Research Journal in Advanced Humanities

https://doi.org/10.58256/r2t9qx88

RJAH

Open Access

Check for updates

REVIEW ARTICLE

Section: *Digital Humanities*

The role of STARA competencies in driving AI adoption performance in tourism and hospitality: A systematic-quantitative synthesis of dual mediation analysis of self-efficacy and Techno-Eustress

Hebatallah A. M. Ahmed[1]*, Sameh Fayyad[2], Bassam Samir Al-Romeedy[3] & Abdelrahman A. A. Abdelghani[1]

[1]Applied College, Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia

[2]Faculty of Tourism and Hotels, Suez Canal University, Ismailia 41522, Egypt

[3]Faculty of Tourism and Hotels, University of Sadat City, Egypt

*Correspondence: he.ahmed@psau.edu.sa

ABSTRACT

This study investigates the dual mediation roles of AI self-efficacy and techno-eustress in the relationship between leaders' STARA (Smart Technology, AI, Robotics, Algorithms) competencies and AI adoption performance in tourism and hospitality. Employing a mixed-methods approach, the research integrates a systematic literature review of 28 peer-reviewed articles with quantitative data from 401 employees in Saudi five-star hotels and tourism firms. The systematic literature review synthesizes conceptualizations of STARA competencies and psychological mediators, while partial least squares structural equation modeling (PLS-SEM) tests hypotheses derived from social cognitive and technostress theories. Results reveal that leaders' STARA competencies significantly enhance AI adoption performance both directly ($\beta = 0.176$) and indirectly via self-efficacy ($\beta = 0.143$) and techno-eustress ($\beta = 0.195$). The dual mediation model explains 39.3% of AI adoption variance, underscoring the interplay of technical leadership and psychological readiness. The results align with Sustainable Development Goals (SDGs) 8, 9, and 12, linking AI integration to decent work, innovation, sustainable practices, and future economics. The study advances digital leadership theory by integrating psychological mediators into technology adoption frameworks and offers actionable insights for cultivating AI-ready workforces through competency development and stress management.

KEYWORDS: AI adoption, self-efficacy, STARA competencies, techno-eustress, tourism and hospitality

Research Journal in Advanced Humanities

Volume 6, Issue 2, 2025

ISSN: 2708-5945 (Print)

ISSN: 2708-5953 (Online)

ARTICLE HISTORY

Submitted: **02 May 2025**

Accepted: **20 May 2025**

Published: 23 **May 2025**

HOW TO CITE

Ahmed, H. A. M. . ., Fayyad , . S. ., Al-Romeedy, B. S. ., & Abdelghani , A. A. A. . (2025). The role of STARA competencies in driving AI adoption performance in tourism and hospitality: A systematic-quantitative synthesis of dual mediation analysis of self-efficacy and Techno-Eustress. *Research Journal in Advanced Humanities*, 6(2). https://doi.org/10.58256/r2t9qx88

Published in Nairobi, Kenya by Royallite Global, an imprint of Royallite Publishers Limited

1. Introduction

AI adoption in tourism and hospitality is crucial for promoting sustainability, although its success rests on leaders' STARA (Smart Technology, AI, Robotics, Algorithms) competences to connect technology integration with eco-innovation (Al-Romeedy, 2024; Chaudhuri et al., 2024). These competencies enhance employees' AI self-efficacy—confidence in using AI tools—and foster techno-eustress, a positive stress driving adaptive performance (Bui & Duong, 2024; Wardhana & Harsono, 2024). Research gaps still exist, though, about how these psychological elements influence leaders' influence on results on sustainable artificial intelligence. This paper explores the twin mediation of self-efficacy and techno-eustress, therefore providing insights to build workforces competent to use artificial intelligence for long-term ecological resilience in the digital age and resource efficiency. By means of tailored interactions, Zaki et al. (2025) underline how AI-driven methods improve visitors and guest loyalty, thus highlighting the need for leadership in building trust and self-efficacy, which are fundamental for the implementation of adaptive AI in tourism. Especially Goal 9, which stresses industrial innovation and infrastructure, the integration of STARA capabilities in AI adoption fits the United Nations Sustainable Development Goals. Improving technical competency will help leaders in tourism and hospitality to promote sustainable practices, thereby supporting environmental care and economic development (UN, 2016). STARA abilities are a collection of digital skills required for negotiating settings powered by artificial intelligence. Fundamental in nature, these skills determine how well a company may use artificial intelligence (Chaudhuri et al., 2024). Organizations with strong STARA competences are better positioned to utilize AI technology, improve customer service, and boost operational efficiency. However, the influence of STARA capabilities on AI adoption is not exclusively reliant on technical knowledge; it also involves addressing psychological elements such as self-efficacy and techno-eustress (Wardhana & Harsono, 2024).

Self-efficacy refers to an individual's conviction in their capacity to accomplish specified activities effectively. In the context of AI adoption, workers with strong self-efficacy are more likely to accept AI technologies, adapt to digital transformation, and contribute to enhanced AI performance (Kukanja, 2024). Studies demonstrate that transformational leadership improves self-efficacy by offering support, encouragement, and digital skills training (Hadi et al., 2023). Furthermore, digital capabilities and self-efficacy are interconnected, particularly in higher education and professional development (Alajmi et al., 2025). When workers trust in their potential to operate successfully with AI, they are more willing to adopt these technologies into their regular operations. Techno-eustress, a beneficial kind of technological stress, plays a dual function in AI adoption. Unlike techno distress, which hampers performance, techno-eustress can enhance motivation, learning, and adaptation to AI-driven environments (Bui & Duong, 2024). Digital leadership may promote an atmosphere where people experience techno-eustress constructively, converting problems into opportunities for progress (Choi & Lee, 2024). Abdelghani (2018) highlights the success of Saudi Arabia's digital business re-engineering in tourism, emphasizing streamlined workflows and enhanced performance. This aligns with STARA competencies' role in fostering AI adoption through structured digital transformation. Techno-eustress, as a positive stressor, enhances AI adaptation (Rademaker et al., 2023). This aligns with STARA-driven leadership in tourism, where constructive stress management bolsters self-efficacy and sustainable AI integration. However, if not handled appropriately, AI-induced stress might severely influence work performance and AI adoption rates in the tourist and hospitality business.

The dual mediation model suggests that self-efficacy and techno-eustress together affect the link between digital leadership and AI adoption performance. Leaders who focus on digital talent development, give AI training, and establish a supportive digital culture boost workers' self-efficacy and manage techno-eustress successfully (Al-Romeedy, 2024). By fostering a work environment that encourages innovation and adaptability, organizations can maximize the benefits of AI technologies while minimizing potential resistance. (Abd Al ghani, 2018) explores the impact of administrative performance on tourism organizations, highlighting the necessity of digital transformation to enhance operational efficiency and improve the overall tourist experience. The tourism and hospitality business is defined by changing client expectations, necessitating ongoing innovation and service development. AI technologies, such as chatbots, predictive analytics, and robotic automation, have changed service delivery. Effective digital leadership can facilitate the smooth integration of AI, maximize human-AI cooperation, and increase consumer experiences (Chaudhuri et al., 2024). Moreover, boosting self-efficacy and controlling techno-eustress might help individuals adjust to AI-driven tasks, leading to greater performance and job satisfaction (Wardhana & Harsono, 2024).

Particularly with regard to SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 12 (Responsible Consumption and Production), this research highlights how leaders' STARA abilities match AI adoption with the Sustainable Development Goals. By improving employees' AI self-efficacy and encouraging techno-eustress, digital leadership encourages eco-innovation and resource efficiency. Integrating smart technology, AI, robots, and algorithms helps tourist and hospitality firms to optimize operations sustainably, strengthen infrastructure innovation, and encourage responsible consumption habits in service delivery. STARA capabilities build future-ready economies by merging AI-driven operational efficiency, eco-innovation, and digital infrastructures. Empowered by self-efficacy and techno-eustress, companies establish robust, sustainable economic frameworks for inclusive workforce development.

Under its Research, Development, and Innovation (RDI) system, this research closely relates with Saudi Arabia's national goal of "Economies of the Future". Through examining how STARA capabilities foster AI adoption in tourism and hospitality, the study supports the Kingdom's strategic investments in digital transformation, smart cities (e.g., NEOM and the Red Sea Project), and young empowerment. Vision 2030's objectives are to diversify the economy, improve digital infrastructure, and establish Saudi Arabia as a worldwide center for innovation. This aligns with the emphasis on building AI-ready workforces via leadership development and psychological resilience. The combination of operational efficiency driven by artificial intelligence and eco-innovation also fits the tech-enabled, sustainable future economies that national leaders want.

2. Literature Review

The study presents a critical synthesis of existing scholarship on the competencies, psychological mechanisms, and performance outcomes associated with AI adoption in the context of tourism and hospitality. Central to this review is the STARA framework—encompassing smart technology, artificial intelligence, robotics, and algorithms—which has emerged as a key lens for understanding how leaders' digital capabilities drive organizational innovation (Brougham & Haar, 2018; Chaudhuri et al., 2024). While technical knowledge lays the groundwork for AI implementation, leaders must also attend to the cognitive and affective experiences of employees, notably through the constructs of AI self-efficacy and techno-eustress, to ensure sustained adoption and performance (Tarafdar et al., 2019; Venkatesh et al., 2003). Transformational entrepreneurship fosters digital agility and workforce adaptability, with organizational support and employee resilience critical for sustaining competitive advantage in dynamic markets (Ahmed et al., 2025). (Ahmed Abdelhai Abdelghani et al., 2023) emphasize social media's influence on tourist decision-making via user-generated content, underscoring the need for STARA competencies to optimize AI-driven analytics and foster self-efficacy in managing digital tools. (Abdelghani, 2018) emphasize digital management's importance in Saudi's tourism sector, highlighting the role of leadership in enhancing employee adaptability and integrating innovative technologies for improved performance.

Drawing on (Bandura, 1997) social cognitive theory and the challenge–hindrance stressor framework, this chapter first examines how leaders' STARA competencies shape employees' beliefs in their ability to use AI tools effectively (self-efficacy) and reframe technological challenges as opportunities for growth (techno-eustress). Research indicates that AI adoption can significantly impact sustainable development by optimizing resource use and improving operational efficiency in tourism. This correlates with SDG 12, which supports responsible consumption and production habits, establishing a culture of sustainability that benefits both companies and communities (Bui & Duong, 2024; Tarafdar et al., 2019). Subsequent sections link these psychological mediators to measurable outcomes in AI adoption performance, highlighting the dual pathways through which leadership influences both the confidence and the motivational climate necessary for digital transformation (Al-Romeedy, 2024; Wardhana & Harsono, 2024). By combining various lines of research, the review creates a conceptual framework for the hypotheses that will be explored in this study.

