Training	0.117	0.094	0.128	*0.871*		
Burnout	0.588	0.590	0.513	–0.133	*0.921*	
Engagement	0.315	0.155	0.197	0.623	–0.122	*0.880*

The model fit was assessed using the normed-fit index (NFI) indicators and the standardised root mean square residual (SRMR). To be considered an acceptable model fit, SRMR values should be less than 0.8, and NFI values should be above 0.8 (Hair et al.,

2022). In this study, the model exhibited an SRMR of 0.044 and an NFI of 0.901, indicating a satisfactory model fit. Further, the variance inflation factor (VIF) values were all below 4.5, lower than the threshold of 10, indicating no significant collinearity issue with the model.

Table 4   Heterotrait-monotrait ratio

	Cog load	*Info distrust*	*Public fear*	*Training*	*Burnout*
Cog load					
Info distrust	0.837				
Public fear	0.624	0.699			
Training	0.138	0.105	0.148		
Burnout	0.638	0.644	0.566	0.145	
Engagement	0.354	0.171	0.222	0.684	0.131

4.2   Structural model

The Smart PLS bootstrapping analysis results are summarised in Table 4 and Figure 1. The analysis revealed that all the job demands significantly predicted burnout. Specifically, results showed a statistically significant effect of cognitive overload on burnout ($\beta = 0.332$, $p < 0.001$), information distrust on burnout ($\beta = 0.182$, $p < 0.001$), and public fear on burnout ($\beta = 0.237$, $p < 0.001$), supporting H1a, H1b, and H1c. The greater job demands led to higher burnout.

Regarding work engagement, the results showed mixed findings. Information distrust significantly predicted work engagement ($\beta = -0.207$, $p < 0.01$), supporting H2b. Cognitive load also statistically significantly predicted work engagement ($\beta = 0.332$, $p < 0.001$), but unlike hypothesised, cognitive overload showed a positive relationship with work engagement, rejecting H2a. Public fear did not predict work engagement, rejecting H2c.

Table 5   Results summary

Hypothesis	*Std. beta*	*Std. deviation*	*t-value*	*Results*
H1a. Cog load → burnout	0.332	0.061	5.474***	Supported
H1b. Info distrust → burnout	0.182	0.072	2.549*	Supported
H1c. Public fear → burnout	0.237	0.056	4.260***	Supported
H2a. Cog load → engagement	0.378	0.059	6.395***	Rejected
H2b. Info distrust → engagement	-0.207	0.071	2.915**	Supported
H2c. Public fear → engagement	0.041	0.056	0.746	Rejected
H3. Training → engagement	0.592	0.042	14.187***	Supported
H4. Moderating effect – training	0.174	0.053	3.278**	Supported

In terms of job resources, results showed that employee training was statistically significantly related to work engagement ($\beta = 0.592$, $p < 0.001$). Further, for the moderating effect, employee training significantly moderated the relationship between cognitive overload and burnout ($\beta = 0.174$, $p < 0.01$). Specifically, while employees did

not show significant differences in the extreme cognitive overload situation, employee training significantly relieved the level of employee burnout in less extreme cognitive overload situations.

Figure 2   Results summary
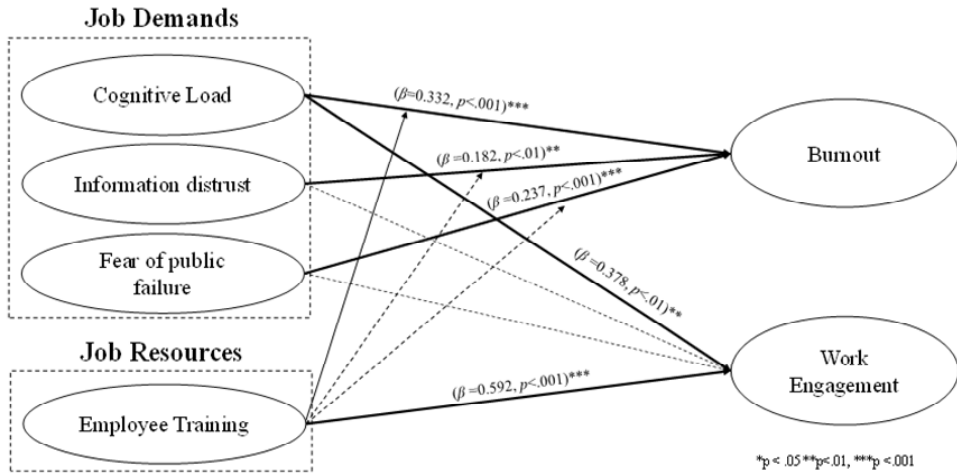
5   Discussion

With the increasing presence of technology, it has become essential to understand how technology impacts the role of retail employees and their well-being (Vadruccio, Seghezzi, and Tumino, 2024). Applying the JD-R model, this study examined the effect of retail employee technology on retail store employees' well-being. Specifically, this study examined the impact of three job demands dimensions (cognitive load, information distrust, and fear of public failure) and one job resource (employee training) on the burnout and work engagement of retail store employees.

