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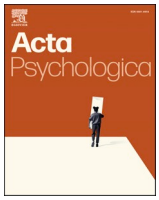

Exploring the influence of individual digitalization on technostress in Chinese IT remote workers: The mediating role of Information Processing demands and the Job Complexity

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ABSTRACT

This research study explores the connection between individual digitalization and technostress among Chinese IT remote workers, focusing on the mediating roles of Information Processing volume and Job Complexity. Concurrently, the escalation in both the volume of Information Processing and the Job Complexity necessitates higher levels of individual digitalization, potentially influencing technostress. The study specifically examines how the digitalization levels of remote workers relate to their work-related stress, as well as the potential mediating role of Information Processing demands, encompassing Job Complexity and the quantity of Information Processing. The study involved two distinct groups of Chinese IT professionals (N = 972) working remotely in different sectors: tourism and hospitality (n = 317) and banking product sales (n = 655). The findings reveal that individual digitalization is negatively linked to technostress among Chinese IT remote workers and that Job Complexity and Information Processing mediate this relationship. Additionally, the direct effects of individual digitalization on Job Complexity and Information Processing varied significantly based on the type of organization, as predicted. Workers in the banking sector showed a more substantial effect of individual digitalization on Job Complexity compared to those in the tourism and hospitality sectors. Similarly, the impact of individual digitalization on Information Processing demands was lower for remote workers in the banking sector than those in the tourism and hospitality sectors, despite both being statistically significant. This study contributes to the ongoing discussion on employee well-being, emphasizing the importance of the workplace environment and job design in effectively managing technostress.

1. Introduction

In the contemporary era of rapid digital transformation, significantly accelerated by the COVID-19 pandemic, workplaces globally have undergone profound changes. The shift toward remote work and increased reliance on digital tools have become defining features of modern organizational life, with these changes being particularly pronounced in the information technology (IT) sector. In China, the IT industry is experiencing a rapid expansion of remote work and ubiquitous adoption of digital tools, making these shifts even more significant (Song et al., 2022). This phenomenon, termed 'individual digitalization,' encompasses integrating and utilizing digital technologies in daily life, encompassing proficiency, frequency of digital engagement, and adeptness in leveraging digital resources (Melzer & Diewald, 2020).

Despite the widespread adoption of digital technologies, a growing body of evidence suggests these advancements come with challenges, particularly concerning employee well-being (Ashraf et al., 2023). One such challenge is technostress, a phenomenon that has been a concern since 2005, when it was first identified as a significant issue among IT workers. Tu et al. (2005) highlighted the early impact of technostress in China, noting that older employees and those with higher levels of computer literacy were especially vulnerable due to the pressures of managing complex digital tools and the high expectations for productivity (Altaf et al., 2022). This early warning has since been validated by more recent studies documenting the prevalence of technostress in the IT sector (Pullins et al., 2020).

Globally, technostress remains a significant issue, with a substantial portion of IT professionals experiencing high-stress levels due to constant connectivity and the pressure to adapt to new technologies continuously. Recent data indicates that around 67 % of workers in high-

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stress sectors like financial services, including IT, report experiencing substantial work-related stress, much of which can be attributed to technostress (Hall et al., 2024; Kamala et al., 2025; Trivedi et al., 2024).

In China, technostress is particularly acute among IT workers. The original study by Tu et al. (2005) found that technostress affected a large proportion of IT professionals in several major Chinese cities. The phenomenon is particularly pronounced among older employees and those with higher computer literacy, who often bear the brunt of techno-overload and techno-complexity. The high expectations for productivity in Chinese organizations further exacerbate this issue, leading to significant stress and negatively impacting overall productivity.

A critical aspect of understanding technostress is recognizing the role of Information Processing demands and Job Complexity as mediating factors in the relationship between technology use and technostress. Information Processing demands refer to the cognitive load associated with handling vast amounts of information, making decisions, and solving problems—all of which digital technologies intensify (Nastjuk et al., 2024). As these demands increase, they can lead to cognitive overload, where employees feel overwhelmed by the volume and complexity of information they must process (Tarafdar et al., 2007). This cognitive overload directly contributes to technostress, as individuals struggle to manage the mental demands of technology.

Job Complexity further amplifies this effect. In technology-driven roles, the intricacy of tasks, the need for diverse skills, and the requirement to integrate various knowledge sources all contribute to a more complex work environment (Wu et al., 2023). This complexity can exacerbate technostress, particularly when employees feel their jobs demand more than they can comfortably manage (Ayyagari et al., 2011). Thus, Information Processing demands and Job Complexity serve as crucial mediators influencing how technology use translates into technostress.

In addition to these mediating variables, the type of organization is a moderating variable in this study. The choice to focus on specific sectors—namely banking and tourism—stems from the unique demands and digital environments that characterize these industries. Banking is a sector known for its rigorous data security requirements, constant innovation, and high stakes in financial transactions, all of which contribute to heightened Information Processing demands and Job Complexity. Conversely, the tourism sector, while also technologically intensive, involves different forms of customer interaction, real-time service delivery, and dynamic information management, which might moderate the relationship between technology use and technostress differently (Tarafdar et al., 2019). By examining these two distinct sectors, the study aims to uncover how organizational context influences the impact of individual digitalization on technostress, providing a more nuanced understanding of this relationship.

1.1. Research gap and contributions

Given the limited research specifically addressing the effects of individual digitalization on technostress in the context of IT remote workers, especially within Chinese organizations, this study fills a critical gap in the literature (Sun et al., 2022). Existing studies primarily focus on technostress in traditional work settings or general digital environments without isolating the role of individual digitalization or sector-specific moderating effects. Our study highlights how Information Processing demands and Job Complexity mediate the relationship between individual digitalization and technostress and investigates how sector-specific organizational contexts (banking vs. tourism) moderate this relationship. This dual-level analysis offers both theoretical insights into technostress dynamics and practical recommendations for mitigating stress in different industries.

