

**Digital Transformation, Employee Burnout and Work Engagement:
Examining the Mediating Role of Technostress in Pakistani
Organizations**

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Abstract

Digital transformation has become essential for improving efficiency and service delivery in the banking sector, yet its effects on employee well-being and work engagement remain an important concern, particularly in developing-country contexts such as Pakistan. This study examined the effects of digital transformation on employee burnout and work engagement, with technostress as a mediating mechanism, among employees of public, private conventional, and Islamic commercial banks operating in Peshawar, Khyber Pakhtunkhwa. A quantitative, explanatory, and cross-sectional research design was adopted, and primary data were collected through a structured questionnaire using proportionate stratified sampling. A total of 460 questionnaires were distributed, of which 391 usable responses were retained for analysis. The data were analysed using IBM SPSS, while the mediating effects were tested through the Preacher and Hayes bootstrapping procedure using PROCESS Model 4 with 5,000 bootstrap samples. The findings showed that digital transformation had significant positive effects on technostress, employee burnout, and work engagement. Technostress significantly increased employee burnout but reduced work engagement. The mediation analysis further revealed that technostress partially mediated the relationship between digital transformation and employee burnout and competitively mediated the relationship between digital transformation and work engagement. These findings demonstrate that digital transformation has a dual effect on employees because it can improve engagement through greater efficiency while simultaneously creating technology-related pressure that increases exhaustion and weakens involvement in work. The study concludes that banks should support digital transformation with continuous training, user-friendly systems, technical assistance, manageable workloads, employee participation, and appropriate limits on after-hours digital communication to protect employee well-being and sustain work engagement.

Keywords: Digital transformation; technostress; employee burnout; work engagement; banking sector.

Introduction

Digital transformation is no longer a luxury for banks aiming to be more efficient, easily accessible to customers and competitive. It isn't just a matter of implementing new software; it's about reshaping work processes, employee roles, communication, skill requirements, and service-delivery methods (Vial, 2019). The banking sector in Pakistan has embraced the various technologies, such as mobile banking, internet banking, biometric verification, electronic reporting and digital payments, automated compliance, and AI capabilities in a few short years. The State Bank of Pakistan (SBP, 2025) reported that around 88% of the national retail-payment transactions in fiscal year 2024-2025 were made via digital channels. While this transformation has made customers more convenient and banking more efficient, have also altered the speed, volume and complexity of the work that employees do. Financial staff often face the challenge of having to master new systems, deal with various platforms, troubleshoot technology issues with customers, and adhere to digitally tracked performance metrics. So, it's not enough to judge digital transformation by the number of transactions and the number of customers using the systems: it's also about how it impacts the people who use it.

The stress that comes with the use of technologies in the workplace is often referred to as technostress. It is when workers are having trouble adjusting to the demands produced by the information and communication technologies. The major dimensions of it are techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty (Tarafdar et al., 2007). These stresses can cause bank staff to work more quickly, be on call at all times, study complex systems and adjust to regular change, and worry about automation and the fear of losing their job. These are especially significant for the banking sector in Pakistan where the bankers are under pressure of their long working hours, workload, accuracy, regulations and customer service. Occupational stress has been demonstrated to be a major factor of burnout amongst the Pakistani banking employees (Khattak et al., 2011), technostress has been linked to lower job satisfaction, reduced commitment, and adverse psychological outcomes (Ragu-Nathan et al., 2008; Kumar 2024). Technostress can therefore shed light on the digital transformation and its impact of higher employee burnout, evidenced by exhaustion, emotional disconnection, lower concentration and decreased professional effectiveness (Maslach & Leiter, 2016).

Digital transformation can also impact work engagement, defined as a positive work-related state that is characterised by vigour, dedication, and absorption (Schaufeli et al., 2002). Digital technologies can enhance engagement, by eliminating repetitive tasks, making information more accessible, assisting in decision making and helping employees serve customers better. These can be undermined, however, where technologies are seen as complicated, intrusive, unreliable, and too demanding. In this situation, workers can invest more psychological effort in dealing with the pressure from the technology than in their primary work. Past research suggests that technostress

can diminish work engagement through its impact on an increased workload, work–family conflict, cognitive strain, and continuous connectivity (Harunavamwe & Kanengoni, 2023; Ye et al., 2024). Such relationships can be explained by the Job Demands–Resources theory, stating that job resources are able to stimulate motivation and engagement, whilst excess job demands will have a draining effect on the physical and psychological resources of the employee leading to a burnout (Bakker & Demerouti, 2017). Digital transformation can thus act as a means as well as an end, as a tool when it is helpful, and as a burden when it is not: overload, uncertainty, insecurity, and complexity.

