ISTANBUL TICARET UNIVERSITY
INSTITUTE OF GRADUATE SCHOOL
DEPARTMENT OF BUSINESS ADMINISTRATION
MASTER OF BUSINESS ADMINISTRATION PROGRAMME

A CROSS-SECTIONAL STUDY ON THE RELATIONSHIP BETWEEN STARA AWARENESS AND EMPLOYEE CREATIVITY: MODERATING ROLE OF PSYCHOLOGICAL RESILIENCE

MA Thesis

Kawthar NADAH

ISTANBUL, 2025

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Master's Thesis

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ISTANBUL, 2025

ETHICS STATEMENT

I declare that this thesis is an original work and has been prepared in accordance with the Graduate Regulations of the Council of Higher Education and Istanbul Commerce University. I fully complied with scientific ethical rules while conducting this study. I have cited all the sources I have used and I have not quoted in detail from any source. All matters contained in this thesis are my personal opinion and do not reflect the official view of Istanbul Commerce University.

Name and surname: Kawthar NADAH

Signature:

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ABSTRACT

This study aimed to investigate the relationship between STARA (Smart Technology, Artificial Intelligence, Robotics, and Algorithms) awareness and employee creativity. The study also highlights the importance of psychological resilience and investigates its impact on this relationship. For this purpose, a questionnaire technique was employed to collect data from 318 employees in the healthcare sector at the University Hospital Centre (CHU) Hassan II in Fez, Morocco, including doctors, nurses, technicians, and secretaries. After confirming the scales' validity and reliability, hypotheses were tested through regression analyses. The results indicate a positive relationship between STARA awareness and employee creativity. Moreover, psychological resilience strengthens this relationship, meaning that psychologically resilient employees tend to be more creative in response to the threats posed by STARA.

Keywords: *STARA awareness, employee creativity, psychological resilience*

ÖZET

Bu çalışmanın amacı AYZERA (Akıllı Teknoloji, Yapay Zeka, Robotik ve Algoritmalar) farkındalığı ile çalışan yaratıcılığı arasındaki ilişkiyi araştırmaktır. Çalışma ayrıca psikolojik dayanıklılığın önemine dikkat çekmekte ve bu ilişki üzerindeki etkisini incelemektedir. Bu amaçla, Fas'ın Fez kentindeki Hassan II Üniversitesi Hastanesi Merkezi'nde doktorlar, hemşireler, teknisyenler ve sekreterler dahil olmak üzere sağlık sektöründe çalışan 318 çalışandan Anket tekniği ile veri toplanmıştır. Ölçeklerin geçerlilik ve güvenilirliklerini doğruladıktan sonra, hipotezler regresyon analizleri ile test edilmiştir. Sonuçlar AYZERA farkındalığı ile çalışan yaratıcılığı arasında pozitif bir ilişki olduğunu göstermektedir. Ayrıca psikolojik dayanıklılık bu ilişkiyi güçlendirmektedir, yani psikolojik olarak dayanıklı çalışanlar AYZERA'nın oluşturduğu tehditlere karşı daha yaratıcı tepki verme eğilimindedirler.

Anahtar Kelimeler: *STARA farkındalığı, çalışan yaratıcılığı, psikolojik dayanıklılık*

TABLE OF CONTENTS

Ethics statement ..... **ii**
Acknowledgment ..... **iii**
Abstract ..... **iv**
Özet ..... **v**
List of tables ..... **vii**
List of figures ..... **viii**
INTRODUCTION **1**
2. THEORETICAL FRAMEWORK **3**
2.1. STARA Awareness 3
2.1.1. Consequences of STARA Awareness 7
2.3. STARA Awareness and Employee Creativity 9
2.2. Employee Creativity 11
2.2.1. Antecedents of Employee Creativity 12
2.4. Psychological Resilience 13
2.4.1. Antecedents of Psychological Resilience 18
2.4.2. Consequences of Psychological Resilience 19
2.5. Moderating Role of Psychological Resilience 20
3. METHOD **23**
3.1. Research Design and Participants 23
3.2. Data Collection Instruments 23
3.2.1. STARA Awareness Scale 23
3.2.2. Employee Creativity Scale 23
3.2.3. Psychological Resilience Scale 24
3.3. Reliability and Validity Tests 24
3.4. Data Collection Process 25
3.5. Data Analysis Strategy 25
4. FINDINGS **26**
5. DISCUSSION **29**
6. CONCLUSION **31**
REFERENCES **32**
APPENDIX **50**

LIST OF TABLES

Page

Table 1. Measurement Model Fit Indices 25
Table 2. Means, Standard Deviations, and Correlations 26
Table 3. Comparison of Mean Values According to Demographics 27
Table 4. Moderation Test 27

LIST OF FIGURES

Page

Figure 1. Theoretical Model 22
Figure 2. Measurement Model 24
Figure 3. Moderation 28

INTRODUCTION

The new emerging technologies (i.e., STARA) have radically changed the workplace dynamics, introducing new job requirements and creating both opportunities and challenges for employees. The increased use of these technologies is driving employees to better understand their potential to reshape their roles and career opportunities. In this respect, this study examines the relationship between employees' awareness of STARA and their creativity at work, with a focus on how psychological resilience affects this relationship.

Brougham and Haar (2018) first introduced the concept of STARA awareness, demonstrating that it can lead to negative consequences, such as turnover intention. Concerning creativity in particular, Wang et al. (2022) found that service employees' awareness of AI and robotics indirectly boosted creativity through active learning. Similarly, Kang et al. (2023) indicate that employees who perceive STARA technologies positively are more engaged in job-crafting, which can foster greater creativity. Conversely, some studies have identified potential adverse outcomes when employees see these technologies as threats. For example, Lestari and Djastuti (2020) found that STARA awareness can cause stress and burnout. As a result, contradictory findings suggest the relationship between STARA awareness and creativity might depend on other psychological factors.

One important aspect missing from the existing literature is the insufficient attention given to the role of psychological resilience in better understanding the relationship between STARA awareness and creativity. Although previous studies have examined the impact of STARA awareness from different perspectives, none have identified whether highly resilient employees can easily translate STARA awareness into creative behavior. This idea is theoretically sound, as the resilience theory of Luthans et al. (2007) suggests that resilient individuals are more likely to perceive challenges as opportunities for improvement and growth. That is why our research focuses on this issue by examining whether psychological resilience strengthens or weakens the influence of STARA awareness on creativity.

This research offers insights into both theoretical understanding and practical application. Theoretically, it contributes to existing literature, such as the job demands-resources model (Demerouti et al., 2001), by considering psychological resilience as a personal resource that can limit the adverse effects of STARA awareness while enhancing its positive impact on creativity. From a practical perspective, the findings of this study may help guide institutions in adopting

resilience training programs to prepare employees to confront and adapt to technological changes and challenges with greater creativity.

The thesis is divided into a set of organized sections to provide a comprehensive and straightforward overview of the topic. The first section presents the theoretical framework, which provides all the basic concepts of the study. It reviews the most important literature and studies related to STARA awareness, employee creativity, and psychological resilience, where hypotheses are developed. Then, in the Methods section, the study design, data collection, and analytical tools used are explained. Following this, we present the statistical analyses in the Results section. An extensive discussion of the interpretation of these results, from both theoretical and practical perspectives, follows. Finally, the study concludes with the most important findings, highlights some limitations, and provides suggestions for future studies.

2. THEORETICAL FRAMEWORK

2.1. STARA Awareness

STARA, an acronym for Smart Technology, Artificial Intelligence, Robotics, and Algorithms, is a result of the advancements and developments in technology over the last few years. STARA awareness is a concept developed by Brougham and Haar (2018) to measure how employees perceive these types of technology as a potential replacement for their jobs. Therefore, STARA awareness refers to employees' perceptions of the workplace, including how it will change after the adoption of new technologies and how these changes will affect their job opportunities and careers (Ding, 2021). Each component of STARA is developed for a particular reason.

The first component of STARA, *smart technology*, includes devices to enable them to perceive and interact with and respond to their surroundings (Kortuem et al., 2010). One of the most recognized forms of smart technology is the Internet of Things (IoT), a concept introduced by Kevin Ashton to describe networks of interconnected physical devices (Ashton, 2009). The Internet of Things (IoT) devices use integrated sensors to observe, capture, and analyze data from their environment (Gubbi et al., 2013). This technology is distinguished by its capacity to transmit data over the network and respond independently according to pre-defined rules or intelligent algorithms (Vermesan et al., 2011). *Smart* implies that these devices can reason and make decisions independently without human assistance (Violino et al., 2020).