1.2. Expected results and practical implications

We anticipate that our findings will demonstrate that higher levels of individual digitalization correlate with increased technostress, primarily through heightened Information Processing demands and Job Complexity. However, the moderating effect of organizational context will likely reveal that banking sector workers, due to stringent technological demands, experience technostress more acutely compared to those in tourism. The insights derived will help organizations design better interventions to reduce cognitive overload, improve task design, and foster employee well-being in digitalized workplaces. By addressing these key aspects, organizations can mitigate technostress and improve overall productivity in the IT sector.

In conclusion, this study explores the intricate relationship between individual digitalization and technostress among Chinese IT remote workers (Nastjuk et al., 2023). We focus mainly on the mediating role of Information Processing demands and Job Complexity, especially in sectors like banking and tourism, where remote IT work is becoming increasingly common. Additionally, this study examines how organizational characteristics specific to the Chinese context, such as the rapid adoption of remote work practices and the emphasis on digital efficiency, influence the dynamics between individual digitalization and technostress.

1.3. Theoretical framework

1.3.1. Individual digitalization from diverse theoretical foundations

Individual digitalization is how individuals integrate digital technologies into their personal and professional lives. This concept includes various factors, such as proficiency with digital tools, frequency of digital engagement, and the capacity to utilize digital resources effectively. Grounding this study is the Unified Theory of Acceptance and Use of Technology (UTAUT), a comprehensive framework developed by Venkatesh et al. (2003) that explains technology adoption and usage. UTAUT highlights performance expectancy, effort expectancy, social influence, and facilitating conditions. However, while influential, UTAUT has been critiqued for its narrow focus on individual-level factors, often neglecting technology use's broader social and organizational dimensions (Venkatesh et al., 2012). The connection between UTAUT and our study is essential as it helps explain how individuals adopt digital technologies and how this adoption leads to stress when not effectively managed, linking directly to the mediating variables (Job Complexity and Information Processing demands) that translate technology use into technostress.

1.3.2. Technostress Theory

Technostress Theory, as elaborated by Tarafdar et al. (2007), provides a critical lens to examine the adverse psychological effects of technology use in work settings. Technostress, particularly relevant to IT professionals, encompasses multiple dimensions such as techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. These stressors emerge as individuals must continuously adapt to new technologies and increased digital demands. In this study, technostress is examined as the primary outcome of individual digitalization, with its relationship to the mediating variables and moderating organizational contexts addressed in our hypotheses.

1.3.3. Job Demands-Resources (JD-R) Model

The Job Demands-Resources (JD-R) Model plays a pivotal role in enriching the understanding of the relationship between individual digitalization and technostress. It does so by examining the balance between job demands and available resources (Bakker & Demerouti, 2007, 2017). In IT work, job demands might include the complexity of Information Processing, high workload, and the constant need to update technical skills, while resources could involve organizational support, training, and personal digital competencies (Demerouti & Bakker, 2023). According to the JD-R Model, when job demands surpass the available resources, employees are likely to experience stress and potential burnout (Bakker et al., 2023). This model supports our

hypotheses regarding the mediating role of Job Complexity and Information Processing demands. As digitalization increases job demands, the lack of sufficient resources can heighten technostress.

1.3.4. Cognitive Load Theory (CLT)

The cognitive Load Theory, proposed by Sweller (1988), is of significant importance in providing insight into the mental effort required to process information in highly digitalized environments. For IT professionals, the cognitive load can be particularly high due to the necessity to manage and process complex, often voluminous, information. When individuals are frequently required to learn and adapt to new digital tools or systems, the cognitive load can increase, leading to diminished performance and increased stress. In this study, CLT is directly tied to our hypotheses by emphasizing the cognitive challenges and overload that arise when Job Complexity and Information Processing demands increase due to digitalization.

1.3.5. Socio-Technical Systems Theory (STST)

Socio-Technical Systems Theory adds a holistic perspective by considering the interplay between social and technical elements in the workplace. This theory posits that effective work design must account for both the technological systems and the social context in which they operate. In the context of individual digitalization, STST emphasizes the importance of aligning digital tools and processes with the organizational and social structures within which they are embedded (Baxter & Sommerville, 2011). We use STST to support our hypothesis regarding the moderating role of organizational type (banking vs. tourism) and its influence on the relationship between digitalization and technostress.

By integrating UTAUT, Technostress Theory, the JD-R Model, Cognitive Load Theory, and Socio-Technical Systems Theory, this study establishes a robust theoretical foundation for exploring the impact of individual digitalization on technostress among Chinese IT remote workers. This multi-theoretical approach enables a nuanced analysis that considers individual factors and the complex interplay between cognitive demands, job resources, and socio-technical contexts (Garg et al., 2023).

1.3.6. Justification of hypotheses

Based on this theoretical framework, the following hypotheses are justified:

Hypothesis 1. Individual digitalization will negatively affect technostress among Chinese IT remote workers.

As suggested by UTAUT and Technostress Theory, digitalization increases cognitive demands and stressors. Without proper adaptation, this relationship leads to technostress, particularly in remote IT contexts.

Hypothesis 2. Work design characteristics will mediate the relationship between individual digitalization and technostress.

Hypothesis 2a. Job Complexity will mediate the relationship between individual digitalization and technostress.

The JD-R Model explains how Job Complexity acts as a mediator. Increased digitalization raises job demands, and insufficient resources to manage this complexity intensify technostress (Stich et al., 2018).

Hypothesis 2b. Information Processing demands will mediate the relationship between individual digitalization and technostress.

Cognitive Load Theory underlines the impact of increased cognitive demands on stress. The complexity of digitalized environments requires significant mental effort, contributing to technostress.

