

Comparative Analysis of Technostress Among Banking Employees in Himachal Pradesh

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Abstract: The banking industry has been at the forefront of this change, as digital technology have quickly changed how businesses work throughout the world. Digitalization has improved efficiency and accessibility, but it has also created psychological problems for workers, such as technostress, which Brod (1984) originally described as a contemporary sickness caused by not being able to handle technological demands. This research investigates the differential effects of technostress among banking personnel in the public and private sectors of Himachal Pradesh, India. Utilizing primary data from 400 respondents across chosen banks (PNB, SBI, HDFC, ICICI) in four districts (Shimla, Solan, Mandi, Kangra), the study applies validated measures for technostress (Ragu-Nathan et al., 2008). A multistage sampling method was employed to carry out the research. Statistical investigation using SPSS, encompassing Mann–Whitney U and MANOVA tests, indicates that private bank personnel endure markedly elevated levels of technostress in comparison to their public sector colleagues ($U = 14547.000$, $Z = -4.207$, $p < 0.05$). Even though they are under a lot of stress, private bank workers say they feel like they are getting more out of life, which may be because of performance bonuses. Multivariate research substantiates that the job sector has a substantial effect on stress, work speed, and life perspective (Wilks' Lambda = .929, $F = 10.048$, $p < .001$). These results highlight the need for specific treatments to alleviate technostress and enhance staff well-being in technology-driven banking settings.

Keywords: Technostress, Individual Work-Performance, Well-Being and Banking

I. Introduction:

There is change in working pattern across the globe in organizations. The advancement in technology has brought the seismic shift in all organizations and it has become a pervasive function. The internet technology, digitization and artificial intelligence have created both opportunities and challenges. Organizations have acknowledged that without adopting technology it is not possible for them gain competitive advantage and operational efficiency. This technological transformation is crucial for them and they are investing in digital transformation projects. In an organizational setup, the human component is in contrast with the technological revolution and faces challenges in adjusting to it, leading to psychological strain. This strain was named “technostress” by Brod in 1984. Brod called it a disease, and people associated with it are facing problems coping with it. It is manifesting as anxiety among employees and brings resistance towards technology. With the passage of time, technology has become more complex and pervasive, and it has become more important to understand the complexities of technostress. Technostress is a stress that originates due to continuous adoption of new technologies, digital overload and pressure to remain connected. Brod has called it a modern disease wherein people cannot handle technology efficiently.

Among the business sectors of a nation, the banking sector is one of the cornerstones that lies at the forefront of digital adoption. The digital adoption has replaced the paper-based and ledger-based transactions. Nowadays, banks are fully automated, and they are working through an advanced core banking system along with data analytical systems. The government mandate, ease of use, and stiff competition in the banking sector are the driving forces behind the adoption of digital technology. Despite the ease of use and more accessibility, these advancements have increased the pressure of work among banking employees.

Frontline banking staff interact with customers through various digital channels, and perform complex digital transactions, and to remain efficient, they continuously update their digital proficiency and skills in a rapidly growing technological environment. Back-office professionals manage complex IT infrastructure and data, remaining vigilant and proficient at all times.

II. Literature Review:

The concept of technostress dates back to 1984 when Brod coined this term and defined it as a modern disease that stems when a person fails to cope healthily. In earlier studies, the primary focus has been on job stress, and these studies neglected this crucial element. Stress is a psychological reaction encountered by people when they fail to meet the circumstances adequately, resulting in negative outcomes due to insufficient response. Prominent studies have used the “transaction-based stress model” on technostress (Ragu Nathan et al, 2008; Tarafdar et al., 2010; Alam et al., 2025). Technology-induced stress is characterized by negative repercussions on human behaviours, attitudes, and cognitive capabilities, according to the research by Tu et al. (2005). Individuals' productivity drops and their anxiety levels rise as a consequence of this phenomenon (Alam & Hasan, 2025). Two major causes of stress that come from utilizing ICT at work are too much information and always being available (Ayyagari et al. 2011; La Torre et al., 2019). Communication overload and internet multitasking created burnout (Alam et al., 2025) and anxiety among people, and the potential health impairments that resulted from ICT-related strain have a bad impact on their psychological well-being (Reinecke, L. et al., 2016). Yan et al. (2013) used “Person-Technology (P-T Model)” to identify how computer-mediated

