Moderating Technology, Stress, and Performance in Hospitality

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ARTICLE INFO	ABSTRACT

This study investigates how technology adoption, job stress, and the role of supervisors in the hospitality industry influence performance, with a specific focus on the supervisory role as a moderating variable. This quantitative research employs a descriptive method and uses Structural Equation Modeling - Partial Least Squares (SEM-PLS) to analyze the data. The population consists of all employees of locally owned five-star hotels in Jakarta that have been in operation for at least 20 years, with a total of 400 respondents. Data collection was conducted using a non-probability sampling technique with purposive sampling. The findings of this study indicate that technology adoption enhances performance but also increases job stress. However, well-managed stress can contribute positively to performance. The role of supervisors strengthens the impact of technology and helps manage stress, directly contributing to improved performance. The hospitality industry can utilize these findings to develop more effective strategies for improving job performance, while also recognizing the crucial role of supervisors in overcoming challenges associated with the implementation of new technologies, maintaining employees' mental well-being, ensuring smooth operations, and promoting sustainable practices.

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SARI PATI

Studi ini menyelidiki bagaimana adopsi teknologi, stres kerja, dan peran supervisor dalam industri perhotelan memengaruhi kinerja dan peran supervisor sebagai moderator. Penelitian kuantitatif ini menggunakan metode deskriptif dan menggunakan SEM-PLS untuk menguji data. Populasi adalah semua karyawan hotel bintang 5 lokal di Jakarta yang telah beroperasi selama 20 tahun, dengan 400 responden. Teknik pengumpulan data menggunakan non-probability sampling dengan purposive sampling. Temuan penelitian ini menunjukkan bahwa adopsi teknologi meningkatkan kinerja tetapi juga meningkatkan stres kerja. Stres yang terkelola dapat meningkatkan kinerja. Peran supervisor memperkuat dampak teknologi dan membantu mengelola stres, berkontribusi langsung pada peningkatan kinerja. Industri perhotelan dapat menggunakan temuan penelitian ini untuk mengembangkan cara yang lebih efektif untuk meningkatkan kinerja pekerjaan sambil mempertimbangkan peran penting supervisor dalam mengatasi kesulitan dalam menerapkan teknologi baru, memperhatikan kesehatan mental karyawan sehingga operasi dapat berjalan lancar, dan mendorong praktik berkelanjutan.

INTRODUCTION

In the wake of the Industrial Revolution 4.0, the hospitality industry is pressured to adapt to rapid technological transformations. As digital innovation reshapes business landscapes globally, hotel businesses must modernise operations, enhance customer experiences, and stay competitive by integrating new technologies (Guo et al., 2023). The Indonesian hotel industry is experiencing significant growth due to the expansion of its tourism sector. Tourism contributes to national income, job creation, and poverty reduction, making it one of the most significant sources of foreign exchange and a pillar of sustainable economic development (Ayudhia & Riyadi, 2018; Isa & Mahardika, 2022). However, this sector's sustainability and continued competitiveness depend heavily on its ability to embrace technological advancement (Ramgade & Kumar, 2021; Sharma et al., 2020).

Despite the potential benefits, technology adoption in hospitality presents challenges. The hotel sector, a labour-intensive industry, relies heavily on human capital for service delivery and guest satisfaction (J. Sun et al., 2022). Integrating artificial intelligence, automation, and digital platforms offers increased efficiency, improved customer service, and cost reduction (Buhalis, 2020; Mariani et al., 2018). Technology can also enhance employee performance and reduce human error (Bozkurt & Akgül, 2023; Grewal et al., 2020). However, such changes have brought about psychological concerns among workers, particularly fears of job displacement and increased job demands (Duan & Deng, 2022; Ivanov & Webster, 2017; Prentice et al., 2020). These stressors are compounded by industry issues such as low wages, long hours, and emotional labour demands (Ma et al., 2021; Ruel & Njoku, 2020; Seqhobane & Kokt, 2021).

Although previous studies have explored the relationship between technology and job performance or job stress independently, there is a lack of integrated understanding of how these elements interact, particularly within high-pressure environments like luxury hotels. Moreover, the role of supervisors, who often act as intermediaries between organizational change and employee well-being, is underexplored in this context. Evidence suggests that supervisors can mitigate stress and improve performance by offering guidance, support, and feedback (Artajaya & Lindisari, 2024; Heimerl et al., 2020; Naidoo, 2018; Yunus et al., 2018). However, their moderating influence on the impact of technology adoption and job stress on performance remains an open question.

