

## **Techno-Invasion and Contextual Performance Among Malaysian Telecommuters: Moderating and Mediating Effects**

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### **ABSTRACT**

The rapid expansion of telecommuting has intensified employees' reliance on digital technologies, increasing the risk of techno-invasion that blurs boundaries between work and personal life. The research seeks to offer an understanding of how telecommuters cope with and reduce the problems brought by techno-invasion. In this quantitative-based research, the theories and hypotheses were rigorously designed based on a literature review, which encompassed some detected knowledge gaps, on the framework of the Job Demands-Resources Theory and Contextual Performance Model. A survey-based data collection method was employed in this study to obtain responses from 153 telecommuters based in Kuala Lumpur. The data were analysed using the SPSS and SMART-PLS4 package. Results indicated no significant relationship between techno invasion and telecommuters' performance. Furthermore, emotional intelligence did not show a significant moderate effect on the relationship between techno invasion and work exhaustion. These results suggest practical steps for leaders to address work fatigue and burnout caused by technological intrusion by fostering a

supportive work culture. This study contributes to the technostress literature by integrating the Job Demands-Resources (JD-R) framework with Contextual Performance Theory and empirically testing a moderated mediation model among Malaysian telecommuters.

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## INTRODUCTION

Remote work or telecommuting has recently been growing due to rapid advancements in technological tools. This change towards telecommuting emanates from widespread and easy accessibility of several technologies that facilitate telecommuting, such as high-speed internet, better online interaction tools, and highly secured digital tools and systems for working together from afar, such as telecommuting (Hurst, 2020). It is often praised and accepted for its flexibility, reduces stress from commuting, and lowers costs for both employees and companies (Hopwood, 2019). Nevertheless, there are also negative consequences emanating from remote working. A survey conducted by McKinsey found that more than 60% of participants reported a decrease in productivity while working from home during the COVID-19 pandemic (Lund et al., 2020). Despite extensive research on technostress, existing studies have predominantly focussed on task performance outcomes in Western contexts, leaving contextual performance, and emerging economy settings underexplored. According to a Forbes report, nearly half of the U.S. workforce, specifically 49%, would consider resigning if they became frustrated with the available technology (Abbot, 2023). This study refers to these disagreements by focusing on contextual performance rather than task performance, suggesting that techno invasion may indirectly affect performance through work exhaustion. This approach aligns with Li and Wang (2021), who noted contextual performance remains underexplored in technostress literature.

This research investigates the impact of techno-invasion on the work performance of remote workers. Research has thoroughly examined the impact of technostress on employee performance (Tarafdar et al., 2014). Previous research has demonstrated that techno invasions have a negative impact on the mental well-being and work-related burnout of employees (Dragano & Lanau, 2020). Findings from research on the connection between techno-invasion and stress, or work-related exhaustion, revealed a significant and positive correlation. (Borle et al., 2021; Satpathy et al., 2021). Wang et al. (2023) investigated the roles of work exhaustion in explaining technostress. It was proposed that a further examination of this phenomenon be undertaken.

Research conducted by Warriar et al. (2024) found that EI functions as a positive mediator in the connection between communication effectiveness in virtual environments and decision-making undertaken by professional workers. The relationship between technostress and burnout, from the perspective of emotional intelligence, remains an area that has been somewhat ignored in research. Emotional intelligence is critical for managing involved workplace relationships and coping with stress, with Goleman (1998) emphasising it as the primary factor contributing to job success. The study was conducted in the Malaysian context and cultural norms change significantly from the Western context. Previous research has predominantly examined technostress in developed nations (e.g., the U.S., Europe), often

observing the rare faces faced by workers in emerging economies. However, by analysing the moderating role of emotional intelligence and the mediating effect of work exhaustion in Malaysian institutions, this study proposals traditionally contextualised insights that enhance a universal kind of technostress and its impact on performance. This study addresses both an empirical and a theoretical gap by examining the indirect and conditional mechanisms through which techno-invasion affects contextual performance via work exhaustion.

## LITERATURE REVIEW

### Theoretical Support

Tarafdar et al. (2020) and Ayyagari et al. (2011), technostress is an issue that affects employees who fight or have problems with new technology management and deployment. Corresponding to research, technological overload, invasion, complexity, insecurity, and uncertainty are the five stressor categories characterised by the technostress model. In addition, not all technological stressors cause negative effects for employees. Corresponding to Pansini et al. (2023), technological complexity and uncertainty are two stressors that can be benefited by employers to foster output and commitment at work of employees.