The second component of STARA, *artificial intelligence*, is a computer science field that uses algorithms to help organizations achieve their goals. It emphasizes customer participation in product development and the use of digital technology for creativity and innovation (Ahmad & Mustafa, 2022). John McCarthy introduced the term artificial intelligence in 1955 (McCarthy et al., 1955). Since then, it has evolved dramatically, from its historical roots in humanoid automata and Leonardo da Vinci's designs to its current applications (Hamet & Tremblay, 2017). Some of the subfields of artificial intelligence are machine learning, deep learning, artificial neural networks, natural language processing, and computer vision. They are used by companies and organizations across various industries, including healthcare, education, production, and logistics, to increase productivity, automate processes, and enhance decision-making. Artificial intelligence can revolutionize industries and change the way people live and work. However, it can

raise ethical issues that need careful consideration, such as employment displacement, bias, and privacy (Ahmad & Mustafa, 2022). Machine learning, a form of artificial intelligence, involves creating models that can perform tasks without relying on predefined methods, instead focusing on training data (Alpaydin, 2020). Supervised learning is a method used in Machine Learning that utilizes input/output pairs provided by a human instructor. This approach enables the system to make generalizations and predictions (Müller & Guido, 2016). Machine learning has enhanced the efficiency and automation of several fields, including radiotherapy, a cancer treatment method (El Naqa & Murphy, 2015).

Deep learning is a subset of machine learning methods that utilize multilayer neural networks, also known as "deep neural networks," to process and interpret data, enabling the learning and decision-making process. Deep learning is likely to enhance automation, data analysis, and decision-making processes in smart factories and industries within Industry 4.0 (Ahmed et al., 2022). Artificial neural networks are computer models inspired by the way the human brain functions. Artificial neural networks possess a unique learning algorithm that enables them to adjust and learn from data, distinguishing them from other machine learning models. Their distinctive structure enables them to effectively learn and connect with real-world problems (Guresen & Kayakutlu, 2011). Natural language processing is a computer system that analyzes and emulates human speech. They include translation applications, text comprehension, and conversation maintenance. However, it confronts obstacles such as ambiguity and necessitates changes in programming language grammar and semantics (Allen, 2003). According to Reja et al. (2022), computer vision is a field that empowers computers to interpret visual information encompassing images and videos. Convolutional neural networks (CNNs) enable computer vision to discover sophisticated patterns by automatically extracting hierarchical information from images, drawing inspiration from the human visual system (Krizhevsky et al., 2012). Computer vision has transformed many industries (Litjens et al., 2017). Computer vision aids pathologists in identifying malignant cells in histological images (Janowczyk & Madabhushi, 2016).

The third component of STARA is *robotics*. Robotics is an interdisciplinary field that encompasses the design, construction, and programming of robots. They are programmable machines capable of performing various tasks, just like humans. A typical

robot consists of a power generator, sensors, actuators, a body, and a controller. The sensors help the robot understand its state and surroundings. The control system, typically software, modifies the robot's actions based on the information it receives. The mechanism transfers motions and forces, and the actuator converts energy into mechanical energy (Chen et al., 2017). Companies incorporate robots into their framework for various reasons. As Mai et al. (2022) noted, robots are utilized to automate tasks with high precision and efficiency, thereby enhancing manufacturing processes, research, and innovation. Arents and Greitans (2022) confirm that, in the industrial sector, companies are turning to AI-based robotic systems to meet the demands of this domain, aiming for improved performance, adaptability, safety, and cost reduction. Intelligent industrial robots, guided by the "see-think-act" principle, possess sensory capabilities, high-level instruction, context-aware task execution, knowledge acquisition, and adaptive planning.

The last element of STARA is *algorithms*. The algorithm refers to a sequence of tasks or activities in an intelligent system. For example, a robot operates according to a series of codes/programs written based on an algorithm (Başar, 2023). Cormen et al. (2022) define an algorithm as a method for efficient computation. It can be used for data sorting, DNA analysis, and e-commerce optimization. A wide range of professions and businesses, including legal research, report writing, and news media, are being profoundly impacted by systems run on algorithms. Programs can efficiently analyze and sort out massive volumes of documents. High-precision dexterity robots are becoming increasingly common, which increases the accessibility and affordability of automation. This trend may impact the workforce, altering employment dynamics and job roles across various industries. It is anticipated that algorithms will become more commonplace (Brougham & Haar, 2018).

Some researchers believe the STARA is a product of the Fourth Industrial Revolution (i.e., Industry 4.0) (Ding, 2021). Historically, industrial revolutions have transitioned from primary and secondary to tertiary sectors, creating many new jobs as technology advances. This is similar to previous industrial revolutions, but with distinct difficulties given current technological development. There may be fewer readily available replacement jobs, which could prolong this transition. (Brougham & Haar, 2018). Software, robots, and intelligent machines are expected to replace one in three jobs by

2025. Both manual labor and knowledge-based work fall under this category. From agriculture to financial analysis, drones and intelligent machines are anticipated to play a significant role in various industries. Information technology professionals must adapt and take the initiative in utilizing these technologies, as this shift in employment patterns is viewed as the beginning of a new era of technological development (Thibodeau, 2014). In discussing the appearance of robots and the effects of automation on the labor market, Jones (2016) addresses that transportation, logistics, and administration will be particularly vulnerable to the adverse effects of automation. However, it is also noted that the effects of automation differ depending on the industry and type of job. The last recession witnessed a shift in employment patterns, with a rise in high-skilled jobs in professional services and the healthcare industry, and a decline in manual labor and low-paying sectors such as manufacturing and construction. The wide range of effects that robots can have on workers implies that there might be unfavorable short-term repercussions for ordinary employees.

According to Brougham and Haar (2018), STARA awareness refers to an employee's perception of the impact of STARA on their job and career opportunities. It is an important aspect of career planning, considering personal interests, values, and talents. Lestari et al. (2023) emphasized STARA's relevance in transforming workplaces, particularly in sectors such as hospitality. Mukhlis et al. (2023) also found that employees believe these technologies can enhance human jobs, which may lead to job loss. As reported by Bort (2014), Bill Gates argued that technological advancements over time would replace many jobs, referring to this phenomenon as “Software Substitution,” especially for those with lower skills, while people remain unaware of the fundamental changes that these technologies will bring. However, awareness of STARA and knowing everyone’s career planning and professional development are important to align with future changes (Lestari & Djastuti, 2020). In the same context, Arthur et al. (1995) introduced the concept of “Intelligent Careers” to address the dynamic nature of careers in response to various economic, technological, and social challenges. Individuals require specific competencies to effectively manage their careers in an era where traditional job security is becoming increasingly rare and organizational commitment to employees is waning (Waterman & Waterman, 1994). Intelligent careers equip individuals with adaptability, flexibility, and strategic career management skills to navigate modern work environments, enabling them to overcome challenges and uncertainties (Baruch, 2004). On the other hand, Lestari and

Djastuti (2020) offer a different perspective on STARA awareness. They see that it is not restricted solely to job outcomes. However, they demonstrated how employees' awareness of STARA technologies impacts their psychology, resulting in negative consequences such as stress and burnout. Christensen (1997) discussed disruptive technological changes as a phenomenon and the challenges that organizations may face, indirectly suggesting that employees may need to adapt to new work patterns or might encounter uncertainties concerning job roles and job security throughout these technological changes. Technological progress is an important driver of change in today's society. Initially billed as a source of freedom and connectivity, it is now associated with caution and anxiety, despite the transformative power of technological innovations such as artificial intelligence, robotics, and big data analytics, which are reshaping industries and labor markets worldwide (Wenmoth, 2021). The perception of employees toward STARA may vary from one to another. According to Agrawal et al. (2017), employees recognize the potential of AI and predictive analytics to enhance productivity and streamline tasks. However, they also recognize the importance of human judgment in complex and sensitive situations, such as medicine. In such scenarios, the role of human judgment remains crucial. At the same time, Wenmoth (2021) the evolutionary relationship between workers and advanced technology necessitates workers to develop new skills, such as critical thinking, problem-solving, and continuous learning. Moreover, Agrawal et al. (2017) noted that with lower forecasting costs, more tasks may become vulnerable to automation, potentially leading to shifts in workplace dynamics.