Technology adoption has been linked to improved productivity and competitive advantage (Nuryyev et al., 2020; S. Sun et al., 2020), but also to increased employee stress due to unfamiliar systems and fear of redundancy (Bangun et al., 2021; Bednar & Welch, 2020). Job stress has negatively impacted job satisfaction, engagement, and performance (Hoboubi et al., 2017; Junaidi et al., 2020; Schwepker & Dimitriou, 2021). Meanwhile, adequate supervision has been shown to enhance employee performance, reduce turnover, and foster a positive work environment (Sekhar & Patwardhan, 2023; Yang et al., 2019).

Based on the literature discussion above, this research aims to examine the influence of technology adoption, job stress, and the role of supervisors as moderating variables on the performance of Hospitality Industry employees. The novelty of this study lies in its integrative approach, bringing together technology adoption, job stress, and supervisor support into a unified model to assess their combined impact on employee performance. While these components have been studied individually, few have examined their interaction within a single framework. Furthermore, the study offers unique insights into how supervisory roles can mediate the pressures of technological change. This research contributes new knowledge to the academic field and practical management strategies, highlighting pathways to achieve sustainable workforce performance amidst technological disruption.

METHODS

Developing research hypotheses and a conceptual research model

Technology adoption improves work performance by increasing productivity, communication, and reducing errors (Hartini et al., 2023). Based on the Technology Acceptance Model, the ease and usefulness of technology have a positive effect on performance (Hasan et al., 2010). In five-star hotels, technologies such as property management systems, guest service applications, and automated check-in speed up work processes and increase productivity. Based on the above discussion, this study proposes the following hypothesis:

Hypothesis 1: Technology adoption significantly affects job performance at 5-star hotels in Jakarta.

However, the use of technology can also cause work stress due to fears of losing a job or difficulty adapting (Baskaran et al., 2020; Yuvaraj & Nadheya, 2018). The uncertainty of new systems and the lack of training can add to the stress, especially in busy hotel environments. Based on the above discussion, this study proposes the following hypothesis:

Hypothesis 2: Technology adoption significantly affects job stress at 5-star hotels in Jakarta.

Work stress has various impacts on performance. Several studies have shown that stress can be motivating (Chen et al., 2022; Iskamto, 2021; Soomro et al., 2019). But most have found a negative impact on productivity (Purnomo et al., 2021). Based on the above discussion, this study proposes the following hypothesis:

Hypothesis 3: Job stress significantly affects job performance at 5-star hotels in Jakarta.

Supervisors are responsible for monitoring service quality and analyzing employee needs, and tighter interactions between supervisors and employees frequently result in higher employee performance (Darvishmotevali, 2019). Based on the above discussion, this study proposes the following hypothesis:

Hypothesis 4: Supervisors' role moderates technology adoption's influence on job performance at 5-star hotels in Jakarta.

Employees who receive emotional support from their supervisor are more likely to feel confident and valued, which lessens the damaging effects of work-related stress (Chen et al., 2022). The absence of supervisor assistance is one of the reasons for job stress (Bekmezci et al., 2022). Based on the above discussion, this study proposes the following hypothesis:

Hypothesis 5: Supervisors' role moderates job stress's influence on job performance at 5-star hotels in Jakarta.

Supervisors' feedback can motivate staff members to grow and perform better (Su et al., 2022). Similarly, a study conducted on 295 academic staff members in private institutions in Pakistan revealed a significant correlation between the level of supervisor support and better job outcomes (Zeb et al., 2023). Based on the above discussion, this study proposes the following hypothesis:

Hypothesis 6: The supervisor's role significantly affects job performance at 5-star hotels in Jakarta.

A conceptual framework for this study was constructed using the information provided above, as shown in Figure 1.