Hypothesis 3. The type of organization where IT remote workers are employed (banking vs. tourism) will moderate the relationship between individual digitalization and Job Complexity and Information Processing demands.

Hypothesis 3a. IT remote workers in the banking sector will experience a stronger effect of individual digitalization on Job Complexity compared to those in the tourism sector.

STST highlights how organizational structure affects digitalization's impact. Banking environments, due to stringent processes and regulatory demands, intensify Job Complexity compared to the more flexible tourism sector (Süße et al., 2018).

Hypothesis 3b. IT remote workers in the banking sector will experience a lower effect of individual digitalization on Information Processing demands compared to those in tourism.

STST explains that banking organizations often have structured support systems that mitigate cognitive overload, while tourism firms may rely more on individual adaptability (Damberg et al., 2024; Ji et al., 2023; Osei et al., 2023; Zeshan et al., 2021).

Hypothesis 4. The type of organization will moderate the indirect relationship between individual digitalization and Technostress, with banking sector workers showing a stronger effect.

The combination of Technostress Theory and STST provides a basis for this hypothesis, emphasizing that the structured, high-stakes nature of banking amplifies the stress-inducing effects of digitalization more than in tourism (Binh et al., 2023; Gao & Wang, 2023; Kong et al., 2023; Wu et al., 2023).

The entire conceptual model and the model with hypotheses are displayed in Fig. 1.

2. Method

2.1. Participants

The study was conducted with two distinct samples of Chinese IT professionals (N = 972), representing two different sectors: tourism and hospitality (n = 317), and banking product sales (n = 655). Participants were selected using a convenient (non-random) sampling method, reflecting the study's focus on sector-specific insights rather than general population generalizability. Efforts were made to capture a diverse range of IT roles and responsibilities by distributing the survey through multiple professional networks, industry forums, and social media platforms, ensuring variability in participants' backgrounds and experiences.

It is acknowledged that the sample is not fully representative of the broader population of Chinese IT workers. However, the large sample size provides valuable insights into the sector-specific dynamics of technostress, and future studies could extend this work using probability sampling methods to enhance generalizability. Demographic characteristics of both groups of employees are displayed in Table 1.

2.2. Procedure

Before beginning the study, ethical approval was obtained from the University [anonymized for review] (date of approval: [anonymized for review]). The study was designed and conducted following the ethical standards of the current local legislation and the 1964 Helsinki Declaration reformed in Fortaleza (Brazil). Possible participants were assured of the confidentiality and anonymity of the data obtained. In the first step of the survey, all participants provided informed consent to the survey conditions before the beginning. The inclusion criteria for participation were being an employee of the banking or the hospitality and tourism sector in China and working remotely in complete or hybrid formats. Following Kendall's criteria (1989), the minimal sample size was estimated as 10 participants for each scale item. Considering that the study included 23 items (Individual digitalization, five items; WDQ Job Complexity, four items; WDQ Information Processing, four items; Techno-overload subscale, five items; and Techno-complexity, five

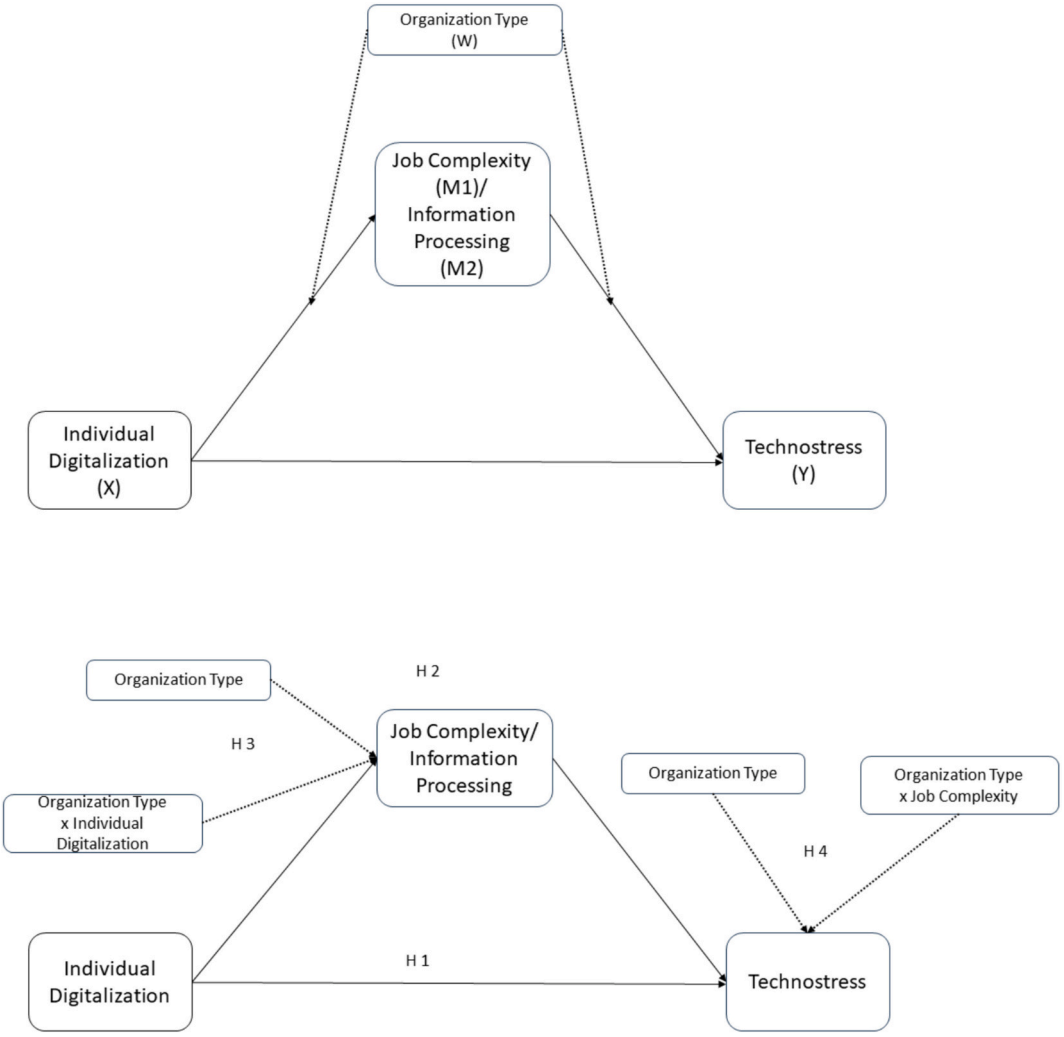

Fig. 1. Full conceptual model (above) and the model with hypotheses (below).