First, consistent with previous research (e.g., Demerouti et al., 2001; Scholze and Hecker, 2024), the results confirmed that job demands (i.e., cognitive overload, information distrust, fear of public failure) led to burnout. All forms of job demands, cognitive overload, information distrust, and fear of public failure led to increased burnout. This aligns with recent research that showed job demands related to technology can impact employees' well-being (Scholze and Hecker, 2024; Wu, Liang and Wang, 2024)

However, job demands did not lead to decreased work engagement. Specifically, information distrust and fear of public failure did not predict work engagement. While cognitive overload did significantly impact work engagement, contrary to expectations, a positive relationship was found. The complex nature of the stressors may cause the positive effect of cognitive overload on work engagement. Literature suggests that job stressors can be categorised into two types: challenge stressors and hindrance stressors (Prem et al., 2017; Cavanaugh et al., 2000). While challenge stressors are related obstacles that allow individuals to learn and achieve, hindrance stressors are associated with stressful demands that unnecessarily impede personal growth and development

(LePine et al., 2005; Prem et al., 2017). Meta-analytical evidence showed that both stressors are indeed perceived as strains. However, challenge stressors were closely tied to favorable effects related to motivation and performance, while hindrance stressors were tied with negative effects connected to motivation and performance (LePine et al., 2005). Additionally, studies have indicated that challenge stressors are positively associated with job satisfaction (Cavanaugh et al., 2000), learning motivation (Prem et al., 2017), and engagement (Crawford et al., 2010). Employees consider 'meaningful and challenging work' as a critical factor for their work engagement (Martin, 2020). Given that some stressors can positively facilitate personal growth and achieve a mastery level (Cavanaugh et al., 2000), it is possible that cognitive overload was perceived as a challenge stressor to predict work engagement positively.

Further, the findings confirm that job resources (i.e., employee training) enhanced the work engagement of retail employees when they work with retail technology. Further, as a key job resource, employee training buffered the effect of cognitive load on burnout among retail employees. These findings suggest that ongoing organisational workshops and training can help ease the degree of mental effort required to use new technology. Rayburn et al. (2021) found that continuous training to adopt technology can develop efficacy towards technology, foster technological expectancy, and suppress stress related to its usage. Similarly, Scholze and Hecker (2024) found that job resources enhance work engagement and job satisfaction. The moderating effect of employee training may suggest that employee training can set expectations towards technology usage, assist employees in connecting technology with personal growth, and contribute to improved performance. That said, the reason why the fear of public failure and information distrust were found not significant may be because these factors were less relevant to achieving personal development and growth. Public failure and informational distrust are extrinsic stressors caused by technology failure and may not be controllable by employees. Training may not mitigate the effect of these two factors unless employees have some level of control over such technology failures.

6   Implications and conclusions

6.1   *Theoretical implications*

This study contributes to the JD-R model literature by identifying and adopting technology-specific job demands to investigate how they may play a vital role in influencing retail employees' well-being. Results imply that job demands, such as cognitive overload, information distrust, and fear of public failure that are specific to in-store technology usage, significantly contribute to retail employees' job burnout. While previous JD-R research has explored technology use in domains such as education (Hanaysha, 2016), AI, robotics (Meyer et al., 2020), and the healthcare sector, limited attention has been given to frontline retail employees. This study addresses this gap and extends the JD-R framework to a critical yet underexplored workforce segment.

This study also contributes to the increasing body of literature on understanding employees' emotions and stress in the workplace (e.g., Kalwani and Mahesh, 2020), suggesting that the introduction of new technology can affect employees' well-being. In addition, while existing studies on retail store employees' use of in-store technology have mainly focused on proposing conceptual models (Pantano et al., 2018) without empirical

data, this study advances and empirically tests a conceptual model examining the impact of retail employees' technology usage on employees' burnout and work engagement.