In the case of Pakistan, though banking sector has been rapidly digitalized, the existing studies have focused on one thing separately, i.e., occupational stress, burnout, work engagement, and technostress. Khattak et al. (2011) studied occupational stress and burnout, Pirzada et al. (2024) conducted a study on engagement and burnout, and Shahid and Khalid (2024) studied technostress among bank employees in Pakistan. But, there has been hardly any study that has investigated digital transformation as an organizational change, technostress as the mediation mechanism and employee burnout and work engagement as competing outcomes. This thus forms a significant employee-centered research gap, as the positive sides of banking digitalization could come at the expense of employees' well-being and engagement. Therefore, this research explores the impact of digital transformation on employee burnout and work engagement with a mediation of technostress among the employees of commercial banks of Peshawar, Pakistan. It is believed that the study will guide bank management in designing digital transformation strategies which will include technological innovation, training, manageable workload, employee participation, technical support, and employee well-being protection.

Theoretical Foundation and Literature Review

Supporting Theory: Job Demands–Resources Theory

The Job Demands Resources (JD–R) theory is the most appropriate theoretical base of the proposed research model as it explains employee burnout and work engagement in a single model. The characteristics of the workplace are divided into two categories: job demands (those that require ongoing cognitive and/or emotional effort) and job resources (those that facilitate the performance, learning, and development of employees). Digital transformation can also be a tool that helps to bring information to people, to automate repetitive tasks, and to enable customer service in the present model. But it can also generate demands by the constant change of systems, overload of digital tasks, constant connection, complexity of the technologies and fear of losing skills. These demands, when outstripping the employees coping mechanisms, result in technostress, depleting energy and contributing to burnout whilst reducing vigour, dedication and absorption. Technostress is then the psychological process that can create competing employee effects, when the digital transformation is not adequately managed, in the banking sector of Pakistan (Bakker & Demerouti, 2017; Picazo Rodríguez et al., 2024).

Digital Transformation and Technostress

Digital transformation affects the way in which employees work, coordinate, monitor and evaluate their work. Employees might need to learn new skills or knowledge to support the new systems, such as artificial intelligence, enterprise systems, mobile applications, automated reporting, and interconnected digital platforms, as they return to their current roles. The resulting changes can cause techno-overload (when employees are required to work faster or do more), techno-complexity (when a system seems hard to use) and techno-uncertainty (when they are constantly faced with new technologies that render their previous knowledge irrelevant). Existing studies have revealed that high levels of reliance on workplace technologies can lead to role overload, role conflict, uncertainty and technology related strain for employees (Ragu-Nathan et al., 2008; Tarafdar et al., 2007; Rahman et al., 2025; Alam et al., 2024). Thus, digital transformation is likely to lead to technostress when technological changes are much quicker than employees can cope.

In particular, Pakistan's banking industry is relevant here because its staff more and more rely on digital transaction systems, biometric verification, mobile banking, customer relationship systems, automated compliance processes, and electronic performance-monitoring tools. While these systems can increase the efficiency of banking, employees may feel like they have too much information, there is intrusion into their working and personal lives, and they feel insecure about the technology, and are under pressure to be always "on," or available digitally. Shahid and Khalid (2024) noted that in Pakistan's banking industry, technology-related requirements are linked to negative thinking, emotional stress, and decreased employee engagement. New systems, however, if not used by employees well, can be perceived as just one more job requirement, and not a useful tool.

H1: Digital transformation has a significant positive effect on technostress among employees in Pakistan's banking sector.

Digital Transformation and Employee Burnout

Digital change can directly contribute to employee burnout due to the increased intensity of work and extra role expectations. Often employees are required to learn new systems, solve technology issues, keep digital records, reply to customers almost immediately, and uphold performance standards with no decreasing in their current responsibilities. These demands can drain mental and emotional energy and can ultimately lead to burnout, disconnection and a loss of job competence. In fact, Zhang et al. (2025) showed that organizational digitalization also led to increased role overload and burnout among employees, which suggests that the impacts of digitalization on employees are not necessarily positive. They found that technological development can be emotionally damaging when organisations focus on achieving efficiency without making changes to workload, or supporting their staff.

Burnout may be more likely in banking because staff are already facing pressure with tight deadlines, customer complaints, regulatory demands, accuracy pressures and onerous performance targets. Previous study conducted in Pakistan revealed that occupational stress is an important factor that leads to burnout in commercial-bank employees (Khattak et al., 2011; Alam et al., 2025; Alam et al., 2024). New banking technologies could exacerbate these existing pressures by increasing digital monitoring,

decreasing recovery time and having employees doing both conventional and technology driven tasks. Hence, the inability to offset the demands of digital transformation with training, autonomy, staffing, and managerial support can lead to emotional exhaustion.

H2: Digital transformation has a significant positive effect on employee burnout in Pakistan's banking sector.

