# EMPLOYEE ENGAGEMENT AND RETENTION IN AI-ENABLED HOTEL OPERATIONS: EXAMINING THE ROLE OF TECHNOSTRESS

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**Abstract.** The integration of artificial intelligence (AI) has transformed hotel operations and increased employees' need to adapt to changing technological demands. Guided by Person–Environment (P-E) Fit Theory, this study examined the relationships between vigor, dedication, absorption, technostress, and employee retention, including the mediating role of technostress. A quantitative cross-sectional survey was conducted among 96 Malaysian hotel employees with experience in AI-enabled operations, and the data were analysed using SPSS and PLS-SEM. The findings showed that dedication significantly and positively predicted employee retention, while absorption significantly and positively predicted technostress. Vigor and dedication were negatively but not significantly related to technostress, whereas technostress had a positive but not significant relationship with employee retention. The study found no significant mediating effects of technostress. The findings demonstrate that engagement dimensions operate differently within AI-enabled hotel environments and extend P-E Fit Theory to technology-driven hospitality contexts. Given the modest sample size, interpret the results cautiously and validate them with larger samples.
**Keywords**: *employee engagement, technostress, employee retention, artificial intelligence, AI-enabled hotel operations, Malaysian hotel industry*

## Introduction

The hospitality industry is increasingly integrating artificial intelligence (AI), digital operational systems, and automated technologies to improve efficiency, service quality, and competitiveness (Osei and Cheng, 2024; Webster and Ivanov, 2023). In Malaysia, this transformation has accelerated as hotels respond to labour shortages, operational restructuring, and changing guest expectations (Osei and Cheng, 2024; Teng et al., 2024). While AI offers operational benefits, employees must continuously learn new technologies and adapt to digital work processes, which may increase technostress when technological demands exceed their ability to cope (Wu et al., 2022). Employee engagement may influence how employees respond to these demands. Engaged employees demonstrate vigor, dedication, and absorption, which may support adaptation to changing work environments (Schaufeli et al., 2002). However, hospitality research has largely emphasised AI adoption from operational, customer-experience, and service perspectives, with comparatively less attention to employees' psychological adaptation and the role of technostress in employee retention within AI-enabled hotel environments. This research examines the relationships among vigor, dedication, absorption, technostress, and employee retention in AI-driven hotel operations in Malaysia. It investigates (1) the relationships between employee engagement dimensions and employee retention, (2) the relationships between employee engagement dimensions and technostress, and (3) the mediating role of technostress in

the relationships between employee engagement dimensions and employee retention. It is guided by Person–Environment (P-E) Fit Theory.

## *Theoretical background and hypotheses development*

### *Person-Environment (P-E) Fit Theory*

Person–Environment (P-E) Fit Theory proposes that favourable workplace outcomes occur when employees' abilities and resources are compatible with environmental demands, whereas incompatibility may contribute to stress and unfavourable outcomes (Kerse et al., 2022; Kristof-Brown et al., 2005; French and Caplan, 1972). In AI-enabled hotel operations, technological demands may create adjustment difficulties and technostress when they exceed employees' capabilities or available resources (Jiang et al., 2023; Farrish and Edwards, 2020). Employee engagement may facilitate adaptation to these demands, while stronger compatibility with AI-enabled work environments may support favourable workplace outcomes and employees' willingness to remain (Otoo and Rather, 2024; Oh et al., 2023). Thus, P-E Fit Theory provides the theoretical foundation to investigate the connections between employee engagement, technostress, and employee retention in this study.

### *Employee engagement and employee retention*

Employee engagement reflects employees' vigor, dedication, and absorption at work (Schaufeli et al., 2002). Engaged employees generally showed stronger passion, commitment, and psychological attachment, which may strengthen their willingness to remain with an organisation (Darmayanti et al., 2024; Oh et al., 2023; Bharadwaj et al., 2022). In AI-enabled hotel operations, these engagement dimensions may also support employees' adaptation to changing work environments. Accordingly, the following hypotheses are proposed:

H1a: Vigor positively relates to employee retention in AI-enabled hotel operations.
H1b: Dedication positively relates to employee retention in AI-enabled hotel operations.
H1c: Absorption positively relates to employee retention in AI-enabled hotel operations.

