

TECHNOSTRESS AND EMPLOYEE VIGOR: EVIDENCE FROM TELECOMMUNICATION FIRMS IN RIVERS STATE, NIGERIA

Dr. Iwo Samuel-Ikiroma Sokari & Dr. Kalapapa Benjamin Dappa

iwosokari.samuel@iaue.edu.ng, kalapapa.dappa@iaue.edu.ng

**Department of Employment Relations and Human Resource Management,
Faculty of Administration and Management,
Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers State,
Nigeria**

Abstract

This study examined the relationship between technostress and employee vigor among employees of telecommunication firms in Rivers State, Nigeria. The increasing use of digital technologies and technology-enabled work processes has enhanced organisational efficiency but also intensified technology-related stress, affecting employees' energy and psychological well-being. Technostress was examined using techno-overload and techno-invasion, while employee vigor was measured using energy at work and mental resilience. The study was anchored on the Job Demands-Resources (JD-R) Theory and adopted a correlational research design. The population comprised 380 employees from four selected telecommunication firms in Rivers State, Nigeria, and a sample size of 181 was determined using the Krejcie and Morgan (1970) sample size determination table. A total of 181 questionnaires were distributed (100.00%), 173 (95.58%) were retrieved, 8 (4.42%) were not returned, no questionnaire was invalid (0.00%), and 173 (95.58%) questionnaires were used for the final analysis. Data were analyzed using descriptive statistics and the Pearson Product Moment Correlation Coefficient (PPMCC) at a 0.05 level of significance. The findings revealed that techno-overload had strong negative and significant relationships with energy at work ($r = -0.746$, $p < 0.05$) and mental resilience ($r = -0.718$, $p < 0.05$). Similarly, techno-invasion had strong negative and significant relationships with energy at work ($r = -0.731$, $p < 0.05$) and mental resilience ($r = -0.764$, $p < 0.05$). The study concludes that technostress significantly undermines employee vigor and recommends reducing technology-induced workload, promoting healthy work-life boundaries, providing digital competence and stress management training, and integrating employee well-being initiatives into human resource policies.

Keywords: Technostress, Techno-Overload, Techno-Invasion, Employee Vigor, Mental Resilience.

INTRODUCTION

The rapid advancement of information and communication technology (ICT) has transformed organisational operations worldwide. Digital technologies have enhanced efficiency, communication, customer service, and data-driven decision-making. In the telecommunication industry, employees rely heavily on sophisticated digital systems to perform their duties. While these technologies improve productivity and competitiveness, they also create technology-related stress, commonly referred to as technostress (Tarafdar et al., 2019).

Technostress refers to employees' inability to cope effectively with the demands of information and communication technologies. It arises from continuous interaction with computers, smartphones, enterprise software, virtual communication platforms, and automated work systems. Employees are increasingly expected to process large volumes of information, adapt to technological changes, respond rapidly to digital communications, and remain connected beyond official working hours, often exceeding their coping capacity and affecting psychological well-being and work outcomes (Tarafdar et al., 2019; Salazar-Concha et al., 2021). The widespread use of remote communication, cloud computing, and mobile technologies has further intensified work overload, blurred work-life

boundaries, and cognitive exhaustion, making technostress a growing occupational risk (Stich et al., 2018).

Among the dimensions of technostress, this study focuses on techno-overload and techno-invasion. Techno-overload occurs when technology compels employees to work faster, multitask, and process excessive information within limited timeframes, increasing physical and mental demands (Tarafdar et al., 2019). Techno-invasion reflects the intrusion of technology into employees' personal lives through constant accessibility via mobile devices, emails, and online communication platforms, limiting opportunities for recovery and increasing emotional strain (Stich et al., 2018).

Employee vigor is a key indicator of work engagement and organisational effectiveness because it reflects employees' energy, mental resilience, persistence, and willingness to invest effort in their work. In this study, vigor is measured by energy at work and mental resilience. Energy at work refers to employees' vitality and enthusiasm while performing their duties, whereas mental resilience is their ability to recover from setbacks and maintain positive functioning under workplace pressure.

Previous studies suggest that excessive technology demands reduce employee vigor by increasing digital interruptions, information processing demands, and expectations of constant responsiveness, leading to emotional exhaustion, reduced enthusiasm, and lower performance (Tarafdar et al., 2019; Salazar-Concha et al., 2021). Consequently, organisations undergoing digital transformation should complement technological investments with strategies that protect employees' well-being.

The Nigerian telecommunication industry provides an appropriate context because it is one of the country's most technology-intensive sectors. Employees routinely manage digital customer service platforms, automated network systems, electronic databases, mobile applications, and virtual communication channels while meeting rising customer expectations. Although these technologies improve operational efficiency, they also increase employees' exposure to techno-overload and techno-invasion, potentially reducing their energy at work and mental resilience.

Despite growing scholarly interest in technostress, most studies have focused on job satisfaction, burnout, organisational commitment, turnover intention, work-life balance, and job performance, with limited attention to employee vigor, particularly in developing economies. Empirical evidence from Nigeria's telecommunication industry also remains scarce. This study therefore examines the relationship between technostress, measured through techno-overload and techno-invasion, and employee vigor, measured by energy at work and mental resilience, among employees of telecommunication firms in Rivers State, Nigeria.

Statement of the Problem

The telecommunication industry has undergone rapid digital transformation, increasing employees' reliance on information and communication technologies (ICTs) such as enterprise software, cloud-based applications, customer relationship management systems, and virtual communication platforms. While these technologies have improved productivity and service delivery, they have also intensified technostress, which arises when employees struggle to cope with technology-related demands (Tarafdar et al., 2019).

