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Corrigendum to "Adaptation and validation of technostress creators and technostress inhibitors inventories in a Spanish-speaking Latin American country" [Technol. Soc. 66 (2021) 101660]

Carla Cecilia Torres [a,*], Pedro R. Gil-Monte [b], Hugo Figueiredo-Ferraz [c]

[a] Esan University, 1652, Alonso de Molina Avenue, Monterrico, Surco, Lima, 15023, Peru
[b] UNIPSICO, University of Valencia, Spain
[c] Universidad Internacional de Valencia-VIU, Spain

The authors regret the misprints in the list of the article' authors.

Where it says Carla Cecilia Torres, it must say Carla Cecilia Torres[a], Pedro R. Gil-Monte[b], Hugo Figueiredo-Ferraz[c]

In addition, the affiliations of authors must be included:

[a]Esan University; Peru
[b]UNIPSICO; University of Valencia; Spain
[c]Universidad Internacional de Valencia-VIU; Spain

The authors would like to apologise for any inconvenience caused.

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* Corresponding author.
E-mail address: ctorresb@esan.edu.pe (C.C. Torres).

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Adaptation and Validation of Technostress Creators and Technostress Inhibitors Inventories in a Spanish-Speaking Latin American Country

Carla Cecilia Torres

Esan University, 1652, Alonso de Molina Avenue, Monterrico, Surco, Lima, 15023, Peru

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ABSTRACT

The use of information and communications technology (ICT) in organizations is a global phenomenon. Their benefits: providing companies with efficiency and productivity, are well-known. Even so, there is growing worry over the stress that workers experience due to technology—technostress—and its negative consequences for organizations and workers. Technostress has not been studied much in a Latin American setting. As a starting point, it is necessary to possess valid and reliable instruments to measure the factors that generate it and the organizational mechanisms that have the potential to reduce its effects. The purpose of this study is to adapt and validate the *Technostress Creators* and *Technostress Inhibitors Inventories* in Peru, a Spanish-speaking Latin American country. A linguistic and cultural adaptation was carried out in order to evaluate the psychometric properties of the instruments in a sample of 360 employee ICT end-users. The results indicate the validity of the construct and high reliability for the Technostress Creators Inventory but not for the Technostress Inhibitors Inventory. This study demonstrates that the factors generating technostress are the same in different regions but that the suitability of different organizational practices to address it varies. It is necessary to identify mechanisms best suited to the cultural context of Latin America.

1. Introduction

Nowadays, information and communications technology (ICT) is inseparable from the workplace. Many different empirical studies have confirmed the positive effects of ICT on productivity and innovation in the workplace, both in developed countries [1–3] and in developing countries [4–7]. Of developing countries around the world, those in Latin America present the highest levels of ICT penetration in private companies; according to World Bank Enterprise Surveys, 85% of Latin American private companies possess high-speed internet, 90% use email to communicate with their customers or suppliers and 60% have their own webpages [6]. In Latin America, ICT is not essential only for large companies but also for small and medium-sized enterprises (SME). According to the Inter-American Development Bank [8], SME account for 80% of employment and are characterized by ICT penetration of up to 97% for Internet, 87% for personal computers and 67% for mobile phones. Moreover, more than 80% of SME in Latin America use email, which surpasses the global average of 60% [8].

Despite the positive effects of ICT on productivity and innovation, companies all over the world must remember that in a work environment running on technology, employees are exposed to the ongoing processes of updating software and hardware. Moreover, employees must deal with the problems these updates can cause in terms of consistency and reliability, as well as the possibility that they can now be monitored and reachable anytime, anywhere [9]. While some employees consider this to be a positive challenge, others experience it as technostress [10]. Technostress is an adaptation problem related to the use of new technologies that develops when workers perceive that they are not capable of adequately managing the demands resulting from the use of these new technologies [11,12]. In effect, the use of ICTs has been resulting in more and more negative cognitions that are associated with the perception of not being able to respond to the demands that those ICTs generate [13]. Consequently, the Observatorio de Prevención de Riesgos Laborales [Observatory of Work Risk Prevention], in its studies on technostress [14,15], has been registering an increase in these negative thoughts linked to the use of ICT in Latin American countries like Mexico, Colombia, Peru and Ecuador. Additionally, in the current context of the COVID-19 pandemic, studies in Chile report the prevalence of technostress among schoolteachers [16,17].

It is important to study technostress as a phenomenon due to its negative consequences for workers and organizations. Technostress can generate exhaustion [9,18,19] and, in the long run, burnout [20–22]. It

E-mail address: ctorresb@esan.edu.pe.

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can also affect performance and innovation [23,24]. It is associated with job dissatisfaction [25–27], decreased organizational commitment [28], absenteeism [23,29] and turnover intentions [30]. Therefore, in recent years, the study of technostress has increased in relevance in the literature regarding information systems management, organizational behavior and occupational health psychology [10].

From the literature review, it can be concluded that, from 2008 on, the number of annual publications on technostress in the workplace has been progressively increasing [10,31]. This prevalence coincides with the publication of the conceptual model Ragu-Nathan et al. [28] developed to understand technostress and the publication of the Technostress Creators and Technostress Inhibitors Inventories, which are the instruments to validate it empirically.

The Technostress Creators Inventory [28] measures the factors that create stress due to the use of ICT in a workplace context. Certainly, it is one of the most commonly used self-report instrument in the literature on technostress [32]. Its multidimensional superordinate nature [33] lends it great flexibility, as its dimensions can be used as first-order constructs or as manifestations of second-order constructs. This means that it can be adapted to different research objectives and technological and workplace contexts, as it has been used in numerous studies [27, 34–37]. Studies report construct validity and high reliability indices. It has been used mainly in the United States, its country of origin [19,29, 34,38], but it has also been used in Western European countries [18,30] and Asia [39,40], which contributes to the external validity of the instrument and to the conceptual models that help prove it empirically.

The Technostress Inhibitors Inventory [28] measures the organizational mechanisms that have the potential to reduce the effect of technostress creators. Although the Technostress Inhibitors Inventory has been used less often than the Technostress Creators Inventory, studies in the United States [13,23] and South Korea [39] indicate construct validity and reliability. Moreover, the results demonstrate technostress inhibitors' potential to reduce technological stressors' negative effects, such as job dissatisfaction, reduced organizational commitment and reduced employee innovation, on the organization [23].

In both cases, the countries of Latin America have yet to be the validation context. In this sense, it is still unknown if the factors that create technostress and the organizational mechanisms used to reduce it are the same as those found in other regions. It is important to mention that, in general, scientific studies on technostress in the Latin American workplace are scarce [10,31,41]. The few studies there are [16,17] use Salanova, Llorens and Cifre's [42] model, which focuses on the expressions of technostress or technostrain but not on the technological factors that can generate technostress. As can be seen, alternative models are unavailable to help understand the causes of technostress in Latin America and the ways to relieve it. It is necessary to develop knowledge about technostress in this part of the world which means valid and reliable instruments are needed. The Technostress Creators and Technostress Inhibitors Inventories have contributed in an important way to the generation of knowledge on technostress [38] and have proven valid and reliable in the different countries where they have been used. However, they should be submitted to an adaptation and validation process so they can be used in a new linguistic and cultural context, in this case, Latin America [43].

With this in mind, this study has as its purpose the adaptation and validation of the Technostress Creators and Technostress Inhibitors Inventories for a Peruvian sample. To that end, a linguistic and cultural adaptation is necessary [44,45] due to the fact that in the majority of Latin American countries, including Peru, most people speak Spanish as their mother tongue and are culturally dissimilar to countries like the United States [46]. Moreover, cultural values affect the ways in which technostress creators are perceived [47]. Peru is one of the Spanish-speaking Latin American countries that is culturally closest to the countries possessing the greatest population in the region, like Mexico and Colombia [46,48]. Adapting and validating the Technostress Creators and Technostress Inhibitors Inventories for a Peruvian sample is the first step toward their validation in Latin America. This research will contribute to the confirmation of whether technostress creators and technostress inhibitors manifest themselves as they do in other regions that have been studied. That being the case, it will provide valid and reliable instruments to study technostress in Latin America. If they do not, it will shed light on the differences in order to develop instruments and adequate theory for the regional context.