2.1.1. Consequences of STARA Awareness

STARA awareness has some significant outcomes. According to Brougham and Haar (2018), employee job satisfaction will suffer, and turnover intention will increase. Moreover, STARA awareness and organizational commitment will have a negative relationship. The authors revealed that STARA awareness will have a negative impact on employee well-being. They found that older workers did not perceive STARA as a danger to their existing positions and future career paths, even among those aware of the technology's potential. This implies that people may be inspired to consider alternative careers by learning about STARA. Ding (2022) suggests that STARA awareness can lead to job insecurity, decreased performance, reduced engagement, lower organizational

commitment, and reduced job satisfaction. This can result in job turnover and undervaluation, negatively impacting organizational commitment and career satisfaction. However, Ding (2022) believes that adopting STARA can drive innovative work behaviors, benefiting both employees and the organization. This behavior involves creating, introducing, and applying new ideas that benefit roles and the organization. Research conducted by Tan et al. (2023) covered the positive impact of STARA awareness on the work behavior of hospitality employees. They found that this awareness improves their competence, boosts their competitive productivity, and generates optimal performance. The study highlights how STARA awareness forms the employees' perspectives and can ultimately lead to optimal performance. Kang et al. (2023) have two different insights. On the positive side, STARA awareness can increase performance pressure, lead to more job-crafting activities, and foster a proactive response to organizational changes. However, they also see that it could lead to negative employee behaviors, reduced loyalty, and increased job insecurity. Wang et al. (2022) covered the perception of two components of STARA (i.e., artificial intelligence and robotics) to analyze their impact on employee creativity. They found that they impact employee creativity by encouraging proactive behaviors, such as active learning and task design. Lestari et al. (2023) examined the impact of STARA awareness on hospitality workers in Jakarta during the COVID-19 epidemic. A negative correlation was observed between STARA awareness and work stress, while an increase in STARA awareness is associated with higher levels of job stability and fulfillment. Mukhlis et al. (2023) found that STARA awareness increases employee turnover intention, suggesting employees may contemplate job transfers due to technological improvements. In addition, STARA awareness increases employment insecurity, reflecting job displacement fears. Job insecurity is positively correlated with STARA awareness, as shown by Lingmont and Alexiou (2020). STARA awareness influences job uncertainty as people realize that automation technology might endanger job stability. Abdullah and Fakieh (2020) investigated the impact of STARA awareness on the attitudes of Saudi healthcare employees toward AI applications, revealing significant differences in job acceptance and concerns. Zhao et al. (2023) revealed that STARA awareness increases organizational deviance and psychological contract breach in-service employees. Vishwanath et al. (2019) suggested that understanding the capabilities of humanoid co-workers can promote acceptance and positive feelings toward robots in collaborative workplaces,

without affecting productivity or job loss. However, Li et al. (2019) suggest that robotics awareness has a negative impact on employees in the hospitality industry, particularly in terms of increased turnover intentions. Additionally, Kong et al. (2021) found a negative correlation between AI awareness and job fatigue, indicating an undesired impact on employee well-being.

2.3. STARA Awareness and Employee Creativity

Automating repetitive tasks in modern workplaces boosts employee creativity by freeing up critical time and knowledge resources for engaging in intellectually stimulating activities. This mitigates boredom and enables employees to focus on specific tasks, cultivating a culture of effectiveness and improvement, promoting innovation and adaptation, and generating new perspectives. Automation enhances operational efficiency and cultivates a culture of innovation and continuous improvement. Dias et al. (2019) highlight the transformative impact of robotic process automation on the human resources and finance services provided by the Finnish government's shared services center (FinServ) in Finland, enabling workers to complete more tasks and focus on innovative responsibilities. Fernandez and Aman (2018) found that automation, such as robotic process automation, enhances employee creativity by eliminating repetitive tasks, reducing errors, fostering trust in data, and encouraging innovative problem-solving. Güner et al. (2020) also demonstrate that robotic process automation liberates employees from repetitive tasks, enabling them to concentrate on creative work and pursue fresh ideas, leading to a more efficient workplace. Ratia et al. (2018) demonstrate how robotic process automation can enhance staff creativity in healthcare management practices. Automating routine administrative tasks frees staff, doctors, and nurses to prioritize patient care and interaction.

Problem-solving skills are crucial for encouraging innovation and developing creativity in the workplace. Acquiring knowledge in Smart Technologies, Artificial Intelligence, Robotics, and Algorithms (STARA) enhances these capabilities by exposing individuals to advanced solutions and technologies that can solve complex challenges. AI can detect patterns, predict outcomes, and suggest new approaches that traditional technologies may overlook. Employees must be informed about technological advances to adapt and integrate new resources into their problem-solving skills. Park et al. (2023) highlight the

valuable insights that innovative technologies provide to employees, enabling them to identify patterns, make informed decisions, and utilize innovative problem-solving techniques to foster creativity. Chuang (2024) states that Artificial Intelligence can foster innovation and creativity by enhancing problem-solving skills, providing valuable insights, and helping individuals tackle complex problems with greater creativity.

Job insecurity caused by STARA awareness can be a source of creativity. When employees realize that automation or innovative technologies may replace them, their stress and anxiety can lead them to think more creatively. Employees may seek unconventional solutions and showcase their unique human skills, such as emotional intelligence and innovative thinking, to demonstrate their worth and distinguish themselves from machines. This increased sense of alertness, caused by the threat of job loss, can also enhance their ability to think creatively. Thus, job insecurity deriving from STARA awareness can serve as a motivator. Some literature supports this. For example, Staw et al. (1981) reveal that job insecurity leads employees to work harder, find innovative solutions, enhance skills, adopt new technologies, and improve processes. Also, Parker et al. (2010) suggest that employees can protect their jobs and promote organizational growth by engaging in proactive behaviors that emphasize human skills. Friedman and Förster (2001) note that job insecurity can increase alertness and engagement, thereby enhancing creativity and fostering a positive workplace culture. Baer and Oldham (2006) found that the moderate effect of job insecurity can improve creativity by motivating employees to take risks and think creatively. Liang et al. (2022) explored the dual impact of AI awareness, which may cause emotional exhaustion that reduces innovation and enhances intrinsic motivation. Likewise, Wang et al. (2022) discovered that awareness of artificial intelligence and robotics promotes creativity by encouraging proactive behaviors, such as active learning and task crafting, especially in individuals with an internal locus of control. Accordingly, the first hypothesis is developed as follows.

Hypothesis 1*:* There is a positive relationship between employees' STARA awareness and creativity.

2.2. Employee Creativity

As explained by Kang et al. (2023), employee creativity is a process of utilizing imagination, creativity, and problem-solving skills to promote organizational performance and increase productivity. It is based on the ability to think creatively, adapt quickly, and generate valuable ideas for the company. It is essential for innovation, productivity, and competitive advantage, supporting the business's success (Syamsidah et al., 2023).

Creativity research has garnered recognition since the mid-20th century, resulting in the creation of specialized journals and books that focus on understanding and enhancing individual creativity, particularly in the workplace (Barron & Harrington, 1981). Moreover, Shalley and Berry-Smith (2001) illustrate that the concept of employee creativity emerged due to the need for innovative work environments to meet competitive challenges. Initially, the focus was on understanding the factors influencing creativity, beginning with personal trait analysis (Ford, 1996).

Williams (2001) emphasizes the role of managers in fostering employee creativity by tailoring training to enhance performance and organizational culture. Wiig (1997) highlights the significance of employee creativity in intellectual capital management and knowledge management. He states that encouraging employee creativity is crucial for the longevity and competitiveness of organizations in the knowledge age. Jaiswal and Dhar (2017) noted that modern organizations operate in uncertain work environments and emphasize employee creativity as a means to cope with uncertainty and foster innovation. Hanaysha (2023) emphasized the importance of companies keeping their employees engaged and motivating them to generate new ideas and consistently achieve set goals. Wenmoth (2021) suggests that education needs to be reformed to match the changing world of today's labor force. Knowledge management initiatives aim to harness and enhance employee creativity by fostering an environment that encourages idea generation, innovation, and knowledge sharing. Wiig (1997) also emphasizes the importance of organizational restructuring to effectively harness employee creativity and foster a culture that supports and encourages it. The concept of employee creativity was explored by Hanaysha (2023), who focused on the distinction between creativity and innovation, underscoring creativity as the generation of original and meaningful ideas, while innovation refers to the successful execution of those ideas.