This study focuses on two key dimensions of technostress: techno-overload and techno-invasion. Techno-overload occurs when technology compels employees to work faster, process excessive information, and multitask, while techno-invasion reflects the blurring of work-life boundaries through constant connectivity and expectations of immediate responsiveness (Tarafdar et al., 2019). These demands can reduce employees' opportunities for recovery and diminish their energy and psychological resilience.

Employee vigor, reflected in energy at work and mental resilience, is essential for sustaining performance, adaptability, and quality service delivery. However, excessive technology demands may gradually deplete these positive psychological resources (Schaufeli et al., 2006; Tarafdar et al., 2019).

Although technostress has received considerable scholarly attention, most studies have emphasized burnout, job dissatisfaction, work exhaustion, organisational commitment, turnover intention, work-life conflict, and job performance, with limited focus on employee vigor or the specific effects of techno-overload and techno-invasion (Tarafdar et al., 2019). A systematic review by Borle et al. (2021) further identified important conceptual gaps, noting that positive psychological outcomes such as vigor remain underexplored, particularly in technology-intensive workplaces.

Methodologically, previous studies have relied largely on systematic reviews, meta-analyses, structural equation modelling, mediation, and moderation analyses, while relatively few have employed correlational survey designs using Pearson Product Moment Correlation (PPMC) to examine the direct relationships between technostress dimensions and employee vigor. Geographically, empirical evidence is concentrated in Europe, North America, and Asia, with limited studies in Sub-Saharan Africa. Despite the technology-intensive nature of Nigeria's telecommunication industry, little empirical evidence exists on how techno-overload and techno-invasion influence employees' energy at work and mental resilience in Rivers State.

Against these conceptual, methodological, and geographical gaps, this study examines the relationship between technostress and employee vigor among employees of telecommunication firms in Rivers State, Nigeria, focusing on techno-overload, techno-invasion, energy at work, and mental resilience.

Research Objectives

The main objective of this study is to examine the relationship between technostress and employee vigor among employees of telecommunication firms in Rivers State, Nigeria. The specific objectives are to:

- i. Examine the relationship between techno-overload and employees' energy at work in telecommunication firms in Rivers State, Nigeria.
- ii. Determine the relationship between techno-overload and employees' mental resilience in telecommunication firms in Rivers State, Nigeria.
- iii. Examine the relationship between techno-invasion and employees' energy at work in telecommunication firms in Rivers State, Nigeria.
- iv. Determine the relationship between techno-invasion and employees' mental resilience in telecommunication firms in Rivers State, Nigeria.

Research Questions

The following research questions will guide the study:

- i. What is the relationship between techno-overload and employees' energy at work in telecommunication firms in Rivers State, Nigeria?
- ii. What is the relationship between techno-overload and employees' mental resilience in telecommunication firms in Rivers State, Nigeria?
- iii. What is the relationship between techno-invasion and employees' energy at work in telecommunication firms in Rivers State, Nigeria?
- iv. What is the relationship between techno-invasion and employees' mental resilience in telecommunication firms in Rivers State, Nigeria?

Research Hypotheses

The following null hypotheses will be tested at the 0.05 level of significance:

- H01: There is no significant relationship between techno-overload and employees' energy at work in telecommunication firms in Rivers State, Nigeria.
- H02: There is no significant relationship between techno-overload and employees' mental resilience in telecommunication firms in Rivers State, Nigeria.
- H03: There is no significant relationship between techno-invasion and employees' energy at work in telecommunication firms in Rivers State, Nigeria.
- H04: There is no significant relationship between techno-invasion and employees' mental resilience in telecommunication firms in Rivers State, Nigeria.

Conceptual Framework

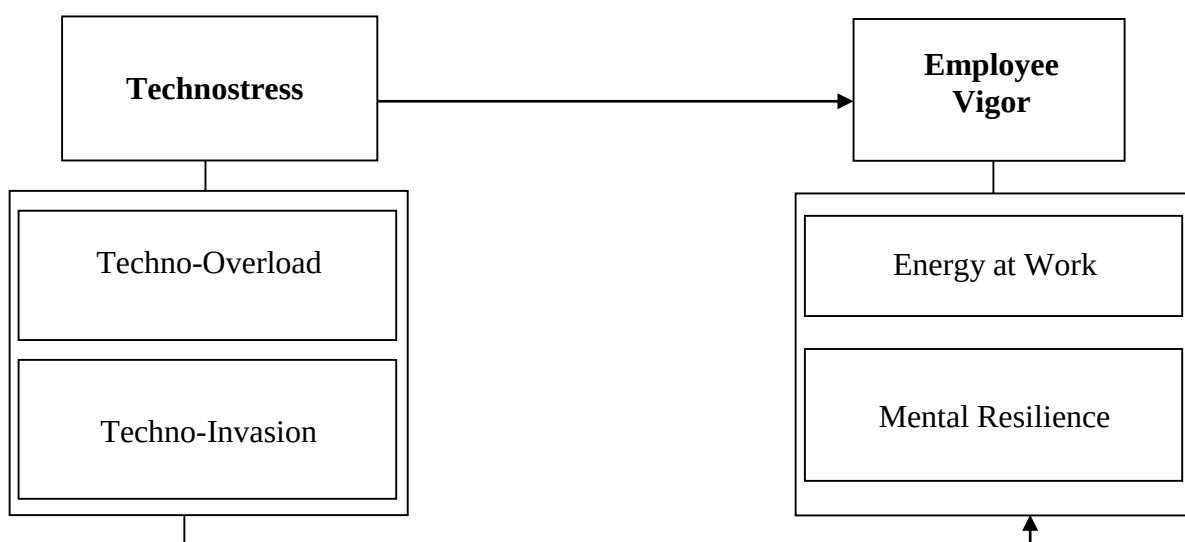


Figure 1: Conceptual Framework Showing the Relationship between Technostress and Employee Vigor among Employees of Telecommunication Firms in Rivers State, Nigeria