2. Theoretical framework

The conceptual model proposed by Ragu-Nathan et al. [28] is based on the Transactional Theory of Stress [49–51], which postulates that psychological stress occurs when people perceive that the demands placed on them exceed their resources [52].

Demands, also known as stressors, refer to the person-environment relationship and the relational meaning that a person assigns to it [53]. When the relationship is considered damaging, threatening or challenging to the person's wellbeing, it can be said to be stressful [52]. Ragu-Nathan et al. [28] identified five stressors: 1) *Techno-overload* refers to the work overload that employees experience due to technology. ICT makes it possible for workers to be exposed to more information than they can manage. It makes them more accessible due to their being more exposed to different interrupters (e.g., text messages, emails) and requests, which affects the workflow and makes concentration more difficult. Workers feel that they do not have enough time for the number of tasks they must complete. 2) *Techno-invasion* refers to the sensation that one can be reached at any time and any place due to technology. ICT makes it possible to be in constant contact with coworkers, with bosses and with work itself. As a consequence, employees feel they must always be connected, even outside of their regular working hours. 3) *Techno-complexity* refers to the sensation that it is difficult to learn and use new technologies. It references how workers must invest a lot of time and effort to understand how new technologies work and thus feel intimidated. 4) *Techno-insecurity* refers to the sensation of job insecurity due to new technologies. Workers feel threatened by other employees who could have a better understanding of ICT or who possess more up-to-date knowledge. 5) *Techno-uncertainty* refers to the sensation of uncertainty due to constant changes and updates to ICT. Workers feel their knowledge becomes obsolete quickly, and they do not know how much time and effort it will take them to learn how to manage new ICT changes [13]. Ragu-Nathan et al. [28] call these stressors *Technostress creators* (TSC). TSC are the factors that generate stress due to the use of technology in the organizational environment. This stress can manifest itself through reactions both physiological (e.g., accelerated heart rate, hormonal changes) and psychological (e.g., exhaustion, dissatisfaction) in nature, and is known as strain [54].

Resources are elements that allow people to cope with stressful situations and can be both personal (e.g., health and energy, knowledge, positive beliefs like self-efficacy) and situational (e.g., social support, material resources, information) [50]. Organizations can facilitate situational resources for coping [55]. Ragu-Nathan et al. [28] identify three: 1) *Literacy facilitation* refers to the educational means to provide knowledge related to ICT. Organizational practices like offering documentation, training and support from users who have more knowledge can reduce the effect of stressors like techno-complexity. 2) *Technical support provision* refers to assistance and technical support in order to answer questions and resolve problems related to the use of ICT. Accessibility and good helpdesk performance can reduce the effect of stressors like techno-complexity and techno-uncertainty. 3) *Technology involvement facilitation* refers to the mechanisms that foster and sustain involvement with new ICT. This happens when companies spread information regarding plans to adopt new technologies, consider workers' perspectives regarding the plans and incentivize participation in the process [13]. Ragu-Nathan et al. [28] call these three resources *Technostress inhibitors* (TSI). TSI are organizational mechanisms that have the potential to dampen the negative impact of TSC on the organization, for example, a drop in productivity [27]. Fig. 1 represents a transaction-based model of stress and the proposed relationships between stressors, strain, resources and organizational outcomes.

Ragu-Nathan et al. [28] conceptualized TSC and TSI as multidimensional superordinate constructs with reflective indicators. This implies that the causal relationships flow from the construct toward its dimensions [33] and from these toward their indicators [56]. In other words, TSC and TSI are second-order constructs that manifest themselves through their dimensions—the first-order constructs. As for the indicators of the reflective constructs, the dimensions of the superordinate constructs are different ways in which the same construct is revealed [57,58], which means that they can be considered interchangeable and that they can be expected to be covariates [59,60].

According to the aforementioned theoretical points, for the Technostress Creators and Technostress Inhibitors Inventories to be considered valid, the following requirements must be fulfilled:

In the first place, a first-order factorial structure should be identified, one composed of five factors: techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty. Additionally, based on the covariance between these five factors, a secondary factorial structure that represents TSC should be identified, as proposed by Ragu-Nathan et al.; other studies have confirmed this [20,28,40].

In the second place, a first-order factorial structure should be identified, one composed of three factors: literacy facilitation, technical support provision and technology involvement facilitation. Moreover, based on the covariance between these three factors, a second-order factorial structure that represents the TSI should be identified, according to what Ragu-Nathan et al. have proposed, and other studies have confirmed this [23,28,39].

In the third place, in order to bring together evidence of the validity of the construct, it is expected that the TSC and TSI behave according to the nature of the constructs they represent, as they correlate with conceptually related constructs [61]. As for the TSC, according to the Transaction-Based Model of Stress (Fig. 1), the stress generated by the stressors can manifest itself through psychological strains, such as exhaustion. "Psychological exhaustion" refers to the lasting feeling of low energy due to work conditions [62–64]. Many studies confirm the positive relationship between TSC and this psychological strain [18–20, 39]. In this sense, it is expected that the five TSC will correlate positively with psychological exhaustion. Moreover, the general literature on stress is consistent in showing that people with high negative affect scores tended to experience more stress and dissatisfaction [65], in part because they tended to interpret events in a more unfavorable way [66]. Therefore, it is expected that the five TSC will correlate positively with negative affect.

As for TSI, according to the Transaction-Based Model of Stress (Fig. 1), resources help deal with these stressful situations and can reduce stress. TSI are organizational resources that have the potential to reduce the negative consequences of stress caused by the use of ICT [13]. The negative consequences of stress are manifested through strains, like psychological exhaustion. Therefore, it is expected that the three TSI will be negatively correlated with psychological exhaustion.

Additionally, resources can also be personal. Self-efficacy is a personal resource that refers to the set of beliefs about one's own ability to produce results of a determined quality [67]. These beliefs mediate the evaluation of demands, reducing the perception of stressors and stress [50]. As both types of resources play a similar role in decreasing stress, it is expected that the three TSI and self-efficacy will be positively correlated.

3. Method

Fig. 2 shows the research design. The Technostress Creators and Technostress Inhibitors Inventories underwent a transcultural adaptation process. Additionally, the questionnaire included scales to measure the conceptually related constructs: psychological exhaustion, self-efficacy and negative affect. Scales from previous studies, adapted and validated, were used. These scales were used as a part of the validation process after confirming the measurement models. Afterward, the instruments and related procedures are described, as well as the sampling method and sample description and the statistical analyses that were carried out.

3.1. Measures

3.1.1. Technostress creators inventory

The Technostress Creators Inventory [28] measures the factors that create stress due to the use of ICT in a workplace context. It is composed of