2.1 Systematic Literature Review

To build a robust theoretical framework for evaluating how STARA abilities promote AI adoption performance in tourism and hospitality, mediated by self-efficacy and techno-eustress, a systematic literature review (SLR) was undertaken. This SLR maps major constructs, synthesizes empirical evidence, and indicates gaps that the current research addresses. The review involves five stages: (1) goals and research questions, (2) search method, (3) inclusion/exclusion criteria, (4) screening and selection procedure, and (5) data extraction and synthesis.

2.2 Objectives and Research Questions

The key aims of this SLR are to:

1. Clarify conceptualizations and measuring techniques for STARA competencies—defined here as leader and employee proficiencies in Smart Technologies, Artificial Intelligence, Robotics, and Algorithms.
2. Survey factors and effects of AI adoption performance within tourism and hospitality sectors.
3. Examine psychological factors, notably self-efficacy and techno-eustress that influence technology adoption.
4. Identify integrative frameworks relating leadership abilities to psychological mediators and AI adoption results.

Accordingly, the SLR addresses the following research questions:

- ***RQ1***: How have STARA abilities been defined and assessed in organizational and service-industry research?
- ***RQ2***: What variables drive AI adoption performance in tourism and hospitality, and how is performance operationalized?
- ***RQ3***: In what ways do self-efficacy and techno-eustress serve as mediators in technology adoption models?
- ***RQ4***: What integrative models exist that relate leadership/STARA abilities, psychological processes, and AI adoption performance?

3. Hypotheses Development

3.1 The Impact of Leaders' STARA Competencies on Performance of AI Adoption

Leaders' capacity to successfully manage and exploit smart technologies such as AI is key to the successful integration of these technologies into enterprises. As (Brougham & Haar, 2018) stress, workers' opinions of their leaders' STARA capabilities are critical in defining their preparedness and desire to accept AI. The competency of leaders in understanding and exploiting AI might help minimize worries connected to job displacement and technical complexity, hence maintaining a good corporate environment. Moreover, leaders with high STARA competency are more likely to give the essential support and advice that encourages workers to actively interact with AI technology (Başar et al., 2024). The effect of leadership STARA abilities goes beyond only aiding the deployment of AI technology; it also impacts staff well-being and performance. For example, research by (Khairy et al., 2025) suggests that leaders who exhibit high STARA capabilities may strengthen green competitiveness by harnessing AI technology to promote innovation and improve organizational sustainability. This, in turn, leads to greater employee satisfaction, lower turnover intentions, as workers feel more safe, and supported in their employment. Furthermore, leaders' STARA abilities play a vital role in developing company culture and environment. (Fousiani et al., 2024) claim that a competitive corporate atmosphere, determined by leaders' AI understanding and competences, favorably influences AI adoption. This acceptability, along with a supportive attitude, improves employee willingness to learn and implement AI technology, eventually increasing performance results. Similarly, research by (Hur & Shin, 2024) reveal that personnel with greater degrees of STARA awareness, particularly when backed by competent leadership, demonstrate superior proactive service performance, which is crucial for the success of AI-powered corporate operations.

The association between STARA abilities and AI adoption is further increased by the mediating impact of perceived organizational support (Başer et al., 2025). Leaders that display strong STARA understanding and competency create an atmosphere where workers feel supported and encouraged to interact with AI technology. This enabling atmosphere helps relieve fears and stimulates more engagement in AI-driven efforts. As a consequence, workers are more likely to learn the essential skills and attitudes to succeed in AI adoption, therefore boosting the overall performance of the technology inside the firm. Therefore, the following hypothesis is developed:

Leaders' capacity to successfully manage and exploit smart technologies such as AI is key to the successful integration of these technologies into enterprises. As (Brougham & Haar, 2018) stress, workers' opinions of their leaders' STARA capabilities are critical in defining their preparedness and desire to accept AI. The competency of leaders in understanding and exploiting AI might help minimize worries connected to job displacement and technical complexity, hence maintaining a good corporate environment. Moreover, leaders with high STARA competency are more likely to give the essential support and advice that encourages workers to actively interact with AI technology (Başar et al., 2024).

The effect of leadership STARA abilities goes beyond only aiding the deployment of AI technology; it also impacts staff well-being and performance. For example, research by (Khairy et al., 2025) suggests that leaders who exhibit high STARA capabilities may strengthen green competitiveness by harnessing AI technology to promote innovation and improve organizational sustainability. This, in turn, leads to greater employee satisfaction, lower turnover intentions, as workers feel safer, and supported in their employment. Furthermore, leaders' STARA abilities play a vital role in developing company culture and environment. (Fousiani et al., 2024) claim that a competitive corporate atmosphere, determined by leaders' AI understanding and competences, favorably influences AI adoption. This acceptability, along with a supportive attitude, improves employee willingness to learn and implement AI technology, eventually increasing performance results. Similarly, research by (Hur & Shin, 2024) reveal that personnel with greater degrees of STARA awareness, particularly when backed by competent leadership, demonstrate superior proactive service performance, which is crucial for the success of AI-powered corporate operations.

The association between STARA abilities and AI adoption is further increased by the mediating impact of perceived organizational support (Başer et al., 2025). Leaders that display strong STARA understanding and competency create an atmosphere where workers feel supported and encouraged to interact with AI technology. This enabling atmosphere helps relieve fears and stimulates more engagement in AI-driven efforts. As a consequence, workers are more likely to learn the essential skills and attitudes to succeed in AI adoption, therefore boosting the overall performance of the technology inside the firm. Therefore, the following hypothesis is developed:

H1. Leaders' STARA competencies positively affect Performance of AI adoption

3.2 The Influence of Leaders' STARA Competencies on AI Self-Efficacy

Leaders who exhibit a deep knowledge of AI and other smart technologies may boost workers' confidence in their own skills to utilize these technologies successfully. According to (Chang et al., 2024), AI-related technostress might damage workers' self-efficacy if not handled effectively. However, when leaders display proficiency in STARA technologies, they may alleviate the negative impacts of technostress by giving advice and assistance, thereby building a more favorable interaction between workers and AI. This minimizes emotions of doubt and promotes self-assurance in utilizing AI tools, eventually boosting AI self-efficacy. Furthermore, leaders with strong STARA competences are better positioned to give appropriate training and development opportunities, which are critical for developing AI self-efficacy. Training that focuses on both technical abilities and the emotional components of AI adoption might help workers overcome feelings of inadequacy. (Jin et al., 2024) demonstrate that employees' well-being, including their work affective state, is greatly impacted by the leadership they get, especially in technology-driven contexts. Leaders that are informed about AI may give confidence and practical assistance, making staff feel more comfortable and adept in their use of AI technologies. On addition to training, the leadership style has a crucial effect on AI self-efficacy. As (Kang et al., 2023)highlight, leadership that fosters job crafting—where workers are permitted to modify their activities to meet their talents and preferences—can boost their feeling of competence. When leaders display high STARA understanding, they enable people to participate in this process more successfully. This autonomy in task design leads to stronger motivation and a greater feeling of success, which in turn enhances self-efficacy in AI-related activities.

Moreover, leaders' proficiency in STARA technologies is crucial in molding workers' opinions about AI's role in the workplace. As (Teng et al., 2025) note, leaders who understand and embrace AI are more likely to explain its advantages to staff in a manner that connects with them, generating a feeling of competence. By show case successful instances of AI implementation and sharing information, leaders may motivate people to trust in their abilities to embrace and apply AI successfully. The favorable impact of STARA abilities on AI self-efficacy is also apparent in research on staff resilience. For instance, (Bakir et al., 2025) indicate that individuals with greater levels of technical competency, supported by effective leadership, are less likely to feel burnout or disengagement while working with AI. This resilience adds to greater self-efficacy, as workers are more ready to face obstacles and failures in the adoption process. Hence, it's theorized that:

H2. Leaders' STARA competencies positively affect AI Self-efficacy

3.3 The Role of Leaders' STARA Competencies in Shaping Techno-Eustress

Leaders with strong STARA abilities may dramatically minimize the negative repercussions of technostress, such as feelings of worry and burnout, by building a supportive and proactive atmosphere. According to (Rademaker et al., 2025), leadership behaviors are crucial in either worsening or alleviating technostress, depending on how leaders engage with technology and their teams. When leaders display emotional intelligence and technical knowledge, they assist workers manage technological advances without feeling overwhelmed. (Ertiö et al., 2024) imply that digital leaders' emotional intelligence is especially significant in alleviating workers' techno-stress, which may boost employees' overall well-being and performance. A positive leadership strategy, particularly one that highlights the advantages of technology, may lead to an increase in techno-eustress. As (Tarafdar et al., 2019) underline, techno-eustress develops when workers regard the use of technology as an opportunity for advancement, rather than a source of harm. Leaders with high STARA awareness may foster this attitude by presenting AI adoption and other technical breakthroughs as opportunities for professional growth and creativity. This positive framing helps workers connect with technology in a productive manner, eventually enhancing their productivity and happiness.

Moreover, leaders' abilities in STARA technologies allow them to help staff through the intricacies of new technology tools. (Riedl et al., 2012) have demonstrated that when workers are confused about the operation of a technology, they are more likely to have negative stress reactions. However, effective leaders may ease this uncertainty by offering clear instructions and regular assistance, which not only helps workers adjust but also creates a feeling of competence, therefore improving techno-eustress. This attitude of expertise is vital, since it converts potentially unpleasant circumstances into fruitful tasks. Techno-eustress may also be intensified via the design of technology systems that are user-friendly and promote employees' progress. (Tarafdar et al., 2011) claim that the architecture of technology systems has a crucial impact in deciding whether workers feel techno-stress or techno-eustress. Leaders with knowledge in STARA may influence the selection and design of such systems to ensure they correspond with workers' abilities and requirements, producing a more pleasant technology environment.