6.2   Managerial implications

The study provides practical implications. First, the results confirm that technology-specific demands can critically affect retail employees' burnout in the workplace. Therefore, in addition to monitoring general job demands, such as workload, time pressure, and role ambiguity, managers should also carefully assess whether any technology-specific job demands have been created by the adopted in-store technology, which may require additional support and resources to address them.

Second, the study emphasises the importance of providing necessary employee training to reduce the feeling of exhaustion caused by the usage of retail employee technology. The findings suggest that proper training can help employees reduce stress while enhancing work engagement. Therefore, it is crucial to provide regular and sufficient training sessions that employees find not only adequate and relevant to their roles, but also aligned with the technologies they are using in the store. Continuous training will increase the technology receptiveness of retail store employees and improve their overall performance as well as the level of engagement.

Additionally, it is important to note that employee training alone was insufficient to mitigate the effects of information distrust and public fear on burnout. Companies should explore additional strategies, such as transparent communication about technology use, psychological safety initiatives, and support systems, that promote employee trust and confidence. These strategies may help address concerns and sustain employee motivation when using technology at work.

6.3   Limitations and future research

Given the complex relationship between job demands and work engagement, future studies could explore different factors that affect this relationship. For example, different job demand types, including job ambiguity, job conflict, and increased time expenditure, may play roles in influencing work engagement.

Furthermore, this study only investigated general retail employee technology; future studies could investigate whether different types of retail employee technology affect the dynamics of the relationships. For example, the perceived autonomy and compatibility with existing work could be important factors in alleviating stress caused by job demands.

Lastly, future studies could explore the impact of employees' individual traits on their perception and evaluation of the work environment using retail employee technology. Specifically, an individual's familiarity with technology could be an important factor influencing the relationship, such as personal innovativeness and computer anxiety. Further, one's general self-efficacy could also be an important factor that influences individuals' responses toward increased job demands. Additionally, demographic characteristics may meaningfully influence these relationships. For instance, future studies could compare perceptions between younger and older employees or those with shorter versus longer tenure. Younger employees may be more open to adopting new technologies and may find them less challenging to learn. In contrast, employees with longer tenure may show greater commitment to adapting to new technologies in order to

maintain their current roles, rather than seeking alternative positions when faced with challenges. Exploring these demographic factors could offer valuable insights into variations in employee responses to retail technology.

References

Alexander, B. and Kent, A. (2021) 'Tracking technology diffusion in-store: a fashion retail perspective', *International Journal of Retail and Distribution Management*, Vol. 49, No. 10, pp.1369–1390.

Andrew, O.C. and Sofian, S. (2012) 'Individual factors and work outcomes of employee engagement', *Procedia - Social and Behavioral Sciences*, Vol. 40, pp.498–508.

Bakker, A.B. and Demerouti, E. (2007) 'The job demands-resources model: state of the art', *Journal of Managerial Psychology*, Vol. 22 No. 3, pp.309–328.

Bakker, A.B. and Demerouti, E. (2024) 'Job demands–resources theory: frequently asked questions', *Journal of Occupational Health Psychology*, Vol. 29, No. 3, pp.188–200.

Cavanaugh, M.A., Boswell, W.R., Roehling, M.V. and Boudreau, J.W. (2000) 'An empirical examination of self-reported work stress among US managers', *Journal of Applied Psychology*, Vol. 85, No. 1, pp.65–74.

Crawford, E.R., LePine, J.A. and Rich, B.L. (2010) 'Linking job demands and resources to employee engagement and burnout: a theoretical extension and meta-analytic test', *Journal of Applied Psychology*, Vol. 95 No. 5, pp.834–848.

Delpechitre, D., Black, H.G. and Farrish, J. (2019) 'The dark side of technology: examining the impact of technology overload on salespeople', *Journal of Business and Industrial Marketing*, Vol. 34 No. 2, pp.317–337.

Demerouti, E., Bakker, A.B., Nachreiner, F. and Schaufeli, W.B. (2001) 'The job demands-resources model of burnout', *Journal of Applied Psychology*, Vol. 86, No. 3, pp.499–512.

Duxbury, L., Higgins, C., Smart, R. and Stevenson, M. (2014) 'Mobile technology and boundary permeability', *British Journal of Management*, Vol. 25 No. 3, pp.570–588.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research*, Vol. 18, No. 1, pp.39–50.