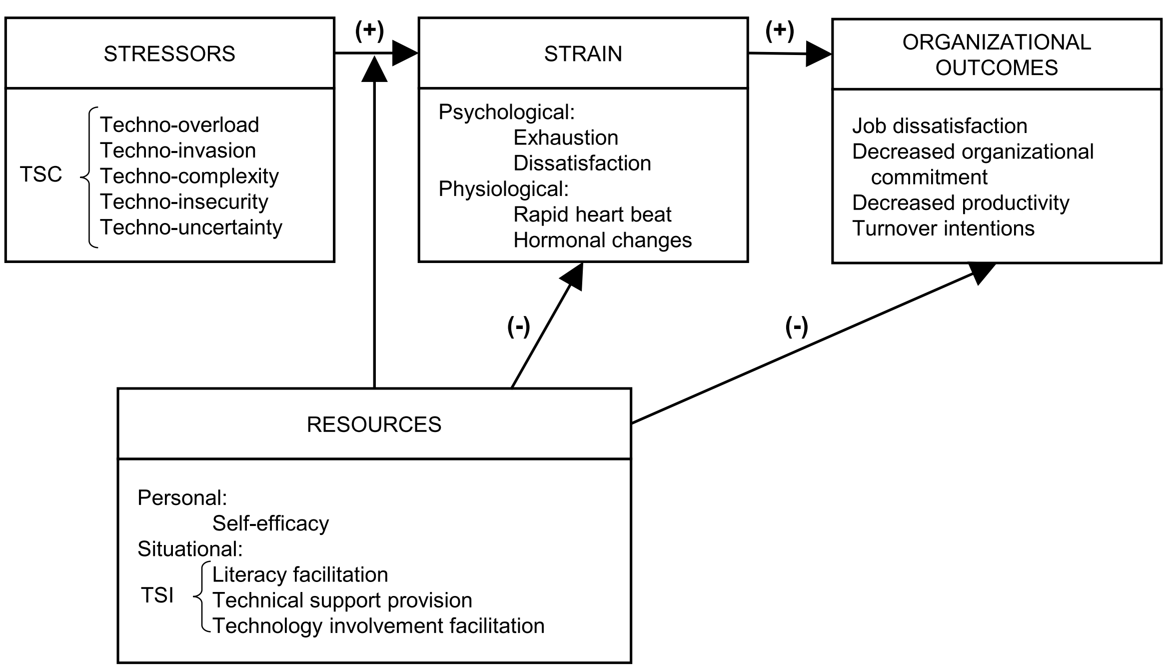

Fig. 1. Transaction-based model of stress.

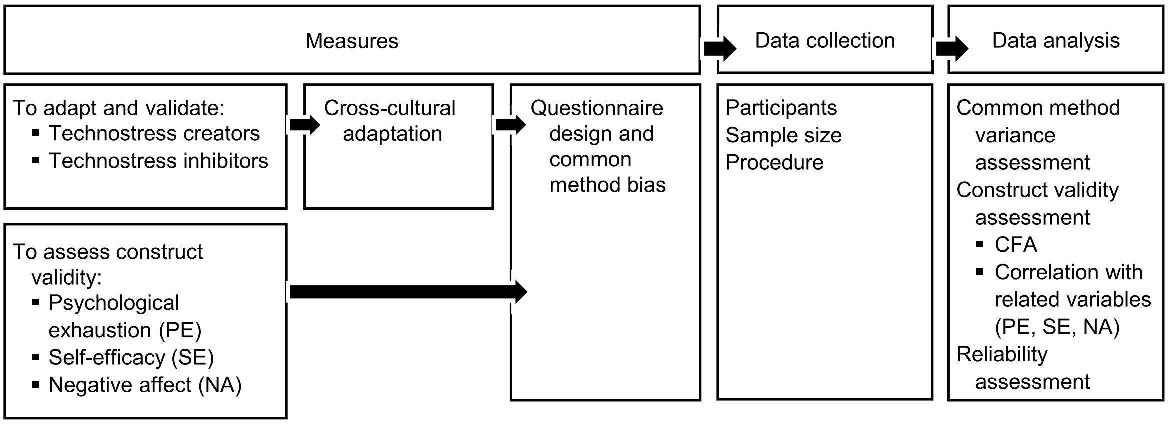

Fig. 2. Survey research design.

23 items, which are divided into five subscales: Techno-overload (5 items, α = .82) is about situations in which employees feel obligated to work more and faster due to ICT. Techno-invasion (4 items, α = .80) describes situations in which workers feel their lives are being invaded due to the constant connection made possible by ICT. Techno-complexity (5 items, α = .77) refers to situations in which workers feel that it is very difficult for them to learn and use ICT. Techno-insecurity (5 items, α = .78) reflects situations in which employees feel at risk of losing their jobs, threatened by other workers who possess a better grasp of ICT than they do. Techno-uncertainty (4 items, α = .83) refers to situations in which workers feel that ICT are constantly being updated or changed.

3.1.2. *Technostress inhibitors inventory*

The Technostress Inhibitors Inventory [28] measures the organizational mechanisms that have the potential to reduce the effect of technostressors. It is composed of 13 items, which are divided into three subscales: Literacy facilitation (5 items, α = .85) describes the ways that organizations can provide knowledge and facilitate learning related to ICT in the workplace. Technical support provision (4 items, α = .86) describes the assistance and technical support provided by the organization in order to help workers in their use of ICT. Technology involvement facilitation (4 items, α = .87) refers to mechanisms that keep workers involved in the adoption of ICT and new technological developments in the organization. The items of both inventories were evaluated on a five-point Likert scale ranged from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The original scale includes a sixth point for "Does not apply" or "I don't know," which was eliminated through the transcultural adaptation process described in section 3.1.7.

3.1.3. *Psychological exhaustion scale*

The Psychological Exhaustion Scale (4 items, α = .85) is part of the Spanish Burnout Inventory [62,68]. It was adapted to the technological context in order to capture the emotional and physical exhaustion that employees feel due to continual use of ICT. One example of an item is "I feel emotionally exhausted through the use of ITC for work." The items were responded to on a 5-point frequency scale: 0 (*Never*); 1 (*Rarely: Several times a year*); 2 (*Sometimes: Several times a month*); 3 (*Frequently: Several times a week*); 4 (*Very frequently: Every day*).

3.1.4. *General self-efficacy scale*

The General Self-Efficacy Scale [69] (10 items, α = .85) measures the sense of personal confidence in effectively leading while in the middle of a variety of stressful situations. The items were adapted so that the stressful situation was the technological context. One example of an item is "I can resolve the majority of technological problems that I am faced with if I put forth the necessary effort." They were evaluated with a 5-point Likert scale as follows: 0 (*Strongly disagree*); 1 (*Disagree*); 2 (*Neither agree nor disagree*); 3 (*Agree*); 4 (*Strongly agree*). The Spanish version of Baessler & Schwarzer [70] was used.

3.1.5. *Negative affect scale*

The Negative Affect Scale (5 items, α = .72) is part of the International-Spanas-Short Form [71,72]. It measures negative affect, a personality characteristic based on adverse emotions [65]. The scale presents words that describe negative emotional states. The participant should report the frequency with which each state (e.g., "Displeased") is experienced using a scale of five points ranging from 1 (*Never*) to 5 (*Always*). The time period for the experience is not specified (e.g., "… in the past week"), with the goal of measuring negative affect as a personality trait. The Spanish version of Gargurevich [73] was used.

3.1.6. *ICT use and demographic information*

Questions were included regarding the types of ICT used and how many days per week and hours per day they were used. The following ICT classification was used [9]: mobile technologies (e.g., mobile telephone, smartphone, laptop, tablet), network technologies (e.g., Internet, intranet, virtual private network or VPN), communication technologies (e.g., email, voice messages), business technologies and databases (e.g., ERP, PeopleSoft®, SAP®, Oracle® applications), generic application technologies (e.g., word processing, like Word®; spreadsheets, like Excel®; presentations, like PowerPoint®) and collaborative technologies (e.g., instant messaging, chat, videoconferencing, Skype®). Additionally, questions to characterize the sample were included: sex, age, education level and time at present company.

3.1.7. *Cross-cultural adaptation*

The process suggested by Beaton et al. [44] was followed for the transcultural adaptation of the Technostress Creators and Technostress Inhibitors Inventories. The process consisted of five stages: First was the translation from English to Spanish. Four translations were undertaken, two by informed translators and two by uninformed translators. Afterward, a synthesis was carried out by an expert committee composed of specialists in translation, psychology and technology. Taking the synthesis, native English-speaking translators from the United States carried out a back translation, which was reviewed by an expert committee, and it was re-translated three times in order to obtain an almost perfect match with the original. Additionally, it was reviewed by a linguist. Afterward, the instrument was evaluated through 36 interviews with ICT end-users in order to ensure comprehension. Finally, a pilot of 30 electronically-applied surveys was conducted to evaluate format and application time. In both cases, men and women of different ages, occupations and ranks participated.