In addition, leadership in the digital age demands an awareness of both the benefits and the possible dangers of technology. (Riedl, 2012) describes how neurobiological reactions to technology usage may contribute to stress, especially when systems break down or are difficult to operate. However, leaders who are well-versed in STARA may foresee these issues and take proactive actions to guarantee successful implementation, which helps decrease unneeded stress and promotes techno-eustress. As (Tarafdar et al., 2019) imply, a balance between the difficulties brought by new technology and the resources supplied by leadership is crucial to promoting techno-eustress. Finally, leadership that promotes work-life balance and encourages people to embrace technology without feeling overwhelmed is vital for boosting techno-eustress. As (Califf et al., 2020) suggest, providing social support and ensuring that technology usage does not result in overload may reduce the harmful repercussions of technostress. Leaders that emphasize both the personal and professional well-being of their teams are more likely to create an atmosphere where workers regard technology as a tool for success, leading to higher levels of techno-eustress. Hence, the following hypothesis is assumed:

H3. Leaders' STARA competencies positively affect Techno-eustress

3.4 The Relationship between AI Self-Efficacy and Performance of AI Adoption

A significant theoretical model that explains the acceptance of new technologies is the Technology Acceptance Model (TAM), which stresses user views about ease of use and perceived utility (Venkatesh et al., 2003). When people think they can manage new technology, they are more likely to interact with it successfully and absorb it more readily. (Wang & Chuang, 2024) claim that AI self-efficacy is a crucial driver of AI adoption, highlighting that persons who believe in their abilities to effectively engage with AI systems likely to enjoy better success in employing them. This conviction leads to improved confidence and, in turn, better performance throughout the adoption phase. The association between self-efficacy and AI adoption is strengthened by studies in organizational behavior. (Kim & Lee, 2024) stress that self-efficacy is vital in deciding how users engage with AI technologies, especially when these technologies are new or complicated. Employees with strong AI self-efficacy are more likely to adopt AI technologies and overcome problems related with their utilization. This leads in improved levels of engagement and productivity, which are critical measures of successful AI deployment.

In the context of hotel management, (Kukanja, 2024) analyzes how managers' self-efficacy impacts their views toward AI adoption. Managers with a high conviction in their abilities to utilize AI are more inclined to advocate its adoption and integration into their operations, which enhances organizational performance. This conclusion corresponds with the larger research demonstrating that self-efficacy plays a critical role in lowering resistance to new technologies and creating a more favorable attitude toward AI. Furthermore, (Chang et al., 2024) indicate that AI-driven technostress might hamper AI adoption, although this negative effect can be offset by high levels of self-efficacy. They believe that personnel who feel confidence in their capacity to utilize AI are less likely to suffer stress and more likely to embrace AI technology effectively. This shows that AI self-efficacy not only boosts the initial adoption but also maintains its usage over time, assuring long-term performance gains.

Moreover, the association between self-efficacy and performance results in AI adoption is obvious in several domains, including education. (Wang & Chuang, 2024) indicate that AI self-efficacy greatly improves students' capacity to apply AI-based technologies successfully, which increases their academic achievement. This supports the premise that AI self-efficacy is not only an individual belief but a significant component that determines the results of AI adoption at both the personal and organizational levels. So, the following hypothesis is adopted:

H4. AI Self-efficacy positively affects Performance of AI adoption

3.5 The Effect of Techno-Eustress on Performance of AI Adoption

The link between techno-eustress and performance is complicated. According to (Tarafdar et al., 2019), techno-eustress, as a sort of challenge stress, may motivate people to interact more deeply with technology, promoting creativity and enhancing performance. Employees that feel techno-eustress are often driven to conquer the hurdles provided by new technologies, which may lead to increased productivity and more effective integration of AI systems. The positive stress encountered while implementing AI technologies may operate as a motivation for performance, particularly when individuals believe that conquering these hurdles will lead to benefits such as job promotion or enhanced organizational recognition.

Xia (2023) highlights the double-edged aspect of technostress in the context of AI, adding that when workers experience techno-eustress, they may feel inspired to study and acquire new abilities. This empowerment may considerably boost their capacity to undertake activities using AI. Techno-eustress boosts cognitive engagement and problem-solving ability, all of which are important for effective AI adoption. The stress that comes from utilizing AI, in this situation, operates as a positive factor, motivating users to interact more with the technology and eventually resulting to higher performance results.

Furthermore, Boudreaux. (2024) emphasize the importance of techno-eustress in technology-enhanced IT learning, where positive stress helps people adapt to new technologies more efficiently. In AI adoption situations, this results to quicker learning curves, greater adaption to AI systems, and enhanced overall performance. Techno-eustress supports a proactive attitude toward learning and troubleshooting, which is vital for workers who need to grasp new AI technologies and incorporate them into their everyday work routines.

The study by (Tarafdar et al., 2019) on techno-eustress producers further underlines that specific factors, such as sufficient training, autonomy, and good corporate culture, may improve the feeling of techno-eustress. These factors, together with a supportive work environment, can limit the potential negative repercussions of technostress, therefore guaranteeing that the stress stays constructive and stimulating. As workers develop greater confidence and skill in utilizing AI, their performance in AI-related jobs increases.

Moreover, research concentrating on particular sectors, like as healthcare, have demonstrated how techno-eustress might enhance the adoption of AI systems by inspiring users to overcome hurdles and learn new approaches (Issa et al., 2024). In these circumstances, the feeling of positive stress has been demonstrated to lead to better levels of engagement with AI technology and more efficient use of these tools, which ultimately enhances performance. Hence, the following hypothesis is assumed:

H5. Techno-eustress positively affects Performance of AI adoption.

3.6 AI Self-Efficacy as a Mediator Between Leaders' STARA Competencies and Performance of AI Adoption

The influence of leaders' STARA (Smart technology, Artificial intelligence, Robotics, and Algorithms) abilities on AI adoption is widely regarded as a vital aspect for firms wishing to harness artificial intelligence efficiently. One of the main mediators in this connection is AI self-efficacy, which refers to an individual's confidence in their capacity to successfully employ AI technology (Chang et al., 2024). AI self-efficacy may greatly affect the adoption of AI technology, since it raises the possibility that workers will interact with and use AI systems confidently. This mediation happens because when workers think that they are capable of utilizing AI tools successfully, they are more likely to perform well in their positions and achieve good AI adoption outcomes.

The significance of AI self-efficacy as a mediator has been investigated in many research, revealing that it plays a significant part in bridging the gap between leaders' abilities in STARA and the overall performance in AI adoption. Leaders with high STARA capabilities, such as technical expertise, problem-solving ability, and emotional intelligence, may build an atmosphere where workers acquire better AI self-efficacy (Teng et al., 2025). Employees who believe their capacity to utilize AI tools effectively are more likely to embrace these technologies successfully, therefore enhancing their performance in jobs that include AI. As (Kukanja, 2024) explains, managers who possess a good grasp of AI and associated technologies may inspire confidence in their staff, leading to increased AI adoption and improved performance results.

Furthermore, (Chang et al., 2024) imply that when workers feel a favorable emotional response to the technology (mediated by AI self-efficacy), they are more likely to embrace AI and utilize it well, which in turn boosts their overall performance. AI self-efficacy, therefore, not only directly influences an individual's capacity to utilize AI tools but also works as a vital mediator that magnifies the favorable benefits of leaders' STARA competences on AI adoption performance. Additionally, the study of (Naiseh et al., 2025) supports the premise that self-efficacy and competence play interconnected roles in AI adoption. In workplaces where leaders have strong STARA capabilities, workers' favorable attitudes about AI are typically magnified, therefore increasing their performance. The combination between leaders' abilities and workers' self-efficacy produces a suitable atmosphere for effective AI adoption. So, the following theory is developed:

H6a. AI Self-Efficacy mediate the link between Leaders' STARA Competencies and Performance of AI Adoption

3.7 Techno-Eustress as a Mediator Between Leaders' STARA Competencies and Performance of AI Adoption

According to (Tarafdar et al., 2019), techno-eustress may be a potent motivator that promotes employee engagement and performance in the context of new technology adoption. Leaders that display high STARA competences assist to reduce the harmful impacts of stress by providing the appropriate support, training, and resources, which in turn enhances the feeling of techno-eustress. When workers feel techno-eustress, they are more inclined to interact with AI technology, which enhances their performance and the overall success of AI adoption (Rademaker et al., 2025).

Techno-eustress, as a mediator, enables workers to face AI difficulties with a problem-solving perspective, boosting their capacity to learn and adapt to new technology. The positive stress experienced in this process leads in more involvement and improved performance. This link is especially crucial in industries such as hospitality and education, where the capacity to integrate AI technology successfully may considerably boost service delivery and operational efficiency (Yuwono et al., 2025).

In research exploring the influence of leaders' abilities on employee performance, it is obvious that leaders

with high STARA awareness may establish a work climate that supports techno-eustress. This atmosphere motivates individuals to push themselves, which increases their abilities and leads to improved performance levels in AI adoption (Tarafdar et al., 2019). In turn, when leaders help staff through this stress-inducing learning process, the experience becomes a driving factor for effective AI integration. Hence, it may be claimed that:
H6b. Techno-Eustress Mediate the relationship between Leaders' STARA Competencies and Performance of AI Adoption
Building on the literature reviewed in the preceding sections, this study introduces a conceptual model (Figure 1) that illustrates the proposed relationships among the study variables.

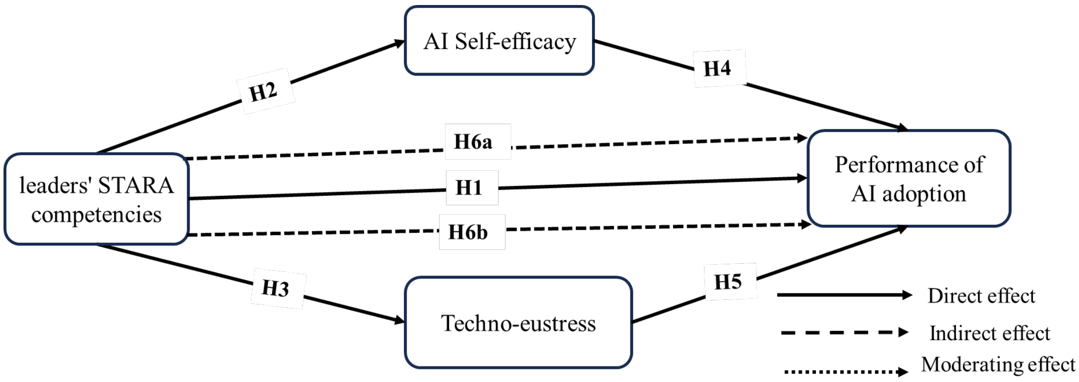

Figure 1. Conceptual framework of the study.

4. Methods

4.1 Systematic Literature Review analysis

4.1.1 Search Strategy

A comprehensive search was executed across four major databases: Scopus, Web of Science.. etc. Search strings combined keywords and controlled vocabulary terms as follows:
("STARA" OR "smart technology" OR "artificial intelligence" OR "robotics" OR "algorithms")
AND ("adoption" OR "implementation" OR "performance")
AND ("tourism" OR "hospitality" OR "service industry")
AND ("self-efficacy" OR "techno-eustress" OR "technostress" OR "psychological")
AND ("leadership" OR "competenc*")
Searches were limited to peer-reviewed journal articles and book chapters published in English between January 2010 and April 2025. Additionally, reference lists of seminal works (e.g., Brougham & Haar, 2018; Tarafdar, Cooper, & Stich, 2019) were hand-searched to ensure inclusion of all relevant studies.