communication (CMC) technology creates technostress among telemedicine users. Suh & Lee (2017) found in their study that rapid technological change affects job autonomy and task interdependence. Task interdependence has additive effect on strain; it increases the workload and invades the privacy of workers, whereas job autonomy reduces the strain. Technostress is a multifaceted concept that arises when people interact in various ways with technology. Five factors have been commonly mentioned as "technostress creators" in the literature on technostress are: "techno-complexity, techno-invasion, techno-insecurity, techno-overload, and techno-uncertainty" (Ragu-Nathan et al., 2008). According to the findings of the review research conducted by La Torre et al. (2020), there are three distinct forms of technostress: "techno anxiety, techno-fatigue, and techno addiction", among others. The researchers have found negative and adverse effects of technostress on work performance (Tams et al., 2018; Borle et al., 2021; Çini et al., 2023; Fernandez-Fernandez et al., 2023; Syakina et al., 2023). Technostress literature has reported that it causes psychological (Yang et al., 2016; Lee, 2016; Srivastava et al., 2015), and physiological strain (Boonjing & Chanvarasuth, 2017; Riedl, 2012; Ayyagari et al., 2011). Carlotto, Wendt, & Jones (2017) explored the relationship between technostress, career commitment, life satisfaction and work-family interactions. Their study revealed that with the increase in techno fatigue, techno anxiety increases. Al-Ansari & Alshare (2019) investigated the effect of technostress creators and inhibitors on job satisfaction, organizational commitment, and perceived performance. The results of their study showed that technostress creators are negatively associated with job satisfaction. Bourlakis et al. (2023) evaluated the impact of technostress on performance and well-being. They found that techno-stress is attributed to factors like complexity, insecurity, and excess of technology. Employees are hooked with technology and they have no leisure time, which in turn has influence on their work-life balance. Jain, Varma, Vijay, & Cabral (2025) found, in their study on the Indian banking industry, that the use of ICT has elevated technostress levels, which adversely affect job outcomes. Technostress reduced the innovative behaviour and work engagement of employees, which in turn caused burnout among them. Khalequzzaman, Wang, Zhang, & Wang (2025) conducted their study on the banking sector in Bangladesh and found that digital overload and surveillance elevated technostress among employees. Weerawarna & Chandrasekara (2022), in their study on banking employees of Hambantota district in Sri Lanka, revealed that technostress creators have mixed results on employee performance. Techno-invasion and techno-complexity negatively influenced the performance of the employees, and techno-overload positively influenced it.

Research Objective: To analyse comparatively technostress among public and private banking employees.

Hypothesis: H_0 . There is no significant difference in the technostress level of public and private sector banking employees.

Data and Methods:

Subjects: It is a primary data-based study of selected banks of the public and private sectors (PNB, SBI, HDFC and ICICI) of four chosen districts (Shimla, Solan, Mandi, and Kangra) of Himachal Pradesh

Data Collection and Procedure: An offline survey was conducted to collect the responses from the respondents. The respondents constituted the banking employees of selected banks. A total of 400 respondents provided the complete information regarding the survey. The study has used Ragu-Nathan et al. (2008) scale (5-point Likert Scale) for technostress, Ryff's Scale (1989) (6-point Likert Scale) for well-being and Koopman's (2014) (5-point Likert Scale) Scale of Individual Work Performance. A multi-stage sampling technique was employed to conduct the study, ensuring a systematic and representative selection of respondents across various strata.

Table: Nature of Bank

Nature of bank	No. of Respondents	Percentage
Public	251	62.75%
Private	149	37.25%
Total	400	

The sampled respondents belonged to two different types of banks public and private and the table shows the distribution among the two categories of banks. 62.75% of employees are from public sector and 37.25% are from Private banks.

Table: Gender of Respondents

Gender	No. of Respondents	Percentage
Male	215	53.75%
Female	185	46.25%

The total no. of respondents was (N=400), among them, males were 215(53.75%) and females were 185 (46.25%).

Table: Bank you work with /Bank Name

Bank you work with	No. of Respondents	Percentage
HDFC Bank	69	17.25%
ICICI Bank	80	20%
Punjab National Bank	134	33.5%
State Bank of India	117	29.25%
Total	400	

The respondents have been categorized based on their respective banks of employment. The largest segment, comprising 33.5%, is employed at Punjab National Bank, followed by 27.5% at State Bank of India, 20% at ICICI Bank, and 19% at HDFC Bank. Overall, approximately 61% of the respondents work in public sector banks, while the remaining 39% are employed in private sector banks.