Based on the interviews, it was considered necessary to specify in some items that the context was the use of ICT in a workplace environment (e.g., "I spend less time with my family due to the technology that I use for work," see Appendix A). Also, examples and definitions were included for potentially unfamiliar terms (e.g., "The computer networks [for example, the server, connections, interconnected equipment, etc.] are changed frequently in our organization"). Moreover, the sixth point (*Does not apply/I don't know*) of the scale was omitted due to some respondents using it as if it were 1 (*Strongly disagree*). This option is usually included to identify people who do not find the item relevant to their case and who, therefore, should not be part of the sample. By using it in the same way as option 1 (*Strongly disagree*), the sixth option loses its purpose and becomes a source of error.

3.1.8. Questionnaire design and common method bias

The common method bias refers to the covariation between two items due to a shared measurement method instead of to the construct they represent [74,75]. The use of self-report measurements can generate this type of problem due to the same source providing ratings to all of the variables involved in the study. Since people can tend to provide ratings in a certain way, independently of the information that one seeks to obtain from them, their ratings might not reflect their true opinions, and when this pattern is not controlled for, it can affect the estimates [76]. In this sense, the questionnaire was designed according to the procedural recommendations of Podsakoff [77]: With the goal of reducing the risk of social desirability and leniency, the questionnaire directions emphasized the study's anonymity, the importance of an honest answer and the fact that there were no right or wrong answers. In order to avoid the risk of acquiescence, care was taken so that items would not include vague or ambiguous terms and also so that consecutive items would not possess similar phrasing; moreover, in order to keep motivation high, a progress bar was included and participants were thanked for their responses and encouraged to keep responding. Finally, in order to reduce the priming effect, distractors were used to generate psychological separation between the scales [61,76].

3.2. Data collection

The questionnaire was responded to by 360 employees on full-time contracts who used ICT to carry out their work-related tasks and functions. Fully 215 (59.7%) of them were men, and 145 (40.3%) were women, with an average age of 37.5 years old ($SD = 8.50$). In the sample, 95% had obtained postsecondary education, and 64.7% had earned postgraduate degrees. On average, they had been working in their present companies for 6.1 years ($SD = 5.92$). 95.6% reported using 5 types of ICT or more for between 4.7 ($SD = 2.94$) and 7.4 ($SD = 3.23$) hours per day.

The minimum sample size of 360 individuals was estimated with the Monte Carlo method, for a confirmatory second-order factor analysis. To that effect, the recommendations of Brown [74] and Muthén and Muthén [78] were followed. The lowest expected effect size was .36, according to previous studies [28], as was a power of .80 [79] and p level of .05 (two-tailed). The Monte Carlo method was chosen due to the fact that habitual conventions do not take into account the complexity of the model, the size of the effect nor the power of the sample to detect it.

The sample was obtained through convenience sampling. A database of students at a Peruvian business school was used. Data was collected through online surveys, with the support of the Survey Monkey platform. The invitation was sent by email and indicated in general terms the purpose of the study, the fact that participation was anonymous, the contact email of the author and a link to begin the survey. Of the 13,871 invitations, 1806 responses (13%) were obtained, of which 612 (33%) met the inclusion criteria. Fully 30 surveys were excluded due to the amount of time taken to respond to the survey and/or incoherent responses. Finally, via SPSS, a random sample of 360 cases was selected and used for the analyses in this study.

3.3. Data analysis

Initially, descriptive analyses were carried out to characterize the sample. Moreover, common method variance (CMV) was discarded. First, as a diagnostic tool, a confirmatory factor analysis (CFA) indicated that a single factor could not explain the covariance between all of the variables in the study [76]. Comparative fit index (CFI) $\geq .90$, the root square error of approximation (RMSEA) ≤ 0.06 and the standardized root mean square residual (SRMR) $\leq .08$ [80] were considered indicators of the fit of the model. The fit of the one-factor model was $\chi^2(1430) = 8134.462$, $p < .001$, CFI $= .336$, RMSEA $= 0.127$, SRMR $= .176$. Then, the unmeasured latent method factor (ULMF) technique was followed [81]. There were problems identifying the model in which the variables load their own factor and the method factor, which indicates that a model with a latent factor that represents the shared variance among all the variables in the study is not viable. The results of both analyses indicated that the CMV was not a source of concern in this study.

Later, multivariate normality was evaluated with a Mardia coefficient, which should be lower than 1.96 [82]. The multivariate kurtosis indicated the abnormality of the data for the TSC (*Mardia coefficient* = 27.29) and TSI (*Mardia coefficient* = 36.12) scales, which is why the maximum likelihood estimation with robust standard errors available in the Mplus program was opted for [83]. MLM was used for the TSC scales and MLR for the TSI scales due to the fact that the technical support provision subscale contained missing data, as it was only responded to by those who had a helpdesk in their workplace.

To verify the validity of the construct, two CFAs were run for each inventory. The first one was supposed to confirm the dimensionality of the first-order factor structure and the viability of the higher-order factor structure. The second one was to validate the second-order factor structure. In the evaluation of the first CFA, the following fit indexes were taken into consideration: CFI $\geq .90$, RMSEA ≤ 0.06 and SRMR $\leq .08$ [80]. The significance of the estimated parameters, the variance of the factors and the covariance among factors were verified. Moreover, the direction and magnitude of the factor loadings were evaluated: they had to be positive and greater than .40 [74]. Later, the discriminant validity among first-order factors was analyzed. It needed to be weak for the data to be able to be represented by a higher-order factor structure [59]. It was observed that the standardized covariances were high, greater than .50 [79], but significantly less than 1, even so [59,74].

With the second CFA, the goal was to validate if the covariation among first-order factors could be explained by a second-order factor. In general, as the restrictions that are imposed on the model occur at lesser degrees of freedom, it is not possible to expect a greater fit for the second-order solution [74,84]. Other indicators must be considered to evaluate the goodness of fit of the model. Brown [74] suggests carrying out the Nested χ^2 test to determine if the degradation in the fit is significant. Even so, Fornell & Larcker [85] criticized the use of sequential tests because they increase the chance of type 1 errors. Because of that, Marsh & Hocevar [84] proposed the Target coefficient (T) (i.e., the ratio of the Chi-square value of the first-order model over the value of the Chi-square value of the second-order model). If $T = 100\%$, the entirety of the relations among first-order factors can be explained by the most restrictive second-order model, independently of the goodness of fit [84]. The recommended criterion, $T > 80\%$, was used [28]. Continually, the significance, direction, and magnitude of the higher-order factor loadings were proven, as was the proportion of variance explained from the first-order factors by the second-order factor [28,74].

Later, the reliability of the scales was evaluated. Raykov's [86] rho coefficient (composite reliability) was used. In accordance with the purpose of this study, a coefficient of .70 or greater was considered acceptable [87].

Finally, in order to add to the evidence of the validity of the construct, the psychological exhaustion, self-efficacy and negative affect scales were used, as they are conceptually related to the TSC and TSI [61]. A measurement model was run, and correlations were observed between the latent factors. The TSC should correlate positively with psychological exhaustion [9,50] and negative affect [50,65], and the TSI should correlate negatively with psychological exhaustion [28] and positively with self-efficacy [40].

4. Results

4.1. TSC confirmatory factor analysis

The first-order CFA obtained a result of χ^2 (220) = 495.996, $p < .001$, CFI = .936, RMSEA = 0.059, SRMR = .049. Taken together, these indicators demonstrate the adequate fit of the model [80]. All of the estimated parameters, variances and covariances were significant. The factor loadings were positive as expected and were between .43 and .87 (Fig. 3).

The correlations between the five factors were high, ranging from .62 to .93. (Table 1). Moreover, they were significantly different from 1. These results indicate weak discriminant validity between the first-order factors. Therefore, a second-order factor, theorized by Ragu-Nathan et al. [28] to be TSC, could explain the high covariation among them.