Digital Transformation and Work Engagement

Digital transformation may also have a beneficial impact on work engagement if an employee is aware of new technologies as useful job resources. Digital systems can help to eliminate repetitive tasks, access customer information, communication, decision making and help employees perform their work better. These benefits can boost employees' strength through energy conservation, their enthusiasm through meaningfulness of their actions, and their absorption by enabling them to focus on higher value tasks. Generally, work engagement can be seen from their energy, enthusiasm, involvement and focus in doing work (Schaufeli et al., 2002). If staff are properly trained and engaged in digital change, they will be more likely to see digital change as an opportunity for their professional development instead of a threat.

Empirical evidence shows that it is the employee experience of transformation that determines whether digitalization creates engagement. Ye et al. (2024) revealed that employee engagement with regards to enterprise digital transformation is contingent on the interplay of organizational and individual circumstances associated with technological adjustments. In the same vein, Picazo Rodríguez et al. (2024) also included in their model digital transformation, technostress and work engagement, highlighting the need to take into account the human impact of digital transformation in addition to productivity. User-friendly systems, adequate digital training, employee engagement and transparent communication can help employees to utilise technology more confidently and provide better services to customers in banks in Pakistan. As a result, it is expected that a good digital transformation will increase employee participation and engagement with their jobs.

H3: Digital transformation has a significant positive effect on work engagement among employees in Pakistan's banking sector.

Technostress and Employee Burnout

Technostress is the feeling that one cannot effectively handle the demands generated by the technologies in the workplace. Techno-overload compels workers to go faster or do more, and techno-invasion makes them feel "on call" outside of the typical workday. Techno-complexity leads to more mental work, while techno-insecurity and techno-uncertainty create worries of job loss and ongoing technological evolution. Exposure to these stressors over time exhausts employees' emotional and cognitive resources, ultimately resulting in exhaustion and psychological withdrawal. The negative impact of technology on humans is not just for a short duration; Srivastava et al. (2015) found job burnout to be a major outcome of technostress creators.

Further empirical evidence validates the relationship of technostress and burnout. In the field of technostress in the workplace, Khedhaouria and Cucchi (2019) identified that various technostress creators led to job burnout among managers; whereas studies in

the field of technostress linked the technostress creators to the burnout symptoms and to the decrease in well-being. In the banking system of Pakistan, this may manifest in many forms, such as customer grievances over electronic communication, frequent software updates, pressure to prevent transactional mistakes, and disruptions in the banking system. Considering banking technologies are integrated in nearly all activities, workers may not be given much chance to de-escalate their minds from technology requirements. This constant exposure is likely to lead to burnout (Khedhaouria & Cucchi, 2019; Shahid & Khalid, 2024; Rahman et al., 2025).

H4: Technostress has a significant positive effect on employee burnout in Pakistan's banking sector.

Technostress and Work Engagement

The availability of physical, psychological and organizational resources is a prerequisite for work engagement. Technostress devours these resources as employees struggle to learn about complex systems, cope with electronic distractions, and deal with constant electronic demands. The growing cognitive load may make it hard for employees to maintain their enthusiasm, energy, and engagement. Technological pressure might thus decrease engagement by diverting the employees' attention away from the sense of the job towards dealing with digital issues. Job engagement was an important outcome of technostress as Srivastava et al., (2015) showed that employees' reactions to technological demands affect their positive connection to work.

Di Dalmazi et al. (2022) revealed that techno-overload, techno-invasion and techno-complexity created affective and cognitive strain, and that the latter negatively affected work engagement of employees. What they've found is that the relentlessly connected and challenging technology can be a drain on the mental capacity workers need to stay engaged and motivated. The same might happen among the staff members of Pakistani banks if the digital platforms are designed to provide an additional burden, and not to ease the burden of already existing tasks. If a significant amount of time is required to fix system errors, make sense of regular updates and respond to communications via the digital system after working hours, employees can become less enthusiastic and less engaged. Thus, it is expected that the higher the technostress, the more likely it is to decrease work engagement in the selected sector.

H5: Technostress has a significant negative effect on work engagement among employees in Pakistan's banking sector.

Mediating Role of Technostress Between Digital Transformation and Employee Burnout

Burnout is likely to result if employees perceive technological changes as overwhelming or overdemanding – and not necessarily because of the digital transformation itself. This distinction is the reason why Technostress is acting as a mediator. The emergence of digital transformation comes with new systems, new communication channels, new performance expectations and new skills. This change can create techno-overload, techno-complexity, techno-invasion, techno-insecurity and techno-uncertainty. These stressors, when they don't go away, cause psychological strain and over time drain the resources from employees leading to burnout. So, technostress is a link between the organizational change process and the individual's

exhaustion or adverse outcome due to perceived or objective technological changes (Ragu-Nathan et al., 2008; Tarafdar et al., 2007).