Table 1
Demographic characteristics of both groups of employees (N = 972).

Participants' features	Banking sector (n = 655)	Tourism & hospitality sector (n = 317)
Age in years. Mean (S.D.)	38.06 (9.77)	33.80 (10.47)
Gender	Males: N = 140 Females: N = 515	Males: N = 64 Females: N = 253
Organization size (mean number of employees)	804.85	708.88
Organizational seniority in years. Mean (S.D.)	6.76 (6.22)	5.02 (6.11)
Team seniority in years. Mean (S.D.)	6.21 (6.92)	5.18 (7.17)
Years of professional experience. Mean (S.D.)	11.76 (8.57)	7.70 (7.82)
Type of employment contract	Fixed-term employment contracts: N = 286 Indefinite-term contracts: N = 299 Project-based or task-specific contracts: N = 40 Part-time employment contracts: N = 30	Fixed-term employment contracts: N = 145 Indefinite-term contracts: N = 125 Project-based or task-specific contracts: N = 35 Part-time employment contracts: N = 12

items). The initial requisite was 230 participants, but considering that more than 40 % of the participants abandoned the surveys without filling them out, the final sample needed was adjusted to 384 participants (230/0.7 = 384). The achieved sample size of 972 participants exceeded the minimum requirement based on Kendall's criteria (1989), ensuring sufficient statistical power for hypothesis testing and subgroup analyses. Given the target demographic of IT professionals working remotely in the banking and tourism sectors, the survey was distributed in three waves. This distribution approach was used to increase response rates and minimize potential bias due to non-response by ensuring that participants from both sectors and varying roles were adequately represented. The first wave targeted initial participants via professional networks, the second wave focused on industry-specific groups, and the third wave aimed to reach additional participants using social media platforms.

The survey was created and distributed using Questionnaire Star (问卷星), a widely recognized platform in China for its ease of access and strong user engagement. The distribution channels included professional networks, industry forums, and social media platforms, particularly LinkedIn and WeChat. Data collection was conducted during two months of 2024 (March and April) using a self-administered instrument.

No rewards were provided for participation in the study. The respondents submitted 1298 surveys, representing a response rate of 74.9 %.

2.3. Instruments

2.3.1. Individual digitalization

Defined as per the level of proficiency and comfort with digital tools, the frequency of engaging in digital activities, and the ability to effectively navigate and leverage digital resources, this variable was assessed with five items Hult et al. (2020) used. The items were designed to evaluate individual's attitudes and use of IT in everyday life, e.g., for organization, socialization, learning, and pleasure. The reliability of the scale in the present study was α = 0.92. Regarding the content and construct validity, the individual digitalization items were derived from a well-established study by Hult et al. (2020), which validated these items through both exploratory and confirmatory factor analyses, ensuring that they accurately measure the construct of individual digitalization. Furthermore, expert reviews were conducted during the original scale development to ensure content validity, verifying that the items comprehensively covered the domain of digitalization as intended.

2.3.2. Work-design characteristics

Job Complexity and Information Processing were assessed with the WDQ developed by Morgeson and Humphrey (2006), a self-reporting measure that includes eight items, four for each subscale. Cronbach's alpha of the original version of the WDQ were from α = 0.80 (Job Complexity) and α = 0.80 (Information Processing). Job Complexity displayed a high-reliability level in the present study α = 0.92, as well as Information Processing that reached an alpha value of 0.91. The WDQ, as developed by Morgeson and Humphrey (2006), underwent rigorous psychometric validation, including factor analysis and internal consistency checks, to ensure that each subscale (Job Complexity and Information Processing) accurately reflected the intended constructs. The original development process also involved consultation with subject matter experts to confirm that the items adequately captured the breadth and depth of the measured work-design characteristics.

2.3.3. Technostress

We assessed this variable with two subscales from the Technostress scale (Tarafdar et al., 2007). The first subscale assessed techno-overload, contained five items, and showed adequate reliability (α = 0.89) in the original study. Techno-overload refers to situations where IT pressures individuals to work much faster and longer. The second subscale is techno-complexity, including five items, and showed good reliability in the original study (α = 0.89). Techno-complexity is related to the individual's perception of not having the necessary IT skills and spending significant time and effort learning and understanding different aspects related to IT. Following the procedure of the original article, the technostress global rating has been calculated by adding the two scales of overload and complexity. The global reliability of the scale in the present study was α = 0.85. The Technostress scale by Tarafdar et al. (2007) has been extensively validated in various contexts, with specific attention to the distinct dimensions of technostress, such as overload and complexity. The original authors employed factor analysis to confirm that the items load appropriately onto the intended factors, ensuring the scale's construct validity. Additionally, content validity was established through comprehensive item generation and review processes, ensuring that the scale items accurately reflect the stressors related to technology use.