Gong, T., Wang, C.Y. and Lee, K. (2022) 'Effects of characteristics of in-store retail technology on customer citizenship behavior', *Journal of Retailing and Consumer Services*, Vol. 65, p.102488, https://doi.org/10.1016/j.jretconser.2021.102488.

Guha, S. and Chakrabarti, S. (2014) 'Employee turnover: a study on information technology sector', *Journal of Business and Management*, Vol. 20, No. 2, pp.71–87.

Hair, J.F., Risher, J.J., Sarstedt, M. and Ringle, C.M. (2019) 'When to use and how to report the results of PLS-SEM', *European Business Review*, Vol. 31, No. 1, pp.2–24.

Hanaysha, J. (2016) 'Testing the effects of employee empowerment, teamwork, and employee training on employee productivity in higher education sector', *International Journal of Learning and Development*, Vol. 6, No. 1, pp.164–178.

Harris, K.J., Lambert, A. and Harris, R.B. (2013) 'HRM effectiveness as a moderator of the relationships between abusive supervision and technology work overload and job outcomes for technology end users', *Journal of Applied Social Psychology*, Vol. 43, No. 8, pp.1686–1695.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015) 'A new criterion for assessing discriminant validity in variance-based structural equation modeling', *Journal of the Academy of Marketing Science*, Vol. 43, pp.115–135.

Huang, W.R. and Su, C.H. (2016) 'The mediating role of job satisfaction in the relationship between job training satisfaction and turnover intentions', *Industrial and Commercial Training*, Vol. 48, No. 1, pp.42–52.

Jain, S. and Khurana, N. (2017) 'Enhancing employee engagement through training and development', *Asian Journal of Management*, Vol. 8, No. 1, pp.1–6.

Kalwani, S. and Mahesh, J. (2020) 'trends in organizational behavior: a systematic review and research directions', *Journal of Business and Management*, Vol. 26, No. 1, pp.40–78.

Lee, R.T. and Ashforth, B.E. (1993) 'A further examination of managerial burnout: toward an integrated model', *Journal of Organizational Behavior*, Vol. 14, No. 1, pp.3–20.

LePine, J.A., Podsakoff, N.P. and LePine, M.A. (2005) 'A meta-analytic test of the challenge stressor–hindrance stressor framework: an explanation for inconsistent relationships among stressors and performance', *Academy of Management Journal*, Vol. 48, No. 5, pp.764–775.

Mansour, M. (2020) 'The relationship between human resources management practices and job engagement: the mediating role of psychological capital', *Management Science Letters*, Vol. 10, No. 13, pp.3047–3056.

Martin, M.R. (2020) 'Employee engagement among millennial cross-cultural ministers: insights for recruitment and retainment', *Advances in Business Research*, Vol. 10, pp.107–119.

Maslach, C. and Jackson, S.E. (1981) 'The measurement of experienced burnout', *Journal of Organizational Behavior*, Vol. 2, No. 2, pp.99–113.

Maslach, C., Jackson, S.E. and Leiter, M.P. (1997) 'Maslach burnout inventory: third edition', in Zalaquett, C.P. and Wood, R.J. (Eds.): *Evaluating Stress: A Book of Resources*, pp.191–218, Scarecrow Education, Lanham, MD.

Maslach, C., Jackson, S.E., and Leiter, M.P. (1996) *Burnout Inventory Manual*, Consulting Psychologist Press, Palo Alto.

Menguc, B., Auh, S., Fisher, M. and Haddad, A. (2013) 'To be engaged or not to be engaged: the antecedents and consequences of service employee engagement', *Journal of Business Research*, Vol. 66, No. 11, pp.2163–2170.

Meyer, P., Jonas, J.M. and Roth, A. (2020) 'Frontline employees' acceptance of and resistance to service robots in stationary retail – an exploratory interview study', *SMR - Journal of Service Management Research*, Vol. 4, No. 1, pp.21–34.

Microsoft (2022) *2022 Work Trend Index Special Report: Technology Can Help Unlock a New Future for Frontline Workers* [online] https://www.microsoft.com/en-us/worklab/work-trend-index/technology-unlocks-a-new-future-for-frontline (accessed 9 May 2023).

Mowday, R.T., Steers, R.M. and Porter, L.W. (1979) 'The measurement of organizational commitment', *Journal of Vocational Behavior*, Vol. 14, No. 2, pp.224–247.

Oyedele, A. and Simpson, P.M. (2007) 'An empirical investigation of consumer control factors on intention to use selected self-service technologies', *International Journal of Service Industry Management*, Vol. 18, No. 3, pp.287–306.