Sample and Procedure

This research employs quantitative methodology. A questionnaire distributed online across many networks and media was used to collect data. The study's participants are staff from Jakarta's five-star hotels with local brands. The rationale behind selecting these hotels is that, although they are only local brands, they are equally competitive with global names and have, on average, been in
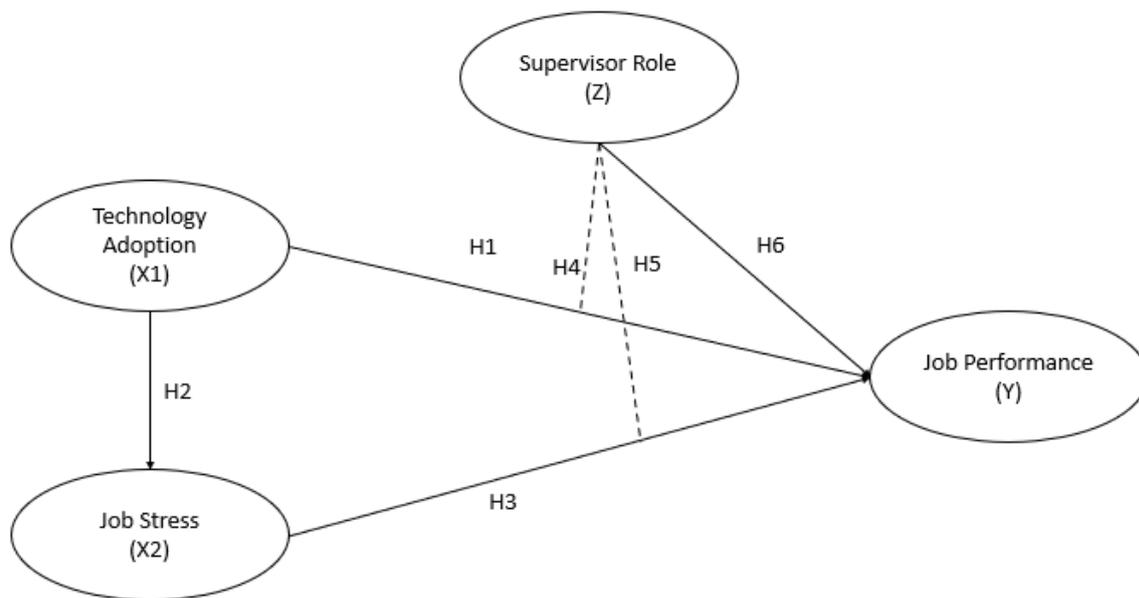
Figure 1. Conceptual Framework

operation for over 20 years. Employees at local brand 5-star hotels in Jakarta between the ages of 25 and 50 had been employed permanently for more than two years and met the sample requirements for this study. Therefore, four hundred valid responses were gathered, and Structural Equation Modeling (SEM) using Smart PLS software was used for analysis. There are two sections to the questionnaire. Answers to questions on demographics, including gender, age, education level, employment status, and length of service, are required in the first section. Answers to questions about work performance, supervisory roles, job stress, and technology adoption are needed for the second section.

In this study, we used purposive sampling to target employees of local 5-star hotels in Jakarta specifically. This approach was chosen for several key reasons. The research examines the effects of technology adoption, job stress, and supervisory roles on job performance in Jakarta's local 5-star hotels. These hotels, although local in brand, are equally competitive with global chains and present a unique context where the adoption of modern technology is crucial for maintaining their market position. Employees of these hotels are directly impacted by these operational challenges, making them highly relevant to the study's focus.

Moreover, hotel employees with permanent employment and at least two years of experience are targeted because they have substantial exposure to these hotels' organizational culture, technology systems, and supervisory practices. These employees are more likely to provide insightful responses about the long-term impacts of technology adoption and job stress than newer or temporary employees with insufficient experience to assess these factors comprehensively. Also, by selecting employees with 2 years of tenure, we ensure consistency in job roles and responsibilities. This minimizes variability in responses that could arise from employees who are still adjusting to their roles or who have significantly different experience levels with hotel technology and supervisory practices. This homogeneity in the sample is crucial for the robustness of the analysis and helps eliminate confounding variables.