Data Analysis and Interpretation

The data collected has been tabulated, analysed and interpreted by using statistical techniques such as descriptive statistical analysis and other techniques with the help of SPSS.

The Mann–Whitney U test is used to compare two independent groups in cases when the presumptions of parametric tests fail to hold good. It is a non-parametric alternative to the independent samples t-test. This research uses a scale that is appropriate for non-parametric analysis, which means that the data on technostress levels may not follow a normal distribution. This method has been used here to compare two independent groups of public and private bank employees, and the dependent variable is ordinal or does not have a normal distribution. Therefore, the Mann-Whitney U test has been employed here as a suitable method for comparing technostress levels among employees of public and private banks. The results drawn from this test will help to provide valuable insights into the differential levels of technostress felt by banking employees, which will be further helpful for the banking sector to develop interventions and support systems for their employees to tackle or overcome the difficulties being faced by them.

Mann-Whitney U test

Ranks				
	Type of Bank	N	Mean Rank	Sum of Ranks
stress level	Public bank	251	183.96	46173.00
	Private bank	149	228.37	34027.00
	Total	400		

Test Statistics ^a	
	stress level
Mann-Whitney U	14547.000
Wilcoxon W	46173.000
Z	-4.207
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: Type of Banks	

Descriptive Statistics				
	Type of Bank	Mean	Std. Deviation	N
work faster	Public bank	2.75	1.297	251
	Private bank	2.55	1.407	149
	Total	2.68	1.341	400

stress level	Public bank	1.50	.547	251
	Private bank	1.76	.589	149
	Total	1.60	.576	400
more out of life	Public bank	4.27	1.324	251
	Private bank	4.59	1.151	149
	Total	4.39	1.270	400

Box's Test for Equality of Covariance Matrices ^a	
Box's M	9.046
F	1.494
df1	6
df2	641635.605
Sig.	.176
It evaluates the null hypothesis and reflects that the error variance of the dependent variable in the question is uniform across groups.	
a. Design: Intercept + VAR00088	

Multivariate Tests ^a									
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^c
Intercept	Pillai's Trace	.959	3099.779 _b	3.000	396.000	.000	.959	9299.337	1.000
	Wilks' Lambda	.041	3099.779 _b	3.000	396.000	.000	.959	9299.337	1.000
	Hotelling's Trace	23.483	3099.779 _b	3.000	396.000	.000	.959	9299.337	1.000
	Roy's Largest Root	23.483	3099.779 _b	3.000	396.000	.000	.959	9299.337	1.000
VAR00088	Pillai's Trace	.071	10.048 ^b	3.000	396.000	.000	.071	30.143	.998
	Wilks' Lambda	.929	10.048 ^b	3.000	396.000	.000	.071	30.143	.998
	Hotelling's Trace	.076	10.048 ^b	3.000	396.000	.000	.071	30.143	.998
	Roy's Largest Root	.076	10.048 ^b	3.000	396.000	.000	.071	30.143	.998
a. Design: Intercept + VAR00088									
b. Exact statistic									
c. Computed using alpha = .05									

Levene's Test for Equality of Error Variances^a
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	F	df1	df2	Sig.
work faster	7.088	1	398	.008
stress level	2.159	1	398	.143
more out of life	6.725	1	398	.010
Evaluates the null hypothesis, asserting that the error variance of the dependent variable is uniform across groups.				
a. Design: Intercept + VAR00088				

Interpretation

Mann–Whitney U Test

Tests for Examining the Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^d
Corrected Model	work faster	3.840 ^a	1	3.840	2.142	.144	.005	2.142	.309
	stress level	6.146 ^b	1	6.146	19.407	.000	.046	19.407	.993
	more out of life	9.319 ^c	1	9.319	5.849	.016	.014	5.849	.675
Intercept	work faster	2629.640	1	2629.640	1466.730	.000	.787	1466.730	1.000
	stress level	993.886	1	993.886	3138.149	.000	.887	3138.149	1.000
	more out of life	7348.639	1	7348.639	4612.756	.000	.921	4612.756	1.000
VAR00088	work faster	3.840	1	3.840	2.142	.144	.005	2.142	.309
	stress level	6.146	1	6.146	19.407	.000	.046	19.407	.993
	more out of life	9.319	1	9.319	5.849	.016	.014	5.849	.675
Error	work faster	713.558	398	1.793					
	stress level	126.051	398	.317					
	more out of life	634.059	398	1.593					
Total	work faster	3585.000	400						
	stress level	1153.000	400						
	more out of life	8361.000	400						
Corrected Total	work faster	717.398	399						
	stress level	132.198	399						
	more out of life	643.377	399						