Source: The dimensions of Technostress (Techno-Overload and Techno-Invasion) were adapted from the technostress creators framework of Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan (2007), as refined by Tarafdar, Cooper, and Stich (2019). The measures of Employee Vigor (Energy at Work and Mental Resilience) were adapted from the vigor dimension of the Utrecht Work Engagement Scale (UWES) developed by Schaufeli, Bakker, and Salanova (2006), and supported by Knight et al. (2019) and Lesener et al. (2020).

LITERATURE REVIEW

Conceptual Review

Concept of Technostress

The increasing integration of information and communication technologies (ICTs) has transformed how employees perform their jobs. Technologies such as cloud computing, enterprise resource planning systems, customer relationship management platforms, mobile applications, artificial intelligence, and virtual communication tools have enhanced organisational efficiency and responsiveness. In the telecommunication industry, employees depend heavily on these technologies for operations, customer service, and decision making. While these innovations improve productivity, they also create psychological demands that may affect employees' well-being (Tarafdar et al., 2019).

Technostress refers to the stress arising from employees' interaction with information and communication technologies. It occurs when technological demands exceed employees' resources, skills, or coping abilities, leading to psychological strain and reduced work effectiveness (Tarafdar et al., 2019). As organisations continue to digitalize, employees are expected to multitask across digital platforms, respond rapidly to electronic communications, and adapt to evolving technologies. Although technology can also promote learning and innovation when supported by adequate resources, its negative effects often outweigh its benefits in many workplaces (Tarafdar et al., 2019).

Borle et al. (2021) found consistent links between technostress and emotional exhaustion, burnout, psychological strain, reduced job satisfaction, lower organisational commitment, and poorer work performance, identifying techno overload and techno invasion as the most frequently examined dimensions. From the Job Demands Resources (JD-R) perspective, technology functions as a job demand when it increases workload and constant connectivity without adequate support, but it can also serve as a job resource when organisations provide training, technical support, and autonomy (Tarafdar et al., 2019).

Technostress is particularly relevant in telecommunication firms, where employees operate in highly digitalized environments requiring continuous customer interaction, real time service delivery, and constant connectivity. Consistent with the framework of Tarafdar et al. (2007) and its refinement by Tarafdar et al. (2019), this study conceptualizes technostress through two dimensions, techno overload and techno invasion, as they best reflect the technology related challenges faced by employees in telecommunication firms.

Techno-Overload

Techno overload refers to a situation in which information and communication technologies compel employees to work faster, process more information, and accomplish more tasks within limited time. Rather than reducing workload, technology may increase work pace, expand responsibilities, and encourage continuous multitasking. Tarafdar et al. (2019) identify techno overload as a principal techno stressor because it creates expectations of immediate responsiveness and sustained productivity that often exceed employees' coping capacities.

The widespread use of smartphones, cloud based applications, collaborative software, and instant messaging platforms has intensified techno overload, requiring employees to manage emails, virtual meetings, customer inquiries, and administrative tasks simultaneously. Although these technologies improve communication and efficiency, they also increase cognitive workload and reduce opportunities for focused work. Borle et al. (2021) found that techno overload is the most widely studied techno stressor and is associated with burnout, emotional exhaustion, psychological distress, reduced job satisfaction, and poorer work outcomes. Similarly, Tarafdar et al. (2019) noted that excessive technological demands, information overload, and constant interruptions can reduce motivation, work engagement, and psychological well-being. These challenges are particularly evident in telecommunication firms, where employees manage multiple technology driven activities concurrently.

Techno Invasion

Techno invasion refers to the extent to which digital technologies intrude into employees' personal lives by making them continuously accessible for work beyond official working hours. Through mobile devices, emails, messaging applications, and remote work technologies, employees often receive work related requests during evenings, weekends, and holidays, reducing the separation between work and personal life (Tarafdar et al., 2019).

Unlike techno overload, techno invasion primarily limits employees' opportunities for psychological detachment and recovery, contributing to work life imbalance, emotional exhaustion, and reduced well-being. Borle et al. (2021) identified techno invasion as a major dimension of technostress associated with poorer mental health, reduced recovery, and lower occupational well-being. Empirical evidence further shows that techno overload and techno invasion increase work family conflict, family burnout, and turnover intentions, demonstrating that excessive technology demands affect both work and personal life. In telecommunication firms, continuous digital connectivity may gradually reduce employees' energy at work and mental resilience, making the effective management of techno invasion essential for sustaining a healthy and engaged workforce.

Concept of Employee Vigor

Employee vigor is a positive psychological state characterized by high levels of physical energy, mental resilience, and willingness to invest effort in work. It is one of the three dimensions of work engagement, alongside dedication and absorption, and represents the energetic component of employees' relationship with their work (Schaufeli et al., 2006). Employees with high vigor remain energetic, persistent, and psychologically resilient, contributing to improved performance, innovation, customer service, and organisational effectiveness (Lesener et al., 2020).