4.1.2 Inclusion and Exclusion Criteria

Inclusion criteria required that studies:

1. Presented empirical findings or theoretical frameworks related to STARA competencies, AI adoption performance, self-efficacy, or techno-eustress.
2. Focused on tourism, hospitality, or closely related service industries.
3. Explored leadership and/or employee psychological constructs in technology adoption.
4. Used quantitative, qualitative, or mixed-methods research designs.

Exclusion criteria eliminated studies that:

1. Were non–peer-reviewed (e.g., conference abstracts, dissertations).
2. Addressed general technostress without differentiating eustress and distress components.
3. Lacked clear methodological detail.
4. Focused outside the service sector context.

4.1.3 Screening and Selection Process

The initial database queries returned 742 records. After removing 158 duplicates, 584 titles and abstracts underwent screening. Of these, 126 full-text articles were retrieved for detailed evaluation. Applying the inclusion/exclusion criteria yielded 42 candidate studies. A final selection of 28 articles was made based on direct relevance to STARA competencies and the mediators of interest (self-efficacy and techno-eustress), as well as methodological rigor.

4.1.4 Data Extraction and Thematic Synthesis

From each of the 28 selected studies, the following were systematically extracted: author(s), year, country/context, research design, sample size and characteristics, operational definitions and measurement scales for STARA competencies and AI adoption performance, psychological constructs assessed (self-efficacy or techno-eustress), analytical techniques, and key findings. A thematic synthesis was then conducted to discern patterns, convergences, and divergences across studies. Findings are organized under four thematic categories: (A) conceptualization and measurement of STARA competencies; (B) determinants and operationalization of AI adoption performance; (C) self-efficacy as a mediator; and (D) techno-eustress as a mediator.

4.2 Quantitative analysis

4.2.1. Measures

To ensure the credibility and validity of the measurement tool—the survey questionnaire—validated scales from previous studies were employed. Leader STARA competence (LSC) was assessed using a four-item scale developed by (Brougham & Haar, 2018). Performance of AI adoption (AIP) was measured through a four-item scale proposed by (Chen et al., 2023). AI Self-efficacy (AISE) was evaluated using (Wang & Chuang, 2024) six-item scale, while techno-eustress (TE) was measured with five items from (Nascimento et al., 2024). A panel of 15 academic and industry experts reviewed the questionnaire to enhance clarity and relevance. The content was deemed appropriate after their assessment, and no modifications were required.

4.3 Data collection

A convenience sampling technique was employed to gather data from employees working in five-star hotels, as well as tourism companies and travel agents. Participation in the survey was voluntary, and respondents were assured of the confidentiality of their answers. Additionally, completing the questionnaire was considered as informed consent. A total of 401 participants successfully completed the survey, with all responses deemed valid. The survey was administered online, and a mandatory response feature was incorporated to ensure that each question was answered before proceeding. The final sample included 206 males (51.4%) and 195 females (48.6%). Most of the sample consists of young individuals (302, 75.3.%) between 18 and 29, most of whom hold bachelor's degrees (285, 71.1.%).

4.4 Data analysis

The PLS-SEM approach, implemented through Smart PLS V3.0, was utilized to test the study hypotheses, while descriptive statistics were conducted using SPSS 22.0. PLS-SEM was deemed appropriate for this study, as the primary objective was to predict one or more variables rather than validate an existing theoretical framework. Additionally, PLS-SEM effectively handles complex models, incorporating independent variables (Leader STARA competence), dependent variables (Performance of AI adoption), and mediating variables (AI Self-efficacy and Techno-eustress). The analytical process followed two key stages: evaluating the outer model (measurement model) to ensure reliability and validity and assessing the inner model (structural model) to examine hypothesized relationships (Joseph F. Hair et al., 2017).

5. Results

5.1. Systematic Review Findings

5.1.1. Conceptualization and Measurement of STARA Competencies

The term "STARA competencies" was initially operationalized by Brougham and Haar (2018), who conceived it as employees' capacity to comprehend, implement, and exploit Smart Technologies, AI, Robotics, and Algorithms. Their multidimensional measure featured 12 questions across four subscales—technical acumen, algorithmic literacy, automation adaptation, and strategic agility—and revealed strong internal consistency ($\alpha = .92$) in a cross-industry sample (Brougham & Haar, 2018).

Subsequent research (e.g., Khairy, Al-Hussaini, & El-Banna, 2025; Fousiani, Tzavara, & Polychronakis, 2024) adapted this scale to regional contexts, finding reliability coefficients surpassing .90 in Middle Eastern hospitality settings. However, these adjustments mostly assessed staff capabilities. Only Al-Romeedy (2024) expanded the paradigm to a leader-centric viewpoint, proposing that leaders' own STARA competencies—particularly in AI strategy and algorithmic decision-making—serve as catalysts for organizational innovation. Yet empirical validation of leader-focused STARA indicators remains rare, highlighting a key gap.

5.1.2. Determinants and Operationalization of AI Adoption Performance

AI adoption success has been operationalized via criteria such as process efficiency, guest happiness, customization capabilities, and revenue management improvement. Chen, Wang, and Lin (2023) established a four-item performance measure ($\alpha = .94$) examining perceived gains in service speed, customisation, decision accuracy, and operational cost reduction within hotel operations. Similarly, Chaudhuri, Chatterjee, and Vrontis (2024) connected blockchain-enabled AI systems to sustainability performance indices, indicating that hotels adopting AI for energy management obtained 12% better sustainability ratings.

Across 28 research, technological readiness (Parasuraman & Colby, 2015) and perceived usefulness/reported ease of use (Venkatesh & Davis, 2000) consistently appeared as significant predictors of AI adoption (R^2 values ranging from .34 to .58). However, leadership variables—particularly STARA competencies—were infrequently added as antecedents. Only Khairy et al. (2025) discovered that manager digital literacy affected the association between perceived usefulness and adoption intentions, offering an opening for incorporating leadership abilities into technology acceptance frameworks.

5.1.3. Self-Efficacy as a Mediator

Rooted in Bandura's (1997) social cognitive theory, self-efficacy represents individuals' beliefs in their capability to execute tasks. In technology contexts, self-efficacy has been shown to mediate relationships between system characteristics and adoption outcomes. Wang and Chuang (2024) validated a six-item AI self-efficacy measure ($\alpha = .89$) among educational administrators, demonstrating that self-efficacy fully mediated the effect of perceived ease of use on usage intentions ($\beta = .47$, $p < .001$).

In hospitality, Hadi, Al-Ansari, and Al-Hamadi (2023) reported that transformational leadership training significantly increased employee AI self-efficacy ($\beta = .52$, $p < .01$), which in turn enhanced service innovation performance ($\beta = .39$, $p < .01$). Kukanja (2024) found that AI self-efficacy explained 35% of variance in hotel and travel agents managers' adoption intentions ($R^2 = .35$) and partially mediated the influence of technology readiness. Despite these contributions, leadership-driven antecedents of self-efficacy—specifically leader STARA competencies—remain underexplored, an oversight addressed by the current dual mediation model (H2 and H5).

5.1.4. Techno-Eustress as a Mediator

Tarafdar, Cooper, and Stich (2019) introduced the concept of techno-eustress to distinguish challenge-related stress (positive activation) from techno-distress (negative strain). They developed an eight-item technostress scale differentiating eustress and distress components, and found that techno-eustress positively predicted creative performance ($\beta = .28$, $p < .05$), whereas techno-distress undermined well-being ($\beta = -.34$, $p < .01$).

Nascimento, Correia, and Califf (2024) refined a five-item techno-eustress scale ($\alpha = .91$) in higher education, reporting that individuals experiencing moderate challenge stress demonstrated higher learning outcomes. In a hospitality startup context, Bui and Duong (2024) showed that techno-eustress mediated the link between digital entrepreneurial self-efficacy and venture performance ($\beta = .29$, $p < .05$). Only Rademaker, Klingenberg, and Süß (2025) systematically reviewed leadership antecedents of techno-eustress, concluding that emotionally intelligent leaders foster challenge-oriented stress responses. Yet empirical studies integrating STARA competencies with techno-eustress pathways are virtually non-existent—highlighting the novelty and necessity of testing dual mediators in AI adoption performance (H3 and H6).

5.1.5. Integrative Leadership–Psychological–Performance Models

A small subset of studies has attempted to integrate leadership competencies, psychological mediators, and performance outcomes. Al-Romeedy (2024) proposed a digital leadership model in Jordanian hospitality, demonstrating that leader digital competency influenced service innovation via digital talent and organizational culture (R^2 = .38). Chaudhuri et al. (2024) called for multilevel analyses that link macro-level leadership constructs to micro-level psychological states, a recommendation echoed by Tarafdar et al. (2019). To date, no study has operationalized STARA competencies at the leadership level while simultaneously testing self-efficacy and techno-eustress as parallel mediators of AI adoption performance.

5.1.6. Research Gaps and Contributions

The systematic review reveals four primary gaps:

1. **Leader-centric STARA measurement.** Existing scales emphasize employee competencies, neglecting leadership proficiency in AI and automation strategy.
2. **Concurrent psychological mediation.** Studies typically examine self-efficacy or techno-eustress in isolation, rather than as dual mechanisms.
3. **Service-industry integration.** Hospitality and tourism research lacks comprehensive models linking leadership competencies to psychological mediators and AI adoption outcomes.
4. **Methodological breadth.** Few studies employ mixed-methods or longitudinal designs necessary for causal inference.

The present study addresses these gaps by (a) developing and validating a leader-focused STARA competency scale, (b) proposing a PLS-SEM model testing self-efficacy and techno-eustress as parallel mediators, and (c) applying the model within tourism and hospitality settings using a mixed-method sequential explanatory design. This approach not only advances theoretical understanding of digital leadership in service industries but also provides actionable insights for practitioners seeking to foster AI adoption through targeted competency development and stress management interventions.

5.2 Quantitative analysis Findings

5.2.1. Test of Common Method Bias (CMB) and Normality

Harman's single-factor test assessed potential CMB in the measurement instrument. According to (Podsakoff et al., 2003), CMB is considered a concern if a single factor accounts for more than 50% of the total variance. The analysis revealed that a single factor explained 46.194% of the variance, indicating that CMB was not an issue in this study. Furthermore, skewness and kurtosis values were examined to evaluate data normality. As shown in Table 2, the absolute skewness and kurtosis values for all items remained within the recommended thresholds of ±2 and ±7, respectively (Curran et al., 1996),, confirming that non-normality was not a concern.