The decision to categorize job experience into two groups (2 to 4 years and more than 4 years) is based

on some considerations. Research in organizational behaviour suggests that the first few years of an employee's tenure are crucial for adapting to the work environment, including becoming familiar with new technologies, understanding job roles, and interacting with supervisors (Puji Lestari & Sinambela, 2021). Dividing job experience into 2 to 4 years and more than 4 years allows us to capture differences between employees still within this critical adjustment period and those who have moved beyond it. Also, employees with 2 to 4 years of experience will likely be familiar with ongoing technological changes and supervisory practices but may face challenges in adapting fully. Those with more than 4 years of experience are expected better to understand their hotel's operational technologies and supervisory dynamics. This distinction is critical for analyzing how long-term experience influences the relationship between technology adoption, job stress, and performance. Lastly, employees who have been in the organization for more than 4 years might have different stress levels compared to newer employees, as they may either have adapted to stressors over time or face increased responsibilities that come with tenure. Dividing respondents by experience allows us to more clearly explore these different impacts on stress and performance.

Measurement Scale

The questionnaire included inquiries on technology adoption, work performance, supervisor roles, employee stress levels, and prior research. A 5-point Likert-style scale was used in the data-gathering process to record replies. In the survey design, only dependable elements from each category were included. The study included 40 measurement items, based on Hair et al. (2017), recommends that the sample size be at least 5-10 times the number of indicators. This strategy adheres to the best standards for data collecting and study design while guaranteeing the survey methodology's robustness and dependability.

The technology adoption components were modified from a scale that. Baskaran et al. (2020)

Had previously been used. A question such as this might be, " Work productivity with technology increases." This measure's Cronbach's alpha score is 0,925, which denotes internal solid consistency. Job stress was measured using the same tool as Tsui (2021) Two examples of sample items are "the work that must be completed in one work shift is very high" and "I feel work pressure while I work." The instrument's Cronbach's alpha coefficient was 0.944, indicating good internal reliability.

Using the Quratulain & Al-Hawari (2021) A questionnaire to evaluate supervisor responsibilities emphasizes the value of trustworthy and proven tools in research. The questionnaire's components reliably and precisely assess the target concept of supervisor positions, as evidenced by the strong Cronbach's alpha coefficient of 0.938. This shows that the questionnaire captures the many aspects of supervisory tasks and offers academics a valuable instrument for studying supervisory roles in organizational situations.

Similarly, the high Cronbach's alpha coefficient of 0.888 indicates excellent reliability for the employee job performance scale created by D. L. Sari et al. (2021). This shows that the scale's components reliably and accurately evaluate various employee performance factors, including productivity, job completion, and work quality.

RESULTS AND DISCUSSION
Result

Smart PLS software was used to evaluate the validity and reliability of our measurement model. Table 1 shows the use of several methodologies, including composite reliability (CR) and Cronbach's value, to evaluate the internal reliability of the data collected. All constructs have composite reliability coefficients (CR), and Cronbach's alpha values are higher than the minimum accepted value of 0.7, which is considered satisfactory. The AVE value for each concept is also based on general guidelines, namely, a minimum of 0.5 (Hair et al., 2017). Meanwhile, fifteen items or loading indicators were

found to have values below the minimum criteria, namely 0.7; as a result, they were eliminated from the model and then eliminated in subsequent analyses. These fifteen components are X1.1, X1.2, X1.3, X1.4 X1.5, Z1, Z2, Z3, Z4, Z5, Z6, Y1, Y2, Y3, dan Y4. The technology adoption variable was reduced from nine items to four items; the supervisor role variable was reduced from twelve to six items; and the employee performance variable was reduced from eight to four items. In conclusion, this first stage of SEM analysis demonstrated that the data is valid and reliable, allowing for the progression to the second stage of structural model assessment and analysis.

Table 1. Measurement Model

Variables	Items	Loadings	Cronbach's Alpha	CR	AVE
Technology Adoption	Work productivity with technology increases	0,830	0,925	0,925	0,925
	The time of work completion decreases with the presence of technology	0,894			
	The technology used is easy to learn	0,891			
	I can use technology flexibly without being limited by time.	0,861			
Job stress	The work that must be completed in one work shift is very high	0,823	0,944	0,953	0,692
	I feel work pressure while I work	0,820			
	There is very little time available to complete the work	0,862			
	Work pressure due to technology use is very high	0,822			
	Supervisors provide support at work.	0,826			
	I have confidence in my co-workers	0,835			
	I feel pressure when providing service to guests	0,858			
	Co-workers provide support at work	0,827			
	The number of jobs increases due to the use of technology	0,811			
Supervisor Role	Supervisors have foresight in leading employees	0,863	0,938	0,951	0,765
	Supervisors can work together with employees to achieve work goals.	0,879			
	Supervisors provide clear work directions to employees	0,891			
	Supervisors provide clear work directions to employees	0,862			
	I believe in the supervisor's ability to lead.	0,862			
	My supervisor is reliable when I encounter problems at work	0,888			
Job Performance	The performance I produce follows the company's expectations.	0,821	0,888	0,923	0,749
	I can complete tasks based on the authority that has been given.	0,889			
	I can work well with supervisors and co-workers	0,880			
	I can complete tasks outside of my responsibilities.	0,871			