The Job Demands–Resources (JD–R) Theory explains vigor as the outcome of the interaction between job demands and job resources. Excessive job demands deplete employees' physical and psychological resources, whereas job resources such as supervisor support, autonomy, feedback, learning opportunities, and organisational support enhance work engagement and vigor (Bakker & Demerouti, 2017; Lesener et al., 2020). Similarly, Wood et al. (2020) observed that employees with high vigor are better able to manage work demands while maintaining well-being. Hakanen and Kaltiainen (2026) further emphasized that vigor remains the defining energetic component of work engagement in increasingly digital workplaces. Accordingly, this study conceptualizes employee vigor through two dimensions: energy at work and mental resilience.

Energy at Work

Energy at work refers to employees' vitality, enthusiasm, alertness, and physical strength while performing their duties (Schaufeli et al., 2006). Employees with high energy display persistence, proactive behaviour, and sustained performance, whereas low energy is associated with fatigue, reduced motivation, and lower effectiveness. Research shows that supportive leadership, meaningful work, psychological safety, and adequate organisational resources enhance employee energy and engagement (Diener et al., 2020). Likewise, Salanova et al. (2020) found that favourable motivational climates strengthen employee energy by satisfying psychological needs. In telecommunication firms, maintaining high energy is essential because employees continuously interact with customers, digital platforms, and communication technologies.

Mental Resilience

Mental resilience refers to employees' ability to cope with workplace challenges, recover from setbacks, adapt to changing demands, and maintain positive functioning under pressure. It enables employees to remain emotionally stable, focused, and productive despite organisational and technological changes. Within the work engagement literature, resilience is a defining characteristic of vigor (Schaufeli et al., 2006). Lesener et al. (2020) further found that resilient employees sustain higher levels of work engagement because they utilize organisational resources more effectively. In technology intensive telecommunication firms, resilience enables employees to adapt to continuous technological change while maintaining motivation and well-being.

Technostress and Employee Vigor

Growing reliance on digital technologies has intensified interest in the relationship between technostress and employee vigor. The Job Demands–Resources Theory explains that excessive technological demands, particularly techno overload and techno invasion, deplete employees' energy and resilience when not matched with adequate organisational support (Bakker & Demerouti, 2017; Tarafdar et al., 2019). Tarafdar et al. (2019) argued that cognitive overload, emotional strain, and continuous interruptions undermine employees' well-being and work engagement, while Borle et al. (2021) concluded that techno stressors are consistently associated with poorer psychological health, burnout, and reduced positive work outcomes.

Although previous studies have focused mainly on burnout and job satisfaction, their findings suggest that technostress reduces employee vigor by lowering energy at work and weakening mental resilience. For telecommunication firms, effective management of technology related stress through supportive work practices, training, realistic workloads, and healthy digital boundaries is essential for sustaining an energetic and resilient workforce.

Theoretical Framework

The Job Demands–Resources (JD–R) Theory, developed by Demerouti, Bakker, Nachreiner, and Schaufeli (2001) and refined by Bakker and Demerouti (2017), explains how job demands and job resources influence employee well-being, work engagement, and performance. Job demands, such as excessive workload, time pressure, and technology-related demands, require sustained effort and may lead to stress and burnout, whereas job resources, including supervisor support, autonomy, feedback, training, and organisational support, enhance motivation, resilience, and performance while buffering the negative effects of job demands.

In digital workplaces, technology-related demands often function as job demands because employees must process large volumes of information, adapt to new technologies, and remain constantly connected. Tarafdar, Cooper, and Stich (2019) extended the theory by explaining technostress as a technology-related job demand that can produce either positive outcomes (techno-eustress) or negative outcomes (techno-distress), depending on employees' coping resources and organisational support. In this study, techno overload and techno invasion are conceptualized as job demands expected to deplete employees' energy at work and mental resilience, thereby reducing employee vigor.

Transactional Theory of Stress and Coping

The Transactional Theory of Stress and Coping, developed by Lazarus and Folkman (1984), explains that stress depends on individuals' cognitive appraisal of environmental demands and their perceived ability to cope. Employees who perceive technological demands as manageable are less likely to experience technostress, whereas those who view them as overwhelming may experience greater psychological strain (Tarafdar et al., 2019). The theory complements the JD-R Theory by emphasizing employees' perceptions of technology-related demands.

Justification for the Anchoring Theory

The JD-R Theory was adopted because it directly explains how job demands influence positive outcomes such as employee vigor. Techno overload and techno invasion align with the concept of job demands, requiring sustained cognitive and emotional effort that may reduce employees' energy and resilience. The theory has also been widely applied in studies of employee well-being, work engagement, occupational stress, burnout, and technology-related work experiences, making it an appropriate framework for examining the relationship between technostress and employee vigor among employees of telecommunication firms in Rivers State, Nigeria (Bakker & Demerouti, 2017; Tarafdar et al., 2019).

Empirical Review

Empirical studies on technostress have increased with the growing reliance on information and communication technologies (ICTs), focusing mainly on employee well-being, job satisfaction, burnout, work engagement, job performance, and organisational outcomes.

Borle et al. (2021) conducted a systematic review of 21 quantitative studies from six major databases and found that techno overload and techno invasion were the most frequently examined dimensions of technostress. These stressors were associated with burnout, emotional exhaustion, reduced job satisfaction, lower productivity, and poorer psychological well-being. The authors recommended further research on specific techno stressors and positive outcomes such as work engagement.

Yener, Arslan, and Kılınc (2021) found that technostress significantly increased burnout, which reduced job performance, while technological self-efficacy and time management weakened its negative effects, highlighting the importance of digital competence and organisational support.