In this study, the scales used were initially in English and were subsequently translated into Chinese following a rigorous back-translation procedure, as outlined by Klotz et al. (2023). Initially, a team of two bilingual experts, proficient in both English and Chinese, independently translated the English scales into Chinese. This initial translation process was meticulous, ensuring that the nuances and specific terminology of the original scales were accurately conveyed in the Chinese context. Following the independent translations, these researchers convened to reconcile any discrepancies and to create a consensus-based draft of the Chinese version.

Subsequently, to ensure the accuracy and fidelity of the translation, another bilingual expert, who were not previously familiar with the original English scales, was enlisted to back-translate the Chinese version into English. This step is crucial as it serves to identify any potential misinterpretations or deviations from the original meaning.

Finally, the team of bilingual researchers compared the original English scales with the back-translated English version. This comparison was crucial to ensure that the Chinese translation accurately and effectively conveyed the same concepts and meanings as the original scales. Adjustments were made as necessary based on this comparison to ensure the final Chinese version of the scales was both linguistically and conceptually equivalent to the original English version. Through this meticulous back-translation process, the integrity and accuracy of the scales were preserved, ensuring that the Chinese version was a faithful and reliable adaptation of the original English scales. As recommended by Klotz et al. (2023), both source and translated scale versions are included in the Appendix (See supplemental material). Providing both scale versions would give bilingual reviewers and editors the ability to examine the equivalence of the two scales subjectively and, upon publication, would give readers from source and target cultures easy access to the measures. All the questionnaire has been answered using a scale response was a 5-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

2.4. Data analyses

Data have been analyzed using SPSS for descriptive statistics, Pearson's correlation matrix and reliabilities of instruments. Using Model 58 (Hayes, 2022), the study explores the relationship between individual digitalization at work (X) and technostress (Y), introducing Job Complexity (M1) and Information Processing (M2) as mediating factors. It further hypothesizes that the type of organization may act as a moderator (W), suggesting that organizational context could influence both the direct impact of individual digitalization on Job Complexity (M1) and Information Processing requirements (M2), on the one hand, and the indirect impact of individual digitalization (X) on stress levels (Y).

3. Results

3.1. Descriptive statistics and correlational analyses

Table 2 provides an overview of the descriptive statistics and relationships between individual digitalization, job complexity, information processing, and technostress. The data indicate that, on average, participants reported moderate levels of individual digitalization and job complexity, while information processing was relatively high, and technostress was reported at lower levels.

The correlations between the variables reveal several significant relationships. Higher levels of individual digitalization were associated with greater perceived Job Complexity. However, individual digitalization was negatively related to both Information Processing and technostress, suggesting that as digitalization increases, participants tend to engage in less Information Processing and experience lower levels of technostress. Job Complexity was also negatively related to Information

Table 2
Descriptive statistics and Pearson's correlation matrix.

Variables	Mean	S.D.	1	2	3
1. Individual digitalization (X)	3.156	1.113	–		
2. Job Complexity (M1)	3.320	0.953	.225***	–	
3. Information Processing (M2)	4.001	1.209	−.450***	−.338***	–
4. Technostress (Y)	1.528	0.594	−.354***	−.423***	.272***

*** $p < .001$.

Processing and technostress, indicating that individuals who perceive their jobs as more complex tend to report lower levels of Information Processing and technostress. Conversely, Information Processing was positively related to technostress, suggesting that higher levels of Information Processing are associated with increased technostress. These findings highlight the interconnected nature of these variables in the context of digitalization and work-related stress.

3.2. Moderated mediation analyses

The results of the Model 58 supported Hypothesis 1, showing that Individual digitalization negatively predicted Technostress among Chinese IT Remote workers, as displayed in Figs. 2 and 3. Hypothesis 2a and 2b, both related to mediational effects, have been also supported. The statistical values showed that Job Complexity and Information Processing mediate the relationships between individual digitalization and Technostress.

Moreover, in confirming Hypotheses 3a and 3b, the results showed that the direct effects of individual digitalization on both Job Complexity and Information Processing significantly varied as a function of the different types of organizations, as seen in Table 3. In more detail (Hypothesis 3a), IT remote workers working in a banking sector showed a more substantial effect of individual digitalization on Job Complexity than those working in a tourism and hospitality firm, being the first significant while the second is not essential. Regarding Hypothesis 3b, IT remote workers working in a banking firm will show a lower effect of individual digitalization on Information Processing demands than those working in a tourism and hospitality firm, despite both being statistically significant.

Finally, in confirming Hypotheses 4a and 4b, the results showed that the indirect effects of Individual Digitalization on Technostress, through Job Complexity and Information Processing, significantly varied as a function of different types of organization, as shown in Table 4. Regarding Hypothesis 4, IT Remote workers working in a banking sector will show a more substantial effect of individual digitalization on Technostress than IT Remote workers working in a tourism and hospitality firm through Job Complexity and Information Processing. Confirming the findings, the indices of moderated mediation, calculated as the difference between the conditional indirect effects, have also been significant both for Job Complexity (Index = .0632; BootSE = .0120; BootLLCI = .0412; BootULCI = .0892) and for Information Processing (Index = .0679; BootSE = .0160; BootLLCI = .03642; BootULCI = .0988).

4. Discussion

The present study aimed to explore the relationship between individual digitalization and technostress, introducing Job Complexity and Information Processing demands as mediating factors, and the type of organization as a moderating factor. The findings confirm most of the proposed hypotheses, and several results deserve deeper discussion in light of previous studies.

Firstly, our study highlights that individual digitalization has a buffering effect on technostress. This finding supports our initial hypothesis and aligns with studies suggesting that digital proficiency and the effective use of digital tools can enhance work efficiency and reduce stress (Ritala et al., 2021). Digital competencies allow employees to perform tasks more effectively, reducing manual workloads and increasing productivity, which, in turn, may mitigate stress. However, this finding goes beyond previous research by emphasizing the importance of continuously developing digital skills as a protective measure against stress in the workplace.