The second-order CFA obtained a result of χ^2 (225) = 536.116, $p <$ .001, CFI = .928, RMSEA = 0.062, SRMR = .051. As expected, the restrictions imposed on the first-order model generated a light degradation in the goodness of fit indicators for the second-order model, but they

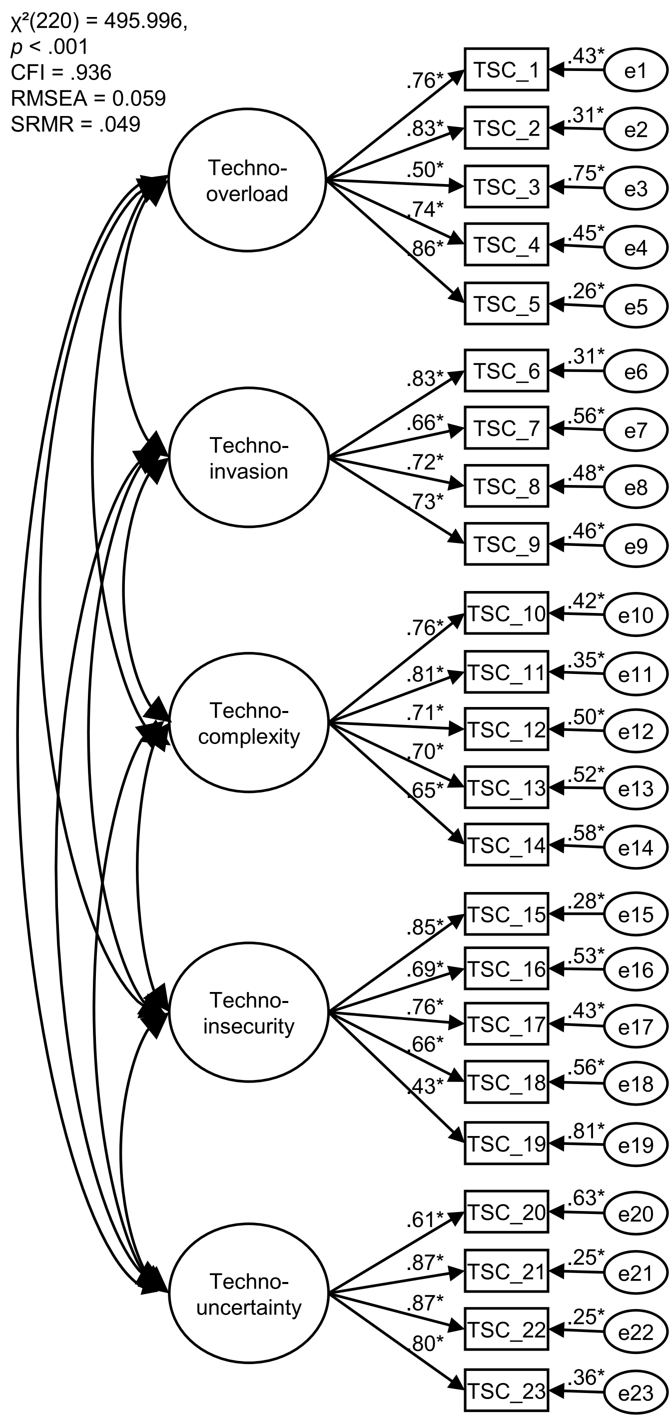

Fig. 3. TSC first-order factor structure. Completely standardized factor loadings and residuals. *$p < .001$.

Table 1
Discriminant validity analysis of the TSC first-order factors.

	Correlation (a)	*S.E* (b)	*S.E**2 (c)	1-*S.E**2 (d)	Discriminant Validity
Techno-invasion with					
Techno-overload	.93	.02	.04	.96	Weak
Techno-complexity with					
Techno-overload	.86	.02	.04	.96	Weak
Techno-invasion	.82	.03	.06	.94	Weak
Techno-insecurity with					
Techno-overload	.86	.02	.04	.96	Weak
Techno-invasion	.78	.03	.06	.94	Weak
Techno-complexity	.91	.02	.04	.96	Weak
Techno-uncertainty with					
Techno-overload	.72	.03	.06	.94	Weak
Techno-invasion	.62	.04	.08	.92	Weak
Techno-complexity	.63	.04	.08	.92	Weak
Techno-insecurity	.67	.04	.08	.92	Weak

Note: If a > 0.5 and a < d, weak discriminant validity. If a > d, discriminant validity nonexistent. If a < 0.5, discriminant validity exists (Bagozzi & Heatherton, 1994).

remained within the established criteria. By comparing the chi-square value of the first-order model with that of the second-order model, the Target coefficient (*T*) was 92.5%, which indicates a good representation of the relationships between the first-order factors for the more restrictive second-order model. The higher-order factor loadings were significant, positive and strong. The lowest loading was techno-uncertainty = .72, and the greatest was techno-overload = .97 (Table 2). The second-order factor explained the majority of the variance in the five TSC; techno-uncertainty was the factor with the least proportion of variance explained (R^2 = .52).

4.2. TSI confirmatory factor analysis

In this case, the first-order CFA obtained a result of χ^2 (62) = 186.071, $p < .001$, CFI = .942, RMSEA = 0.075, SRMR = .046. The CFI and the SRMR indicate a good absolute and comparative fit, respectively. However, the RMSEA, as it is over 0.06, revealed that the model could have unnecessary parameters or restrictions, which is why the solution was reviewed to identify the problematic areas [74]. To start with, all of the estimated parameters, variances and covariances were significant. The factor loadings were positive, between .67 and .91 (Fig. 4).

Table 2
TSC second-order confirmatory factor analysis. Completely standardized solution.

	Factor Loading	Residual Variance	R^2
TSC_1	.75*	.44*	.56*
TSC_2	.83*	.31*	.69*
TSC_3	.50*	.75*	.25*
TSC_4	.74*	.45*	.55*
TSC_5	.86*	.27*	.73*
TSC_6	.83*	.31*	.69*
TSC_7	.66*	.57*	.43*
TSC_8	.73*	.46*	.54*
TSC_9	.73*	.47*	.53*
TSC_10	.76*	.42*	.58*
TSC_11	.80*	.36*	.64*
TSC_12	.72*	.48*	.52*
TSC_13	.69*	.52*	.48*
TSC_14	.65*	.58*	.42*
TSC_15	.85*	.28*	.72*
TSC_16	.69*	.53*	.47*
TSC_17	.75*	.43*	.57*
TSC_18	.66*	.56*	.44*
TSC_19	.44*	.80*	.20*
TSC_20	.61*	.63*	.37*
TSC_21	.87*	.25*	.75*
TSC_22	.87*	.25*	.75*
TSC_23	.80*	.37*	.63*
Techno-overload	.97*	.06*	.94*
Techno-invasion	.91*	.17*	.83*
Techno-complexity	.92*	.16*	.84*
Techno-insecurity	.91*	.17*	.83*
Techno-uncertainty	.72*	.48*	.52*

*$p < .001$.

It was in the magnitude of the correlation between technology involvement facilitation (TIF) and literacy facilitation (LF) ($r = .99$, $p < .001$) where problems were found. No discriminant validity was identified (Table 3), which implies that TIF and LF are not differentiated as two separate types of practices. Hence, they should be represented by a single factor; later the composition of that factor will be discussed. Table 3 also shows that the correlations between the other factors were under .50, which indicated discriminant validity [59]. Therefore, the data could not be represented by a second-order structure.

In the first place, it is necessary to review why TIF and LF are not differentiated. The interviews in the transcultural adaptation process and the additional interviews with experts on the implementation of technology suggest that the practices to maintain workers' involvement in the organization's technological progress and updates, which TIF describes, would be very limited or almost absent in the studied context. The few moments in which the workers could feel involved are associated with educational spaces, as are those practices that the LF construct describes, which could explain the high correlation between the two variables.

The declarations by the end-users who participated in the transcultural adaptation process regarding TIF are summarized below. They indicated that their organizations neither encouraged (item TSI_10, see Appendix B) nor compensated (item TSI_11) workers for using new technologies; rather, the workers simply had to use them, because otherwise, they could not carry out their jobs. They also mentioned that consultation before the introduction of new technologies (item TSI_12) would be at the managerial level; employees would be informed and made aware of the change in training sessions or at the time they went to use their computers. With regard to involvement (item TSI_13), they expressed that it was not the case for the companies they worked for but that they associated it with training. Interviews with four experts on the implementation of new technologies corroborated these declarations. The experts stated that decisions about the introduction of new technologies were made at the senior management level without consulting employees. Only a few employees designated by management were involved in order to help register the processes of the company. The rest of the employees were excluded from the operation until the training sessions, which is when they would be informed, their concerns would be addressed and they would be taught how to use the new technology.