Pirkkalainen, Salo, Tarafdar, and Makkonen (2019) reported that employees who adopted proactive coping strategies, such as continuous learning and effective planning, experienced lower technostress than those using reactive coping, suggesting that proactive organisational interventions can reduce technology-related stress.

Florkowski (2019) found that technostress significantly reduced job satisfaction, particularly among employees experiencing techno insecurity and continuous technological change, indicating that inadequate organisational support can undermine employees' well-being and commitment.

Al Ansari and Alshare (2019) reported that all dimensions of technostress negatively affected employees' job satisfaction and recommended employee training, technical support, and technology management strategies to reduce technology-induced stress.

The reviewed studies show that technostress negatively affects employee well-being and organisational outcomes, while organisational support, technological self-efficacy, and proactive coping help reduce its effects. However, most studies focused on burnout, job satisfaction, productivity, and performance rather than employee vigor measured by energy at work and mental resilience. They also relied largely on systematic reviews, structural equation modelling, mediation, or moderation analyses and were conducted mainly in Europe, North America, and Asia, with limited evidence from Nigeria, particularly telecommunication firms in Rivers State. These gaps justify the present study.

METHODOLOGY

This study adopted a correlational research design to examine the relationship between technostress and employee vigor among employees of telecommunication firms in Rivers State, Nigeria. The population comprised 380 management and non-management employees drawn from four selected telecommunication firms operating in Rivers State. The firms were purposively selected because they have an established operational presence in the state, are major providers of telecommunication services, and employ personnel across key functional departments, including customer service, sales and marketing, technical operations, network engineering, information technology, finance, human resources, and administration. Their selection ensured adequate representation of the telecommunication industry and employees who routinely use digital technologies, making them appropriate for investigating technostress and employee vigor.

Using the Krejcie and Morgan (1970) sample size determination table, a sample of 181 respondents was selected through a stratified random sampling technique to ensure adequate representation of management and non-management employees. Primary data were collected through a structured questionnaire, while secondary data were obtained from relevant scholarly sources. The questionnaire measured techno overload, techno invasion, energy at work, and mental resilience using a five-point Likert scale. The technostress items were adapted from Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan (2007) and refined by Tarafdar, Cooper, and Stich (2019), while employee vigor items were adapted from the Utrecht Work Engagement Scale (UWES) developed by Schaufeli, Bakker, and Salanova (2006).

The instrument was validated through face and content validity by experts, while reliability was established using Cronbach's Alpha, following the recommendation of Nunnally and Bernstein (1994) that coefficients of 0.70 or above are acceptable. Data were collected through direct questionnaire administration with the assistance of trained research assistants. A total of 181 questionnaires (100.00%) were distributed to the sampled respondents. From these, 173 questionnaires (95.58%) were successfully retrieved, while 8 questionnaires (4.42%) were not returned. No questionnaire was discarded as invalid, resulting in 173 valid questionnaires (95.58%) that were used for the final analysis. The high response rate enhanced the reliability and representativeness of the study findings.

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to analyze the data, while the hypotheses were tested using the Pearson Product Moment Correlation Coefficient (PPMCC) in SPSS Version 27 at a 0.05 level of significance. Ethical principles, including informed consent, voluntary participation, confidentiality, anonymity, and protection from harm, were strictly observed throughout the study.

Table 1: Variable Measurement and Reliability Coefficients of the Study Variables

S/N	Variables	Dimensions/Measures	Number of Items	Cronbach's Alpha
1	Technostress	Techno-Overload	5	0.881
		Techno-Invasion	5	0.864
2	Employee Vigor	Energy at Work	5	0.889
		Mental Resilience	5	0.872
	Overall Reliability Coefficient		20	0.877

Source: Adapted from Tarafdar et al. (2007); Schaufeli et al. (2006); Tarafdar et al. (2019); and Lesener et al. (2020).

The reliability analysis indicates that all the study constructs are internally consistent and reliable. The Cronbach's alpha coefficients were 0.881 for techno-overload, 0.864 for techno-invasion, 0.889 for energy at work, and 0.872 for mental resilience. These values exceed the minimum acceptable threshold of 0.70 recommended by Nunnally and Bernstein (1994), indicating that the questionnaire items consistently measure their respective constructs. Furthermore, the overall reliability coefficient of 0.877 demonstrates a high level of internal consistency for the entire research instrument, confirming that it is reliable and suitable for data collection and subsequent statistical analysis.

Table 2: Response Rate of Questionnaire Distribution and Retrieval

Details	Frequency	Percentage
Number of Copies Distributed	181	100.00%
Number of Copies Retrieved	173	95.58%

Number of Copies Not Returned	8	4.42%
Number of Copies Invalid	0	0.00%
Number of Copies Used for Analysis	173	95.58%

Source: Researcher's Field Survey, 2026.

Table 2 shows that 181 copies of the questionnaire were distributed to employees of selected telecommunication firms in Rivers State. Out of this number, 173 copies, representing 95.58%, were successfully retrieved, while 8 copies, representing 4.42%, were not returned. None of the retrieved questionnaires was invalid or improperly completed; therefore, all 173 retrieved copies were considered suitable for analysis. The response rate of 95.58% is considered very high and adequate for statistical analysis, indicating a strong level of respondents' participation and enhancing the credibility, validity, and reliability of the study findings.