### *Employee engagement and technostress*

AI-enabled hotel operations require employees to adapt continuously to changing technological demands, which may contribute to technostress when employees struggle to adapt. Employee engagement may provide psychological resources to manage these demands (Oh et al., 2023; Saks, 2022). From a P-E Fit perspective, greater vigor, dedication, and absorption may improve employees' compatibility with technology-driven work environments and thereby reduce technostress. Accordingly, the following hypotheses are proposed:

H2a: Vigor negatively relates to technostress in AI-enabled hotel operations.
H2b: Dedication negatively relates to technostress in AI-enabled hotel operations.
H2c: Absorption negatively relates to technostress in AI-enabled hotel operations.

### *Technostress and employee retention*

Technostress arises when technological demands exceed employees' capabilities or available resources and has been associated with unfavourable workplace outcomes, including turnover-related outcomes (Wu et al., 2022; Farrish and Edwards, 2020). From a P-E Fit perspective, incompatibility between employees' capabilities and technological demands may consequently influence their willingness to remain with an organisation.

### *Mediating role of technostress*

Employee engagement may influence retention indirectly through employees' technological adjustment. P-E Fit Theory suggests that engaged employees may adapt more effectively to technological demands, potentially reducing technostress and supporting retention (Kerse et al., 2022). Accordingly, technostress is proposed as a mediator between the employee engagement dimensions and employee retention:

H3a: Technostress mediates the relationship between vigor and employee retention in AI-enabled hotel operations.
H3b: Technostress mediates the relationship between dedication and employee retention in AI-enabled hotel operations.
H3c: Technostress mediates the relationship between absorption and employee retention in AI-enabled hotel operations.

## Materials and Methods

### *Research design and participants*

A quantitative cross-sectional design was used with among Malaysian hotel employees aged 18 years and above who have direct experience using AI-enabled technologies or digital operational systems. The study targeted employees from operational departments in four- and five-star hotels, where AI-enabled technologies are more likely to be incorporated into daily operations. The study used non-probability purposive sampling to recruit respondents with relevant experience in AI-enabled hotel operations (Etikan et al., 2016). G*Power 3.1 was used to estimate the minimum sample size (Faul et al., 2009). An a priori analysis suggested a minimum sample size of 85 respondents with a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, power = 0.80, and four predictors (Cohen, 1988). After filtering, 96 valid replies remained, exceeding the required minimum sample size.

### *Instrument and data collection*

A standardised, self-administered questionnaire was distributed in both physical and online formats. The Utrecht Work Engagement Scale (UWES), which was adapted from Schaufeli et al. (2002) and evaluated on a seven-point frequency scale, was used to gauge employee engagement. It includes six items for vigor, five for dedication, and six for absorption. Eight items from Kyndt et al. (2009) measured employee retention, while 23 items from Tarafdar et al. (2007) measured technostress across five dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. Both measures used five-point agreement scales. A pilot study

involving 45 hotel employees assessed questionnaire clarity and reliability. Cronbach's alpha indicated satisfactory reliability for vigor (α = 0.959), dedication (α = 0.910), absorption (α = 0.938), technostress (α = 0.972), and employee retention (α = 0.867), with all values exceeding 0.70.

### *Data analysis*

SmartPLS 4 and SPSS were used to examine the data. PLS-SEM evaluated the measurement and structural models, while SPSS was used for reliability analysis, descriptive statistics, and data screening. Indicator loadings, composite reliability (CR), average variance extracted (AVE), and discriminant validity were used to assess the measurement model. Path coefficients, $R^2$, effect sizes ($f^2$), and bootstrapping with 5,000 subsamples were used to evaluate structural correlations. The mediating influence of technostress was evaluated by looking at indirect effects (*Table 1*).

***Table 1***. *Demographic profile of respondents (N = 96).*

| Category | Frequency | Percentage |
|---|---|---|
| Gender | | |
| Female | 62 | 64.6 |
| Male | 34 | 35.4 |
| Age | | |
| 18–24 years | 14 | 14.6 |
| 25–34 years | 73 | 76.0 |
| 35–44 years | 3 | 3.1 |
| 45–54 years | 6 | 6.3 |
| Department | | |
| Sales and Marketing | 28 | 29.2 |
| Front Office | 26 | 27.1 |
| Food and Beverage | 24 | 25.0 |
| Other | 13 | 13.5 |
| Housekeeping | 5 | 5.2 |
| Education | | |
| Undergraduate | 69 | 71.9 |
| Secondary School | 14 | 14.6 |
| Postgraduate | 12 | 12.5 |
| Other | 1 | 1.0 |