Both experiences revealed a low incidence of TIF. In effect, TIF obtained an average ($M = 2.8$, $SD = 1.04$) that was significantly lower than that of LF ($M = 3.2$, $SD = 1.00$), $z = -10.920$, $p < .001$, $r = -.58$ and TSP

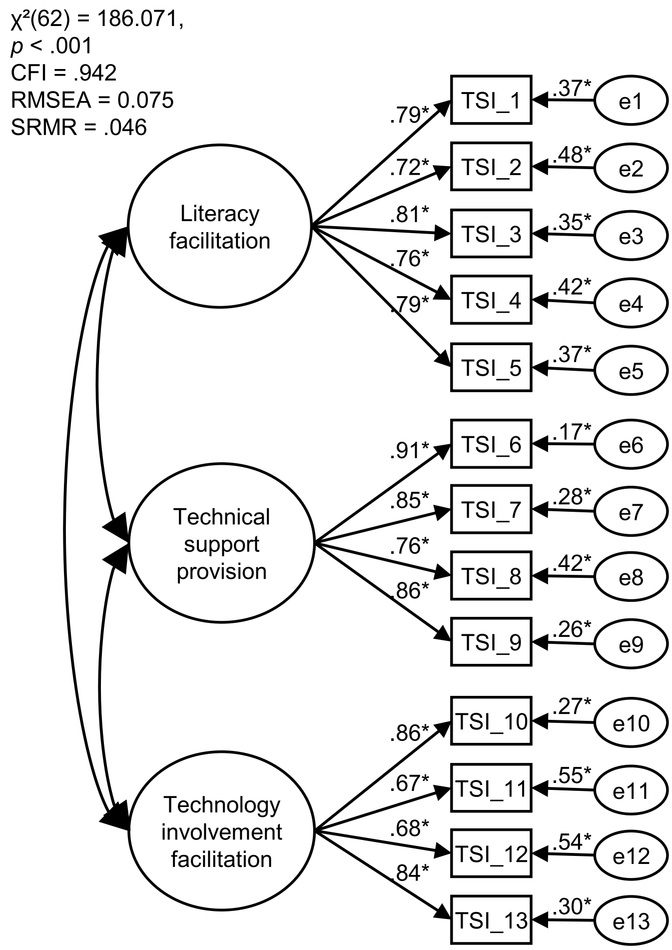

Fig. 4. TSI first-order factor structure. Completely standardized factor loadings and residuals. $*p < .001$.

($M = 3.5$, $SD = 0.84$), $z = -10.800$, $p < .001$, $r = -.57$. On average, participants tended to disagree with the idea that the companies where they worked sought to involve them. Currently, TIF would not be a part of the support mechanisms in the adoption of new technologies in this context, and, as such, it cannot be considered a TSI. Thus, TIF was excluded from the analysis and an alternative, two-factor model was tested. The CFA composed of LF and technical support provision (TSP) obtained a better fit: χ^2 (25) = 51.818, $p < .001$, CFI = .978, RMSEA = 0.055, SRMR = .046 (Fig. 5).

Table 3
Discriminant validity analysis of the TSI first-order factors.

	Correlation (a)	*S.E* (b)	*S.E**2 (c)	1-*S.E**2 (d)	Discriminant validity
TSP with					
LF	.47	.07	.14	.86	Exists
TIF with					
LF	.99	.02	.04	.96	Nonexistent
TSP	.37	.07	.14	.86	Exists

Note: TSP = Technical support provision; LF = Literacy facilitation; TIF = Technology involvement facilitation. If a > 0.5 and a < d, weak discriminant validity. If a > d, nonexistent discriminant validity. If a < 0.5, discriminant validity exists (Bagozzi & Heatherton, 1994).

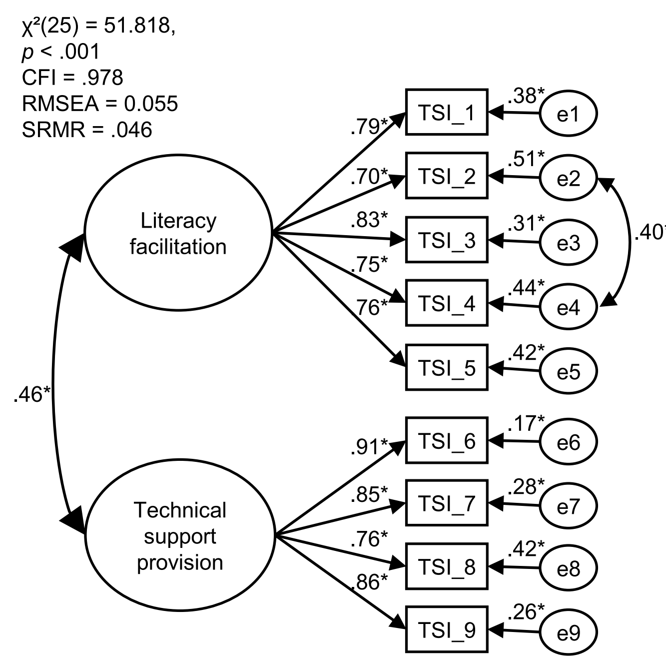

Fig. 5. TSI Alternative Model. Completely Standardized Solution. $*p < .001$.

Table 4
TSC and TSI reliability.

	ρ
TSC	
Techno-overload	.86
Techno-invasion	.83
Techno-complexity	.85
Techno-insecurity	.82
Techno-uncertainty	.87
TSI	
Literacy facilitation	.84
Technical support provision	.91

Note: ρ = Raykov's rho coefficient (composite reliability).

4.3. Reliability

The reliability of the subscales of both inventories remains high. The rho values were between .82 and .91 (Table 4).

4.4. Correlation with related variables

Table 5 shows the correlations of TSC and TSI with other variables. The TSC significantly and positively correlated with psychological exhaustion and negative affect, as expected. These results contribute evidence to the construct validity of the Technostress Creators Inventory. The correlations of LF and TSP with self-efficacy were positive and significant, as expected. However, the correlations with psychological exhaustion were not significant.

5. Discussion

The purpose of this study was to adapt and validate the Technostress Creators and Technostress Inhibitors Inventories in a sample of Peruvian workers. Regarding the Technostress Creators Inventory, the results demonstrate the validity and reliability of the TSC for this sample. Techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty are the factors that generate technostress and, taken together, show TSC, as Ragu-Nathan et al. [28] proposed and other studies confirm [20,40]. That techno-uncertainty presents lower values relative to the other dimensions is consistent with other studies, both when the TSC are used to evaluate the effect of the ICT in general [27,28,40,88] and when the construct is adapted to evaluate specific ICT [35]. However, the results also correspond to some recent questioning regarding whether or not the Technostress Creators Inventory is still valid. Fischer et al. [32] found in a qualitative study that stress is due more to events after a change (e.g., if the technology is already in force and can be used) than to the change itself, as is posed in the definition of techno-uncertainty in Ragu-Nathan et al. [28]. As stress is a dynamic process in which the relationship with the environment is constantly evolving [50], it is possible that the end-users of ICT are adapting to the pace of the change of the technologies with which they are working. In this sense, although their first appraisals would consider techno-uncertainty to be damaging and threatening, with time, it becomes less so. From there, the dimension of techno-uncertainty becomes less strong than the other TSC. It is important to note that some studies have stopped including the dimension of techno-uncertainty altogether as a manifestation of TSC [23,34,37–39]. It appears that techno-uncertainty-related behavior would have to be observed in future studies in order to confirm its downward trend and the reasons for it.

Table 5
Correlations of TSC and TSI with related variables.