CR: Composite reliability; AVE: Average extracted variance

The discriminant validity is assessed using the Fornell-Larcker Criterion. A construct is valid by comparing the root value of AVE (Fornell-Larcker Criterion) with the correlation value between latent variables. The root value of AVE must be greater than the correlation between latent variables. The Fornell-Larcker Criterion can be seen in Table 2.

The findings section will explain the significance of the influence between the constructs, represented by the route coefficients, explaining the distribution of the hypothesized results. Figure 2 shows the importance of the influence between the constructs, as represented by the route coefficients. The proposed theory is used to determine the signs of the route coefficients. The bootstrapping procedure uses resampling techniques to perform t-tests (critical ratios) to evaluate the significance of the route coefficients.

T-tests or critical ratio calculations are performed on the path coefficients that resulted from the bootstrapping procedure during the analysis. A resampling technique called bootstrapping is used to estimate the sampling distribution of a statistic by repeatedly resampling from the observed data. These t-tests are used to determine the importance of route coefficients. Based on the t-test findings,

we assume the route coefficient is statistically significant. If so, it implies that there is little possibility that the link between the variables shown by the route happened by accident.

Figure 2 and the corresponding t-test findings are essential for assessing the structural model and validating the study's assumptions. They support the overall interpretation and conclusions from the study findings and offer empirical evidence on the linkages between the constructs.

The hypothesis test results shown in Table 3 offer fascinating new insights into how the many elements in our study relate to one another. First, there is a statistically significant positive connection between employee performance and technology adoption ($\beta = 0.232$, t = 3.552, p<0.05), which provides strong support for Hypothesis 1 (H1). Second, the results show a high positive correlation with $\beta = 0.852$, t = 58.004, and p<0.05, supporting Hypothesis 2 (H2). The results regarding the association between job stress and employee performance are also notable, showing a substantial positive relationship ($\beta = 0.201$, t = 2.553, and p<0.05). Based on these results, Hypothesis 3 (H3) is thus confirmed. Furthermore, the research demonstrates the validity of Hypothesis 4 (H4),