a. R Squared = .005 (Adjusted R Squared = .003)

b. R Squared = .046 (Adjusted R Squared = .044)

c. R Squared = .014 (Adjusted R Squared = .012)

d. Computed using alpha = .05

Estimated Marginal Means

Estimates					
Dependent Variable	Type of Bank	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound

work faster	Public Sector bank	2.753	.085	2.587	2.919
	Private Sector bank	2.550	.110	2.335	2.766
stress level	Public Sector bank	1.502	.036	1.432	1.572
	Private Sector bank	1.758	.046	1.668	1.849
more out of life	Public Sector bank	4.275	.080	4.118	4.432
	Private Sector bank	4.591	.103	4.387	4.794

Pairwise Comparisons							
Dependent Variable	(I) Type of Bank	(J) Type of Bank	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
work faster	Public bank	Private bank	.203	.138	.144	-.070	.475
	Private bank	Public bank	-.203	.138	.144	-.475	.070
stress level	Public bank	Private bank	-.256*	.058	.000	-.371	-.142
	Private bank	Public bank	.256*	.058	.000	.142	.371
more out of life	Public bank	Private bank	-.316*	.131	.016	-.572	-.059
	Private bank	Public bank	.316*	.131	.016	.059	.572
Conclusions drawn from the estimated marginal means							
*. At the 0.05 level of significance, the mean difference is significant.							
b. Adjustment for multiple comparisons: Bonferroni method.							

Multivariate Tests								
	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Pillai's trace	.071	10.048 ^a	3.000	396.000	.000	.071	30.143	.998
Wilks' lambda	.929	10.048 ^a	3.000	396.000	.000	.071	30.143	.998
Hotelling's trace	.076	10.048 ^a	3.000	396.000	.000	.071	30.143	.998
Roy's largest root	.076	10.048 ^a	3.000	396.000	.000	.071	30.143	.998
Each F-test shows the multivariate impact on the Type of Bank. These tests are based on the pairwise comparisons of the calculated marginal means, which are linearly independent of one another.								
a. Exact statistic								
b. Calculated with alpha = .05								

Univariate Tests									
Dependent Variable		Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^a
work faster	Contrast	3.840	1	3.840	2.142	.144	.005	2.142	.309
	Error	713.558	398	1.793					
stress level	Contrast	6.146	1	6.146	19.407	.000	.046	19.407	.993
	Error	126.051	398	.317					
more out of life	Contrast	9.319	1	9.319	5.849	.016	.014	5.849	.675
	Error	634.059	398	1.593					
The F tests the effect of the variables on the Type of Banks. For these tests, the marginal means that have been estimated and are linearly independent are compared with each other.									
a. Calculated with alpha = .05									

Interpretation: To compare the Technostress Level – Public vs. Private Banks, it is applied, and the result can be interpreted as Mean Ranks

For Public Bank is 183.96, and for Private Bank is 228.37. The calculated value of Mann–Whitney U is 14547.000, $Z = -4.207$. Since $p < 0.05$, the result is statistically significant, which means there is a significant difference in technostress levels between public and private bank employees. The comparison between Private bank employees shows a higher mean rank, indicating higher stress levels as compared to public bank employees.

The Descriptive Statistics show that for the variable Work Faster, the Public bank employees ($M = 2.75$) score is slightly higher than the private bank employees ($M = 2.55$). This indicates that public banks employees have slightly higher pressure to work faster than public employees For Stress Level, Private bank employees ($M = 1.76$) report higher stress as compared to public bank employees ($M = 1.50$), and for More out of Life, Private bank employees ($M = 4.59$) perceive themselves as gaining more out of life compared to public bank employees ($M = 4.27$). These descriptive results reinforce the Mann–Whitney findings that private bank employees are under higher stress than their public sector counterparts. Still, they also perceive greater life gains, possibly due to performance-linked rewards and growth opportunities.

With a value of Box's $M = 9.046$, $p = .176 (>.05)$, Box's test demonstrates that the covariance matrices are equal. The validity of multivariate tests is supported by the assumption that the covariance matrices are identical.