	PE	NA	SE
TSC			
Techno-overload	.69*	.45*	
Techno-invasion	.64*	.37*	
Techno-complexity	.59*	.43*	
Techno-insecurity	.60*	.35*	
Techno-uncertainty	.43*	.25*	
TSI			
Literacy facilitation	.05 (ns)		.20*
Technical support provision	.00 (ns)		.23*

Note: PE = Psychological exhaustion; NA = Negative affect; SE = Self-efficacy.
*$p < .001$.

As for the Technostress Inhibitors Inventory, it lacks construct validity for the Peruvian sample. Not all of the support mechanisms proposed by Ragu-Nathan et al. [28] fit in the context studied, and they do not necessarily act jointly. For now, mechanisms oriented toward educating (LF) and providing support when problems arise (TSP) could represent TSI. The results suggest that TIF is not a TSI in this sample. Similar results have not been found in studies carried out in other regions: on the contrary, there are studies that include TIF as the only TSI [27].

It would be necessary to review why TIF did not appear to be a TSI in this sample and if in the future, encouraging the involvement of workers (TIF) would fit into this new context. On one hand, the literature shows the importance of involving employees since the beginning stages of the organization's strategic planning, mainly for the commitment to the implementation processes that it generates [89]. Moreover, when a new technology is introduced, involving employees can reduce anxiety and frustration regarding the new way of working [12,90], which is a reason it works as a TSI in other regions and could be an opportunity for management to encourage it in this organizational environment.

On the other hand, the literature also indicates that the effectiveness of these types of practices associated with involvement could be affected by culture [91]. Power distance is one of the most frequently used dimensions in the study of the relationship between national culture and the adoption of new technologies [92]. The high power distance characterizing the relationships between managers and their subordinates in Peru and in other Latin American countries [46] tends to inhibit the employee participation [93] necessary for employee involvement. The lack of involvement found in this study could be a manifestation of Peruvian culture, so encouraging involvement might not be the best idea.

Power distance refers to the degree to which the unequal distribution of power is accepted in a society; in countries where power distance is low, superiors and subordinates feel comfortable participating, forming their own opinions and taking action for themselves [94], which facilitates the adoption of new technologies because they are more open to presenting and suggesting their points of view in order to obtain better results [95,96]. Hence, the practices that are described in TIF would be more appropriate in this type of environment.

On the contrary, in societies where power distance is high, like Peru and other countries in the region, there tend to be differences of superiority between those who have power and those who do not; superiors try to demonstrate their relative power as much as possible, while subordinates accept this without question [46]. This makes assertive communication and collaborative practices between superiors and subordinates in the organizational environment difficult [93]. To this is added the great influence that superiors can exercise over their subordinates, who act under their approval and with their support [94]. For example, in countries where power distance is high, endorsement by top management is positively related to the acceptance of new technologies due to the fact that workers are less disposed to question the decisions of their superiors [97]. However, when the employees perceive that their superiors are not convinced or involved, the implementation and acceptance process is put at risk, since the workers will align their attitudes to those of their superiors [98].

In this sense, the literature suggests that in places where the power distance is high, the introduction of new technology should be communicated by the head of the organization on down [99]. Coincidentally, the experts interviewed mentioned that, based on their experience, the success of the adoption of new technology would depend on the involvement of senior management and managers and not so much on convincing employees. Apparently, there is the expectation that the employees will align with the attitudes of the organization, and so it is not seen as necessary to do anything in order to generate interest and keep them involved. As a consequence, the low incidence of TIF could be a manifestation of high power distance, and encouraging TIF could be rather inappropriate due to the existing relationship between superiors and subordinates. In general, the two-factor model, represented by LF and TSP, would be a better representation of current practices. The task of identifying other support mechanisms coherent with the cultural context remains open.

Additionally, it is necessary to reflect on the lack of correlation between TSI and psychological exhaustion. Similar results were found in studies that used measurements associated with psychological wellbeing as an indicator of strain [100,101]. The studies that have reported negative and significant relationships between TSI and strains have used organizational outcomes like job satisfaction as indicators of strain [28]. It appears that TSI are mechanisms designed to reduce the impact of TSC on measurements of organizational fit. It is possible that they are not designed to reduce the psychological strain that is related to the wellbeing of workers. Lazarus [52] criticized the use of job satisfaction as a measurement of strain due to the fact that there is considerable evidence to indicate that job satisfaction is not substantially related to more general measurements of psychological wellbeing. For example, a meta-analysis by Rice, Near and Hunt [102] reviewed the empirical evidence of 23 studies that examined the relationship between life satisfaction and job satisfaction. They found an average correlation of .30, which implies that both constructs shared a variance of only 9%. This average correlation has been replicated by later meta-analyses [103,104]. Furthermore, the relationship between job satisfaction and productivity is moderate to low [105], whereas the relationship between life satisfaction and performance is moderate to high [106,107]. This indicates the need to design organizational mechanisms that have the potential to reduce the negative impact of TSC on wellbeing, which would be beneficial both for the worker and for the organization. For example, Sykes [108] proposes taking advantage of informal networks that form among employees in order to obtain information, advice or support. Peer advice ties, when evaluated against other, traditional support structures, like training, on-line support, helpdesk support and change management support, appear to have a greater impact on different organizational outcomes, like job satisfaction and job performance, but also on stress indicators like emotional exhaustion [108].

6. Limitations and future research directions

The following limitations of this study should be taken into consideration. Due to the type of constructs evaluated, the data were obtained through self-report surveys. Using this method exposes the results to possible biases. Even so, preventative measures were taken in the questionnaire design (section 3.1.8), and the possible presence of common method variance was discarded after statistical tests (section 3.3).

The sample was obtained via convenience sampling, and so other studies are necessary to evaluate whether the results are replicable or not. Moreover, as the sample was drawn from the database of a graduate school, the level of instruction is probably higher than that of the population in general. Studies with random samples are necessary to be able to generalize the conclusions of this study to a broader population.

As for study design, alternative measurements of the factors that generate technostress were not included to evaluate the construct validity. In their place, scales of conceptually related constructs were used. The decision was made to use psychological exhaustion instead of organizational outcomes because it captures the psychological stress that workers can experience and has been used in other studies [9]. Nevertheless, to complement the evaluation of TSI, measurements of organizational outcomes are necessary to validate the instrument according to what Ragu-Nathan et al. have proposed [28].

Moreover, in order to analyze the results related to TIF, interviews that had been carried out as part of the adaptation process were analyzed, and interviews that had not been initially planned as part of the study design were also carried out. Systematic studies are needed to confirm the perceptions regarding TIF in this study.

Finally, although Peru does share cultural similarities with other countries in the region, such as Mexico, Colombia, Venezuela and Chile, a single study with a Peruvian sample is not enough to establish the validity of the Technostress Creators Inventory in all of Latin America. In this sense, it is necessary to replicate the study in other countries to be able to extend the external validity of TSC in Latin America.

From these results, two future research lines can be identified. The first is related to TSC. On one hand is the validation of the Technostress Creators Inventory in other Latin American countries. On the other hand is the chance to research technostress in technologically specific contexts, especially those related to telecommuting and new technological requirements for workers, which have become more prominent due to the COVID-19 pandemic. The second focuses on TSI and the identification of coherent organizational practices in the cultural context that have the potential to reduce technostress and could be on the TSI.

7. Conclusion, theoretical contribution and managerial implications

The Technostress Creators Inventory is the most-used self-report instrument used to measure the factors that generate technostress [10,31]. After its linguistic and cultural adaptation, its validity and reliability have been proven for a Peruvian sample. This application to a new geographical region extends the external validity of the instrument. Moreover, this can be considered the first step toward continuing the validation of this instrument in other, culturally similar countries in the region.

The Technostress Inhibitors Inventory is the instrument that measures the organizational mechanisms that have the potential to reduce the negative consequences of technostress. Two TSI, LF and TSP, were valid. TIF was excluded, apparently due to cultural differences that are reflected in organizational practices.