In Pakistan's banking context, the proposed mediation is significant as the identical digital efforts could lead to varying degrees of burnout, contingent on how the demands of the digital are perceived. If a digital system is well-designed and supported, it can boost efficiency without over-working employees; if poorly designed and implemented, it can lead to increased workload, uncertainty, surveillance pressure and fear of technological displacement. Increasing employee burnout is a consequence of organizational digitalization that can be explained by role overload and the wider claim that psychological job demands pass on the negative impacts of transformation (Zhang et al., 2025). It is also worth mentioning that Shahid and Khalid (2024) reported the importance of technology-induced strain in Pakistani banks. The model therefore suggests that technostress will account for the reasons for some banking employees' burnout associated with digital transformation.

H6: Technostress mediates the positive relationship between digital transformation and employee burnout in Pakistan's banking sector.

Mediating Role of Technostress Between Digital Transformation and Work Engagement

While digital transformation can equip employees with tools that increase their effectiveness, its positive effect on work engagement can be dampened if it also generates technostress. While automated systems and digital banking may be seen as beneficial, they can end up taking the wind out of employee sails with too many alerts, cumbersome user experience, regular changes and constant access. Technostress thus functions as an intervening mechanism that will either help or hinder employees to maintain their vigor and commitment in the process of transformation. Digital transformation can offer resources, but it can also have demanding features that generate technostress, which initiates an energy-depletion process and, consequently, a decrease in engagement (Bakker & Demerouti, 2017; Picazo Rodríguez et al., 2024).

This was confirmed by evidence from digital work environments. Di Dalmazi et al. (2022) found that technology stressors had a negative impact on engagement via affective and cognitive strain. Therefore, the psychological experiences of workers in relation to the computer thus become an important factor in comprehending the ultimate impact of technology on work engagement. In the context of banks in Pakistan, while digital transformation can streamline customer service and transaction handling, it can also lead to disenchantment and disengagement among employees if they feel that technology is intrusive, challenging, unstable, or threatening. Technostress is therefore likely to carry a negative indirect impact from digital transformation to work engagement, despite a positive direct impact of digital transformation.

H7: Technostress mediates the relationship between digital transformation and work engagement in Pakistan's banking sector, such that digital transformation increases technostress, which subsequently reduces work engagement.