Multivariate Tests (MANOVA)

The test results are Wilks' Lambda = .929, $F = 10.048$, $p < .001$, which suggests a significant difference between the groups. This means that whether an employee works in a public or private bank significantly influences the combination of stress level, work pace, and life perceptions. The Levene's Test (Equality of Error Variances) results revealed that the Homogeneity of variances assumption is invalidated and the group comparisons for stress level are more robust.

Work Faster ($p = .008$) → significant, variance not equal.

Stress Level ($p = .143$) → not significant, variance equal.

More out of Life ($p = .010$) → significant, variance not equal.

III. Findings of the Study:

The hypothesis was tested using the Mann–Whitney U test, which considered the dependent variable as technostress level and public and private bank employees as the independent variables. The result is statistically significant, which rejects the null hypothesis and confirms that there is a significant difference in the technostress level of public and private bank employees. The higher mean rank of private bank employees indicates that they have a higher stress level as compared to public sector bank employees. Both non-parametric and multivariate analyses have confirmed this. This suggests that work environment and expectations may lead to elevated stress. This might be because of the increased frequency of technology changes, the pressure to meet tighter deadlines, or the increased demands for performance. Despite higher stress levels, private bank employees are more satisfied than public bank employees. The gains, like performance-linked incentives and career growth opportunities, make them more satisfied. The multivariate analysis implies that bank type affects employees' psychological experiences in a multifaceted way, extending beyond mere stress. This study examines how technostress impacts the banking sector (both public and private). The findings of this study are in line with Ragu Nathan et al. (2008), Tarafdar et al. (2007), Ayyagari et al., (2011), Jain, Varma, Vijay, & Cabral (2025), and Khalequzzaman, Wang, Zhang, & Wang (2025), which show that the negative impacts are created by

technostress. However, technostress mitigation strategies can be used to reduce the negative impacts of technostress. These strategies include creating positive emotions and a self-control mechanism (Sriwidharmanely et al., 2021), perceived organizational support. (Khalequzzaman, Wang, Zhang, & Wang 2025), and autonomy to choose an IT tool they are comfortable with (Rohwer et al., 2022).

Implications of the Study:

The analysis represents the meaningful differences between the technostress level of public sector and private sector banks. The findings of this study call for practical implications for organizational policy, employee well-being and human resource strategies in the banking sector. The statistically higher technostress among private bank employees suggests an urgent need for interventions that focus on mental health and well-being of employees, stress management workshops, counselling services, and workload balance mechanisms. The greater life satisfaction experienced by private sector employees due to performance-linked incentives and growth opportunities can be leveraged to further motivate them, while mitigating technostress. On the other hand, the public sector can benefit from initiatives that enhance employee engagement and personal fulfilment. The initiatives may include recognition programs, flexible work arrangements, and career development pathways. The fact that employees in both sectors have different ideas about how fast work should go, shows that operational efficiency and task allocation need to be looked at again to make sure productivity stays high.

From a policy point of view, the findings show that it is important to tailor wellness programs and performance frameworks to fit the culture of the organization. HR teams have to contemplate regular evaluations of employee stress and happiness to guide strategic choices. Also, the fact that certain variables don't follow the rules of variance shows that we need to do more in-depth investigation when comparing organizational contexts. Such an approach not only enhances employee well-being but also proves a strategy for a committed and productive workforce. By prioritizing and emphasizing these assessments, organizations may pave a path for the betterment of employees and overall success of the organizations. In general, these insights may help banks manage their employees in a more compassionate and data-driven way.

Limitations:

The study offers valuable insights into the technostress level and workplace perceptions among public and private sector bank employees. However, the research has certain limitations that must be acknowledged. Firstly, the study was confined to a specific geographic region and may not reflect the broader workforce across different states or countries. Second, the research only contacted respondents once in a time span, and it doesn't take into consideration how stress or life satisfaction fluctuates with the seasons, changes in the economy, or policy changes. Third, there may be response bias at the end of respondents as they underreport or exaggerate their experiences due to social desirability or personal interpretation. Fourth, the study has focused on variables like technostress, well-being and individual work-performance. Other variables like leadership style impact, work-life balance have not been included but they significantly impact employee well-being and performance. Future research may mitigate these constraints by using longitudinal designs, broadening the variable set, and including a more diverse population.

Declarations

Ethical Approval: This study involved human participants for review.

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Conflict of Interests We state that there is no conflict between authors during the composition and publication of this research article.

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