Table 2. The Fornell-Larcker Criterion

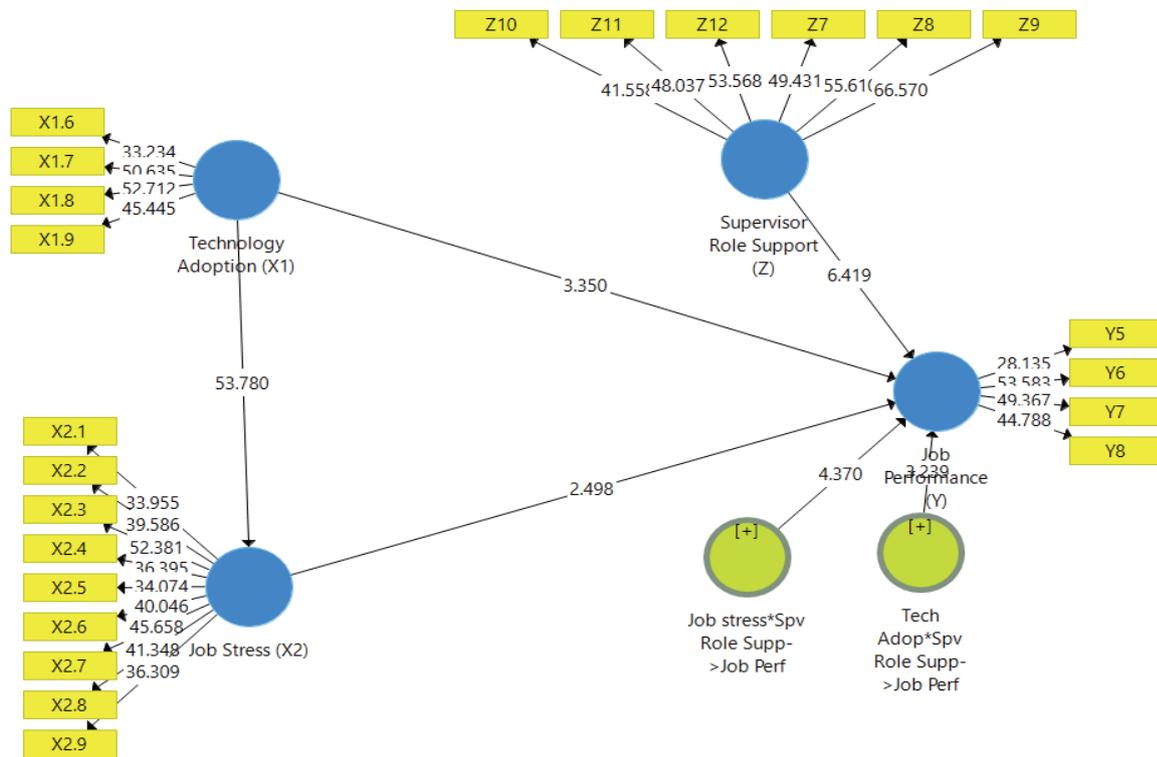|	Job Performance (Y)	Job Stress (X2)	Moderating Effect 1	Moderating Effect 2	Supervisor Role Support (Z)	Technology Adoption (X1)
Job Performance (Y)	0.866					
Job Stress (X2)	0.693	0.832				
Moderating Effect 1	-0.384	-0.387	1.000			
Moderating Effect 2	-0.407	-0.379	0.919	1.000		
Supervisor Role Support (Z)	0.691	0.727	-0.438	-0.389	0.874	
Technology Adoption (X1)	0.679	0.830	-0.412	-0.381	0.692	0.869

Figure 2. Path Analysis

which holds that the supervisor role moderates the impact of technology adoption on employee performance. The data show a strong correlation (β = 0.203, t = 3.440, p<0.05), supporting this hypothesis. It is important to note, though, that this study's findings for Hypothesis 5, which centered on the supervisor's role in mitigating the impact of job stress on employee performance, were, in contrast, showing a significant positif correlation (β = 0.257, t = 4.691, and p<0.05). The essential findings (β = 0.367, t = 6.461, and p<0.05) highlight the impact of supervisors on employee performance, allowing us to conclude that the empirical data confirm Hypothesis 6.

Table 3. Path Analysis

Relationship	Path coefficients	t- value	p-value	Result
(H1) Technology Adoption (X1) → Job Performance (Y)	0,232	3,552	0,000	Supported
(H2) Technology Adoption (X1) → Job Stress (X2)	0,852	58,004	0,000	Supported
(H3) Job Stress (X2) → Job Performance (Y)	0,201	2,553	0,011	Supported
(H4) Technology adopt*Spv role → Job Performance (Y)	0,203	3,440	0,001	Supported
(H5) Job stress*Spv role → Job Performance (Y)	0,257	4,691	0,000	Supported
(H6) Supervisor Role (Z) → Job Performance (Y)	0,367	6,461	0,000	Supported

Discussion

This study investigates the influence of technology adoption and job stress, moderated by the supervisor's role, on employee performance in the hotel industry. In addition, research also explores the direct influence of the adoption of technology and work stress on performance and the influence of technology adoption on work stress. The results of this study indicate that technology adoption, work stress, and the supervisor's role significantly impact employee performance in the hospitality sector. These findings confirm previous research findings, which have indicated that there is a strong relationship between job performance and these factors, namely technology adoption (Kiliçhan & Yilmaz, 2020), job stress (Lee, 2021), and the role of the supervisor (Paethrangsi & Jamjumrus, 2021). Effective technology implementation may enhance worker performance in the hotel sector. Employees can do their jobs more effectively, produce more work, and offer hotel customers better experience when they have access to and the capacity to use the appropriate technology. Additionally, well-managed job stress may promote higher employee performance and an effective supervisor's role in offering guidance and support is crucial in inspiring and guiding workers toward improved performance.