## Results and Discussion

### *Descriptive findings and measurement model*

Dedication recorded the highest mean (M = 4.92, SD = 1.05), then vigor (M = 4.81, SD = 1.13) and absorption (M = 3.95, SD = 1.18). Technostress was moderate (M = 3.09, SD = 0.63), while employee retention was relatively positive (M = 3.80, SD = 0.54). With composite reliability ranging from 0.904 to 0.949 and Cronbach's α ranging from 0.873 to 0.939, the measurement model showed adequate reliability. Except for technostress (AVE = 0.431), all of the constructs had AVE values above the suggested 0.50 level (Hair Jr. et al., 2021). Despite its high internal consistency (α = 0.939; CR = 0.945), technostress indicators were retained to preserve coverage of its five theoretical dimensions. The lower AVE is therefore acknowledged as a measurement limitation, and findings involving technostress should be interpreted cautiously (*Table 2* and *Figure 1*).

***Table 2***. *Measurement model assessment.*

| Construct | Cronbach's α | rho_A | Composite Reliability | AVE |
|---|---|---|---|---|
| Absorption | 0.873 | 0.877 | 0.904 | 0.612 |
| Dedication | 0.875 | 0.900 | 0.913 | 0.686 |

| | | | | |
|---|---|---|---|---|
| Employee Retention | 0.888 | 0.899 | 0.912 | 0.567 |
| Technostress | 0.939 | 0.943 | 0.945 | 0.431 |
| Vigor | 0.936 | 0.940 | 0.949 | 0.758 |

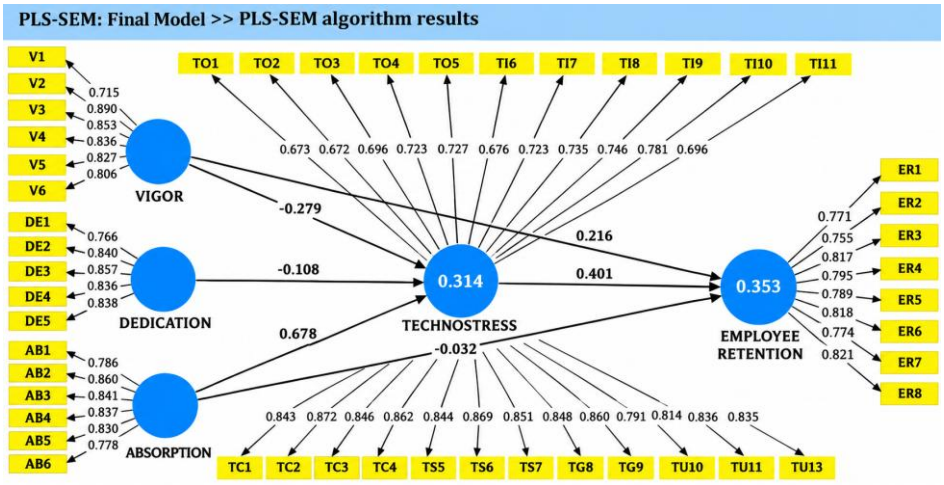



***Figure 1.*** *PLS-SEM structural model.*

## *Structural relationships*

The structural model showed clear connections between technostress, employee retention, and employee engagement variables. H1b was supported by the significant positive connection between dedication and employee retention (β = 0.401, t = 2.636, p = 0.008). In contrast, absorption showed a small, non-significant negative association with employee retention (β = -0.032, t = 0.208, p = 0.835), whereas vigor showed a positive but non-significant relationship (β = 0.216, t = 1.428, p = 0.153). H1a and H1c were therefore not supported. Vigor (β = -0.279, t = 1.690, p = 0.091) and dedication (β = -0.108, t = 0.696, p = 0.487) also revealed negative but non-significant relationships with technostress. H2a and H2b were therefore not supported. Technostress and absorption showed a statistically significant positive correlation (β = 0.678, t = 6.808, p < 0.001). Although significant, this relationship ran counter to the predicted negative direction; therefore, H2c was not supported. Employee retention and technostress showed a positive but non-significant correlation (β = 0.201, t = 1.177, p = 0.239). The model contributed to 35.3% of the variance in employee retention ($R^2$ = 0.353) and 31.4% of the variance in technostress ($R^2$ = 0.314). The latter illustrates shows how vigor, dedication, absorption, and technostress work together to explain employee retention. The indirect-effect study revealed that there were no significant correlations between employee retention through technostress and vigor (β = -0.056, t = 0.986, p = 0.324), dedication (β = -0.022, t = 0.502, p = 0.616), or absorption (β = 0.136, t = 1.176, p = 0.240). As a result, technostress did not mediate the associations between the three employee engagement dimensions and employee retention, as indicated by the lack of support for H3a, H3b, and H3c (*Table 3*).