Research Model

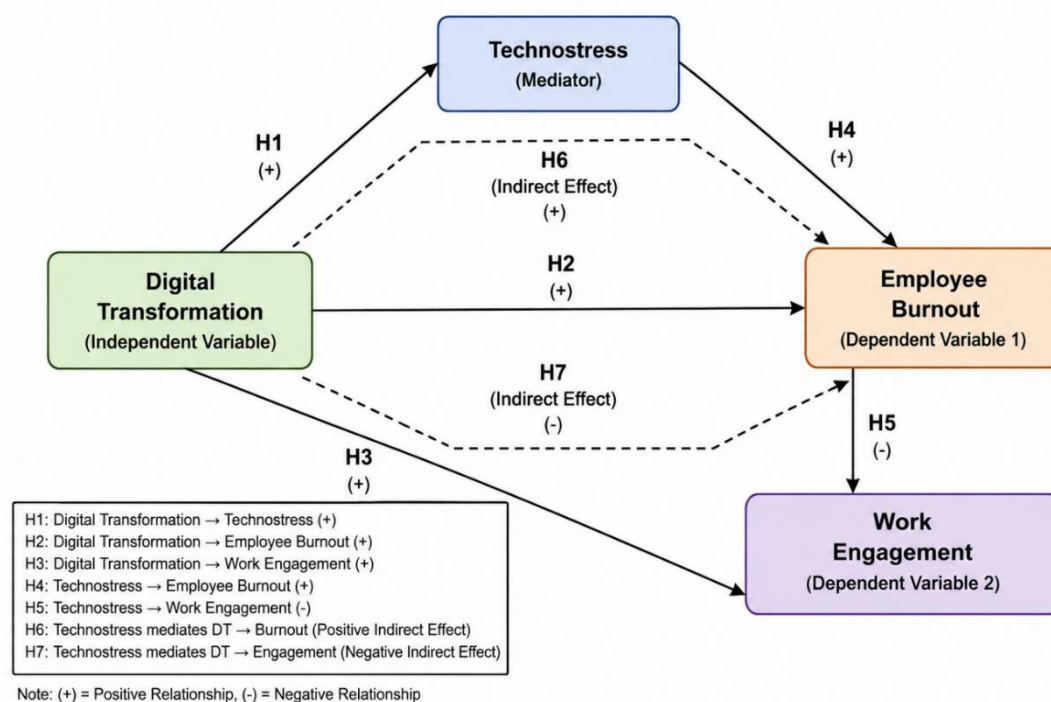


Figure 1. Research Model

Methodology

Methods

In this study, the study design used quantitative, explanatory and cross-sectional survey type. Primary data will be obtained from the employees of public sector, private conventional and Islamic commercial banks of Peshawar Khyber Pakhtunkhwa, Pakistan. The respondents include managerial and non-managerial staff who have been working in the same bank for a minimum of six months and who have had regular access to the bank's digital banking systems. Proportionate Stratified sampling technique will be employed by dividing the banks into public, private conventional banking and Islamic banking and questionnaires will be distributed proportionately among the selected banks and their employees. Since there is no public information as regards the number of banks' employees eligible for the study in Peshawar, Cochran's formula for large or unknown population has been used and it is finally concluded that an estimated of 385 respondents is required to be sampled with 95% level of confidence and 5% margin of error (Cochran, 1977). About 460 questionnaires were sent to allow for nonresponse and incomplete questionnaires. Collected data was analyzed by using the software IBM SPSS and the mediating role of technostress will be tested by using Preacher and Hayes bootstrapping procedure with the software PROCESS model 4 with the number of bootstraps 5000 and the alpha level 95%. Mediation was confirmed if the CI for the indirect effect does not contain 0 (Preacher & Hayes, 2008).

Instrumentation and Reliability

The study used a structured questionnaire containing previously validated measures of digital transformation, technostress, employee burnout, and work engagement. The original response formats of the instruments was retained as far as possible. Table 1 presents the measurement sources, number of items, dimensions, response formats, and reliability values reported in the original studies. Cronbach's alpha will also be recalculated using the data collected from commercial-bank employees in Peshawar; therefore, the published values should not be presented as the reliability results of the current study.

Table 1

Instrumentation and Reported Reliability of the Study Variables

Variable	Instrument and source	Items	Dimensions/measurement focus	Response format	Previously reported Cronbach's alpha
Digital transformation	Digital Transformation Measure adapted from Picazo Rodríguez et al. (2024)	5 retained indicator from an original 12-item pool	Digitalization of work processes, technology integration, automation, and changes in working methods	7-point Likert scale	$\alpha = .700$ for the private-sector sample and $\alpha = .743$ for the public-sector sample
Technostress	Technostress Creators Scale developed by Ragu-Nathan et al. (2008)	20 retained items from an original pool of 23 items	Techno-overload, techno-invasion, techno-complexity, and techno-insecurity and techno-uncertainty	5-point Likert scale	Techno-overload: $\alpha = .82$; techno-invasion: $\alpha = .80$; techno-complexity: $\alpha = .77$; techno-insecurity: $\alpha = .78$; and techno-uncertainty: $\alpha = .83$
Employee burnout	Work-Related Burnout Subscale of the Copenhagen Burnout	7	Physical and psychological exhaustion attributed to work	5 response categories scored from 0 to 100	$\alpha = .87$

	Inventory developed by Kristensen et al. (2005)				
Work engagement	Nine-Item Utrecht Work Engagement Scale developed by Schaufeli et al. (2006)	9	Vigour, dedication, and absorption	7-point frequency scale ranging from 0 = never to 6 = always	Overall UWES-9: $\alpha = .85-.92$; median $\alpha = .92$

Results

Demographic Characteristics of Respondents

A total of 460 questionnaires were distributed among employees of selected public, private conventional, and Islamic commercial banks in Peshawar. Of these, 402 questionnaires were returned. After excluding 11 incomplete questionnaires, 391 usable responses were retained for analysis, producing a usable response rate of 85.0%.

Table 1

Demographic Characteristics of Respondents

Demographic characteristic	Category	Frequency	Percentage
Gender	Male	247	63.2
	Female	144	36.8
Age	21–30 years	128	32.7
	31–40 years	159	40.7
	41–50 years	75	19.2
	Above 50 years	29	7.4
Education	Bachelor's degree	184	47.1
	Master's degree	181	46.3
	Other professional qualification	26	6.6
Type of bank	Public-sector bank	116	29.7
	Private conventional bank	186	47.6
	Islamic bank	89	22.8
Organizational tenure	Less than 5 years	118	30.2
	5–10 years	142	36.3
	11–15 years	77	19.7
	More than 15 years	54	13.8
Job level	Managerial	121	30.9
	Non-managerial	270	69.1

Demographic results show that of the 63.2% who responded male, 36.8% were female. The age group 31–40 years had the highest age group with 40.7%, followed by age group 21–30 years with 32.7% of the participants. In terms of education, 47.1% had bachelor's degree and 46.3% had master's degree. The private conventional-bank

employees accounted for the largest share of 47.6%, followed by public-sector bank employees at 29.7% and Islamic-bank employees at 22.8%. The majority of respondents had from 5 to 10 years of organizational experience and 69.1% had non-managerial roles. The findings point out that the sample consisted of employees of various age group, educational status, experience, work position and bank types.