Amabile (1988) realized that employee creativity contributes to innovation, problem-solving, and competitive advantage, enhancing organizational performance. Barsh et al. (2008) observed that innovation is key to companies' growth and success through the support of employee creativity. Additionally, this creativity contributes to the development of new products and services, enhancing the organization's productivity (Ford, 1996). Zhou and Hoever (2014) indicate that recognizing and fostering creativity through supportive management and climate are key to an organization's sustainable success. Jaiswal and Dhar (2017) assert that employee creativity is essential for organizations, as it benefits them by solving problems, staying competitive, and driving growth. Oldham and Cummings (1996) believe that employee creativity provides a competitive advantage, enabling organizations to adapt to changing circumstances and challenges. Innovation requires creativity, but it also comes with risk and uncertainty. Hon and Lui (2016) suggest that embracing creativity and variation from traditional practices can help organizations effectively manage these uncertainties. Employee creativity is a superpower that enables organizations to succeed in a rapidly changing world (Jaiswal & Dhar, 2017). That is why it is important to investigate factors that foster employee creativity.

2.2.1. Antecedents of Employee Creativity

Shalley and Berry-Smith (2001) emphasize that creativity is primarily driven by internal enthusiasm for problem-solving, while external factors, such as pressure and control, can influence subjective motivations and task concentration. A company's culture and values foster creativity by encouraging employees to take risks, share ideas, and adapt to external trends and technologies, leading to innovation (Woodman et al., 1993). Barsh et al. (2008) share the same view that openness to new ideas and risk-taking from both managers and employees fosters a culture of freedom in creativity. Woodman et al. (1993) state that both the compatibility of cognitive patterns with required tasks and practical training boost the effectiveness of employee creativity. Meanwhile, Barsh et al. (2008) note that leaders must also acquire new skills to foster employee creativity. Amabile et al. (2005) discovered that positive feedback, a supportive work environment, and appreciation energize employee creativity. Oldham and Cummings (1996) share the same perspective that challenging jobs and supportive bosses improve employee creativity. Besides,

employee creativity can be energized, as outlined by Hennessey (2003), if workers feel motivated by their work or rewards. Zhou and Hoever (2014) reveal that job control, moderate time pressure, and a supportive social environment can enhance creativity in the workplace. Liu et al. (2016) highlight the roles of three mechanisms — intrinsic motivation, creative self-efficacy, and prosocial motivation —which enhance creativity. However, Keith and Jagacinski (2023) hint that goals are important in promoting employee creativity. Moreover, Hon and Lui (2016) believe that creativity in the workplace fosters customer satisfaction, enhances employee engagement, and promotes a culture of continuous improvement. Jaiswal and Dhar (2017) analyzed employee creativity from the perspective of leadership theories, underlining the importance of servant leadership in promoting employee creativity. Hanaysha (2023) also notes that leaders play a crucial role in fostering employee creativity by creating a supportive work environment characterized by fairness and integrity. Additionally, Jaboob et al. (2023) analyzed employee creativity in relation to different leadership styles, reinforcing the fundamental role of leadership in enhancing engagement, motivation, and performance improvement. He mentioned that strategic leadership focuses on planning and execution, as well as influencing employee attitudes and perceptions.

2.4. Psychological Resilience

Afek et al. (2021) articulated that psychological resilience is the ability to endure adversity and adapt to challenges while maintaining well-being, influenced by personal traits and environmental factors. It is also a dynamic process that enables individuals to overcome obstacles and view them as opportunities for advancement (Sisto et al., 2019). Alonazi et al. (2023) explained psychological resilience in relation to stress. They found that nurses with higher resilience levels encounter less burnout and stress, while experiencing enhanced job satisfaction. Xu and Yang (2024) found that psychological resilience is correlated with lower stress levels, enabling individuals to manage stress more effectively, particularly during crises such as the COVID-19 pandemic. Koolhaas et al. (2011) discuss how the initial definition of stress as a generalized reaction of the body to a threatening environment has evolved to differentiate between a “stressor” and a “stress response.” According to Chrousos (2009), the stressor is the stimulus that disrupts the balance, and the stress response is the organism's effort to restore that balance. Landy

and Conte (2016) found that interpersonal conflict and job insecurity are significant stressors in the workplace, affecting individual well-being, team cohesion, and organizational effectiveness. Ganster and Rosen (2013) mentioned the adverse effects of burnout and chronic stress on job satisfaction, employee engagement, commitment to organizational goals, absenteeism, productivity, team cohesion, and long-term health.

Folkman and Moskowitz (2004) recognized that people employ emotional, cognitive, and behavioral strategies to cope with stress, including seeking social support, engaging in hobbies, and practicing relaxation techniques. Salmon (2001) sees that regular physical exercise effectively manages stress and creates emotional stability. Steptoe et al. (2016) suggest that a healthy lifestyle, including a balanced diet, enough sleep, and moderate caffeine consumption, can help cope with stress.

Stress-coping theories offer insights into the various strategies individuals employ to handle challenging situations, thereby enhancing our understanding of human behavior, resilience, and mental health. Parker and Endler (1992) categorize coping techniques into task-oriented, emotion-oriented, and avoidance-oriented, emphasizing problem-solving, emotional reactions, and the pursuit of social support (Stanisławski, 2019).

- Task-oriented stress coping strategy: Kariv and Heiman (2005) defined a task-oriented strategy as a problem-focused approach that seeks to change a situation directly to alleviate stress. Task-oriented coping can improve individual psychology and reduce anxiety and depression by promoting problem-solving and engaging with stressors (Christine et al., 2002). The task-oriented style prioritizes logic and rationality in decision-making, focusing on reliable information (Maghan, 2017). Kundi (2021) reported that while task-oriented individuals rely on established rules and data-based decision-making, these strategies may overlook alternative solutions. A task-oriented strategy is more effective when it is possible to change or manage problems through practical procedures (Zouina, 2022). Carver et al. (1989) proposed that a task-oriented approach includes planning, seeking active support, and ignoring distractions to focus on problem-solving.
- Emotion-oriented stress coping strategy: Emotion-oriented coping involves managing stress through emotional responses, processing feelings, and considering ways to feel better rather than directly altering the situation (Nagy &

Balázs, 2023). Emotion-oriented coping strategies are classified into two categories. They are constructive and non-constructive strategies (Smith et al., 2016). Constructive strategies, such as positive reappraisal, social support, and mindfulness, effectively manage stress and promote positive emotional outcomes by reframing situations, addressing issues, and seeking support (Bargiel-Matusiewicz & Omar, 2015). Non-constructive strategies negatively affect emotional and psychological health, increase negative and aggressive thoughts and emotional instability, and obstruct correct adaptation and emotional well-being (Abdryahimova, 2014). Individuals who use this strategy mostly rely on blaming others or themselves, suppressing emotions, and passively accepting a situation (Endler & Parker, 1994). Emotion-oriented coping can exacerbate mental health issues, increasing the risk of self-harm, especially in individuals with disorders like borderline personality disorder (Frei et al., 2021). Studies on emotion-oriented coping have provided inconclusive and contradictory results. Matheson and Anisman (2003) found that individuals with mood disorders, anxiety, or depression often rely on emotion-oriented strategies, such as self-blame, which may lead to adverse effects on their emotions and hinder recovery. McWilliams et al. (2003) reveal that emotion-oriented coping is strongly linked to depression and anxiety, potentially worsening emotional distress. However, Van Harreveld et al. (2007) suggest that emotion-oriented coping strategies promote positive psychological well-being and long-term mental health by enabling individuals to manage emotions, reassess their attitudes, and focus on the positive aspects of challenging experiences.

- Avoidance-oriented stress coping strategy: Avoidance-oriented coping involves distancing oneself from stressors to manage discomfort. It provides temporary relief but often fails to address the root problem (Veisi et al., 2024). They can also lead to poorer long-term outcomes, including increased stress and emotional difficulties (Billings & Moos, 1981). Avoidance-oriented strategies, such as procrastination, denial, and disengagement, as well as behaviors like absenteeism or withdrawal from work, often lead to increased emotional distress in the long term (Achnak & Vantilborgh, 2021). These strategies lead to difficulties in problem-solving and healthy decision-making, while disrupting emotional regulation and hindering the development of constructive solutions (Chasiotis et

al., 2021). Several studies have linked these strategies to specific illnesses. For example, Yu and Sherman (2015) found that avoidance-oriented coping, especially avoiding communication, particularly in women with breast cancer, increases mental distress by reducing emotional support and problem-solving abilities. Similarly, Burns et al. (2015) note that avoidance coping in type 2 diabetes patients, like avoiding stress and neglecting care, can impair disease management and harm mental health. Cognitive behavior therapy is a treatment that modifies dysfunctional thoughts to strengthen behavior and emotional well-being (Cuijpers et al., 2023). It fosters task-oriented coping through structured problem-solving and reduces avoidance by promoting engagement with stressors (Ihara et al., 2024).