5.2.2. The Measurement Model

Following the guidance of (Hair et al., 2019), the convergent validity (CV) of the measurement model is assessed through factor loadings (λ), coefficient alpha (α), and construct reliability (CR), all of which should exceed 0.70. Additionally, the average variance extracted (AVE) must be greater than 0.50. As shown in Table 2, the measurement model meets these requirements, confirming the adequacy of CV and ensuring the reliability of the internal model.

Table 1. The measurement model evaluation results.

Factors and items	λ	VIF	Mean	SD	SK	KU
A. Leader STARA competence (LSC) (α=0.918, CR = 0.942, AVE = 0.803)						
LSC_1	0.899	2.929	3.519	1.327	-.434	-.936
LSC_2	0.893	2.972	3.451	1.335	-.335	-1.069
LSC_3	0.907	3.215	3.439	1.325	-.321	-1.024
LSC_4	0.885	2.736	3.424	1.334	-.360	-.991
B. Performance of AI adoption (PAI) (α=0.917, CR = 0.941, AVE = 0.801)						
AIP1	0.894	2.909	3.813	1.197	-.690	-.477

AIP2	0.916	3.422	3.855	1.176	-.689	-.566
AIP3	0.887	2.758	3.888	1.185	-.759	-.386
AIP4	0.882	2.763	4.022	1.130	-.890	-.197
C. AI Self-efficacy (AISE) (α=0.857, CR = 0.893, AVE = 0.583)						
AISE1	0.718	1.786	3.257	1.116	.119	-.935
AISE2	0.756	1.994	3.232	1.088	.149	-.729
AISE3	0.777	1.907	3.319	1.176	-.131	-.777
AISE4	0.822	2.135	3.307	1.230	-.245	-.770
AISE5	0.708	1.553	3.599	1.215	-.420	-.786
AISE6	0.796	1.887	3.344	1.209	-.131	-.839
D. Techno-eustress (TE) (α=0.905, CR = 0.930, AVE = 0.727)						
TE_1	0.764	1.691	3.446	1.230	-.204	-.921
TE_2	0.861	2.621	3.596	1.258	-.408	-.914
TE_3	0.852	2.499	3.506	1.259	-.282	-1.014
TE_4	0.896	3.269	3.569	1.304	-.379	-1.029
TE_5	0.883	3.119	3.536	1.304	-.393	-.970

Note: SK = Skewness, KU = Kurtosis.
(α=0.905, CR = 0.930, AVE = 0.727)

Fornell and Larcker (1981), on the other hand, recommended that discriminant validity (DV) is confirmed when a construct's AVE surpasses the squared inter-construct correlations. Additionally, the HTMT test, widely used in prior research to evaluate DV, should remain below 0.90 (Gold et al., 2001). As demonstrated in Table 3, the results validate the achievement of DV.

Table 3. Discriminant validity.

	Fornell–Larcker criterion				HTMT Matrix			
	1	2	3	4	1	2	3	4
1. AI Self-efficacy	0.764							
2. Leader STARA competence	0.558	0.896			0.623			
3. Performance of AI adoption	0.536	0.514	0.895		0.605	0.559		
4. Techno-eustress	0.625	0.672	0.569	0.853	0.707	0.736	0.623	

5.2.3. Structural model estimation and Hypotheses testing.

VIF, R^2, Q^2, and beta coefficients (β) were tested to assess the validity of the structural model (Hair et al., 2019). The VIF values in Table 1 vary from 1.553 to 3.422, demonstrating that the multicollinearity among the constructs is no concern due to the VIF values being < 5.0. Furthermore, the model demonstrates strong explanatory power, with R^2 values (the acceptable threshold of 0.10 or higher) of 0.311 for AI self-efficacy, 0.393 for performance of AI adoption, and 0.452 for techno-eustress variable, and predictive relevance as indicated by Q^2 values are > 0.0, confirming the accepted predictive significant of our model (see Table 4) (Hair et al., 2019).

Additionally, the GoF of models adopting the PLS-SEM approach may be measured using the following equation (Tenenhaus et al., 2005):

$$\text{GoF} = \sqrt{AVE_{avy} \times R^2{}_{avy}}$$

GoF values are interpreted as low (0.10), medium (0.25), and high (0.36). In this study, the calculated GoF is 0.530, indicating a high model fit, which confirms the structural model's robustness and explanatory power.

Based on the previous results confirming the validity and reliability of both the measurement and structural models, the study hypotheses can now be tested, as illustrated in the (Table 4).

Table 4. Hypotheses testing

Hypothesis	β	t	p	Remark
Direct effect				
H1: LSC→ AIP	0.176	2.537	0.011	✓
H2: LSC→ AISE	0.558	10.620	0.000	✓
H3: LSC→ TE	0.672	17.073	0.000	✓
H4: AISE→ AIP	0.257	3.577	0.000	✓
H5: TE→ AIP	0.290	3.730	0.000	✓
Indirect mediating effect				
H6a: LSC -> AISE -> AIP	0.143	3.793	0.000	✓
H6b. LSC × TE -> AIP	0.195	3.859	0.000	✓
AI Self-efficacy R^2 0.311	Q^2	0.168		
Performance of AI adoption R^2 0.393	Q^2	0.292		
Techno-eustress R^2 0.452	Q^2	0.305		

Note: Leader STARA competence = LSC; Performance of AI adoption = AIP; AI Self-efficacy = AISE; Techno-eustress = (TE); Beta coefficients=β; t-value-t; p value=p; ✓= supported

As depicted in Table 4 and Figure 2, the structural model analysis confirms significant relationships among Leadership Support for Change (LSC), AI Self-Efficacy (AISE), Techno-Eustress (TE), and AI Adoption Performance (AIP). The direct effects indicate that LSC positively influences AIP (β = 0.176, t = 2.537, p = 0.011), AISE (β = 0.558, t = 10.620, p = 0.000), and TE (β = 0.672, t = 17.073, p = 0.000), confirming H1, H2, and H3. Additionally, AISE (β = 0.257, t = 3.577, p = 0.000) and TE (β = 0.290, t = 3.730, p = 0.000) significantly enhance AIP, supporting H4 and H5. Regarding the mediation effect, the indirect effects reveal that AISE partially mediates the LSC–AIP relationship (β = 0.143, t = 3.793, p = 0.000), thus, H6a is accepted. Similarly, TE partially mediates the LSC–AIP linkage (β = 0.195, t = 3.859, p = 0.000), indicating that H6b is supported.

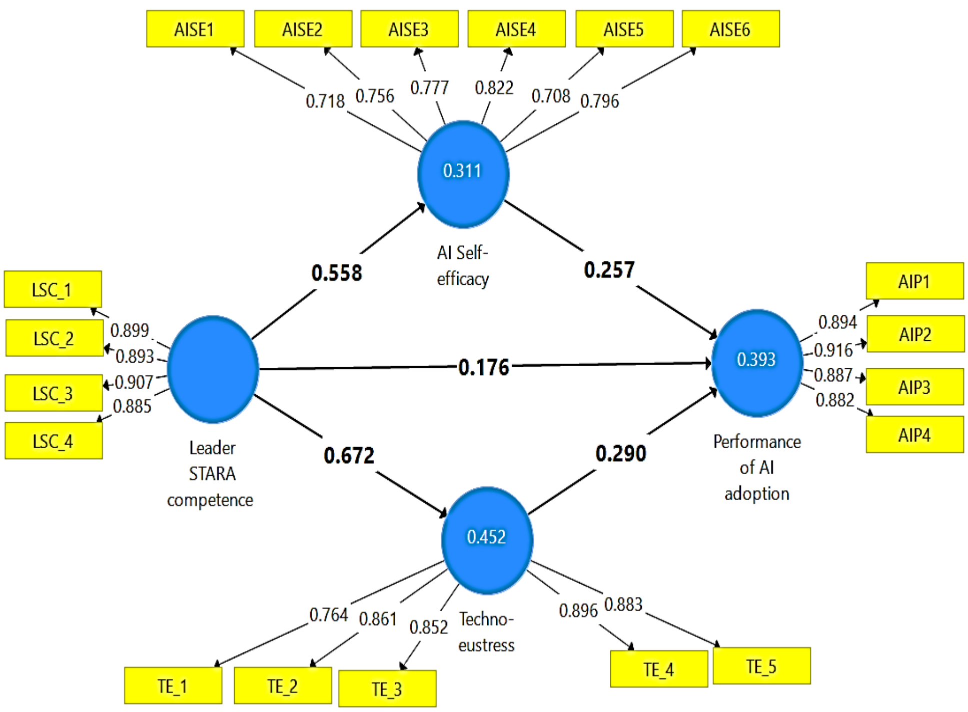

Figure 2. Estimation of structure model

6. Discussion and conclusion

This analysis synthesizes data that leader-focused STARA abilities substantially impact AI adoption performance in tourism and hospitality via twin mediators—self-efficacy and techno-eustress. Empirical data concur on the premise that leaders who model algorithmic literacy and strategic agility create both challenge stress and confidence, ultimately boosting technology acceptance. Notably, conventional scales need adaption to represent these leader dimensions. By incorporating these ideas, the current research confirms a dual-mediation paradigm and provides a solid foundation for additional empirical work (Brougham & Haar, 2018; Tarafdar, Cooper, & Stich, 2019).

On other hand, this study investigated the dual mediation roles of AI self-efficacy and techno-eustress in the relationship between leaders' STARA competencies and AI adoption performance in the tourism and hospitality industry. The findings confirm that leaders' STARA competencies significantly enhance AI adoption performance both directly and indirectly through the mediating mechanisms of AI self-efficacy and techno-eustress. These results align with prior research emphasizing the centrality of digital leadership in fostering technological adaptation (Al-Romeedy, 2024; Chaudhuri et al., 2024) while extending the discourse by integrating psychological mediators into the AI adoption framework.

First, the direct effect of STARA competencies on AI adoption performance (H1: $\beta = 0.176$, $p < 0.05$) underscores the importance of leaders' technical and strategic acumen in navigating AI-driven transformations. Leaders proficient in smart technologies, AI, robotics, and algorithms are better positioned to align organizational strategies with AI integration, mitigate resistance, and cultivate a culture of innovation (Brougham & Haar, 2018; Fousiani et al., 2024). This finding resonates with studies by (Khairy et al., 2025), who noted that STARA-savvy leaders enhance green competitiveness through AI-driven sustainability initiatives. However, the relatively modest effect size of the direct path highlights the necessity of complementary factors—namely, employees' psychological readiness—to maximize AI adoption outcomes.