Moreover, the mediating roles of Job Complexity and Information Processing demands provide valuable insights into the nuanced effects of digitalization on stress. Digitalization was found to both alleviate and exacerbate stress depending on the mediating pathway. On the one hand, it reduces the need for manual tasks and optimizes workflows, potentially lowering technostress (Burmann et al., 2021). On the other hand, it introduces new challenges, including increased task complexity and higher cognitive demands. As Job Complexity increases due to digitalization, workers are often required to manage a wider range of tasks, solve complex problems, and integrate new tools into their daily routines (Wu et al., 2023). Similarly, Information Processing demands are heightened as employees must process larger volumes of information at a faster pace.

This dual effect creates a dynamic relationship between digitalization and technostress, where the stress-reducing benefits of digital tools may be offset by the additional mental workload they impose. For example, while digital tools reduce repetitive tasks, they can simultaneously increase cognitive load, particularly when workers lack sufficient resources or support to manage the complexities of digital environments (Wu et al., 2023).

A key novel finding of this study is the differential effect of individual digitalization across sectors, with significant variations observed between the banking and tourism sectors. Specifically, IT remote workers in the banking sector experience a stronger impact of individual digitalization on Job Complexity compared to their counterparts in tourism and hospitality. This finding can be attributed to the inherently high-stakes nature of the banking sector, where tasks often involve complex data management, cybersecurity, and regulatory compliance (Ji et al., 2023). These demands create a more complex work environment, intensifying the relationship between digitalization and Job Complexity.

Conversely, the impact of individual digitalization on Information Processing demands is lower in the banking sector compared to the

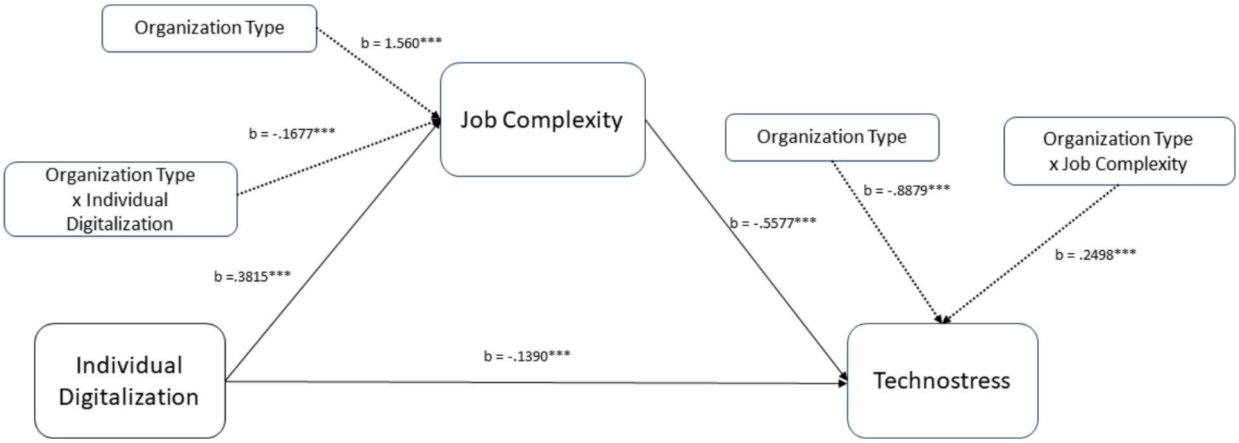

Fig. 2. Unstandardized coefficients for Model 58 with Job Complexity as mediator.

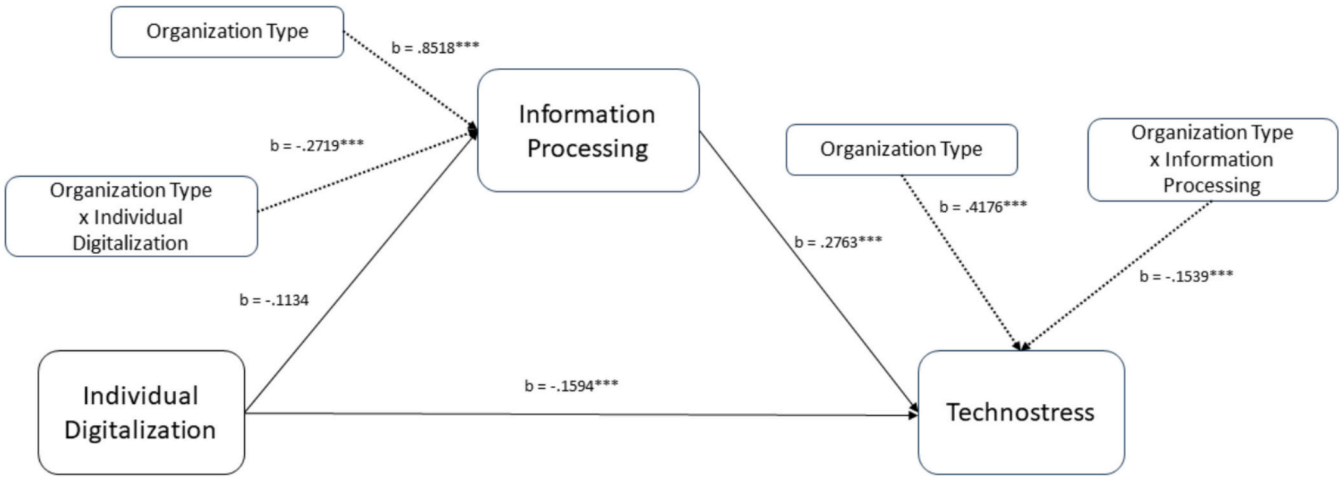

Fig. 3. Unstandardized coefficients for the Model 58 with Information Processing as mediator.

Table 3
Conditional direct effects of Individual digitalization (X) on mediators 1 and 2.