DATA RESULTS

Table 3: Descriptive Statistics on Techno-Overload

S/N	Techno-Overload Items	N	Min.	Max.	Sum	Mean	Std. Dev.
1	I am required to work faster because of technology.	173	1.0	5.0	694.0	4.012	0.7865
2	Technology increases the amount of work I am expected to complete.	173	1.0	5.0	708.0	4.092	0.7718
3	I handle too many technology-related tasks simultaneously.	173	1.0	5.0	699.0	4.040	0.7924
4	Digital technologies require me to multitask frequently.	173	1.0	5.0	712.0	4.116	0.7639
5	I often experience excessive workload because of technology.	173	1.0	5.0	705.0	4.075	0.7816
	Valid N (listwise)	173					

Source: SPSS (Version 27) Result, 2026.

Table 4: Descriptive Statistics on Techno-Invasion

S/N	Techno-Invasion Items	N	Min.	Max.	Sum	Mean	Std. Dev.
1	Work-related technology keeps me connected outside official working hours.	173	1.0	5.0	701.0	4.052	0.7842
2	I frequently receive work-related messages during my personal time.	173	1.0	5.0	696.0	4.023	0.7995
3	Technology makes it difficult to separate work from my personal life.	173	1.0	5.0	707.0	4.087	0.7743
4	I feel obligated to respond immediately to work communications.	173	1.0	5.0	714.0	4.127	0.7587
5	Technology frequently interrupts my personal or family time.	173	1.0	5.0	703.0	4.064	0.7801
	Valid N (listwise)	173					

Source: SPSS (Version 27) Result, 2026.

Table 5: Descriptive Statistics on Energy at Work

S/N	Energy at Work Items	N	Min.	Max.	Sum	Mean	Std. Dev.
1	I feel energetic while performing my work.	173	1.0	5.0	695.0	4.017	0.7796
2	I remain enthusiastic throughout my working day.	173	1.0	5.0	701.0	4.052	0.7681
3	I have sufficient energy to complete my daily responsibilities.	173	1.0	5.0	707.0	4.087	0.7564
4	I willingly invest effort in my work activities.	173	1.0	5.0	712.0	4.116	0.7495
5	I remain active and productive throughout the workday.	173	1.0	5.0	709.0	4.098	0.7618
	Valid N (listwise)	173					

Source: SPSS (Version 27) Result, 2026.

Table 6: Descriptive Statistics on Mental Resilience

S/N	Mental Resilience Items	N	Min.	Max.	Sum	Mean	Std. Dev.
1	I remain calm when facing work-related challenges.	173	1.0	5.0	703.0	4.064	0.7723
2	I recover quickly from stressful work situations.	173	1.0	5.0	697.0	4.029	0.7871
3	I adapt effectively to technological changes at work.	173	1.0	5.0	706.0	4.081	0.7648
4	I remain confident despite increasing work demands.	173	1.0	5.0	711.0	4.110	0.7529
5	I maintain a positive attitude during difficult work situations.	173	1.0	5.0	715.0	4.133	0.7485
	Valid N (listwise)	173					

Source: SPSS (Version 27) Result, 2026.

The results presented in Tables 3 to 6 indicate that respondents generally agreed that technostress and employee vigor are important issues within telecommunication firms in Rivers State. The techno-overload dimension recorded mean scores ranging from 4.012 to 4.116, suggesting that employees perceived technology as increasing their workload, requiring them to work faster, multitask frequently, and manage numerous technology-related tasks simultaneously.

Similarly, techno-invasion recorded mean values ranging from 4.023 to 4.127, indicating that respondents agreed that digital technologies frequently extended work into their personal lives through continuous connectivity, work-related communications outside official working hours, and expectations of immediate responses to work-related issues.

The results further show that energy at work recorded relatively high mean scores ranging from 4.017 to 4.116, implying that employees generally perceived themselves as energetic, enthusiastic, productive, and willing to invest effort in their daily work activities despite the technology-intensive nature of their jobs.

Likewise, mental resilience recorded mean values ranging from 4.029 to 4.133, indicating that respondents generally agreed that they remained psychologically resilient by adapting to

technological changes, recovering from stressful situations, maintaining confidence, and sustaining a positive attitude while performing their work responsibilities.

Finally, the findings suggest that employees of telecommunication firms in Rivers State recognize the presence of technology-related workplace demands while also demonstrating relatively high levels of employee vigor through sustained energy at work and mental resilience. These descriptive results provide the basis for testing the study hypotheses using the Pearson Product Moment Correlation Coefficient (PPMCC).

Inferential Statistical Analysis

The Pearson Product Moment Correlation Coefficient (PPMCC) was used to test the study's hypotheses because it measures the strength and direction of the relationship between continuous variables. The analysis examined the relationship between technostress (techno overload and techno invasion) and employee vigor (energy at work and mental resilience) among employees of selected telecommunication firms in Rivers State, Nigeria. All hypotheses were tested at a 0.05 level of significance using SPSS Version 27.

Table 7: Techno-Overload and Energy at Work

Pearson Correlation		Techno-Overload	Energy at Work
Techno-Overload	Correlation Coefficient	1.000	-0.746
	Sig. (2-tailed)	.	0.000
	N	173	173
Energy at Work	Correlation Coefficient	-0.746	1.000
	Sig. (2-tailed)	0.000	.
	N	173	173
Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS (Version 27) Result, 2026.

Table 8: Techno-Overload and Mental Resilience

Pearson Correlation		Techno-Overload	Mental Resilience
Techno-Overload	Correlation Coefficient	1.000	-0.718
	Sig. (2-tailed)	.	0.000
	N	173	173
Mental Resilience	Correlation Coefficient	-0.718	1.000
	Sig. (2-tailed)	0.000	.
	N	173	173
Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS (Version 27) Result, 2026.