Contextual performance of employees is strengthened by Borman and Motowidlo's Contextual Performance Theory (Borman & Motowidlo, 1997). This perspective accepts the idea that employee performance is a complex concept. Contrasting task

performance, contextual performance involves non-task-related behaviours as voluntary and extraneous actions. The Job Demands-Resources model (JD-R model), which is linked to work tiredness and burnout, was projected by Bakker et al. (2004). The concept indicates that work-related demands lead to burnout and health challenges. The leading source of emotional intelligence is the ability-based paradigm of emotional intelligence generated by Mayer and Salovey (1989). They identified emotional intelligence (EI) as the ability to monitor one's own and other people's feelings and emotions, differentiate between them, and use this information to guide one's thoughts and actions (Mayer & Salovey, 1989). The JD-R model explains how job demands (techno invasion) lead to strain (work exhaustion), while Contextual Performance Theory frames performance outcomes. Concurrently, they form a sequential logic, demands → strain → discretionary behaviours.

### Techno Innovation

Referring to Tarafdar (2020), five stressors included in technostress are techno overload, techno invasion, techno complexity, techno insecurity, and techno uncertainty. Techno invasion refers to the intrusion of technology into personal life, creating expectations of constant connectivity, where technostress is a broader construct incorporating numerous stressors. Techno invasion explains in what manner technology infringes on people's privacy and puts pressure on them to be continuously connected. One form of

technostress is this phenomenon, which is referred to as techno-invasion (Tarafdar et al. 2014). Referring to Büchler et al. (2020), it is typified by a lack of clear boundaries between work and personal life, which causes stress and anxiety and drastically reduces employee job satisfaction. A major source of stress for people is techno invasion, such as for remote workers who must cope with the constant availability of work due to ICTs, which interferes with their privacy and personal time (Rosado et al., 2023). Although not all technological stressors are damaging, techno-invasion is classified as an unsafe stressor. The negative effects go beyond the office, decline general well-being and lead to burnout (Talib et al. 2022). While techno invasion intersects with work-life imbalance, it is technology-driven, unlike the general imbalance caused by other factors.

### **Contextual Performance**

In the early 1990s, scholars advocated for a more comprehensive and broad definition of performance, broadening the scope of the term to include various facets such as task, contextual, and counterproductive performance (Koopmans et al. 2014). Both task and contextual performance encompass the multidimensional performance construct. Contextual performance encompasses prosocial organisational behaviours and organisational citizenship behaviours, including adhering to rules, displaying initiative, putting in extra effort, assisting colleagues, and minimalising the frequency of disruptions (Borman and

Motowidlo, 1997). The concept of contextual performance encompasses various voluntary and interpersonal actions that foster a supportive social and motivational atmosphere within an organisation by establishing a positive workplace environment (Scotter & Motowidlo, 1996). Contextual performance that is relevant to one's actual work responsibilities goes beyond what is explicitly mentioned in job descriptions and is often overlooked or unrewarded, different to the task-oriented performance that aligns with an employee's defined duties and is usually considered during performance assessments (Motowidlo & Scotter, 1994). Contextual performance is theoretically marked from task performance as it implies discretionary behaviours that support organisational functioning (Borman & Motowidlo, 1997). This study measures contextual performance using validated scales to ensure objectivity.

### **Work Exhaustion**

Demerouti et al. (2003) explained that work exhaustion is a critical state of stress faced by employees that is caused by long exposure to certain workplace restrictions or stressors that harm physical, emotional, and mental well-being. Work exhaustion refers to short-term reduction of energy, whereas burnout is a prolonged state relating to emotional exhaustion, suspicion, and decreased efficiency (Maslach & Leiter, 2008). This study operates exhaustion as a precursor to burnout. Tired employees often feel that their emotional and physical energy is depleted because of the great load

of their work (Maslach & Leiter, 2008). A study on work-related tiredness exhibits that it reduces job satisfaction, output, and the probability of employees aiming to exit the company (Wang, 2023). Bakker et al. (2024) explained that the job-demand-resources model 2004 highlights a robust linkage between job demands and available resources in relation to stress. Sources like social assistance and self-efficacy help keep employees protected against the damage of job demands and mitigate burnout. Emotional exhaustion increases because of high workloads and rigid deadlines experienced by employees (Zhang et al. 2022).

### **Emotional Intelligence**

A set of skills analogous to general intelligence is identified as emotional intelligence. Consisted of four key elements: emotional perception, emotional utilisation for cognitive enhancement, emotional understanding, and emotional regulation, define from Salovey and Mayer's (1990) theory. Referring to Mayer et al. (2008), emotional intelligence (EI) is characterised by the ability to make precise emotional reasoning and to utilise emotions and emotional knowledge to upgrade thought processes. EI was conceptualised as a moderator because it protects stress outcomes rather than transmitting them. Individuals with high EI can weaken the connection between techno invasion and exhaustion, side with stress coping theory. This is reliable with conclusions that EI relieves stress effects (Rezvani & Khosravi, 2019).