Type of organizations	Effect	SE	*t*	*p*	LLCI	ULCI
Conditional direct effects of the predictor individual digitalization (X) at different types of organizations (W)						
Outcome variable: Job Complexity (M1)						
Banking	0.2138	0.0291	7.3436	0.0000	0.1567	0.2710
Tourism	0.0461	0.0375	1.2315	0.2184	−0.0274	0.1197
Outcome variable: Information Processing (M2)						
Banking	−0.3853	0.0393	−9.8009	0.0000	−0.4624	−0.3081
Tourism	−0.6571	0.0506	−12.9898	0.0000	−0.7564	−0.5578
Conditional direct effects of the predictor Job Complexity (M1) at different types of organizations (W)						
Outcome variable: technostress (Y)						
Banking	−0.3079	0.0240	−12.8159	0.0000	−0.3550	−0.2608
Tourism	−0.0581	0.0382	−1.5190	0.1291	−0.1331	0.0169
Conditional direct effects of the predictor Information Processing (M2) at different types of organizations (W)						
Outcome variable: technostress (Y)						
Banking	0.1224	0.0190	6.4358	0.0000	0.0851	0.1597
Tourism	−0.0315	0.0251	−1.2567	0.2092	−0.0808	0.0177

Table 4
Conditional indirect effects of Individual digitalization (X) on Technostress (Y) through the mediators 1 and 2.

Type of organizations	Effect	BootSE	BootLLCI	BootULCI
Conditional indirect effects of Individual digitalization (X) on technostress (Y) through Job Complexity (M1)				
Banking	−0.0658	0.0116	−0.0900	−0.0443
Tourism	−0.0027	0.0031	−0.0082	0.0049
Conditional indirect effects of Individual digitalization (X) on technostress (Y) through Information Processing (M2)				
Banking	−0.0471	0.0094	−0.0659	−0.0291
Tourism	0.0207	0.0141	−0.0061	0.0496

tourism and hospitality sector, though it remains significant in both. This difference may be explained by the structured nature of banking workflows, where well-defined processes and support systems help reduce the cognitive burden associated with digitalization. In contrast, IT workers in the tourism sector often face more dynamic and customer-facing environments, requiring them to process diverse types of information related to customer preferences, travel arrangements, and real-time service delivery (Guo et al., 2023). These varying demands highlight the importance of sector-specific factors in shaping the relationship between digitalization and stress.

The observed moderated mediation effects further reinforce the role of organizational context. IT remote workers in the banking sector exhibit stronger indirect effects of individual digitalization on technostress, mediated by both Job Complexity and Information Processing demands, compared to their counterparts in tourism and hospitality. These findings align with previous studies indicating that the banking sector's emphasis on technological innovation and high-stakes decision-making amplifies the cognitive and emotional pressures on IT workers (Gao & Wang, 2023; Liu et al., 2024).

On the other hand, the tourism sector's focus on customer service and operational flexibility creates a different set of job demands. While IT workers in this sector face significant cognitive challenges, these are often moderated by organizational practices such as cross-training, job rotation, and exposure to diverse work tasks, which help mitigate the adverse effects of digitalization on stress (Tian, 2024).

These findings have important practical implications for developing targeted interventions to mitigate technostress. In sectors like banking, where Job Complexity and cognitive demands are high, organizations should prioritize strategies such as providing continuous training, enhancing digital literacy, and offering mental health support. In contrast, tourism organizations should focus on promoting adaptive work practices, improving task variety, and offering flexible work arrangements to help workers manage Information Processing demands.

Future research could explore additional factors influencing the relationship between digitalization and technostress, such as the role of

digital trust (Çetin et al., 2022), clients' digitalization levels (Rahman & Ziru, 2022), and employees' risk perceptions (Birinci, 2022). Expanding the model to include these variables could provide a more comprehensive understanding of how individual digitalization interacts with organizational and personal factors to influence stress outcomes.

In conclusion, this study demonstrates the complex and multifaceted nature of the relationship between individual digitalization and technostress. By examining the mediating roles of Job Complexity and Information Processing demands, and the moderating role of organizational context, we provide valuable insights into how digitalization impacts employee well-being in different sectors. Understanding these dynamics is crucial for developing effective strategies to foster healthier and more productive digital workplaces.

4.1. Limitations of the present study and suggestions for future research

While this study employed a thorough methodology, several limitations should be acknowledged. First, despite careful translation and back-translation of the scales between English and Chinese, subtle differences in language and cultural context may still have influenced participant responses. The reliance on self-report measures could also introduce biases, such as social desirability or response bias, which might affect the accuracy of the reported experiences.

The generalizability of the findings is another concern. Conducted with two distinct samples of Chinese IT professionals, the results may not apply to IT professionals in other countries or industries. Additionally, the use of a self-administered survey may have introduced bias, and the researchers cannot confirm that all respondents were remote workers. The cross-sectional design further limits the ability to establish causal relationships between the variables.

The current study focuses on Job Complexity and Information Processing demands as mediators but does not account for other potential moderator variables that could influence the relationship between individual digitalization and technostress. Future research should include additional moderators such as organizational culture, digital literacy levels, and job autonomy. Examining these moderators could provide a more comprehensive understanding of the conditions under which digitalization either alleviates or exacerbates stress.

External variables, such as industry regulations, client demands, and technological infrastructure, could also significantly affect the study variables. Future studies could incorporate these external factors to explore their influence on Job Complexity, Information Processing demands, and technostress. For instance, stricter regulations in banking or rapid technological changes in tourism could further intensify stress levels.

Expanding this research into other industries and cultural contexts is essential for assessing its broader applicability. Longitudinal studies could provide insight into how the relationships between individual digitalization, job demands, and technostress evolve over time. Additionally, experimental designs or mixed-method approaches could be employed to validate the causal mechanisms identified in this study.