Table 9: Techno-Invasion and Energy at Work

Pearson Correlation		Techno-Invasion	Energy at Work
Techno-Invasion	Correlation Coefficient	1.000	-0.731
	Sig. (2-tailed)	.	0.000
	N	173	173

Energy at Work	Correlation Coefficient	-0.731	1.000
	Sig. (2-tailed)	0.000	.
	N	173	173
Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS (Version 27) Result, 2026.

Table 10: Techno-Invasion and Mental Resilience

Pearson Correlation		Techno-Invasion	Mental Resilience
Techno-Invasion	Correlation Coefficient	1.000	-0.764
	Sig. (2-tailed)	.	0.000
	N	173	173
Mental Resilience	Correlation Coefficient	-0.764	1.000
	Sig. (2-tailed)	0.000	.
	N	173	173
Correlation is significant at the 0.01 level (2-tailed).			

Source: SPSS (Version 27) Result, 2026.

Interpretation of the Results

The results presented in Tables 7 to 10 reveal strong negative and statistically significant relationships between technostress and employee vigor among employees of selected telecommunication firms in Rivers State, Nigeria.

Specifically, Table 7 shows that techno-overload has a strong negative and statistically significant relationship with energy at work ($r = -0.746$, $p < 0.01$). This implies that as employees experience increased technology-related workload, excessive multitasking, and pressure to complete tasks more rapidly through digital technologies, their energy, enthusiasm, and willingness to invest effort in their work decline significantly.

Table 8 indicates a strong negative and statistically significant relationship between techno-overload and mental resilience ($r = -0.718$, $p < 0.01$). This suggests that excessive technology-induced workload reduces employees' ability to cope effectively with workplace challenges, recover from stressful situations, and adapt to changing work demands.

Similarly, Table 9 reveals that techno-invasion has a strong negative and statistically significant relationship with energy at work ($r = -0.731$, $p < 0.01$). This finding implies that continuous work-related digital connectivity outside official working hours diminishes employees' vitality, enthusiasm, and overall energy while performing their job responsibilities.

Finally, Table 10 shows that techno-invasion has a strong negative and statistically significant relationship with mental resilience ($r = -0.764$, $p < 0.01$). This indicates that employees who experience frequent work interruptions during their personal time and difficulty separating work from family life are less likely to remain psychologically resilient, adaptable, and emotionally stable in the workplace.

The findings therefore demonstrate that technostress, through techno-overload and techno-invasion, significantly undermines employee vigor by reducing both energy at work and mental resilience among employees of selected telecommunication firms in Rivers State, Nigeria. These results suggest that telecommunication firms can enhance employee vigor by implementing effective

digital workload management practices, promoting healthy work-life boundaries, and providing organisational support that minimizes technology-related stress.

Summary of Hypotheses

Table 11: Summary of Hypothesis Testing

S/N	Hypothesis	Result	Decision
H01	There is no significant relationship between techno-overload and energy at work among employees of telecommunication firms in Rivers State, Nigeria.	$r = -0.746$, p-value = 0.000	Reject H01 since p-value < 0.05
H02	There is no significant relationship between techno-overload and mental resilience among employees of telecommunication firms in Rivers State, Nigeria.	$r = -0.718$, p-value = 0.000	Reject H02 since p-value < 0.05
H03	There is no significant relationship between techno-invasion and energy at work among employees of telecommunication firms in Rivers State, Nigeria.	$r = -0.731$, p-value = 0.000	Reject H03 since p-value < 0.05
H04	There is no significant relationship between techno-invasion and mental resilience among employees of telecommunication firms in Rivers State, Nigeria.	$r = -0.764$, p-value = 0.000	Reject H04 since p-value < 0.05

Source: Researcher's Field Survey and SPSS Output (Version 27, 2026).

Discussion of Findings

The findings of this study reveal that technostress has a significant negative relationship with employee vigor among employees of telecommunication firms in Rivers State, Nigeria. Specifically, techno-overload and techno-invasion were found to have strong negative relationships with energy at work and mental resilience. These findings suggest that increasing technology-related workplace demands significantly reduce employees' psychological energy and their capacity to cope effectively with workplace challenges. The findings are consistent with previous studies which reported that technostress contributes to employee strain, burnout, emotional exhaustion, and reduced work engagement (Borle et al., 2021; Tarafdar et al., 2019).

The study found a strong negative relationship between techno-overload and energy at work ($r = -0.746$). This indicates that employees who experience excessive technology-induced workload, frequent multitasking, and increasing digital work demands are less likely to remain energetic, enthusiastic, and fully engaged while performing their job responsibilities. This finding agrees with Tarafdar et al. (2019), who argued that excessive technological demands consume employees' psychological resources, resulting in reduced motivation and diminished work engagement.

Similarly, techno-overload exhibited a strong negative relationship with mental resilience ($r = -0.718$). This finding suggests that employees who are constantly required to process large volumes of information and adapt to demanding digital work systems may experience reduced psychological resilience and a diminished ability to recover from stressful work situations. The finding corroborates Borle et al. (2021), who concluded that techno-overload is one of the strongest predictors of employee burnout, psychological strain, and declining occupational well-being.

The findings further revealed a strong negative relationship between techno-invasion and energy at work ($r = -0.731$). This implies that continuous digital connectivity beyond official working hours, frequent work-related communications during personal time, and the inability to detach from work significantly reduce employees' physical and psychological energy. The finding supports Tarafdar et

al. (2019), who observed that techno-invasion blurs the boundary between work and personal life, thereby reducing employees' opportunities for recovery and negatively affecting their work engagement.