### **Techno Invasion and Contextual Performance Relationship**

Yener et al. (2021) establish a sharp connection in Turkish civil servant unions between contextual performance and technostress in research. Wu et al. (2022) exposed that technological stressors were harmful to work performance in China's hospitality industry, with a focus on the effect of techno invasion. A link between techno invasion and its influences on employee unconventional behaviour and efficiency levels (Chen et al., 2022). Saleem et al. (2021) and Fern´andez Fernandez et al. (2023) highlighted contradictory outcomes, proposing that technostress might have a positive or small impact on the job performance of university instructors in Pakistan and remote workers in Madrid. Further research is urgently required to enhance our comprehension of the impact of technostress on contextual performance. The hypothesis in question was formulated as follows:

H1: There is an inverse relationship between techno invasion and contextual performance

### **Techno Invasion and Work Exhaustion Relationship**

Recent studies have highlighted the adverse consequences of technostress and techno invasion on the working population (Harris et al. 2022). Research conducted by Harris et al. (2022) found that telecommuters experience technostress, which negatively affects their overall well-being. According to the study, techno invasion and work

overload can lead to an impact on work-life balance and may cause employee job burnout. Yener et al. (2021) discovered a considerable negative impact on burnout levels among Turkish personnel. Bauwens et al. (2021) discovered that among Dutch childcare staff, job-related burnout was the primary reason for work exhaustion. Studies of the impact of techno invasion have shown that it hurts well-being and causes job-related anxiety as well as emotional exhaustion (Weinert, 2019; Wu et al. 2020). Constant connectivity can lead to decreased employee happiness (Büchler et al., 2020). Based on the literature, the hypothesis was developed and tested:

H2: There is a direct relationship between techno invasion and work exhaustion

### **Work Exhaustion and Contextual Performance Relationship**

Major linkage between reduced contextual performance and emotional exhaustion among university supervisors in Taiwan (Chuang et al., 2022). Australian software developers' performance was extensively impacted by work-related exhaustion, as indicated in a 2019 study by Rezvani & Khosravi. Studies by Camacho and Barrios (2022) attained a correlation between stress levels among teleworkers and their reduced job performance. Emotional fatigue and burnout regularly result in a loss in the engagement of behaviours that increase the efficiency of an organisation (Palenzuela et al. 2019).

These results emphasise exactly how critical it is to treat work-related tiredness to preserve happiness and dynamic organisational forces. The following hypothesis was established:

H3: There is an inverse relationship between work exhaustion and contextual performance

### **Mediating Role of Work Exhaustion**

Aprilia and Riani's (2023) research indicates that burnout mediated the relationship between job performance and technological stressors in a sample of 181 public workers. Yener et al. (2021) discovered that burnout mediated the relationship between technostress and contextual performance, Wang et al. (2023) observed that in a Chinese manufacturing company, work fatigue moderated the relationship between technostress and employee well-being, indicating the impact of technological stressors on workers' general health and productivity, and Tu et al. (2021) observed the complicated connections between stressors, burnout, and psychological well-being. The outcomes showed the significant effect of burnout on the employees' ability to handle the pressures of technology-driven work and yield the finest results across different duties and commitments in their workplace. The following hypothesis was proposed:

H4: Work Exhaustion mediates the relationship between Techno invasion and contextual performance

### **Moderating Role of Emotional Intelligence (EI)**

In the employee workplace, EI acts as a significant buffer or moderator against various work stressors that have a harmful result on personal health, increase intentions to leave the organisation, and result in counterproductive work behaviour (Huang et al., 2019; Rezvani and Khosravi, 2019). Empirical study in what way EI buffers or moderates the relationship between technological invasion or violation and work burnout or performance are quite limited. Before, research has examined the same moderate roles of emotional intelligence (Badawy, 2022; Mishra et al., 2022). Research by Mishra et al. (2022) discovered the mediating role of emotional intelligence between employee performance and different styles of leadership, focussing on micromanagement. The research carried out by Badawy (2022) explored the moderating role of emotional intelligence in the association of employees' counterproductive work behaviours and job fairness perceptions. These findings advance the knowledge of emotional intelligence's consequences for organisational outcomes by highlighting the significance of researching it as a basic coping mechanism and its possible moderating effects in technologically stressful conditions. Drawing on the JD-R model and stress-buffering theory, emotional intelligence is conceptualised as a personal resource that may attenuate the strain-inducing effects of techno-invasion on work exhaustion.