Similar to task-oriented and emotion-oriented approaches, Lazarus and Folkman's transactional model of stress and adaptation outlines how humans evaluate stressful events and react through problem-solving (problem-focused coping) or emotional regulation (emotion-focused coping), utilizing meaning-based adaptation to navigate difficult situations (Theodoratou & Argyrides, 2024). Wahyudhi et al. (2019) suggest that adopting a problem-solving approach can enhance stress management and reduce harmful behaviors, ultimately leading to improved mental health and quality of life. Problem-focused coping involves actively engaging with problem-solving demands by utilizing knowledge and skills to generate effective solutions, thereby fostering a constructive approach to stress management (Ma et al., 2023). Problem-solving or active coping strategies, such as seeking help, joining social groups, and reframing thoughts, enhance stress management by improving adjustment, reducing symptoms, and boosting job satisfaction (Herman & Tetrick, 2009). Aprillia et al. (2024) suggest that emotion-focused coping may adversely impact work-family balance by reducing productivity and impairing decision-making due to the overwhelming presence of negative emotions. Kurogi et al. (2024) found that individuals with schizophrenia frequently employ emotion-focused coping strategies, which may heighten stress and adversely affect social engagement and quality of life.

Luthans et al. (2006b) developed the concept of psychological capital, a framework for positive organizational behavior that aligns with efforts to contribute to a positive psychology. Psychological capital has four dimensions. They are hope, self-efficacy,

resilience, and optimism. Hope is a positive psychological force associated with the theory and research of positive psychology (Luthans et al., 2008). It comprises three distinct components: Agency, track, and goals (Luthans & Youssef, 2004). It is a psychological ability that enhances goal achievement, perceived control, and positive emotions, thereby improving performance in challenging tasks and contributing to success in academics and sports (Luthans, 2002). The second dimension, self-efficacy, as developed by Albert Bandura (2006), emphasizes the belief in one's capabilities, which influences persistence and goal achievement (Luthans et al., 2006a). Self-efficacy can be enhanced through role models, positive feedback, and visualization techniques, all of which foster the confidence necessary for tackling new challenges (Luthans & Youssef, 2004). The third one, resilience, is a positive psychological ability that enables individuals to adapt to difficulties and changes and is associated with improved performance and happiness in the workplace (Luthans et al., 2008). It has three primary qualities: Facing brutal truths without ignoring them, discovering the meaning of difficulties, and adapting using what one must confront (Coutu, 2002). Optimism in psychological capital involves expecting positive outcomes, which influences resilience and well-being, and helps individuals maintain motivation during challenges (Seligman, 2006). Optimism is associated with improved physical health, as optimistic individuals tend to adopt healthier behaviors and experience lower stress levels (Carver & Scheier, 2014). Optimism enhances psychological resilience, allowing individuals to adapt to challenges and maintain a positive outlook (Aspinwall & Taylor, 1997).

Resilience is a crucial aspect of psychological capital, enhancing adaptability and a proactive mindset that are essential for personal and professional growth, while promoting persistence, learning from setbacks, and overall well-being (Masten, 2001). Resilience enhances psychological capital by fostering ongoing growth and the attainment of goals, making it essential for individuals seeking to develop sustainable mental and emotional resources (Windle, 2011). Resilience is crucial in psychological capital as it fosters an adaptive mindset, essential for personal and professional growth, enabling recovery from setbacks and maintaining motivation (Luthans et al., 2007). Luthans et al. (2006b) discuss the association between psychological resilience and psychological capital, emphasizing the importance of positive psychological resources in overcoming challenges and achieving life's triumphs. According to Vella and Pai (2019), psychological resilience refers to an individual's ability to successfully navigate and

recover from difficult situations, resulting in beneficial outcomes. Graber et al. (2015) defined psychological resilience as a lifelong process that helps individuals adapt to adversity, evolving over time and in various circumstances, with childhood and adolescence playing crucial roles. Vella and Pai (2019) define resilience as the ability to overcome challenges and achieve positive results, even in difficult circumstances. Psychology studies resilience in individuals, particularly young people, who have achieved success despite challenging circumstances like low socioeconomic status and parents' mental illness (Grygorenko & Naydonova, 2023). The development of the psychological resilience concept is the focus of Luthar et al.'s (2000) study, which traces its origins to early schizophrenia studies and the current understanding of how resilience functions in changing life circumstances. Yavuz (2023) found that psychological resilience is a crucial aspect of human psychology, encompassing developmental psychopathology, traumatology, neurobiological psychology, and other related fields. Researchers have analyzed psychological resilience to explain why some individuals exhibit remarkable strength and adaptability in the face of adversity, while others struggle (Sisto et al., 2019). Early psychology research, particularly that of Block and Block (1980), established psychological resilience as a personal trait that influences individuals' ability to adapt to stress and harmful events (DenHartigh & Hill, 2022).

2.4.1. Antecedents of Psychological Resilience

Several studies have identified various factors that can enhance or diminish psychological resilience. Bonanno (2004) states that resilience is fueled by robust social support systems that offer emotional comfort, practical help, and a sense of belonging. According to Werner and Smith (2019), positive relationships with family, friends, and mentors can significantly enhance an individual's resilience by offering support and encouragement. However, Cacioppo et al. (2006) suggest that isolation and lack of supportive relationships can undermine resilience by exacerbating feelings of helplessness. Per McEwen (2013), chronic stress and trauma can degrade resilience by disrupting an individual's coping resources and minimizing their ability to cope with additional stressors. Social support is vital for family well-being, as it enhances parenting quality and fosters children's resilience through emotional, informational, and practical assistance (Armstrong et al., 2005). In addition, a 10-year study highlights the crucial role of social

support in fostering resilience against economic stress, showing that both emotional and practical assistance enhance adaptation and lower stress (Conger & Conger, 2002). Self-efficacy affects confidence in managing challenges and contributes to achieving goals, perseverance, and flexibility (Bandura, 1990). Zhang et al. (2020) demonstrate that high general self-efficacy in patients is associated with lower stress levels and greater psychological resilience during and after medical treatment, thereby enhancing coping strategies and improving long-term quality of life. It significantly impacts behavior, motivation, and resilience, as individuals with strong beliefs in their abilities are more likely to adopt positive mindsets and persist through challenges (Bandura, 1990). Personal strengths, such as optimism, gratitude, and self-awareness, contribute to happiness and resilience. Mindfulness enhances these qualities and reduces stress, serving as a psychological buffer during challenging times (Peterson & Seligman, 2004). A rigid, hindrance mindset hinders resilience by viewing challenges as threats, leading to stress and feelings of helplessness, whereas a growth-oriented mindset promotes learning from setbacks, thereby enhancing psychological well-being (Cavenaugh et al., 2000). Animal models enhance insights into neural resilience but fail to capture the intricate interplay of environmental stresses, protective factors, and individual traits influencing human resilience and mental health (Ehret et al., 2015).

2.4.2. Consequences of Psychological Resilience

Psychological resilience is the ability to master challenges and grow stronger as a result. It has been extensively studied to understand its implications in various situations. Following Luthar et al. (2000), individuals with high levels of resilience have better mental health, including lower levels of depression, anxiety, and stress. Resilience is associated with improved physical health, mental function, and a lower risk of chronic disease (Fredrickson et al., 2003). Robertson et al. (2015) found that psychological resilience in the workplace is associated with higher job performance, greater job satisfaction, and lower turnover rates. Wendell (2011) found that resilience strengthens social relationships and community bonds, enabling individuals to move beyond social stressors and maintain supportive connections. Resilience is vital for mental health, reducing anxiety and depression risk by enhancing stress management, adaptability, and recovery from setbacks (Masten, 2001). Resilient individuals develop strong coping skills

to manage stress, utilizing problem-solving techniques, seeking social support, and practicing positive reframing, which enhances their emotional well-being (Fletcher & Sarkar, 2013). Psychological resilience is associated with improved physical health, including enhanced immune function and reduced inflammation, which in turn lowers the risk of chronic illness and promotes healthier behaviors (Southwick et al., 2014). Resilience is closely linked to outstanding academic and career success, as it enables individuals to overcome setbacks, manage stress effectively, and achieve long-term goals, ultimately enhancing performance and job satisfaction (Luthans et al., 2007). Resilience is linked to higher life satisfaction and happiness, as resilient individuals tend to find greater fulfillment and meaning in overcoming challenges (Seligman, 2011). Stronger social relationships characterize resilient individuals, facilitating effective communication, conflict resolution, and support during times of stress (Wagnild & Young, 1993).