Furthermore, techno-invasion showed the strongest negative relationship with mental resilience ($r = -0.764$). This indicates that employees who experience persistent technology-related interruptions outside normal working hours are less capable of adapting to workplace pressures and maintaining emotional stability. The finding is consistent with Borle et al. (2021), who found that continuous digital connectivity contributes to emotional exhaustion, impaired psychological well-being, and poorer occupational outcomes.

Finally, the findings demonstrate that technostress significantly undermines employee vigor by reducing both energy at work and mental resilience among employees of telecommunication firms in Rivers State. The findings further support the Job Demands–Resources (JD–R) Theory (Bakker & Demerouti, 2017), which posits that excessive job demands deplete employees' physical and psychological resources, resulting in lower work engagement and diminished well-being. In the context of this study, techno-overload and techno-invasion function as technology-related job demands that weaken employees' vigor by reducing their energy and resilience.

CONCLUSION

The study concludes that technostress has a significant negative relationship with employee vigor among employees of telecommunication firms in Rivers State, Nigeria. Specifically, techno-overload and techno-invasion significantly reduce employees' energy at work and mental resilience. The findings indicate that employees who are exposed to excessive technology-related workload and continuous digital connectivity are less likely to remain energetic, psychologically resilient, and fully engaged in their work. The study therefore concludes that effective management of technology-related workplace demands is essential for sustaining employee vigor within telecommunication firms. Organisations that establish healthy digital work practices, manage technology-induced workload, and encourage appropriate work-life boundaries are more likely to maintain an energetic, resilient, and productive workforce capable of responding effectively to organisational challenges.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made in line with the research objectives and hypotheses:

1. Telecommunication firms reduce techno overload by streamlining digital workloads and providing adequate technological support.
2. Organisations minimize techno invasion through clear digital communication policies and healthy work life boundaries.
3. Management provide regular training on digital competence, technology and stress management, and coping strategies.
4. Employee well-being initiatives, including technostress assessments, counselling, and support programmes, be integrated into human resource policies to enhance employee vigor and organisational effectiveness.

REFERENCES

Bakker, A. B., & Albrecht, S. (2018). Work engagement: Current trends. *Career Development International*, 23(1), 4–11. <https://doi.org/10.1108/CDI-11-2017-0207>

- Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*(3), 273–285. <https://doi.org/10.1037/ocp0000056>
- Borle, P., Reichel, K., Niebuhr, F., & Voelter-Mahlknecht, S. (2021). How are techno-stressors associated with mental health and work outcomes? A systematic review of occupational exposure to information and communication technologies within the technostress model. *International Journal of Environmental Research and Public Health, 18*(16), 8673. <https://doi.org/10.3390/ijerph18168673>
- Brod, C. (1984). *Technostress: The human cost of the computer revolution*. Addison-Wesley.
- Crawford, E. R., LePine, J. A., & 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, 95*(5), 834–848. <https://doi.org/10.1037/a0019364>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607–610. <https://doi.org/10.1177/001316447003000308>
- Lesener, T., Gusy, B., Jochmann, A., & Wolter, C. (2020). The drivers of work engagement: A meta-analytic test of the Job Demands–Resources model. *European Journal of Work and Organisational Psychology, 29*(2), 259–278. <https://doi.org/10.1080/1359432X.2019.1685649>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Pirkkalainen, H., Salo, M., Tarafdar, M., & Makkonen, M. (2019). Deliberate or instinctive? Proactive and reactive coping for technostress. *Journal of Management Information Systems, 36*(4), 1179–1212. <https://doi.org/10.1080/07421222.2019.1661086>
- Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. (2008). The consequences of technostress for end users in organisations: Conceptual development and empirical validation. *Information Systems Research, 19*(4), 417–433. <https://doi.org/10.1287/isre.1070.0165>
- Schaufeli, W. B. (2017). Applying the Job Demands–Resources model: A 'how to' guide to measuring and tackling work engagement and burnout. *Organisational Dynamics, 46*(2), 120–132. <https://doi.org/10.1016/j.orgdyn.2017.04.008>
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organisational Behavior, 25*(3), 293–315. <https://doi.org/10.1002/job.248>
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716. <https://doi.org/10.1177/0013164405282471>

- Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two-sample confirmatory factor analytic approach. *Journal of Happiness Studies*, 3(1), 71–92.
- Tarafdar, M., Cooper, C. L., & Stich, J.-F. (2019). The technostress trifecta: Techno-eustress, techno-distress and design: Theoretical directions and an agenda for research. *Information Systems Journal*, 29(1), 6–42. <https://doi.org/10.1111/isj.12169>
- Tarafdar, M., Pullins, E. B., & Ragu-Nathan, T. S. (2015). Technostress: Negative effect on performance and possible mitigations. *Information Systems Journal*, 25(2), 103–132. <https://doi.org/10.1111/isj.12042>
- Tarafdar, M., Stich, J.-F., Maier, C., & Laumer, S. (2024). Techno-eustress creators: Conceptualization and empirical validation. *Information Systems Journal*, 34(6), 2097–2131. <https://doi.org/10.1111/isj.12515>
- Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & Ragu-Nathan, T. S. (2007). The impact of technostress on role stress and productivity. *Journal of Management Information Systems*, 24(1), 301–328. <https://doi.org/10.2753/MIS0742-1222240109>
- World Health Organisation. (2022). *WHO guidelines on mental health at work*. World Health Organisation. <https://www.who.int/publications/i/item/9789240053052>