Extending this logic, emotional intelligence is expected to condition the indirect effect of techno-invasion on contextual performance through work exhaustion, forming a moderated mediation relationship. The following hypotheses were put forth. Figure 1 illustrates the research framework for H1 to H6.

H5: The relationship between work burnout and techno-invasion is moderated by EI, indicating that telecommuters with high EI have a weaker relationship

H6: EI moderates the indirect relationship between techno-invasion and contextual performance through work exhaustion, where the mediating effect of work exhaustion is sounder when emotional intelligence is soft for the telecommuters

## **METHODOLOGY**

### **Research Design**

This study utilised the research onion model as proposed by Saunders et al. (2019). The data was gathered using a mono-method quantitative survey strategy that adhered to the principles of positivist philosophy and employed a deductive approach over a fixed, cross-sectional time. A mono-method survey was selected for productivity and equivalence with earlier technostress research. Validated scales and privacy were confirmed to ease bias.

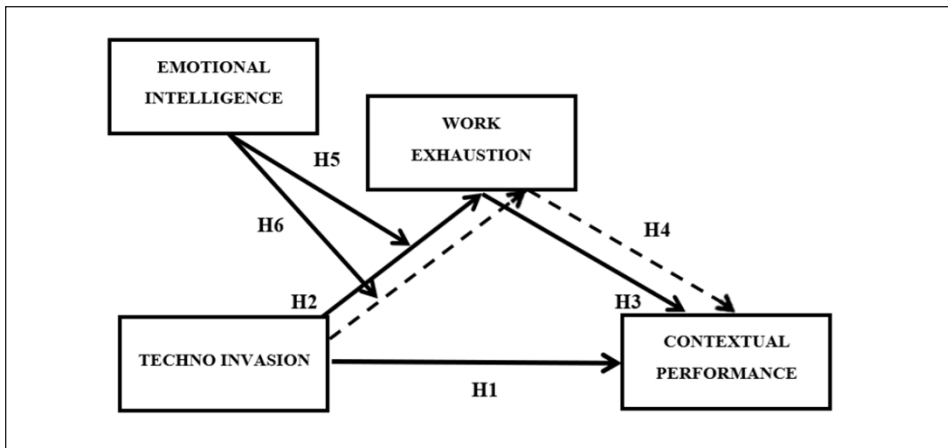


Figure 1. Research framework

With the availability of facts and measurements, positivism was an appropriate philosophy (Saunders et al., 2019). Primary data were collected from a questionnaire in a cross-sectional design. The target population involved people working remotely in Kuala Lumpur's services industry. Before conducting descriptive and inferential statistics using SPSS and SmartPLS, the quality of the data was verified and corrected. SmartPLS was opted for its appropriateness in conducting complex moderated mediation models and small-to-medium sample sizes.

### Sample Size and Sampling Technique

Referring to Saunders et al. (2019), collecting data from an entire population is not practical, thus requiring sampling methods as a necessity in the study. In this research, convenience sampling was chosen as it accommodated the time limitations, in line with the suggested recommendations. Though convenience sampling controls

generalisability, the sample size outstrips minimum SEM requirements (Kline, 2016) and incorporates diverse service sectors, boosting representativeness. Green (1991) explained that the target sample size was initially set at 82. To bolster statistical reliability and broaden the scope of generalisability, the sample size was then increased to 150, in that way granting a more representative sample of the population being investigated. In addition, according to Kline (2005), a sample size of 100 is considered minimal for analysing structural equation models, while a sample size of 100 to 200 is classified as moderate. A sample of 153 participants was considered enough for this research. The sample was drawn from diverse service sectors in Kuala Lumpur to mirror the approximate telecommuting workforce.

### Instrumentation

A self-administered questionnaire was established and handed to qualified

participants to gather initial data. Participants were guaranteed confidentiality and anonymity to reduce social interest unfairness. The survey comprised explanatory questions, and the participants' permission was secured. The questionnaire was split into two separate sections. Section A contains data about age and gender demographics. The section on study variables was assessed using a 5-point Likert scale to gauge responses. The questions were adapted based on existing scales: 4 items from Tarafdar et al. (2007) for techno invasion, 16 items from Koopmans et al. (2012) for contextual performance, 5 items from Moore (2000) for work exhaustion, and 16 items from Wong & Law (2002) for emotional intelligence.