2.5. Moderating Role of Psychological Resilience

Psychological resilience can be crucial in fostering the relationship between STARA awareness and creativity because it enables individuals to respond effectively to challenges and adapt to technological changes (e.g., Groeneveld (2021) observed that resilience enables employees to redefine technostress as a driver of creativity). Demerouti et al. (2001) presented the Job Demands-Resources (JD-R) model that helps better understand how this process works. According to Bakker and Demerouti's (2017) study, the Job Demands-Resources model portrays resilience as a personal resource that mitigates the adverse effects of STARA challenges (e.g., job uncertainty) and transforms them into opportunities for creativity. Although there is a potential for job uncertainty and a need to develop skills continuously, individuals with high psychological resilience may be less affected by these challenges. Furthermore, they can adapt to changes and leverage their awareness of STARA to generate innovative solutions. Likewise, Chen et al. (2023) emphasized that resilience is crucial for effective stress management and mental health. It strengthens skills such as problem-solving and emotional regulation, enabling individuals to overcome uncertainties effectively. De Lorenzo et al. (2023) demonstrate how resilience has transformed challenges into opportunities during the COVID-19 pandemic. This can be similar in the environments shaped by STARA, where

resilient individuals can adapt to technological changes. Additionally, resilience enhances creative efficacy. Resilience boosts individuals' and teams' confidence in their abilities. Additionally, resilient teams work together effectively, generating new ideas that yield creative and innovative results (Fan et al., 2021). Fiksel (2003) suggests that resilience enables systems (e.g., social and industrial) to adapt to challenges, ensuring future sustainability while maintaining the dynamism of creativity and continuous improvement in the face of uncertainty. Mitchell et al. (2019) highlight that people with high resilience recover quickly from stressful situations, helping them avoid adverse outcomes and respond more positively. Resilience enables individuals to remain productive and maintain a positive outlook, facilitating the development of new skills and the discovery of creative workplace solutions (Hu et al., 2015). Xu et al. (2021) noted that psychological resilience fosters creativity and enables individuals to consider various options. It also promotes collaborative thinking and practical problem-solving in complex environments. Psychological resilience is crucial in adapting to technological changes, particularly in STARA technologies. It fosters creativity and helps maintain competitiveness by embracing innovation (Purnomo & Rosadi, 2024). Batool et al. (2021) emphasize the importance of psychological resilience in overcoming challenges and facilitating organizational recovery during crises, noting a positive link between technology awareness and creativity. In addition, Tang et al. (2024) emphasize the importance of resilience as a vital personal resource that enables employees to manage technology-driven stressors, thereby facilitating their ability to tackle challenges and utilize their tech skills creatively. Meanwhile, Oosthuizen (2022) emphasized the vital role of industrial psychologists in helping employees navigate technological disruptions through tailored programs and interventions that promote resilience and creativity. Groeneveld (2021) found that while technological challenges, such as technostress, can harm employee performance, psychological resilience is vital for coping with them, as it enables employees to manage stress and foster creativity and innovation. Accordingly, the following hypothesis is developed.

Hypothesis 2*: The positive relationship between STARA awareness and creativity will be stronger for those with high psychological resilience.*

Figure 1 illustrates the research model, which is based on the hypotheses.

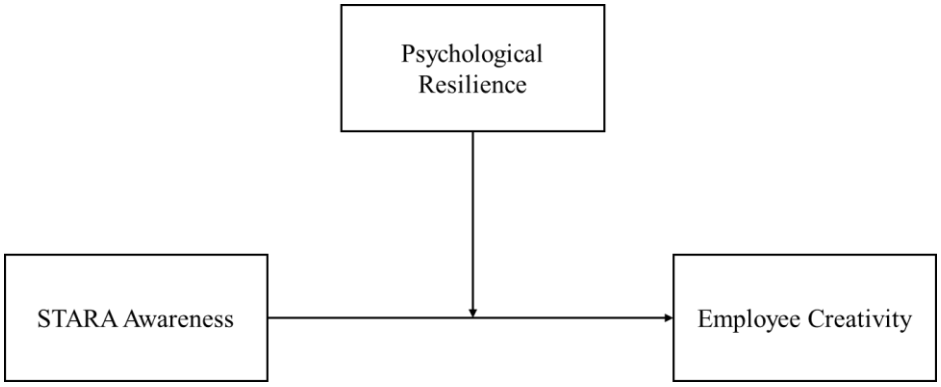


Figure 1. Research Model

3. METHOD

3.1. Research Design and Participants

This research employed a cross-sectional design where the data were collected through a digital questionnaire survey from 318 participants. The survey was conducted in both English and French. The scales are translated into French using the translation-back translation technique (Brislin et al., 1973). The participants work in the University Hospital Center Hassan II (CHU Hassan II), which operates in the healthcare sector. They are located in Fez, Morocco. The total number of personnel working in this organization was approximately 5000, constituting the population of this research. A convenience sampling technique was employed, whereby participants were recruited voluntarily from personnel who were accessible and willing to participate in the study. Of the participants, 154 (48.4%) are male, 164 (51.6%) are female, 171 (53.8%) are married, 147 (46.2%) are single, 67 (21.1%) are medical doctors, 135 (42.5%) are nurses, 99 (31.1%) are technicians, 17 (5.3%) are administrative personnel, 66 (20.8%) have a doctorate, 42 (13.2%) have a master's degree, 206 (64.8%) have an associate degree and 4 (1.3%) have a high school degree.

3.2. Data Collection Instruments

A digital questionnaire form was developed to collect data. The printed versions are presented in Appendix 1 and Appendix 2. It had three sections. In the first section, an informed consent form was presented, and participants were asked to give their permission to share their ideas with us. In the second section, questions were asked to collect participants' demographic information. In the third section, items of STARA awareness, employee creativity, and psychological resilience were listed. Each item was scored on a scale of seven points (1: strongly disagree, 7: strongly agree). Below, detailed information about the scales and their validity and reliability tests is presented.

3.2.1. STARA Awareness Scale

Brougham and Haar's (2018) unidimensional and four-item scale was used to measure participants' STARA awareness.

3.2.2. Employee Creativity Scale

Zhou and George's (2001) unidimensional and thirteen-item scale was used to measure participants' creativity.

3.2.3. Psychological Resilience Scale

Luthans et al.'s (2007) unidimensional and six-item scale was used to measure participants' psychological resilience.

3.3. Reliability and Validity Tests

Cronbach's α coefficients were calculated for each scale to test their reliability. The score for the STARA awareness scale was 0.85. The scores were 0.90 for the employee creativity scale and 0.80 for the psychological resilience scale. Scores indicated that each scale was internally consistent and reliable, as evidenced by values greater than 0.70 (Hair et al., 2010). A measurement model was constructed to test the validity of the scales. The model is presented in Figure 2.