Descriptive Statistics and Reliability Analysis

Descriptive statistics were calculated to determine the general response pattern for digital transformation, technostress, employee burnout, and work engagement. Cronbach's alpha was used to determine the internal consistency of each measurement scale.

Table 2

Descriptive Statistics and Reliability of the Study Variables

Variable	Items	Mean	Standard deviation	Cronbach's alpha
Digital transformation	5	3.76	0.68	.83
Technostress	20	3.41	0.72	.89
Employee burnout	7	3.28	0.77	.87
Work engagement	9	3.62	0.70	.90

On the Digital transformation scale, the mean score was 3.76, suggesting that overall, employees thought that their banks had a relatively high level of digital transformation. Work engagement was also found to have a high mean score of 3.62, indicating that employees were relatively energetic, committed and engaged in their work. The mean score for Technostress was 3.41, which is a moderate to high level of stress employees felt from technology. Employee burnout had a mean of 3.28, which indicated a moderate level of exhaustion due to work.

Cronbach's alpha values were between .83 and .90, with the recommended value of .70 or higher. The reliability coefficient for work engagement was the highest at .90 followed by technostress at .89, employee burnout at .87, and digital transformation at .83. Thus, internal consistency of all measurement scales was satisfactory and they were used for further analysis.

Correlation Analysis

Pearson correlation analysis was conducted to examine the direction and strength of the associations among the study variables.

Table 3

Pearson Correlations Among the Study Variables

Variable	1	2	3	4
1. Digital transformation	1			
2. Technostress	.46**	1		
3. Employee burnout	.37**	.58**	1	
4. Work engagement	.14**	-.38**	-.44**	1

Note. $p < .01$; $N = 391$.

The average score of the Digital transformation scale was 3.76, indicating that, overall, employees believed that their banks had a relatively high level of digital transformation. The mean score for work engagement was also high (3.62), which means that

employees were relatively energetic, committed and engaged in their work. The mean for Technostress was to the level of 3.41 which is a moderate to high level of stress that employees felt due to technology. The mean for employee burnout was 3.28 indicating a moderate degree of exhaustion due to work.

Cronbach's alpha values were between .83 and .90, with the recommended value of .70 or higher. The reliability coefficient for work engagement was the highest at .90 followed by technostress at .89, employee burnout at .87, and digital transformation at .83. So, all the scales showed satisfactory internal consistency and they were used for further analysis.

Regression Analysis

Table 4

Regression Analysis of the Direct Relationships

Model and predictor	B	SE	β	t	p	R ²
Model 1: Technostress						.212
Digital transformation	.490	.048	.460	10.21	<.001	
Model 2: Employee burnout						.137
Digital transformation	.420	.052	.370	8.08	<.001	
Model 3: Employee burnout						.352
Digital transformation	.150	.051	.130	2.94	.004	
Technostress	.550	.046	.520	11.96	<.001	
Model 4: Work engagement						.020
Digital transformation	.145	.052	.140	2.79	.006	
Model 5: Work engagement						.270
Digital transformation	.412	.047	.400	8.77	<.001	
Technostress	-.544	.044	-.560	-12.36	<.001	

Technostress had a significant direct relationship with digital transformation and the variance was accounted for 21.2%. This discovery lends weight to the hypothesis that as technology becomes more present in the organization, there are more technology-related demands for employees.

Digital transformation was also a strong predictor of employee burnout, $\beta = .37$, $p < .001$. Once technostress was added to the regression model, however, the impact of digital transformation on burnout was reduced to .13 ($p = .004$), and technostress was a strong positive predictor of burnout ($\beta = .52$, $p < .001$). Combined digital transformation and technostress accounted for 35.2% of the variance in employee burnout.

Digital transformation was only slightly positively related to work engagement, $\beta = .14$, $p = .006$. Once technostress was added as a variable, the determinants of digital transformation were found to be much stronger positive influences ($\beta = .40$, $p < .001$) and technostress was observed as a significant negative influence ($\beta = -.56$, $p < .001$). The variance accounted for by the combined model was 27.0% for work engagement. The results show that the impact of digital transformation on engagement is direct but can be balanced by the technostress that is experienced in the process.

Mediation Analysis

The mediating role of technostress was tested using PROCESS Model 4 based on the Preacher and Hayes bootstrapping procedure. A total of 5,000 bootstrap samples and 95% confidence intervals were used. An indirect effect was considered statistically significant where the confidence interval did not contain zero.