### **Data Collection, Data Preparation, and Analysis**

Data were gathered from Malaysian telecommuters via the electronic distribution of questionnaires. Sekaran and Bougie (2016) highlighted three main goals targeted in the data analysis: deriving a feel of the data, assessing its goodness or accuracy, and testing the research hypotheses as stated. Primarily, to create a visual picture of the data, descriptive statistics were processed using the IBM SPSS statistical software, version 26. The subsequent step in the analytical process involves verifying the data's integrity by valuing its reliability, multicollinearity, and validity. For this analysis, the Smart PLS4 was utilised. Items with low factor loading were eliminated

to ensure the reliability and validity of the measure. According to Hair et al. (2021), the reliability of the indicator should exceed 0.70. Items below 0.70 were eliminated to maintain construct validity. The average variance extracted (AVE) was computed for convergent validity, and it must be 0.5 or greater, as stated by Hair et al. (2021). The HTMT correlation ratio was calculated to determine discriminant validity. The HTMT value should be below 0.90 (Hair et al., 2021). Multicollinearity was checked to ensure the variance inflation factor (VIF) value was less than 5. Separating predictor and criterion items with statistical checks (VIF < 3.3) indicated no common-method bias. Subsequently, hypothesis testing was carried out after adjusting the data for 5000 sub-samples through bootstrapping in Smart PLS4. Bootstrapping with 5000 subsamples served as a robustness check.

## **RESULTS**

### **Participants' Demographics**

Out of the 162 responses received, 9 respondents were not telecommuters; therefore, their responses had to be removed. Thus, 153 responses were considered for the data analysis. Of those respondents, 60.2% were male, while 39.8% were female. Moreover, 67% of the respondents are married, while 33% are single. Regarding the age of respondents, most belong to the age group of 36-40, about 45 respondents. This is followed by 35 belonging to the age group 26-30, 28 from the age group 31-35, 20 from the age group 41-49,

16 from the age group 20-25, and lastly, only 9 respondents were from the age group 50 or older.

**Internal Consistency Reliability**

The internal consistency of a measurement tool is determined by how much its individual components correlate with each other and are related to the same fundamental concept (Hair et al., 2021). Hair et al. (2019) suggest that reliability values should exceed 0.7. Table 1 presents the reliability analysis for the research. In contrast, the composite reliability rho\_a provides a more accurate assessment of reliability, with acceptable values typically falling between 0.7 and 0.95 (Hair et al., 2019). The composite reliability (rho\_a) coefficients for contextual performance, emotional intelligence, techno-invasion, and

work exhaustion in this investigation were found to be 0.852, 0.857, 0.883, and 0.949, respectively, all of which met the expected benchmarks. Reliability can be confirmed.

**Convergent Validity**

Convergent validity is evaluated by analysing the degree to which a construct converges to explain the variation in its items, with a minimum acceptable Average Variance Extracted (AVE) of 0.50 or higher signifying that the construct accounts for at least 50% of the observed variation in its items (Hair et al., 2019). Table 2 shows the AVE values were recorded for techno invasion at 0.685, work exhaustion at 0.690, contextual performance at 0.737, and emotional intelligence at 0.859. All values exceed the 0.5 threshold and are considered acceptable.

Table 1  
*Reliability*

Variable	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)
Contextual Performance	0.856	0.852	0.862
Emotional Intelligence	0.865	0.857	0.869
Techno Invasion	0.881	0.883	0.918
Work Exhaustion	0.946	0.949	0.961

Table 2  
*Convergent validity*

Variable	Average Variance Extracted (AVE)
Techno Invasion	0.685
Work Exhaustion	0.690
Contextual Performance	0.737
Emotional Intelligence	0.859

### Discriminate Validity

Henseler et al. (2015) have shown in a study that an HTMT of above 0.90 may indicate that discriminant validity does not exist or is violated, while a cut-off value of 0.85 (Henseler et al., 2015) is generally recommended where constructs are more strongly divergent. Discriminant validity was confirmed based on the values obtained in Table 3, where all the values were less than 0.90.

### Multicollinearity

It is crucial to investigate collinearity before assessing structural relationships to prevent it from skewing the regression results. Hair et al. (2019) recommend that the ideal

Variance Inflation Factor for the Inner Model should be around 3 or less to indicate no multicollinearity. The values of VIF in Table 4 are all below 3, so multicollinearity is not present in the structural model. A VIF value below 3.3, as stated in Kock (2017), is indicative of no collinearity problem in this model. The absence of this issue also suggests that the model does not have a common method bias problem (Kock, 2017).