***Table 3****. Structural model and hypothesis testing results.*

| Hypothesis | Relationship | β | t | p | Decision |
|---|---|---|---|---|---|
| H1a | Vigor → Employee Retention | 0.216 | 1.428 | 0.153 | Not Supported |
| H1b | Dedication → Employee Retention | 0.401 | 2.636 | 0.008 | Supported |
| H1c | Absorption → Employee Retention | -0.032 | 0.208 | 0.835 | Not Supported |
| H2a | Vigor → Technostress | -0.279 | 1.690 | 0.091 | Not Supported |
| H2b | Dedication → Technostress | -0.108 | 0.696 | 0.487 | Not Supported |
| H2c | Absorption → Technostress | 0.678 | 6.808 | <0.001 | Not Supported* |

| | | | | | |
|---|---|---|---|---|---|
| - | Technostress → Employee Retention | 0.201 | 1.177 | 0.239 | Not Significant |
| H3a | Vigor → Technostress → Employee Retention | -0.056 | 0.986 | 0.324 | Not Supported |
| H3b | Dedication → Technostress → Employee Retention | -0.022 | 0.502 | 0.616 | Not Supported |
| H3c | Absorption → Technostress → Employee Retention | 0.136 | 1.176 | 0.240 | Not Supported |

*Note: H2c showed a statistically significant relationship; however, the coefficient was positive, contrary to the hypothesised negative direction. Therefore, H2c was not supported.*

### *Employee engagement and employee retention*

Dedication was the only engagement dimension significantly associated with employee retention ($\beta = 0.401$, $p = 0.008$), supporting H1b. This finding indicate that employees' enthusiasm, pride, and psychological attachment to their work may strengthen their willingness to remain with the organisation, consistent with previous engagement and retention research (Darmayanti et al., 2024; Oh et al., 2023; Bharadwaj et al., 2022). In contrast, vigor and absorption were not significantly related to retention, indicating that energy and work immersion alone may be insufficient to determine long-term organisational attachment. Retention may therefore depend more strongly on employees' sense of dedication alongside broader organisational conditions.

### *Employee engagement and technostress*

Vigor and dedication showed negative but non-significant relationships with technostress ($\beta = -0.279$, $p = 0.111$; $\beta = -0.108$, $p = 0.581$), providing no support for H2a and H2b. Although the negative directions were consistent with the proposed P-E Fit reasoning, the non-significant effects suggest that employees' energy and dedication alone may not be sufficient to reduce technology-related strain. Technostress may also depend on factors such as technological complexity, training, organisational support, and employees' digital capabilities. In contrast, absorption showed a significant positive relationship with technostress ($\beta = 0.678$, $p < 0.001$), contrary to H2c. Employees who become deeply immersed in AI-supported work may experience greater cognitive demands, continuous connectivity, or difficulty disengaging from technology, thereby increasing technostress. This finding indicates that engagement does not uniformly reduce technological strain; within AI-enabled hotel operations, intense work absorption may instead contribute to greater technology-related pressure.

### *Dedication and technostress*

Dedication also demonstrated a negative but non-significant relationship with technostress. This finding suggests that employees' enthusiasm, pride, and emotional commitment towards their work may not independently protect them from technology-related adjustment pressure. An employee may be highly dedicated to the organisation and committed to delivering good service but still experience difficulties when required to learn unfamiliar systems, respond to technological updates, or work under digitally intensive conditions. The finding therefore indicates a distinction between emotional commitment and technological adaptability. Dedication primarily reflects employees' psychological identification with their work, whereas successful adaptation to AI-enabled operations may require practical technological competencies, training, confidence, and organisational resources. Consequently, dedicated employees may remain committed to their work while still experiencing technostress when technological demands exceed their available resources.