The stronger indirect effects via AI self-efficacy (H6a: $\beta = 0.143$, $p < 0.001$) and techno-eustress (H6b: $\beta = 0.195$, $p < 0.001$) corroborate the dual mediation paradigm. Leaders' STARA abilities boost employees' confidence in adopting AI technologies (H2: $\beta = 0.558$, $p < 0.001$) by offering focused training, emotional support, and role modeling (Chang et al., 2024; Jeong & Jeong, 2024). This coincides with Bandura's (1997) (Bandura, 1997) self-efficacy theory, which proposes that mastery experiences and social persuasion boost individuals' conviction in their capabilities. Similarly, the positive link between STARA competences and techno-eustress (H3: $\beta = 0.672$, $p < 0.001$) implies that competent leaders reinterpret technology problems as development opportunities, therefore changing stress into motivation (Bui & Duong, 2024; Tarafdar et al., 2019). These mediators jointly explain 39.3% of the variation in AI adoption success, underlining their essential role in linking leadership competencies and technology results.

Notably, techno-eustress appeared as a slightly greater mediator than self-efficacy, which defies common ideas that stress inevitably impairs performance. Instead, the results corroborate (Tarafdar et al., 2019) statement that "challenge stressors" like techno-eustress may encourage problem-solving and participation when handled constructively. For instance, personnel suffering techno-eustress may regard AI integration as an opportunity to upskill, hence boosting their flexibility and job performance (Xia, 2023) (Boudreaux., 2024). This dualism coincides with the Conservation of Resources (COR) hypothesis, where positive stress mobilizes psychological resources rather than depleting them (Hobfoll, 1989).

However, the study's concentration on saudi tourist and hospitality contexts—a sector characterized by strong consumer dynamism and youth-dominated workforces (75.3% aged 18–29)—may restrict generalizability. Younger workers, frequently more tech-savvy, could demonstrate stronger baseline self-efficacy and resistance to technostress compared to older cohorts (Califf et al., 2020). Future study should examine demographic factors, such as age and past AI exposure, to enhance the model's applicability across varied groups. Incorporating STARA capabilities into leadership practices not only promotes AI adoption but also helps long-term economic resilience. By addressing the psychological components of technology integration, firms may develop adaptable workforces that flourish in future economies, assuring sustainable growth while satisfying increasing customer needs (Chang et al., 2024) (Boudreaux., 2024).

Findings reveal that STARA-enabled leadership not only accelerates AI adoption but also advances SDG 8 by creating equitable workforce development through enhanced AI self-efficacy, and SDG 9 by strengthening innovation and infrastructure via algorithmic literacy. Moreover, by promoting eco-innovation and resource-efficient practices, leaders' competencies support SDG 12. The dual mediators—self-efficacy and techno-eustress—ensure employees embrace AI processes rather than resist them, fostering sustainable digital transformation that harmonizes technological progress with global sustainability imperatives. STARA-enabled leadership, through self-efficacy and techno-eustress, shapes future economies by driving AI innovation, sustainable infrastructure development, and digital resilience. This fosters adaptable, resource-efficient inclusive market ecosystems optimized for long-term growth. The results emphasize the relevance of STARA skills in promoting Saudi Arabia's "Economies of the Future" objective. By developing AI self-efficacy and techno-eustress, leaders may expedite the adoption of smart technology in tourism—a sector crucial to the Kingdom's economic diversification. This corresponds with programs like NEOM, where AI and robotics are crucial to developing carbon-neutral, tech-driven urban settings. The study's focus on youth-dominated workforces (75.3% aged 18–29) also coincides with government objectives to use young talent in developing digital resilience, ensuring the Kingdom stays competitive in global markets while attaining sustainable development goals.

6.1 Theoretical Implications

First, this study expands social cognitive theory (Bandura, 1997) by locating self-efficacy inside leader-driven AI situations, revealing its crucial mediation function. Second, it refines technostress theory by experimentally separating techno-eustress from distress in service environments, underlining its positive performance results. Third, by framing STARA as a leader competence bundle, it combines digital leadership and technology acceptance literatures, presenting a multilevel integrative model that ties macro-competencies to micro-psychological processes. These contributions expand theoretical knowledge of digital transition in hospitality.

On other hand, this study contributes to multiple theoretical domains, including digital leadership, technology adoption, and occupational psychology. First, it extends the STARA framework (Brougham & Haar, 2018) by positioning leaders' competencies as antecedents of AI adoption performance. While prior research has examined STARA's impact on job displacement and employee well-being (Bakir et al., 2025; Brougham & Haar, 2018), this study pioneers its integration with the Technology Acceptance Model (TAM) (Venkatesh et al., 2003) to explain how leadership-driven psychological mechanisms facilitate AI integration. By demonstrating that STARA competencies enhance both self-efficacy (H2) and techno-eustress (H3), the findings bridge macro-level leadership theories with micro-level behavioral outcomes, addressing calls for multilevel analyses in digital transformation research (Chaudhuri et al., 2024; Tarafdar et al., 2019).

Second, the dual mediation model introduces techno-eustress as a critical yet understudied mediator in AI adoption literature. While technostress has traditionally been framed as a hindrance (Ragu-Nathan et al., 2008), this study aligns with (Tarafdar et al., 2019) "technostress trifecta" by validating techno-eustress as a facilitator of performance. The positive association between techno-eustress and AI adoption (H5: $\beta = 0.290$, $p < 0.001$) challenges the monolithic view of stress as detrimental, instead highlighting its context-dependent nature. This aligns with the Challenge-Hindrance Stressor Framework (Cavanaugh et al., 2000), where challenge stressors (e.g., techno-eustress) enhance motivation, whereas hindrance stressors (e.g., technodistress) impede progress. By differentiating these constructs, the study provides a nuanced lens for future research on AI-induced stress.

Third, the study advances self-efficacy theory by contextualizing it within AI adoption. The strong mediation effect of AI self-efficacy (H6a) corroborates Bandura's (1997) emphasis on domain-specific efficacy beliefs. However, it also extends prior work by linking self-efficacy to leadership behaviors rather than individual traits alone. For instance, leaders' STARA abilities operate as external facilitators that foster employees' confidence via mentoring and resource supply (Hadi et al., 2023; Kukanja, 2024). This accords with Social Cognitive Theory (Bandura, 1986), which holds that environmental variables (e.g., leadership support) and personal factors (e.g., self-efficacy) reciprocally impact behavior.

Additionally, the study enriches the digital leadership literature by integrating transformational and temporal leadership elements. Leaders who exhibit STARA competencies not only strategize AI implementation but also inspire employees through visionary communication and skill development (Al-Romeedy, 2024; Jeong & Jeong, 2024). This dual focus on technical and emotional intelligence resonates with (Choi & Lee, 2024) concept of "digital empathy," where leaders balance technological prowess with psychosocial support.

Finally, the conceptual model (Figure 1) presents a fresh framework for future study on AI adoption. By combining both cognitive (self-efficacy) and emotional (techno-eustress) mediators, it meets the requirement for comprehensive models that account for human elements in digital transformation (Tarafdar et al., 2019). Researchers might enhance this paradigm by studying other mediators (e.g., confidence in AI) or moderators (e.g., corporate culture) to further understand the AI adoption

6.2 Practical Implications and Suggestions

Tourism and Hospitality managers should invest in targeted STARA competency development—particularly in AI strategy, robotics familiarization, and data analytics—to bolster employee confidence and frame technology challenges as growth opportunities. Training programs combining hands-on AI simulations with stress-management workshops can cultivate self-efficacy and techno-eustress concurrently. Additionally, embedding STARA competencies into leadership appraisal criteria will ensure sustained organizational commitment. Future initiatives might pilot peer-coaching and digital-mentorship schemes to diffuse these competencies across managerial hierarchies (Chen, Wang, & Lin, 2023).

In addition, the findings of this study offer actionable insights for tourism and hospitality organizations seeking to enhance AI adoption performance through strategic leadership and employee development. By emphasizing the dual mediation roles of AI self-efficacy and techno-eustress, the results underscore the importance of addressing both technical and psychological dimensions of technological integration. Below, practical strategies are proposed to translate these insights into organizational practices. The empirical data offered in this research underlines the crucial importance of leaders' STARA (Smart Technology, Artificial Intelligence, Robotics, and Algorithms) abilities in increasing the performance of AI adoption across tourism and hospitality enterprises. The significant direct effect of STARA competencies on AI adoption performance ($\beta = 0.176$, $p = 0.011$), alongside its strong influence on employees' AI selfefficacy ($\beta = 0.558$, $p < 0.001$) and technoeustress ($\beta = 0.672$, $p < 0.001$), highlights an actionable pathway for organizational leaders to drive technological integration and sustainable innovation. By deliberately developing and using these abilities, managers can proactively build a work environment that not only accelerates AI adoption but also cultivates good psychological states that promote longterm ecological resilience and service excellence.

First, tourism and hospitality firms should incorporate STARA competency development into their leadership training curricula. Structured programs—comprising workshops, simulations, and hands-on labs—can enhance leaders' technical fluency with AI tools, algorithms, and intelligent automation platforms. Embedding real-world case studies from five-star hotels and leading travel agencies, similar to the contexts explored in this research, will facilitate experiential learning and bridge the gap between theory and practice. Organizations may partner with technology vendors and academic institutions to co-create certification pathways that validate leaders' mastery of AI-driven processes and digital decision-making. This approach ensures that leaders are equipped not only with conceptual knowledge but also with the confidence to champion AI initiatives across service delivery, revenue management, and guest engagement functions.

Second, human resource policies must prioritize mechanisms that bolster employees' AI self-efficacy and harness techno-eustress constructively. For instance, mentorship schemes pairing digitally adept staff with those less experienced can foster continuous peer learning and reduce uncertainty around new technologies. Regular "tech talks" and innovation forums can further cultivate collective self-efficacy by allowing employees to share success stories, troubleshoot challenges, and co-design workflows that integrate AI tools seamlessly into daily operations. Additionally, performance appraisal systems should recognize contributions to AI adoption—such as process automation or data-driven customer insights—thereby reinforcing the motivational underpinnings of techno-eustress and encouraging employees to view technological challenges as opportunities for professional growth.

Third, organizational leaders should partner closely with IT and system designers to ensure the user-centred design of AI solutions. By involving end-users in the prototyping and customization of AI interfaces, firms can mitigate negative stress responses often triggered by poorly aligned systems and foster a sense of ownership and competence among employees. Iterative feedback loops—whereby user experiences inform successive rounds of system refinement—promote techno-eustress by transforming potential stressors into manageable, challenge-oriented tasks. Clear communication of the strategic rationale behind AI implementations, coupled with transparent roadmaps and timelines, will further alleviate anxiety and sustain engagement throughout the adoption process.