Table 5

Mediating Effect of Technostress Between Digital Transformation and Employee Burnout

Effect	Coefficient	SE/BootSE	t	p	LLCI	ULCI
Digital transformation → Technostress, path <i>a</i>	.490	.048	10.21	<.001	.396	.584
Technostress → Employee burnout, path <i>b</i>	.550	.046	11.96	<.001	.460	.640
Total effect, path <i>c</i>	.420	.052	8.08	<.001	.318	.522
Direct effect, path <i>c'</i>	.150	.051	2.94	.004	.050	.250
Indirect effect, <i>a</i> × <i>b</i>	.270	.036	—	—	.204	.345

Digital transformation had a significant positive effect on technostress, while technostress had a significant positive effect on employee burnout. The indirect effect of digital transformation on burnout through technostress was .270. Its 95% bootstrapped confidence interval ranged from .204 to .345 and did not contain zero. Therefore, the indirect effect was statistically significant.

The direct effect of digital transformation on burnout remained significant after technostress was introduced, although it declined from .420 to .150. This result indicates **partial mediation**. Digital transformation increased employee burnout both directly and indirectly by increasing technostress.

Table 6

Mediating Effect of Technostress Between Digital Transformation and Work Engagement

Effect	Coefficient	SE/BootSE	t	p	LLCI	ULCI
Digital transformation → Technostress, path <i>a</i>	.490	.048	10.21	<.001	.396	.584
Technostress → Work engagement, path <i>b</i>	-.544	.044	-12.36	<.001	-.630	-.458
Total effect, path <i>c</i>	.145	.052	2.79	.006	.043	.247
Direct effect, path <i>c'</i>	.412	.047	8.77	<.001	.320	.504
Indirect effect, <i>a</i> × <i>b</i>	-.267	.034	—	—	-.338	-.204

The indirect effect of digital transformation on work engagement via technostress was -.267. Results indicated a significant mediating effect because the range of the bootstrapped confidence interval was not inclusive of zero and spanned from -.338 to -.204. The direct effect of digital transformation is positive on work engagement, while the indirect effect of digital transformation on work engagement through technostress is negative.

The direct and indirect effects were opposite, thus the effect is a competitive mediation. Digital transformation directly contributed to the work engagement through its

efficiency, information, and work performance aspects. It also, however, had a negative impact on technostress which decreased the vigour, dedication and absorption of employees. The positive aspects of digital transformation were therefore somewhat neutralised by stress associated with technology from banking staff.

Overall, the results confirmed the proposed mediation model of technostress between DT, employee burnout and work engagement. Digital transformation led to an increase in technostress and it further led to an increase in burnout and a decrease in work engagement among the employees of commercial banks in Peshawar.

Discussion

The hypothesis 1 stated that digital transformation has a positive effect on technostress. This hypothesis was also validated with the findings: Digital transformation significantly predicted technostress ($\beta = .46$, $p < .001$). This implies that the adoption of digital transaction systems, automated reporting tools, biometric technologies, mobile banking platforms and electronic monitoring adds more cognitive and psychological strain for banks staff. It is in line with the findings of Ragu-Nathan et al., 2008, who found techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty as some of the biggest outcomes of intensive use of technology in the workplace. It also corroborates Shahid and Khalid (2024), who found that the demands of technology caused information overload, intrusion of work and life, anxiety and emotional strain to banking sector workers in Pakistan.

The results showed a relationship between digital transformation and employee burnout, with hypothesis 2 stating that the former would have a positive impact on the latter, which was supported ($\beta = .37$, $p < .001$). This finding suggests that workers in jobs with more technological change also reported more exhaustion with work, perhaps because they had to learn new technology, troubleshoot, react quickly to digitally connected customers and meet digitally monitored performance standards. This finding aligns with the findings of Zhang et al. (2025), who documented a rise in role overload and employee burnout with the rise in workplace digitalization. This is in line with Khalid et al. (2020) findings that workload, excessive effort, and occupational pressure were the factors that escalated emotional exhaustion of the banking employees in Pakistan.

The third hypothesis was that digital transformation has a positive impact on work engagement. The hypothesis was substantiated with a fairly weak relationship ($\beta = .14$; $p = .006$). This finding suggests that digital technologies can enhance employees' vigour, dedication and absorption as it automates repetitive duties, speeds up access to information, aids decision making, and enhances customer service. This discovery aligns with Ye et al. (2024)'s findings that digital transformation can enhance work engagement when employees have adequate learning capacity and organizational support. This is also in line with Picazo Rodríguez et al. (2024), who determined that the positive employee outcomes of digital transformation are linked to the efficiency of the management of the human and technological dimensions of change.