### *Absorption and technostress*

In contrast, absorption showed a strong, positive, and statistically significant relationship with technostress. Although the hypothesised negative relationship was not supported, the observed positive relationship represents an important finding of the study. Employees who are deeply immersed in their work may interact more intensively and frequently with AI-supported systems, digital platforms, and technology-driven operational processes. Greater immersion may consequently increase employees' exposure to system complexity, continuous technological updates, digital workload, and other technology-related demands. This result suggests that absorption may function differently from vigor and dedication within AI-enabled hotel operations. Rather than protecting employees from technological stress, high absorption may increase technological involvement and, consequently, intensify employees' exposure to adjustment demands. The finding should not be interpreted as suggesting that absorption is inherently harmful. Instead, it indicates that employees deeply involved in their work may experience greater technological pressure because technology has become embedded in the tasks in which they are highly immersed. This finding contributes to the study's novelty by demonstrating that the three employee engagement dimensions do not operate uniformly in technology-intensive hotel environments. In particular, psychological immersion in work may simultaneously represent strong engagement and greater exposure to technology-related demands.

### *Technostress and employee retention*

Technostress present a positive but non-significant relationship with employee retention ($\beta = 0.201$, $p = 0.239$), indicating that technological adjustment pressure did not directly predict retention. This finding may reflect differences in how employees appraise technology-related demands, which can involve both techno-distress and techno-eustress (Tarafdar et al., 2019). From a P-E Fit perspective, retention may therefore depend on broader compatibility with the work environment rather than technological demands alone.

### *Mediation role of technostress*

Technostress did not significantly mediate the relationships between vigor, dedication, or absorption and employee retention; therefore, H3a–H3c were not supported. Although absorption significantly predicted technostress, technostress did not significantly predict retention, while vigor and dedication were also non-significant predictors of technostress. Consequently, the proposed indirect pathways were not established. These findings suggest that engagement, technological adjustment, and retention may operate through more complex and distinct processes rather than a single stress-mediated pathway. From a P-E Fit perspective, employees' adaptation to AI-enabled work environments may also depend on technological competence, organisational support, digital readiness, and training. The findings therefore extend P-E Fit Theory by demonstrating that engagement dimensions may relate differently to technological and retention outcomes in AI-enabled hotel operations. Taken together, the findings support to the literature in three ways. First, the results demonstrate that vigor, dedication, and absorption should not be treated as interchangeable dimensions when examining employee experiences in AI-enabled hotel environments. Dedication was particularly relevant to retention, whereas absorption was strongly associated with

greater technostress. Second, the findings highlight the complexity of technostress within digitally transformed hotel operations. Technology-related pressure was evident in employees' experiences but did not independently explain retention or mediate the engagement–retention relationships. Third, the study extends the application of P-E Fit Theory to AI-enabled hotel operations by showing that employees' compatibility with technology-driven work environments may depend on different psychological and operational processes rather than a single stress-mediated pathway. This employee-centred perspective is particularly relevant as Malaysian hotels continue to integrate AI-supported technologies into daily operational activities.

## Conclusion

This study examined the relationships among employee engagement dimensions, technostress, and employee retention in AI-enabled hotel operations in Malaysia. Dedication significantly predicted employee retention, whereas vigor and absorption did not. Vigor and dedication were negatively but not significantly related to technostress, while absorption showed a significant positive relationship with technostress, contrary to the hypothesised direction. Technostress did not significantly predict retention or mediate the relationships between engagement dimensions and retention. Findings from this research extend P-E Fit Theory by showing that vigor, dedication, and absorption operate differently within technology-driven hotel environments rather than functioning as interchangeable psychological resources. Practically, hotels should complement employee engagement with structured AI onboarding, digital-skills training, technical support, and clear operational guidance, particularly for highly absorbed employees who may experience greater technology-related demands. When interpreting the results, consider several limitations. Although the final sample of 96 exceeded the G*Power minimum of 85, its modest size and purposive sampling limit generalisability. The cross-sectional design also prevents assessment of change over time, while the technostress AVE of 0.431 indicates a measurement limitation that warrants caution. Future studies should use longitudinal designs and refined technostress measures, while examining factors such as digital readiness, technological self-efficacy, organisational support, and training. Overall, sustainable AI adoption in hotel operations requires attention not only to technological capabilities but also to employees’ psychological and operational adaptation.

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## Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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