This study also discovered exciting findings on the supervisor's function in moderating the relationship between technology adoption and job performance. These results are consistent with an earlier study by Mingotto et al. (2021), highlighting managers' crucial role in promoting workplace technology adoption. The outcome is in line with initiatives to satisfy the demands of the rapidly expanding hotel sector. Supervisors may facilitate the successful implementation of technology, enhancing performance. Nonetheless, the study's conclusions about the function of supervisors in the connection between employee performance and workplace stress are similarly intriguing. The association between job stress and performance weakened, as indicated by the negative regression value of the management role variable. Previous research

conducted by Yunus et al., (2018), could not find a significant link between job stress and performance impacted by supervisory responsibilities. The results of this study run counter to those of earlier research. These variations imply that the supervisor's role in controlling work-related stress and employee performance may change depending on the situation and other relevant conditions. Therefore, future research could add a richer dimension to understanding how the supervisor's role may influence employee performance in technology and work-stress situations. This study also suggests the need for further research to investigate factors that may explain the findings across studies so that organizations can develop more effective management strategies to maximize employee performance in various contexts.

This study's investigation of the impact of technology adoption on employee job stress levels shows a positive and substantial relationship between these two variables. These findings support the association between the use of technology and rising workplace stress. The outcome aligns with other study findings that have discovered comparable connections, such as those made by Bednar & Welch (2020). Although the introduction of technology has the potential to boost production and efficiency, it may frequently also provide new difficulties and strains for workers. Employee stress levels may increase because of changes in how work is done, the size of assignments, or modifications to software and systems. It is crucial to comprehend how technology adoption might affect job stress levels to establish efficient techniques for managing technological change in the workplace. Organizations should plan appropriate initiatives to lessen the adverse effects of technology adoption on work stress and assist employees who suffer more significant pressure due to these changes by knowing how it affects this factor. The significance of striking a balance between the usage of cutting-edge technology and worker well-being in a workplace that is constantly changing and growing is also emphasized.

Lastly, our study adds a nuanced understanding of the relationship between job stress and technology adoption in the hospitality industry to the body of literature already in existence. Our findings imply that when managed effectively, moderate stress levels may improve job performance in high-pressure workplaces such as five-star hotels. Previous research has frequently considered job stress as intrinsically destructive. Also, by including supervisors' moderating function in technology acceptance models, the study advances these models. Our results demonstrate that supervisors are essential in mitigating the detrimental impacts of technology adoption on workplace stress and enhancing productivity, thereby contributing to a greater understanding of the leader's role in managing the technology change at the workplace.

MANAGERIAL IMPLICATION

These findings suggest that technology adoption needs to be a priority for hotel management, as it has been shown to improve performance. However, technology implementation must also be accompanied by adequate support, such as training, mentoring, and stress management programs, to reduce potential work stress. Well-managed stress can boost performance, but too much stress can have adverse effects, so the right balance is needed.

The supervisor's role is critical in supporting employees during times of change. Effective supervisors can improve performance, but can increase stress if not used wisely. Therefore, leadership training focusing on communication, empathy, and emotional support is essential. An integrated HR strategy, including technology, employee well-being, and strengthening the supervisor role, will help hotels continuously maintain productivity and job satisfaction.

CONCLUSION

This study confirms a complex yet significant relationship between technology adoption, job stress, job performance, and the moderating role of supervisors in 5-star hotel settings. The empirical findings validate all proposed hypotheses, offering robust evidence that technology positively influences job performance but also contributes to increased stress levels. Notably, job stress can have a dual impact—enhancing performance when moderate, but detrimental when excessive.

The role of supervisors is shown to be critical, both as performance enhancers and stress moderators. However, supervisory involvement may inadvertently increase job stress when not managed appropriately. Overall, this research enhances theoretical understanding and provides a holistic view of the interdependent variables influencing employee performance in the hospitality sector.

This study has several limitations. It focused only on local-brand 5-star hotels with a small sample size, limiting the generalizability of findings to other hotel types, especially international brands. Future research should expand the scope by comparing different hotel categories and brands. Additionally, the study did not include other relevant factors such as work-life balance and job satisfaction, which are known to impact employee performance. Including these in future studies would provide a more comprehensive understanding of performance dynamics in the hospitality sector. ■

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