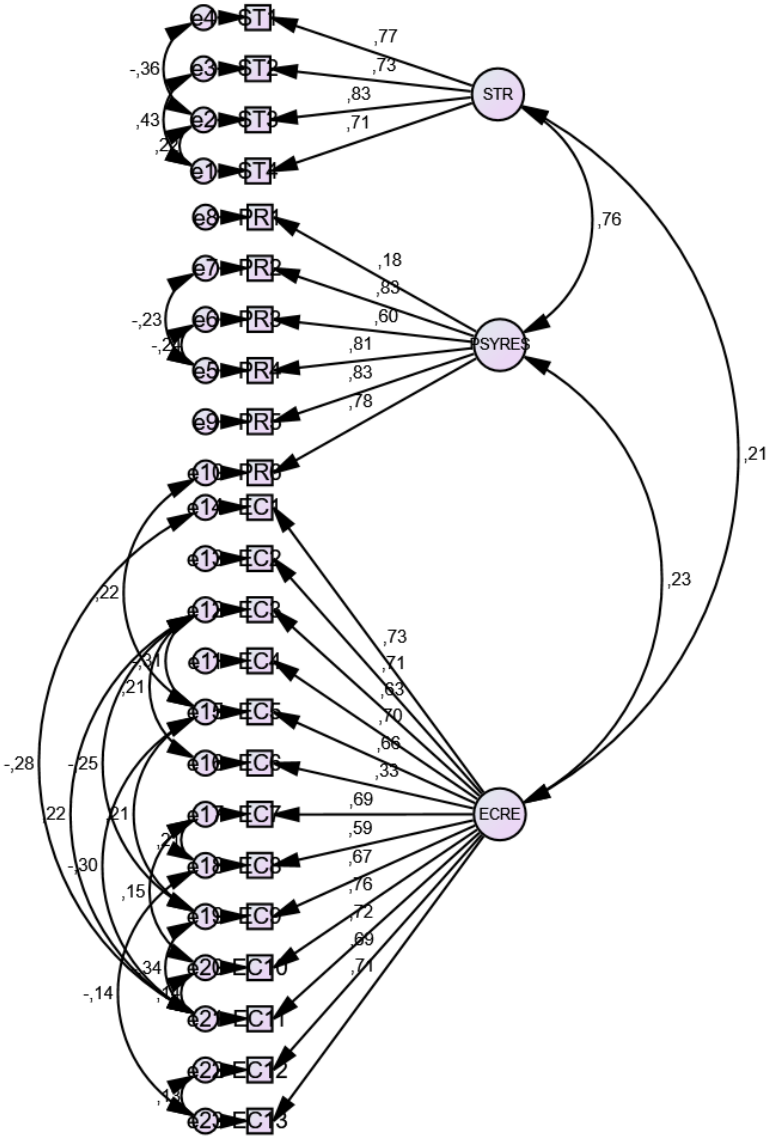


Figure 2. Measurement Model

The measurement model presented in Figure 2 had an acceptable fit (Meydan & Şeşen, 2011). Table 1 shows the indices and values. Accordingly, the validity of the scales is ensured (Hair et al., 2010).

Table 1. Measurement Model Fit Indices

	X^2	Df	X2/df	GFI	IFI	CFI	RMSEA
Value	492.61	208	2.36	0.88	0.92	0.92	0.06

3.4. Data Collection Process

Before data collection, ethical approval, numbered E-65836846-044-341664, was obtained from Istanbul Ticaret University's ethics committee on December 30, 2024. The approval is presented in Appendix 3. To collect the data for this study, on December 23, 2024, I contacted a family member who works at the CHU Hassan II Hospital in Fez, Morocco, as a senior anesthesia nurse. Since I was residing abroad during the data collection period, she took the responsibility of coordinating the process on my behalf. She first contacted the hospital administration and presented a letter that I had already prepared, requesting permission to conduct the study. After receiving approval from the administration, she facilitated the distribution of the survey. I had previously created the questionnaire using Google Forms. She shared the survey link with her colleagues through WhatsApp. Additionally, she distributed the link to the heads of various departments to ensure that it reached a broader range of employees within the hospital. The data collection lasted about two months, and I finalized it on March 4, 2025.

3.5. Data Analysis Strategy

First, some demographic information regarding the participants and research variables was uncovered. Then, correlations between variables were calculated. Finally, hypotheses were tested through linear regression tests. These operations were performed on IBM SPSS and AMOS.

4. FINDINGS

Variables' mean values, standard deviations, and correlation coefficients between them are presented in Table 2.

Table 2. Means, Standard Deviations, and Correlations

Variables	*M*	*SD*	1	2	3
1. STARA Awareness	5.05	0.96	1		
2. Employee Creativity	5.34	0.73	0.18**	1	
3. Psychological Resilience	5.13	0.92	0.70**	0.17**	1

** $p<0.05$

The results, shown in Table 2, indicated positive relationships between STARA awareness, employee creativity, and psychological resilience. Additional analyses were conducted to investigate how these scores vary according to demographic characteristics. The results, presented in Table 3, indicate that the mean scores for each criterion are close, suggesting that demographics play a minimal or insignificant role in explaining the relationships between research variables. Next, a linear regression test was performed to test the hypotheses. According to the results presented in Table 4, there is a positive relationship between STARA Awareness and employee creativity ($\beta = 0.25$, $p < 0.01$). Therefore, hypothesis 1 is supported. When the second hypothesis was tested, a moderation analysis was performed according to Aiken and West's (1991) technique. This technique involves creating an interaction term by multiplying the centered scores of the independent variable (i.e., STARA Awareness) and the moderator variable (i.e., psychological resilience). The centered scores were produced by SPSS software. Thus, the interaction term represents STARA Awareness × Psychological Resilience. To discuss the moderating role of psychological resilience in the relationship between STARA awareness and employee creativity, the interaction term must have a significant relationship with the dependent variable (i.e., employee creativity). According to the results presented in Table 4, a positive relationship exists between the interaction term (i.e., STARA awareness × Psychological resilience) and the dependent variable (i.e., employee creativity). This indicates that psychological resilience strengthens the relationship between STARA awareness and employee creativity. The process is illustrated in Figure 3.

Table 3. Comparison of Mean Values According to Demographics

Variable	Group	n	STARA Awareness		Employee Creativity		Psychological Resilience	
			M	***SD***	***M***	***SD***	***M***	***SD***
Gender	Male	154	5.22	0.80	5.47	0.76	5.31	0.77
	Female	164	4.90	1.07	5.23	0.69	4.97	1.02
Marital Status	Married	171	5.17	0.91	5.52	0.65	5.37	0.88
	Single	147	4.92	1.00	5.14	0.77	4.87	0.89
Position	Doctor	67	5.21	0.97	5.69	0.79	5.60	0.94
	Nurse	135	4.76	0.99	5.23	0.64	4.98	1.00
	Technician	99	5.22	0.82	5.46	0.55	5.06	0.72
	Administrative personnel	17	5.82	0.64	4.21	0.85	4.94	0.49
Educational level	Doctorate	66	5.25	0.94	5.73	0.72	5.62	0.94
	Master	42	5.05	0.78	5.38	0.74	5.34	0.76
	Associated degree	206	5.00	0.97	5.23	0.69	4.96	0.85
	High school	4	4.50	2.16	4.71	1.09	4.04	1.78

Table 4. Moderation Test

Independent Variables	Dependent Variable - Employee Creativity		
	B	***F***	***R^2***
STARA Awareness	0.25^{**}	14.77^{***}	0.11
Psychological Resilience	0.28^{**}		
Interaction Term	0.42^{***}		

$^{***}p<0.001$, $^{**}p<0.01$

Figure 3 illustrates a positive relationship between STARA awareness and employee creativity, regardless of whether psychological resilience is high or low. However, this relationship is stronger when psychological resilience is high because the slope of the high psychological resilience line is greater than that of the low. Therefore, the relationship between STARA awareness and employee creativity was stronger for participants with high psychological resilience. Accordingly, Hypothesis 2 is supported, too.