7.1. Theoretical contribution

Latin America is a region in which little research has been carried out on technostess in the workplace [31,41]. Having an adapted and validated Technostress Creators Inventory has important implications for the generation of knowledge on technostress in Latin America. On one hand, this is because to generate new knowledge, it is necessary to possess valid and reliable instruments. On the other hand, this is because it has shown that the factors that generate technology-related stress in other regions are the same ones as in Latin America. In this sense, the development of knowledge on technostress in Latin America could be built on the knowledge already gathered in other regions. Recent studies do not only deal with the negative facets of technostress but have also begun to explore how it might challenge workers in positive ways and even contribute to their productivity [38].

The lack of the validity of the three TSI highlights that technostress is a contextual phenomenon [23,50]. In this sense, organizational practices that have the potential to reduce the negative effects of stress can vary from region to region. This hints at the need to study best practices to reduce technostress in Latin America. However, it also indicates that caution is recommended regarding the need to adapt and validate the instruments used to measure technostress, taking into account possible cultural differences between regions.

7.2. Managerial implications

Finally, the results of this study confirm that workers can experience techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty. Those in charge of Human Resource management and Information Technology management should be conscious of the possibility that workers could be experiencing these technostressors. The results of this study also show that in the context studied, practices like LF and TSP could help workers deal with these technostressors. In this sense, those in charge of technological resources should make sure to provide manuals, workshops and training to help workers manager ICT. Additionally, they should make sure to provide an adequate helpdesk that can resolve specific problems in a swift and timely manner.

Author note

Carla C. Torres is Social Psychologist and has a MRes degree in Management Sciences. She is doctoral student at the Faculty of Psychology, Universitat de València, Spain. Her research interests is in technostress, dark side of technology use and end user behavior. Currently, she is professor at the Faculty of Economic Science and Business Administration at Esan University, Lima, Peru.

Author Statement

I declare this manuscript is original, has not been previously published and is not currently being considered for publication elsewhere. I also declare that I have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript. I certify that I have complied with the APA ethical principles regarding research with human participants in the conduct of the research presented in this manuscript.

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Declaration of competing interest

None.

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Appendix A. Technostress Creators Inventory

TSC_01	I am forced by this technology to work much faster.	Estoy forzado por esta tecnología a trabajar mucho más rápido.
TSC_02	I am forced by this technology to do more work than I can handle.	Estoy forzado por esta tecnología a hacer más trabajo de lo que puedo manejar.
TSC_03	I am forced by this technology to work with very tight time schedules.	Estoy forzado por esta tecnología a trabajar con tiempos muy ajustados.
TSC_04	I am forced to change my work habits to adapt to new technologies.	Estoy forzado a cambiar la forma en que usualmente realizo mis actividades laborales para adaptarme a las nuevas tecnologías.
TSC_05	I have a higher workload because of increased technology complexity.	Tengo una mayor carga de trabajo por el aumento de la complejidad en la tecnología.
TSC_06	I spend less time with my family due to this technology.	Paso menos tiempo con mi familia debido a esta tecnología que uso para mi trabajo.
TSC_07	I have to be in touch with my work even during my vacation due to this technology.	Tengo que estar en contacto con mi trabajo aún durante mis vacaciones debido a esta tecnología.
TSC_08	I have to sacrifice my vacation and weekend time to keep current on new technologies.	Tengo que sacrificar mi tiempo de vacaciones y fines de semana para mantenerme al día en las nuevas tecnologías.
TSC_09	I feel my personal life is being invaded by this technology.	Siento que mi vida personal está siendo invadida por esta tecnología que uso para el trabajo.
TSC_10	I do not know enough about this technology to handle my job satisfactorily.	No sé lo suficiente sobre esta tecnología como para manejar mi trabajo satisfactoriamente.
TSC_11	I need a long time to understand and use new technologies.	Necesito mucho tiempo para comprender y usar las nuevas tecnologías.
TSC_12	I do not find enough time to study and upgrade my technology skills.	No encuentro tiempo suficiente para estudiar y así poder incrementar mis habilidades en tecnología.
TSC_13	I find new recruits to this organization know more about computer technology than I do.	Encuentro que los nuevos contratados por esta organización conocen más acerca de la tecnología de computación de lo que yo sé.
TSC_14	I often find to complex for me to understand and use new technologies.	A menudo encuentro demasiado complejo para mí comprender y usar las nuevas tecnologías para el trabajo.
TSC_15	I feel constant threat to my job security due to new technologies.	Siento una amenaza constante a mi estabilidad laboral debido a las nuevas tecnologías.
TSC_16	I have to constantly update my skills to avoid being replaced.	Tengo que constantemente actualizar mis habilidades tecnológicas para evitar ser sustituido.
TSC_17	I am threatened by coworkers with newer technology skills.	Estoy amenazado por colaboradores con habilidades tecnológicas más recientes.
TSC_18	I do not share my knowledge with my coworkers for fear of being replaced.	No comparto mi conocimiento con mis compañeros de trabajo por temor a ser sustituido.
TSC_19	I feel there is less sharing of knowledge among coworkers for fear of being replaced.	Siento que se comparte menos el conocimiento entre los colaboradores por temor a ser sustituidos.
TSC_20	There are always new developments in the technologies we use in our organization.	Siempre hay nuevos desarrollos en las tecnologías que usamos en nuestra organización.
TSC_21	There are constant changes in computer software in our organization.	Hay cambios constantes en el software o programas de las computadoras en nuestra organización.
TSC_22	There are constant changes in computer hardware in our organization.	Hay cambios constantes en el hardware o equipo de las computadoras en nuestra organización.
TSC_23	There are frequent upgrades in computer networks in our organization.	Se realizan cambios frecuentes en las redes de computación (por ejemplo, en el servidor, conexiones, equipos interconectados, etc.) de nuestra organización.

Appendix B. Technostress Inhibitors Inventory

TSI_01	Our organization encourages knowledge sharing to help deal with new technology.	Nuestra organización alienta compartir los conocimientos para ayudar a lidiar con las nuevas tecnologías.
TSI_02	Our organization emphasizes teamwork in dealing with new technology-related problems.	Nuestra organización enfatiza el trabajo en equipo al tratar con problemas relacionados a nuevas tecnologías.
TSI_03	Our organization provides end-user training before the introduction of new technology.	Nuestra organización proporciona capacitación al usuario final antes de la introducción de nuevas tecnologías.
TSI_04	Our organization fosters good relationship between IT department and end users.	Nuestra organización fomenta una buena relación entre el área de sistemas y los usuarios TIC.
TSI_05	Our organization provides clear documentation to end user on using new technologies.	Nuestra organización provee documentación clara (por ejemplo, manuales, instructivos, etc.) a los usuarios de TIC sobre el uso de nuevas tecnologías.
TSI_06	Our end-user help desk does a good job of answering questions about technology.	Nuestra mesa de ayuda realiza un buen trabajo respondiendo preguntas sobre tecnología.
TSI_07	Our end-user help desk is well staffed by knowledgeable individuals.	Nuestra mesa de ayuda está bien conformada por personas conocedoras.
TSI_08	Our end-user help desk is easily accessible.	Nuestra mesa de ayuda es fácilmente accesible.
TSI_09	Our end-user help desk is responsive to end-user requests.	Nuestra mesa de ayuda reacciona de manera positiva y rápida a los pedidos de los usuarios de TIC.
TSI_10	Our end users are encouraged to try out new technologies.	En nuestra organización, se anima a los usuarios de TIC a que prueben las nuevas tecnologías.
TSI_11	Our end users are rewarded for using new technologies.	En nuestra organización, se recompensa a los usuarios de TIC por usar las nuevas tecnologías.
TSI_12	Our end users are consulted before introduction of new technology.	En nuestra organización, se consulta a los usuarios de TIC antes de la introducción de nuevas tecnologías.
TSI_13	Our end users are involved in technology change and/or implementation.	En nuestra organización, los usuarios de TIC son involucrados (por ejemplo, se levantan sus necesidades, participan en la elección de la tecnología, se atiende a sus sugerencias, etc.) en el cambio y/o implementación de tecnologías.

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