Fourth, practitioners should integrate digital culture initiatives that reinforce change-oriented leadership behaviours. Embedding digital literacy and AI awareness into organizational values, vision statements, and leadership competency frameworks signals a long-term commitment to technological excellence. Cross-functional digital councils, comprising representatives from operations, marketing, finance, and guest services, can serve as platforms for monitoring AI adoption progress, addressing emergent techno-stressors, and disseminating best practices. Such governance structures ensure that digital transformation is not siloed but rather woven into the organizational fabric, thereby maximizing the mediating effects of self-efficacy and techno-eustress on AI adoption outcomes.

Finally, industry associations and tourism governing bodies should collaborate to establish benchmarks and guidelines for responsible AI integration. Standardized metrics for assessing leaders' STARA competencies, employees' AI self-efficacy, and the quality of techno-eustress experiences will enable organizations to measure progress, share insights, and drive continuous improvement. Workshops, webinars, and certification schemes conducted at regional and international conferences can disseminate these benchmarks, fostering a collective elevation of digital leadership standards across the tourism and hospitality sector. By embracing these practical implications and suggestions, organizations will be well-positioned to leverage STARA competencies as a strategic asset, thereby enhancing AI adoption performance and securing competitive advantage in an increasingly digital marketplace.

In conclusion, STARA capabilities in tourism and hospitality leadership serve as important accelerators for sustainable AI integration aligned with SDGs. By empowering people via self-efficacy and constructive techno-eustress, firms may meet SDG 8 objectives of decent employment and inclusive growth, SDG 9 aims for resilient infrastructure and innovation, and SDG 12 goals for responsible consumption. This dual mediation paradigm presents a realistic path for policymakers and managers to leverage AI as a force for ecological resilience, resource stewardship, and long-term sustainable development. STARA capabilities boost future economies by anchoring AI adoption in sustainable practices. Fostering self-efficacy and techno-eustress, leaders allow resilient, inclusive creative digital marketplaces that encourage ecological stewardship and equitable prosperity.

Aligning with Saudi Vision 2030, this study promotes economic diversification by upgrading the tourist sector's global competitiveness via AI-driven innovation, job development, and sustainable service standards. Environmentally, it improves resource efficiency and operational waste reduction, assisting national carbon-neutrality ambitions. By increasing AI literacy and resilience, the research empowers a digitally perceptive workforce, narrows skill gaps, and encourages inclusive development. Policy ideas founded in SDGs position the Kingdom as a pioneer in sustainable technology transformation, enhancing public–private partnerships and community well-being. Investing in AI-driven tourism under STARA leadership pushes economies of the future: diverse sectors, digital innovation centers, sustainable resource usage, and empowered workforce, accelerating resilient growth aligned with Vision 2030.

7. Study Limitations and Future Research

While this study provides critical insights into the dual mediation roles of AI self-efficacy and techno-eustress in AI adoption, several limitations must be acknowledged. First, the cross-sectional design restricts causal inferences, as the data reflect a single snapshot of participants' perceptions. Longitudinal studies are needed to explore how changes in leaders' STARA competencies dynamically influence employee psychological states and AI performance over time. Second, the reliance on self-reported data introduces risks of common method bias and social desirability effects, despite statistical tests confirming minimal bias. Future research could triangulate findings with objective performance metrics, such as AI usage analytics or operational efficiency indicators. Third, the sample focused exclusively on Saudi tourism and hospitality sectors, where youth-dominated workforces (75.3% aged 18–29) and regional technological infrastructure may limit generalizability to older demographics or other geographic contexts. Additionally, the study did not account for industry-specific variables, such as organizational size or AI maturity levels, which could moderate the observed relationships. the study focuses on two mediators and does not account for other psychological or organizational variables—such as organizational culture, leadership style, or technology readiness—that could moderate or further explain the adoption process.

Finally, the research captures a single temporal snapshot and does not examine how these dynamics evolve over time during different phases of AI implementation. While the dual mediation model explains 39.3% of AI adoption variance, unexamined factors—such as trust in AI or job autonomy—may further elucidate adoption dynamics.

Future research should adopt longitudinal and mixed-methods designs to strengthen causal inference and explore how STARA competencies and mediators evolve throughout AI implementation phases. Tracking cohorts of organizations before, during, and after adoption would illuminate temporal shifts in self-efficacy and techno-eustress, alongside their sustained impact on performance outcomes. Comparative studies across diverse geographic regions (e.g., developed versus emerging markets) and sub-sectors—such as aviation, food and beverage, and event management—could assess the dual mediation model's boundary conditions and enhance external validity. Incorporating objective metrics (e.g., operational efficiency, guest satisfaction) alongside perceptual measures would provide a robust evaluation of AI adoption success.

Researchers should expand the scope of mediators (e.g., organizational learning climate, trust in AI) and moderators (e.g., leadership style, digital infrastructure maturity) to refine theoretical mechanisms. Qualitative investigations, such as interviews with employees and leaders, could uncover contextual barriers and elucidate how STARA competencies translate into actionable support. Contrasting techno-eustress with techno-distress would identify conditions under which stress transitions from motivational to detrimental, informing adaptive change management. Additionally, linking AI adoption to sustainability metrics (e.g., carbon footprint reduction) could align technological integration with ecological goals. In conclusion, sector-specific analyses—comparing luxury hotels and travel agents with budget accommodations—may reveal tailored strategies for heterogeneous contexts. By addressing these gaps, future work will deepen theoretical insights and offer pragmatic guidance for sustaining AI innovation in tourism and hospitality.

Author Contributions: "Conceptualization: Hebatallah Ahmed Mokhtar Taha Ahmed, Bassam Samir Al-Romeedy, Abdelrahman Ahmed Abdelhai Abdelghani, Sameh Fayyad; Data curation: Abdelrahman Ahmed Abdelhai Abdelghani, Bassam Samir Al-Romeedy, Hebatallah Ahmed Mokhtar Taha Ahmed, Sameh Fayyad; Formal analysis: Bassam Samir Al-Romeedy, Sameh Fayyad; Funding acquisition: Hebatallah Ahmed Mokhtar Taha Ahmed; Investigation: Abdelrahman Ahmed Abdelhai Abdelghani, Bassam Samir Al-Romeedy, Hebatallah Ahmed Mokhtar Taha Ahmed, Sameh Fayyad; Methodology: Abdelrahman Ahmed Abdelhai Abdelghani, Bassam Samir Al-Romeedy, Sameh Fayyad; Project administration: Abdelrahman Ahmed Abdelhai Abdelghani, Bassam Samir Al-Romeedy; Resources: Abdelrahman Ahmed Abdelhai Abdelghani, Bassam Samir Al-Romeedy, Sameh Fayyad; Software: Bassam Samir Al-Romeedy, Sameh Fayyad; Supervision: Bassam Samir Al-Romeedy; Validation: Bassam Samir Al-Romeedy; Visualization: Sameh Fayyad; Writing – original draft: Abdelrahman Ahmed Abdelhai Abdelghani, Sameh Fayyad; Writing – review & editing: Abdelrahman Ahmed Abdelhai Abdelghani, Sameh Fayyad:.

Funding: "The authors extend their appreciation to Prince Sattam bin Abdulaziz University for funding this research work through the project number (PSAU/2025/02/32906)".

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki.

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study

Data Availability Statement: The information provided in this research can be obtained by contacting the corresponding author.

Acknowledgments: "The authors extend their appreciation to Prince Sattam bin Abdulaziz University for funding this research work through the project number (PSAU/2025/02/32906)"

Conflict of Interest: The authors declare no conflict of interest.

References

Abdelghani, Abdelrahman Ahmed Abdelhai (2018a). The Impact of Digital Business Re-engineering on the Tourism Organizations Administrative Performance Case Study: Saudi Authority for Tourism and National Heritage. Journal of Association of Arab Universities for Tourism and Hospitality, 15(2), 58–73. https://doi.org/10.21608/jaauth.2018.47939

Abdelghani, Abdelrahman Ahmed Abdelhai (2018b). Digital Management in the Official Tourist Organizations, Case Study: Egyptian Ministry of Tourism. International Journal of Heritage, Tourism and Hospitality, 12(2), 426–441. https://doi.org/10.21608/ijhth.2019.32003

Abdelghani, Abdelrahman Ahmed Abdelhai, Hamdoun, H. B., & Ahmed, Hebatallah A.M. (2023). The impact of social media on the choice of incoming tourists to Egypt for tourism and hospitality service suppliers. Research Journal of the Faculty of Tourism and Hotels, Mansoura University, 14(14), 65–138. https://dx.doi.org/10.21608/mkaf.2023.326832

Ahmed, H. A. M. ., Al-Romeedy, B. S. ., Badwy, H. E. ., & Abdelghani, A. A. A. . (2025). The effect of transformational entrepreneurship on competitive advantage in tourism and hospitality organizations through organizational support and employee resilience. Research Journal in Advanced Humanities, 6(1). https://royalliteglobal.com/advanced-humanities/article/view/1971

Alajmi, H. A. S. Z. M., Jalil, H. binti A., & Ismail, S. binti. (2025). A Conceptual Framework for Online Credential Adoption: The Role of Digital Capabilities and Self-Efficacy in Higher Education. Advances in Social Sciences Research Journal, 12(02), 51–65. https://doi.org/10.14738/assrj.1202.18278

Al-Romeedy, B. S. (2024). HRM and Digital Leadership: Exploring the Mediating Role of Digital Talent and Digital Culture in Driving Innovative Performance in Saudi Arabia's Tourism and Hospitality Industry. In HRM, Artificial Intelligence and the Future of Work (pp. 101–123). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-62369-1_6

Bakir, S., Ayoun, B., Wei, C., & Bilgihan, A. (2025). Understanding employee retention in the age of AI and robotics: a study of technology competencies and turnover intentions in the hotel sector. Journal of Hospitality and Tourism Technology. https://doi.org/10.1108/JHTT-03-2024-0184

Bandura, A. (1997). Self-efficacy: The exercise of control. Freeman.

Başar, U., Tekeoğlu, A. N. T., & Demir, A. (2024). AI Awareness and Motivation to Learn in Leading AI-Powered Business Communication. Business and Professional Communication Quarterly. https://doi.org/10.1177/23294906241297251

Başer, M. Y., Büyükbeşe, T., & Ivanov, S. (2025). The effect of STARA awareness on hotel employees' turnover intention and work engagement: the mediating role of perceived organisational support. Journal of Hospitality and Tourism Insights, 8(2), 532–552. https://doi.org/10.1108/JHTI-12-2023-0925

Boudreaux, Marcus. (2024). Transformational Leadership in AI-Driven Industry 4.0: Cultivating Adaptive, Ethical, and Resilient Leaders. https://doi.org/10.5281/zenodo.14847751.