### R-square and Adjusted R-square

The correlation between exogenous variables and work exhaustion is substantial, indicating that 43.7% of the variation in work exhaustion can be attributed to external

Table 3  
*HTMT*

	Contextual Performance	Emotional Intelligence	Techno Invasion	Work Exhaustion	EI* Techno Invasion
Contextual Performance					
Emotional Intelligence	0.742				
Techno Invasion	0.179	0.286			
Work Exhaustion	0.606	0.657	0.363		
EI*Techno Invasion	0.064	0.049	0.394	0.054	

Table 4  
*VIF-Inner model multicollinearity*

Path	VIF
Emotional Intelligence > Work Exhaustion	1.103
Techno Invasion > Contextual Performance	1.125
Techno Invasion > Work Exhaustion	1.273
Work Exhaustion > Contextual Performance	1.123
Emotional Intelligence X Techno invasion > Work Exhaustion	1.184

factors, as evidenced by a coefficient of determination (R2) of 0.437. According to a guideline established by Chin (1998), coefficients of R2 at 0.67, 0.33, and below 0.19 are classified as strong, moderate, and weak. According to the values listed in Table 5, the coefficient of determination for contextual performance, denoted as R2, is 0.336, indicating that 33.6 percent of the variation in the dependent variable can be attributed to the independent variables. Work Exhaustion has an R2 of 0.437, which explains that 43.7% of the variation in work exhaustion is influenced by exogenous variables. The R-square values for this study are in a moderate range. R<sup>2</sup> values (0.336, 0.437) are moderate, consistent with behavioural research norms.

**Predictive Q-square**

An approach for evaluating the predictive accuracy of the PLS path model involves calculating the Q2 value, for which any value above 0 is satisfactory (Hanafiah, 2020).

In general, Q2 values exceeding 0, 0.25, and 0.50 indicate minor, moderate, and substantial predictive relevance of the PLS-path model, respectively. Table 6 shows the Q2 for contextual performance and work exhaustion is 0.356 and 0.394, falling in the moderate range.

**Path Coefficients and Hypothesis Testing**

Table 7 shows path coefficient results. For a significant relationship to be evident, the T-value must exceed 1.960. Meanwhile, the P-value signifies significance when it is below 0.05 (Hair et al., 2021). According to Table 7, no statistically significant effect of techno invasion was found on contextual performance (p-value >0.05), so. Hypothesis H1 lacks supporting evidence. The significant positive correlation between techno invasion and work-related exhaustion suggests that hypothesis two has been supported at a significant level of p < 0.005. The inverse relationship between work exhaustion and contextual performance is

Table 5  
*Coefficient of determination R2*

Endogenous Variable	R-square	Adjusted
R-square		
Contextual Performance	0.336	0.326

Table 6  
*Predictive relevance Q<sup>2</sup>*

Variable	Q <sup>2</sup> Predict
Contextual Performance	0.356
Work Exhaustion	0.394

Table 7  
Path coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P values
Emotional Intelligence -> Work Exhaustion	-0.567	-0.571	0.065	8.653	0.00
Techno Invasion -> Contextual Performance	0.036	0.037	0.071	0.509	0.306
Techno Invasion -> Work Exhaustion	0.222	0.22	0.083	2.684	0.004
Work Exhaustion -> Contextual Performance	-0.591	-0.595	0.058	10.263	0.00
Emotional Intelligence x Techno Invasion -> Work Exhaustion	-0.115	-0.106	0.077	1.486	0.069

statistically significant ( $p$ -value < 0.00), which confirms support for hypothesis three.

Mediator testing is based on the formula by Zhao et al (2010). Based on the formula by Zhao et al. (2010), the indirect path is significant. However, the direct path is not significant. Therefore, there is full mediation (indirect only). The indirect effect was statistically significant ( $\beta = -0.131$ ,  $p < 0.01$ ), indicating practical relevance. Full mediation happens when the mediating variable, that is, EI, completely explains the relationship between techno invasion and contextual performance. Therefore, hypothesis 4 is supported.

Emotional intelligence, acting as the moderator of this study, fails to significantly influence the connection between techno invasion and work-related exhaustion. According to Table 7, the  $p$ -value for the moderation effect linking EI (Emotional Intelligence) and Techno Invasion to Work Exhaustion is 0.069, which is greater than 0.05. Techno invasion has a lesser effect on work exhaustion when employees utilise EI (B, -0.115), but the moderating influence is not statistically significant. Hence,

hypothesis 5 is not supported. This study also investigates the way emotional intelligence influences the relationship between techno invasion in the workplace and contextual job performance while considering the impact of work-related burnout (Table 8). The specific indirect test results, following 5000 sub-sampling iterations, indicate that the moderated mediation effect is not statistically significant, with a  $p$ -value of 0.141, thereby failing to support the hypothesis on the moderated mediation.