Pantano, E., Priporas, C.V. and Dennis, C. (2018) 'A new approach to retailing for successful competition in the new smart scenario', *International Journal of Retail and Distribution Management*, Vol. 46 No. 3, pp. 264–282.

Phillips-Wren, G. and Adya, M. (2020) 'Decision making under stress: the role of information overload, time pressure, complexity, and uncertainty', *Journal of Decision Systems*, Vol. 29, sup1, pp.213–225.

Prem, R., Ohly, S., Kubicek, B. and Korunka, C. (2017) 'Thriving on challenge stressors? Exploring time pressure and learning demands as antecedents of thriving at work', *Journal of Organizational Behavior*, Vol. 38, No. 1, pp.108–123.

Rasool, T., Warraich, N.F. and Sajid, M. (2022) 'Examining the impact of technology overload at the workplace: a systematic review', *SAGE Open*, Vol. 12, No. 3, pp. 1–18.

Rayburn, S.W., Badrinarayanan, V., Anderson, S.T. and Gupta, A. (2021) 'Continuous techno-training and business-to-business salesperson success: how boosting techno-efficacy enhances sales effort and performance', *Journal of Business Research*, Vol. 133, pp.66–78.

Rubio-Valdehita, S., Díaz-Ramiro, E.M., Rodríguez-López, A.M. and Wang, W. (2024) 'Burnout among retail workers in Spain: the role of gender, personality and psychosocial risk factors', *Social Sciences*, Vol. 13, No. 5, p.264, https://doi.org/10.3390/socsci13050264.

Schaufeli, W.B., Salanova, M., González-Romá, V. and Bakker, A.B. (2002) 'The measurement of engagement and burnout: a two sample confirmatory factor analytic approach', *Journal of Happiness Studies*, Vol. 3, No. 1, pp.71–92.

Scholze, A. and Hecker, A. (2024) 'The job demands-resources model as a theoretical lens for the bright and dark side of digitization', *Computers in Human Behavior*, Vol. 155, p.108177, https://doi.org/10.1016/j.chb.2024.108177.

Sharma, P., Ueno, A. and Kingshott, R. (2021) 'Self-service technology in supermarkets–do frontline staff still matter?', *Journal of Retailing and Consumer Services*, Vol. 59, p.102356, https://doi.org/10.1016/j.jretconser.2020.102356.

Simpson, M.R. (2009) 'Engagement at work: a review of the literature', *International Journal of Nursing Studies*, Vol. 46 No. 7, pp.1012–1024.

Spreer, P. and Rauschnabel, P.A. (2016) 'Selling with technology: understanding the resistance to mobile sales assistant use in retailing', *Journal of Personal Selling and Sales Management*, Vol. 36, No. 3, pp.240–263.

Subramony, M., Groth, M., Hu, X.J. and Wu, Y. (2021) 'Four decades of frontline service employee research: an integrative bibliometric review', *Journal of Service Research*, Vol. 24, No. 2, pp.230–248.

Sumlin, C., Hough, C. and Green, K. (2021) 'Impact of ethics environment, organizational commitment, and job satisfaction on organizational performance', *Journal of Business and Management*, Vol. 27, No. 1, pp.53–78.

Suvaci, B. (2018) 'The impact of organizational culture on employees' protean and boundaryless career attitudes: an empirical study of the banking sector in Turkey', *Journal of Business and Management*, Vol. 24, No. 1, pp.1–25.

Taşkan, B., Karatop, B. and Kubat, C. (2020) 'Impacts of industrial revolutions on the enterprise performance management: a literature review', *Journal of Business and Management*, Vol. 26, No. 1, pp.79–119.

Tuckey, M.R., Boyd, C.M., Winefield, H.R., Bohm, A., Winefield, A.H., Lindsay, A. and Black, Q. (2017) 'Understanding stress in retail work: considering different types of job demands and diverse applications of job resources', *International Journal of Stress Management*, Vol. 24, No. 4, pp.368–391.

Vadruccio, R., Seghezzi, A. and Tumino, A. (2024) 'Smart technologies for retailing: who, what, where and why', *International Journal of Retail and Distribution Management*, Vol. 52, No. 13, pp.79–102.

Wu, T.J., Liang, Y. and Wang, Y. (2024) 'The buffering role of workplace mindfulness: how job insecurity of human-artificial intelligence collaboration impacts employees' work–life-related outcomes', *Journal of Business and Psychology*, Vol. 39, No. 6, pp.1395–1411.