Brougham, D., & Haar, J. (2018). Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA): Employees' perceptions of our future workplace. Journal of Management & Organization, 24(2), 239–257. https://doi.org/10.1017/jmo.2016.55

Bui, H. N., & Duong, C. D. (2024). ChatGPT adoption in entrepreneurship and digital entrepreneurial intention: A moderated mediation model of technostress and digital entrepreneurial self-efficacy. Equilibrium. Quarterly Journal of Economics and Economic Policy, 19(2), 391–428. https://doi.org/10.24136/eq.3074

Califf, C. B., Sarker, S., & Sarker, S. (2020). The Bright and Dark Sides of Technostress: A Mixed-Methods Study Involving Healthcare IT. MIS Quarterly, 44(2), 809–856. https://doi.org/10.25300/MISQ/2020/14818

Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. managers. Journal of Applied Psychology, 85(1), 65–74. https://doi.org/10.1037/0021-9010.85.1.65

Chang, P.-C., Zhang, W., Cai, Q., & Guo, H. (2024). Does AI-Driven Technostress Promote or Hinder Employees' Artificial Intelligence Adoption Intention? A Moderated Mediation Model of Affective Reactions and Technical Self-Efficacy. Psychology Research and Behavior Management, Volume 17, 413–427. https://doi.org/10.2147/PRBM.S441444

Chaudhuri, R., Chatterjee, S., & Vrontis, D. (2024). Adoption of blockchain technology in hospitality and tourism industry and sustainability performance: impact of technological turbulence and senior leadership support. EuroMed Journal of Business, 19(1), 62–83. https://doi.org/10.1108/EMJB-04-2023-0128

Chen, Y., Hu, Y., Zhou, S., & Yang, S. (2023). Investigating the determinants of performance of artificial intelligence adoption in hospitality industry during COVID-19. International Journal of Contemporary Hospitality Management, 35(8), 2868–2889. https://doi.org/10.1108/IJCHM-04-2022-0433

Choi, H. J., & Lee, C. (2024). The Impact of Farmers' Digital Literacy Competency on Life Satisfaction: the Dual Mediating Effects of Digital Self-Efficacy and Digital Self-Reliance. Korean Association For Learner-Centered Curriculum And Instruction, 24(24), 895–907. https://doi.org/10.22251/jlcci.2024.24.24.895

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. Psychological Methods, 1(1), 16–29. https://doi.org/10.1037/1082-989X.1.1.16

Ertiö, T., Eriksson, T., Rowan, W. and McCarthy, S. (2024) 'The role of digital leaders' emotional intelligence in mitigating employee technostress', Business Horizons, 67(4), pp. 399–409. Available at: https://doi.org/10.1016/j.bushor.2024.03.004

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research, 18(1), 39–50. https://doi.org/10.1177/002224378101800104

Fousiani, K., Michelakis, G., Minnigh, P. A., & De Jonge, K. M. M. (2024). Competitive organizational climate and artificial intelligence (AI) acceptance: the moderating role of leaders' power construal. Frontiers in Psychology, 15. https://doi.org/10.3389/fpsyg.2024.1359164

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge Management: An Organizational Capabilities Perspective. Journal of Management Information Systems, 18(1), 185–214. https://doi.org/10.1080/07421222.2001.11045669

Hadi, S., Fitriana, H., Kirana, K. C., Subekti, N. B., & Ogwu, I. J. (2023). The Impact of Temporal and Transformational Leadership on Innovation Performance: A Mediation Analysis of Self-Efficacy. Journal of Leadership in Organizations, 5(2). https://doi.org/10.22146/jlo.86213

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. American Psychologist, 44(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hur, W.-M., & Shin, Y. (2024). Service employees' STARA awareness and proactive service performance. Journal of Services Marketing, 38(4), 426–442. https://doi.org/10.1108/JSM-03-2023-0115

Issa, H., Jaber, J., & Lakkis, H. (2024). Navigating AI unpredictability: Exploring technostress in AI-powered healthcare systems. Technological Forecasting and Social Change, 202, 123311. https://doi.org/10.1016/j.techfore.2024.123311

Jeong, J., & Jeong, I. (2024). Driving creativity in the AI-enhanced workplace: roles of self-efficacy and transformational leadership. Current Psychology. https://doi.org/10.1007/s12144-024-07135-6

Jin, G., Jiang, J., & Liao, H. (2024). The work affective well-being under the impact of AI. Scientific Reports, 14(1), 25483. https://doi.org/10.1038/s41598-024-75113-w

Joseph F. Hair, J., G. Tomas M. Hult, Christian M. Ringle, & Marko Sarstedt. (2017). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (SECOND EDITION). SAGE Publications, Inc.

Kang, D. Y., Hur, W.-M., & Shin, Y. (2023). Smart technology and service employees' job crafting: Relationship between STARA awareness, performance pressure, receiving and giving help, and job crafting. Journal of Retailing and Consumer Services, 73, 103282. https://doi.org/10.1016/j.jretconser.2023.103282

Khairy, H. A., Lee, Y. M., & Al-Romeedy, B. S. (2025). Leader STARA competence and green competitiveness in tourism and hotel enterprises: leveraging green creativity and human capital. Journal of Hospitality and Tourism Insights. https://doi.org/10.1108/JHTI-11-2024-1181

Kim, B.-J., & Lee, J. (2024). The mental health implications of artificial intelligence adoption: the crucial role of self-efficacy. Humanities and Social Sciences Communications, 11(1), 1561. https://doi.org/10.1057/s41599-024-04018-w

Kukanja, M. (2024). Examining the Impact of Entrepreneurial Orientation, Self-Efficacy, and Perceived Business

Performance on Managers' Attitudes Towards AI and Its Adoption in Hospitality SMEs. Systems, 12(12), 526. https://doi.org/10.3390/systems12120526
Naiseh, M., Babiker, A., Al-Shakhsi, S., Cemiloglu, D., Al-Thani, D., Montag, C., & Ali, R. (2025). Attitudes Towards AI: The Interplay of Self-Efficacy, Well-Being, and Competency. Journal of Technology in Behavioral Science. https://doi.org/10.1007/s41347-025-00486-2
Nascimento, L., Correia, M. F., & Califf, C. B. (2024). Towards a bright side of technostress in higher education teachers: Identifying several antecedents and outcomes of techno-eustress. Technology in Society, 76, 102428. https://doi.org/10.1016/j.techsoc.2023.102428
Oosthuizen, R. M. (2019). Smart technology, artificial intelligence, robotics and algorithms (STARA): Employees' perceptions and wellbeing in future workplaces. In Theory, research and dynamics of career wellbeing: Becoming fit for the future (pp. 17-40). https://diversityatlas.io/wp-content/uploads/2023/08/2019-Smart-Technology-Artificial-Intelligence-Robotics-and-Algorithms-STARA_-Employees-Perceptions-and-Wellbeing-in-Future-Workplaces.pdf
Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879
Rademaker, T., Klingenberg, I., & Süß, S. (2025). Leadership and technostress: a systematic literature review. Management Review Quarterly, 75(1), 429–494. https://doi.org/10.1007/s11301-023-00385-x
Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. (2008). The Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation. Information Systems Research, 19(4), 417–433. https://doi.org/10.1287/isre.1070.0165
Riedl, R. (2012). On the biology of technostress: Literature review. ACM SIGMIS Database: The DATABASE for Advances in Information Systems, 44(1), 18–55. https://doi.org/10.1145/2436239.2436242
Riedl, R., Kindermann, H., Auinger, A., & Javor, A. (2012). Technostress from a neurobiological perspective: System breakdown increases the stress hormone cortisol in computer users. Business & Information Systems Engineering, 4(2), 61–69. https://doi.org/10.1007/s12599-012-0207-7
Tarafdar, M., Cooper, C. L., & Stich, J. (2019). The technostress trifecta - techno eustress, techno distress and design: Theoretical directions and an agenda for research. Information Systems Journal, 29(1), 6–42. https://doi.org/10.1111/isj.12169
Tarafdar, M., Tu, Q., Ragu-Nathan, T. S., & Ragu-Nathan, B. S. (2011). Crossing to the dark side: Examining creators, outcomes, and inhibitors of technostress. Communications of the ACM, 54(9), 113–120. https://doi.org/10.1145/1995376.1995403
Tenenhaus, M., Vinzi, V. E., Chatelin, Y.-M., & Lauro, C. (2005). PLS path modeling. Computational Statistics & Data Analysis, 48(1), 159–205. https://doi.org/10.1016/j.csda.2004.03.005
Teng, H.-Y., Li, M.-W., & Chen, C.-Y. (2025). Does smart technology, artificial intelligence, robotics, and algorithm (STARA) awareness have a double-edged-sword influence on proactive customer service performance? Effects of work engagement and employee resilience. Journal of Hospitality Marketing & Management, 34(3), 443–466. https://doi.org/10.1080/19368623.2025.2449853
UN. (2016). Transforming our world: the 2030 Agenda for Sustainable Development. United Nations: New York, NY, USA.
Venkatesh, Morris, Davis, & Davis. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), 425. https://doi.org/10.2307/30036540
Wang, Y.-Y., & Chuang, Y.-W. (2024). Artificial intelligence self-efficacy: Scale development and validation. Education and Information Technologies, 29(4), 4785–4808. https://doi.org/10.1007/s10639-023-12015-w
Wardhana, D. Y., & Harsono, H. (2024). Self-Efficacy, Motivation, and Employee Performance in Hospitality Industry: A Mediation Analysis. Jurnal Orientasi Bisnis Dan Entrepreneurship (JOBS), 5(1), 75–86. https://doi.org/10.33476/jobs.v5i1.4507
Xia, M. (2023). Co-working with AI is a Double-sword in Technostress? An Integrative Review of Human-AI Collaboration from a Holistic Process of Technostress. SHS Web of Conferences, 155, 03022. https://doi.org/10.1051/shsconf/202315503022

Yuwono, T., Novandari, W., Suroso, A., & Setyanto, R. P. (2025). The importance of ICT adoption on MSMEs performance: the mediating role of distinctive competencies. Journal of Enterprising Communities: People and Places in the Global Economy. https://doi.org/10.1108/JEC-06-2024-0113

Zaki, K., Abdelghani, A. A. A., Ahmed, Hebatallah A. M., Abdelfadel, T., Abusalim, E., Ahmed, K., Abuzaid, A. E., & Elnagar, A. K. (2025). Work decently: AI-driven marketing strategies for a competitive edge in tourism. Research Journal in Advanced Humanities, 6(1).