A simple slope analysis was conducted to examine the interaction between techno-invasion and emotional intelligence on work exhaustion. Although the interaction term was not statistically significant, the slope patterns indicate that the relationship between techno-invasion and work exhaustion is weaker for individuals with higher emotional intelligence, suggesting a buffering trend consistent with theoretical expectations. Table 9 summarises the hypothesis testing results. The findings indicate that techno-invasion significantly increases work exhaustion (H2), which in turn negatively

affects contextual performance (H3). Moreover, work exhaustion mediates the relationship between techno-invasion and contextual performance (H4). However, the hypothesized direct effect of techno-invasion on contextual performance (H1), as well as the moderating roles of emotional intelligence (H5 and H6), were not supported.

**DISCUSSION**

Research aimed to examine the impact of techno invasion on contextual performance among Malaysian remote workers and to investigate the potential mediating effect of emotional intelligence. Unexpectedly, the findings demonstrated that techno invasion had no substantial effect on

Table 8  
*Specific indirect results*

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T Statistics	P Values
Emotional Intelligence -> Work Exhaustion -> Contextual Performance	0.08	0.087	0.197	0.407	0.687
Techno Invasion -> Work Exhaustion -> Contextual Performance	-0.352	-0.345	0.164	2.14	0.032
Emotional Intelligence X Techno Invasion -> Work Exhaustion -> Contextual Performance	0.067	0.065	0.045	1.472	1.141

Table 9  
*Results summary of the hypothesis*

Hypothesis	Beta	P-value	Decision
H1: There is an inverse relationship between techno invasion and contextual performance.	0.036	0.306	Not supported
H2: There is a direct relationship between techno invasion and work exhaustion.	0.222	0.004	Accepted
H3: There is an inverse relationship between work exhaustion and contextual performance.	-0.591	0.00	Accepted
H4: Work exhaustion mediates the relationship between techno invasion and contextual performance.	-0.352	0.032	Accepted
H5: The relationship between work burnout and techno-invasion is moderated by EI, indicating that telecommuters with high EI have a weaker relationship.	-0.115	0.069	Not supported
H6: EI moderates the indirect relationship between techno-invasion and contextual performance through work exhaustion, where the mediating effect of work exhaustion is stronger when emotional intelligence is low for the telecommuters.	0.067	0.141	Not supported

contextual performance. Absence of a direct effect could reflect suppression effects or measurement independence, as suggested by Zhao et al. (2010). The study found that work exhaustion fully mediates this relationship. Furthermore, the findings indicated that emotional intelligence did not moderate either the direct or indirect relationship between techno invasion and contextual performance.

The first hypothesis aimed to investigate the effects of techno invasion on contextual performance. The results revealed that the connection was not statistically significant. The findings differed from former research, which directed a substantial effect of techno invasion on contextual performance, aligned with Yener et al. (2021) and Chen et al. (2022). Techno invasion does not disrupt the personal lives of remote workers, which are carried about by technology that gives rise to stresses or conditions of lasting connectivity. The techno invasion does not have a substantial effect on the contextual performance of remote workers. Earlier research has also shown an insignificant correlation between techno invasion or incursion and contextual performance levels (Fernández Fernandez et al., 2023; Saleem et al., 2021). Earlier research granted conflicting outcomes, proposing that technostress may either positively affect or have an insignificant impact on performance.

The second hypothesis was to determine whether techno invasion was related to work-related burnout, and the results exposed a direct and statistically significant

relationship. The result of the study is in agreement with previous research carried out on the effect of techno invasion by Harris et al. (2022) and Bauwens et al. (2021). The findings of this research are consistent with Harris et al. (2022), who exposed a significant role of techno-invasion on burnout and work-family difference among remote workers. It was emphasised that raised levels of techno-invasion led to higher stress levels, burnout, and telecommuting-related work fatigue among telecommuters. Based on the findings, the development of new technology creates significant pressure on telecommuters to stay connected all the time, eventually leading to work-related fatigue among home-based workers or telecommuters.

The third hypothesis was to examine the relationship between work exhaustion and contextual performance. The findings indicated a substantial and statistically significant inverse correlation. The results show an inverse and significant relationship. Prior studies have shown that their results support outcomes from research on the effects of work exhaustion on job performance, as seen in the work of Chuang et al. (2022) and Camacho and Barrios (2022). Research by Chuang et al. in 2022 found equal outcomes, which are associated with their findings that emotional exhaustion has a significant effect on job performance. Remote workers understand enhanced levels of burnout resulting from poor work-life balance, technostress, and other contributing factors, which in turn lead to work exhaustion and weaken their job performance.