Despite these limitations, this study offers valuable insights into the experiences of IT professionals in the Chinese banking and tourism sectors. These findings provide a foundation for future research aimed at developing tailored interventions and policies to improve employee well-being in digitalized work environments.

4.2. Theoretical implications

This study significantly advances our understanding of the complex relationship between digitalization, stress, and organizational behavior. It challenges the assumption that digitalization primarily reduces stress, showing instead that it can both mitigate and exacerbate stress depending on the context and mediating factors. The study suggests that digital tools must be carefully integrated into work environments to avoid adverse effects (Nedeljko et al., 2024).

4.2.1. Contribution to Job Complexity and Information Processing theories

The findings contribute to theories linking Job Complexity to cognitive load by demonstrating how increased digital proficiency can lead to more complex job tasks requiring advanced cognitive processing. This study emphasizes the dual effect, wherein digital tools reduce manual Information Processing but simultaneously introduce new cognitive demands. This trade-off highlights the need for a more nuanced theoretical understanding of how digitalization reshapes job demands.

4.2.2. Sector-specific theoretical contributions

By examining the differential impacts of digitalization across the banking and tourism sectors, the study enriches sector-specific theories of organizational behavior. IT workers in the banking sector face higher Job Complexity and Information Processing demands due to regulatory requirements and technological innovation, leading to greater technostress. In contrast, the tourism sector's service-oriented focus results in a different set of stressors. This sectoral analysis urges scholars to incorporate industry-specific variables into future models of digital transformation and stress.

Future Theoretical Directions: The findings provide a foundation for future research on the interaction between digitalization, stress, and organizational behavior. Subsequent studies could develop more intricate models that incorporate additional moderating factors such as organizational culture, employee support systems, and individual differences in digital literacy. These contributions highlight the necessity for comprehensive frameworks that capture the diverse impacts of digitalization in different organizational contexts.

4.3. Practical implications and recommendations

The findings of this study offer actionable insights for organizations in managing technostress, particularly through job design and tailored interventions in different sectors.

In the banking sector, where digitalization often involves complex systems and high-stakes environments, it is important to focus on enhancing IT workers' technical proficiency while also addressing the mental demands of their roles. Comprehensive technology training programs should address not only technical skills but also cognitive strategies for managing large volumes of Information Processing. Establishing robust digital infrastructure and cybersecurity protocols can help alleviate anxiety related to sensitive data management. Furthermore, integrating regular mental health support and stress management programs can help employees cope with the psychological pressures common in this sector.

In the tourism and hospitality sector, digitalization emphasizes enhancing customer experiences and streamlining operations. Training initiatives should focus on practical applications of technology that directly impact service delivery, ensuring employees feel confident using booking systems and customer relationship management platforms. Creating collaborative work environments where employees can share knowledge and problem-solve collectively can reduce isolation and mitigate technostress in remote work settings. Regular feedback mechanisms and open communication channels between management and IT staff can also help identify areas where digital tools may be overwhelming employees and allow for timely adjustments.

Across both sectors, digitalization strategies should be tailored to specific operational demands and employee capabilities. Periodic assessments of digital workloads can help identify areas where Job Complexity and Information Processing demands are too high, enabling timely interventions. Proactively addressing potential stressors before they escalate can help organizations create a more supportive and balanced digital work environment, ultimately improving job satisfaction and productivity while reducing the risk of technostress.

5. Conclusion

This study advances the understanding of the relationship between individual digitalization and technostress by highlighting the mediating roles of Job Complexity and Information Processing demands and the moderating effect of organizational context. Focusing on IT professionals in the banking and tourism sectors in China, the findings reveal that digitalization can both alleviate and exacerbate technostress, depending on the balance between job demands and available resources. The results indicate that sector-specific factors significantly shape how digitalization influences Job Complexity, cognitive demands, and stress, underscoring the importance of tailoring organizational interventions to specific industries.

From a theoretical perspective, this study contributes to existing frameworks by illustrating the dual impact of digitalization on job demands and employee well-being. It shows that increased digital proficiency can enhance efficiency while simultaneously leading to more complex tasks and cognitive overload. The study also highlights the need to incorporate contextual and sectoral variables in models examining the impact of digitalization on workplace stress.

On a practical level, the research provides actionable recommendations for organizations. In the banking sector, comprehensive training programs, robust digital infrastructure, and mental health support can help mitigate the cognitive and psychological pressures associated with high job complexity. For the tourism sector, fostering digital literacy and promoting collaborative work environments can help manage the demands associated with customer-facing technologies. Proactive interventions, such as periodic assessments of digital workloads, are essential across both sectors to prevent excessive job complexity and information overload.

Despite its contributions, this study has limitations, including the use of a convenient sample and the cross-sectional design, which restricts the generalizability of findings and the ability to establish causality. Future research should explore additional moderator and external variables, employ longitudinal or experimental designs, and expand into other industries and cultural contexts to provide more comprehensive insights.

In conclusion, as digital transformation continues to reshape the workplace, understanding its complex and dynamic impact on employee well-being remains critical. The findings of this study emphasize the need for targeted, sector-specific strategies that not only enhance digital competencies but also address the cognitive and emotional challenges posed by digitalization. By integrating theory and practice, organizations can develop effective solutions to foster healthier, more productive digital work environments.

Ethical approval and informed consent statements

Before beginning the study, Ethical approval was obtained from the University of the Cordilleras (date of approval: January 16th, 2024). The study was designed and conducted following the ethical standards of the current local legislation and the 1964 Helsinki Declaration reformed in Fortaleza (Brazil). Possible participants were assured of the confidentiality and anonymity of the data obtained. In the first step of the survey, all participants provided informed consent to the survey conditions before the beginning.

CRediT authorship contribution statement

Wanxiang Xie: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Rui Yang:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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Data availability

Data will be made available on request.

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