The existence of a relationship between technostress and employee burnout was also explored in Hypothesis 4, which was supported ($\beta = .52$, $p < .001$). Findings indicate that it is not the technology per se that determines burnout, but stressful experiences of technological overload, complexity, continuous connectivity, frequent changes of

systems, and insecurity regarding the replacement of technology. This finding was consistent with the results of Khedhaouria and Cucchi (2019) who found that the use of mixtures of technostress creators has a significant impact on job burnout. It also agrees with Ragu-Nathan et al. (2008) who showed that technology related

Technostress was expected to have a negative effect on work engagement (Hypothesis 5), and the results confirmed this hypothesis ($\beta = -.56$, $p < .001$). This means that high tech-related pressures are less likely to lead to positive employee experiences of energy, commitment, and absorption, as much attention and psychological energy are required to deal with complex systems, interruptions, technical failures, and constant electronic communication. This aligns with the study by Di Dalmazi et al. (2022), which revealed that techno-overload, techno-invasion and techno-complexity induced cognitive strain, decreasing work engagement. It also aligns with Ye et al., (2024) who showed that the management of technological stressors is critical in sustaining employee engagement during digital transformation.

Hypothesis 6 stated that employee burnout is a mediator between digital transformation and technostress. The results confirmed this hypothesis with the indirect effect being positive and significant ($B = .270$, 95% CI [.204, .345]) and direct effect being significant, thus confirming the partial mediation. This implies that digital transformation contributes to burnout in part by providing technological overload, complexity, intrusion, insecurity, and uncertainty, while monitoring, workload, role changes, and skill demands may be directly contributing factors to burnout. The finding is consistent with the Job Demands–Resources theory which postulates that the overexertion of an employee's resources through excessive job demands results in exhaustion (Bakker & Demerouti, 2017). This aligns with Zhang et al. (2025) and Khedhaouria and Cucchi (2019) that determined a relationship between digital work demands and technostress with employee burnout.

Technostress was proposed as a mediator between digital transformation and work engagement (Hypothesis 7). The results showed that the indirect effect of technostress was negative and significant ($B = -.267$, 95% CI [-.338, -.204]) while the direct effect of digital transformation on engagement was still positive, suggesting competitive mediation. This discovery illustrates the double edged sword of digital transformation: the digital revolution can enhance efficiency, information access and employee engagement but also lead to overload, complexity, ongoing connectivity and insecurity, which can have a detrimental impact on employee engagement. This finding aligns with Picazo Rodríguez et al. (2024), who highlighted the role of technostress alongside engagement in assessing digital transformation, and Di Dalmazi et al. (2022), who reported that the technostress was associated with a decrease in employee engagement.

Implications

The results have theoretical and practical implications. Theoretically, the study contributes to the Job Demands–Resources theory by showing that digital transformation can potentially be both a job resource and a job demand. Digital technologies can enhance efficiency and work engagement, but can also lead to technostress and employee burnout when employees are faced with too much work, too complex systems, constant connectivity, and uncertainty about technology (Bakker &

Demerouti, 2017). The substantial mediated effect of Technostress also demonstrates that the impact of the employee's is dependent on how they experience and manage the technological change. In practical terms, commercial banks in Peshawar should offer an ongoing digital training, user friendly systems, technical assistance, realistic workloads, and employee participation during the implementation of new technologies. Management also needs to minimize unessential after hours communications, minimize too much electronic monitoring, and create a support mechanism for employees under pressure from technology. The following actions can deliver the digital transformation operating advantages without driving up burnout or decreasing employee engagement.

Limitations and Future Research Directions

There are a number of limitations with this study. First, because it is a cross section, it does not allow for causal inferences to be drawn as the data are gathered at one point in time. Second, this study is confined to the employees of commercial banks of Peshawar and the results may not be generalized to other cities, provinces or economic sectors in Pakistan. Third, self-reported questionnaire data may lead to a common method bias and socially desirable responses. Future studies should use a longitudinal design and measure employee reactions at different phases of digital transformation, as well as multiple informants (employees, supervisors, and organizational records). The researchers can also replicate the model in other fields like telecommunications, health care, education, and public administration and compare their results with other parts of Pakistan. Additional research might investigate other variables like digital literacy and organizational support as well as employee resilience, leadership style, job autonomy, and technology-related training as moderators.

Conclusion

The present study explored the influence of digitization on employee burnout and work engagement mediated by technostress among the commercial-bank employees of Peshawar, Pakistan. The results revealed that digital transformation had a direct positive influence on work engagement and had a negative influence on technostress and employee burnout. Technostress was a major contributor to explaining the employee-level outcomes of technological change, as evidenced by its strong effect on burnout and on work engagement. It was a partial mediator between digital transformation and burnout and was a competitive mediator between digital transformation and work engagement. The study thus finds that digital transformation can be good or bad, depending on how banks use technology and assist staff during the transformation. The banks that have a blend of technological innovation with proper training, manageable workloads, technical support, and employee involvement are more likely to be moving toward a sustainable digital transformation, ensuring the well-being and engagement of employees.

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