The fourth hypothesis explored the role of work exhaustion as a mediator in the connection between techno invasion and contextual performance, with outcomes indicating that work exhaustion fully mediated this relationship. Research has demonstrated that exhaustion acts as a mediator in the connection between technological stressors and work-related consequences. Yener et al. (2021) discovered that burnout acts as a mediator between techno-stressors and contextual performance. Aprilia and Riani (2023) found that burnout acts as a mediator in the relationship between technostress and work performance. Tu et al. (2021) discovered that exhaustion acted as a mediator in the relationship between commute stress and psychological distress among Chinese workers.

This fifth hypothesis examines exactly how emotional intelligence influences the techno-invasion and work-related burnout relationship. The outcome indicates that emotional intelligence was not observed to be a factor that influences the relationship, and hence, the hypothesis was not accepted. Emotional intelligence as a moderator did not affect the direction or magnitude of the techno-invasion and work-related burnout relationship. Earlier studies have recognised that emotional intelligence was a moderating factor between job stressors and burnout, with higher emotional intelligence affecting or correlating with improved stress handling and lower levels of exhaustion related to the job (Huang et al., 2019). A high level of moderating effect was exhibited by

previous work, as established in Lulie et al. (2023). This study discovered that emotional intelligence, not functioning as a moderator, was correlated with work burnout. Hence, greater emotional intelligence led to fewer employee burnouts.

Through employee burnout or exhaustion of telecommuters, the sixth or final hypothesis sought to evaluate the effect of emotional intelligence in the indirect relationship between technological invasion and contextual performance.

The results of this study did not favour or support the hypothesised moderated mediation model. While it was anticipated that techno-invasion would affect contextual performance through work exhaustion, with emotional intelligence (EI) as a moderator, the test results did not provide any significant interaction effect between the constructs. These results indicate that EI did not affect the indirect link between techno-invasion and contextual performance through work exhaustion. The mediating role was consistent regardless of EI levels. Muller et al. (2005) stated that moderated mediation happens when the levels of a moderating variable (EI) affect how an independent variable (techno invasion) affects a dependent variable (contextual performance) through a mediator variable (employee work burnout). The results showed that there was no discernible moderated-mediation effect in the results. This was a new insight, as the moderated mediation impact of emotional intelligence on the relationship between technological stressors and work-related outcomes through

exhaustion of telecommuters has not been examined in any other research.

## CONCLUSION

The results found that techno invasion does not affect the contextual performance of telecommuters. Organisations should leverage technostress and techno invasion to improve the productivity and performance of employees. The results also found that work exhaustion significantly affects the contextual performance of telecommuters. Therefore, organisations need to provide support to employees to improve their well-being and health. Policies and programs should be implemented to support employees' burnout and work exhaustion. The study also revealed the role of work exhaustion as a mediator and EI as a moderator. A better understanding can be provided of organisations' matters about techno invasion, contextual performance, and work exhaustion of telecommuters. Based on the results of this study, organisations should focus their recruitment, selection, and development of employees on managing techno invasion, work burnout, and contextual performance. Organisations should create an environment that supports the work exhaustion of telecommuters that is caused by the techno invasion. Findings suggest integrating technology-specific demand into the JD-R model for remote work contexts.

### Theoretical and Practical Implications

The findings of the research are of theoretical and practical importance and implications.

Theoretically, new insights were obtained in this study. For one, the techno invasion did not have a significant effect on telecommuters' contextual performance, as expected. This study tested the hypothesis that techno invasion may not always have negative effects on employee performance. This suggests that the intrusion of technology into the personal lives of telecommuters does not always place pressures or expectations based on constant connectivity. Secondly, the research set the central position that emotional intelligence (EI) occupies in moderating techno invasion and contextual performance. Organisations should implement structured interventions such as digital detox policies and EI training programmes. EI development programmes can include stress management workshops and role-playing exercises to enhance coping skills. Thirdly, this research was one of the pioneering pieces of research, to the researcher's best knowledge, to scrutinise the moderated mediation relationship between techno invasion, work exhaustion, and contextual performance. Finally, the research found a large and negative relationship between work exhaustion and telecommuters' contextual performance.

### Limitations and Recommendations for Future Research

The other dimensions of technostress, namely, techno overload, techno complexity, techno insecurity, and techno uncertainty, were not examined. Future studies should examine the effects of the remaining four technostress factors on burnout and

contextual performance of employees. Besides that, future research should examine alternative models and cross-cultural comparisons. The cross-sectional design limits capturing dynamic changes in technology exposure and emotional regulation. Future longitudinal studies are recommended. The target population of this study was telecommuters. This limits the generalisability of the results. Future studies should consider a comparative study between telecommuters and employees in the workplace. Only emotional intelligence (EI) was taken into account as a moderating factor in this investigation. There can be other categorical moderators that affect the results. Future research should consider including variables like mindfulness, gender, and age.

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