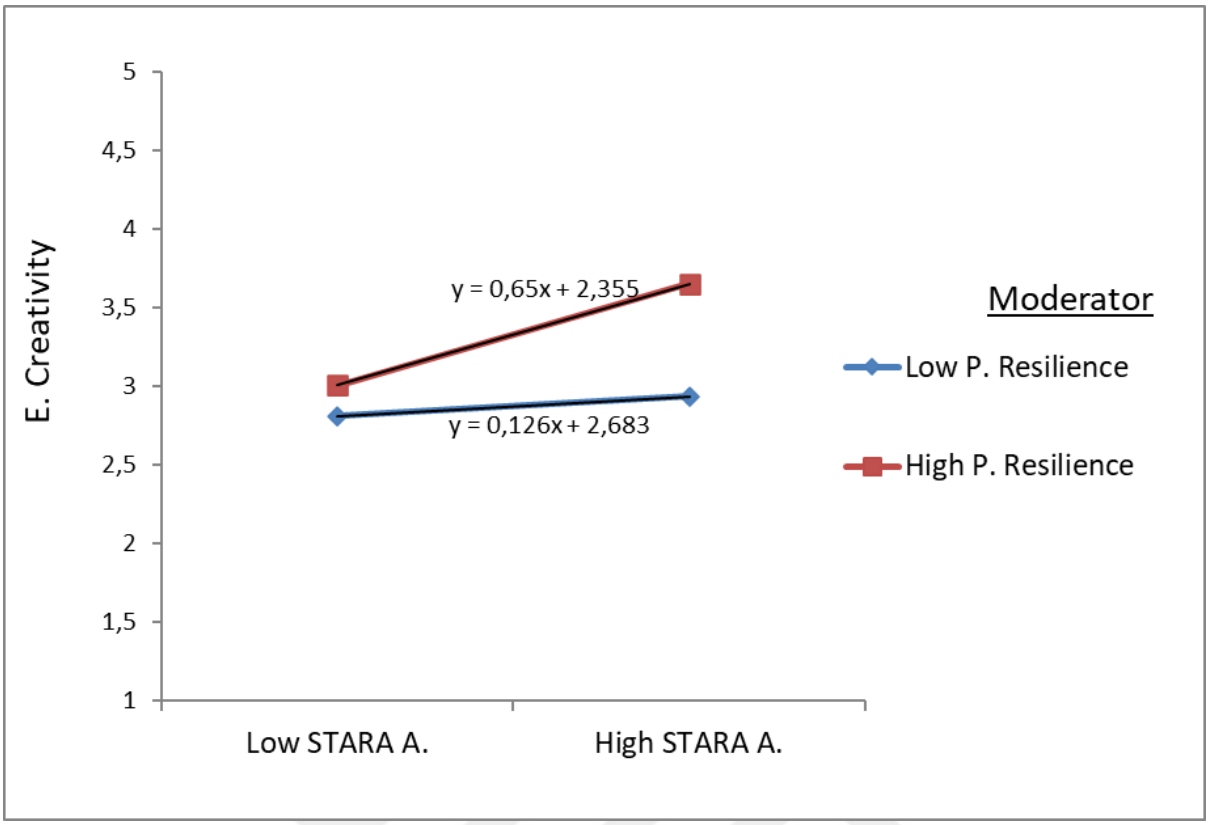


Figure 3. Moderation

Note: E. Creativity: Employee Creativity, STARA A. = STARA Awareness, P. Resilience: Psychological Resilience

5. DISCUSSION

This study examined the relationship between STARA awareness and employee creativity, with psychological resilience as a key moderator. The healthcare sector represents a valuable backdrop for this research, as the rapid adoption of STARA technologies can pose significant job demands and stressors (Brougham & Haar, 2018; Ding, 2022), making it a suitable environment to explore how psychological resilience fosters positive outcomes, such as creativity. Accordingly, the findings of this study showed that employees who are aware of STARA are more creative, especially those with high psychological resilience.

These findings confirm the first hypothesis, which indicates a positive relationship between employees' STARA awareness and creativity; this supports the study by Dias et al. (2019) which showed that advanced technology enables employees to focus more on creative tasks by freeing them from routine work, unlike the other studies, which mainly looked at the adverse effects of STARA awareness, such as job insecurity, stress, turnover as well (Ding, 2022; Brougham & Haar, 2018). This study demonstrates that STARA awareness can enhance employee creativity by enabling them to solve complex and novel problems. Moreover, our research demonstrates that when employees are aware of the threats posed by STARA, they enhance their knowledge, skills, and abilities, becoming more competent and secure in their positions within the workplace.

To the best of our knowledge, psychological resilience was examined for the first time as a moderator in the relationship between STARA awareness and creativity, changing the view of STARA awareness from a negative to a positive one, and confirming that employees with higher resilience have a stronger connection between STARA awareness and creativity. Because some employees perceive STARA as a threat and challenge to their careers, psychologically resilient employees are expected to be more enthusiastic in updating their competencies and being more creative. Likewise, results supported our ideas. This contributes to the existing literature of the job demands-resources model (Demerouti et al., 2001) by considering psychological resilience as a personal resource that can either limit the adverse effects of STARA awareness (when it is seen as a threat, STARA acts like a job demand) or amplify its benefits for creativity (when it is perceived as an opportunity for innovation, STARA functions like a job resource). This aligns with Xu et al. (2021)'s study, which found that resilience helps creativity by allowing people to accept change and overcome challenges. It also contributes to Groeneveld's (2021) study, which

posits that psychological resilience enables employees to manage the pressures of technology, allowing them to adapt creatively to new demands.

These findings can be helpful for hospital managers, as they show that when employees understand what STARA technologies are and how they might impact their work, they become more creative. That is why hospital managers should prioritize clarifying these advanced technologies (STARA) to their employees and explain how they may impact their work, and then guide them on how to adapt. This can be achieved by providing training and discussing technology updates regularly. Additionally, the study found that employees with substantial resilience benefit even more from STARA awareness. Because of this, hospital managers should help their staff, including all professions, develop greater resilience. This can include teaching them stress management, being supportive when staff face challenges, and making an effort to create a more friendly work environment, which will encourage them to be more creative in their work.

This study has some limitations. The study was conducted in only one public hospital in Morocco; therefore, the results may not apply to other hospitals. Several hospitals were contacted via email, but most of them did not respond. Because the sample size was not large enough, findings may not be generalized to other contexts. Therefore, future researchers can replicate it in other contexts and compare the results. The study employed a questionnaire form consisting of closed-ended items. This means that participants chose from a list of options rather than giving detailed answers. Although this method is quick and easy to analyze, it may limit the depth of participants' feelings or experiences, as they may not elaborate on their thoughts in detail. Thus, future studies can collect data through other techniques such as interviews and observation. Accordingly, this study can serve as a starting point for other researchers interested in understanding STARA awareness and employee creativity. Future researchers can build on this by collecting data from a large sample of hospitals or other sectors, including both the public and private sectors, such as education and industry. This would help compare results and better understand how STARA awareness affects creativity. Future researchers can also examine other factors that may influence the relationship between STARA awareness and creativity, such as job satisfaction, training availability, and motivation. These could help establish a more comprehensive model for understanding employee creativity in an era of technological changes.

6. CONCLUSION

This study aimed to understand and explore the relationship between STARA awareness and employee creativity, as well as the extent to which this relationship is affected by psychological resilience within the hospital work environment. The results showed that STARA awareness has a positive influence on employee creativity, and psychological resilience reinforces this positive effect.

The findings suggest that awareness of STARA technologies, instead of only causing anxiety, can actually serve as a driving force, encouraging employees to adopt innovative and creative behaviors to adapt and maintain their value in a changing workplace.

Thus, this study highlights psychological resilience as a moderator in the relationship between STARA awareness and employee creativity, an aspect that has not been addressed previously. Accordingly, this strengthens theoretical frameworks such as the Job Demands-Resources model by highlighting psychological resilience as a key personal resource that enables employees to transform technological demands into opportunities for creativity.

Theoretically, this study paves the way for future research to investigate the impact of psychological resilience on creativity within the work environment. From a practical perspective, managers should focus on both clarifying the role of STARA technologies and enhancing employee resilience through targeted training and supportive leadership. This dual approach can foster a more creative and adaptable workforce. However, since the findings are based on a sample from a single public hospital, future research should aim to validate these results across various industries and cultural contexts.

Ultimately, this research emphasizes that successfully combining technology with human talent requires not just the right tools, but also the development of psychological strengths that enable employees to use those tools in creative ways.

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APPENDIX 1.

INFORMED CONSENT FORM

Dear participant,

This is a thesis study entitled "A Cross-Sectional Study on The Relationship Between STARA Awareness and Employee Creativity: Moderating Role of Psychological Resilience" supervised by Assoc. Prof. Ufuk BAŞAR and conducted by KAWTHAR NADAH, who is enrolled in Istanbul Ticaret University, Institute of Graduate School, Business Administration (English) master program.

The aim of this research is to investigate relationships between STARA (Smart technology, artificial intelligence, robotics, and algorithms) awareness, employee creativity, and psychological resilience of employees who are older than 18 years.

Your participation in the research is entirely voluntary. Since the information received from you during the research will be evaluated anonymously, you will not be asked for identifying information. Your answers will be kept confidential and will only be used by the researcher in scientific studies. In this sense, in order to obtain reliable information from the research results, it is very important to fill out the questions sincerely and not leave the questions blank. This study generally does not include questions that may cause personal discomfort. However, if you feel uncomfortable for any reason during the research, you can terminate your participation. During the study, you are asked to fill out the items and/or questions in the study completely and not to leave any blank. Participation in the study will take approximately 7 minutes.

I am participating in this study voluntarily and I understand that I can terminate my participation at any time. I accept the use of the information I provide for scientific purposes.

Yes ( ) No ( )

DEMOGRAPHIC INFORMATION FORM

What is your age? Please write it with numbers ( )

What is your gender? ( ) male ( ) female

What is your marital status? ( ) married ( ) single

What is your education level?

( ) doctorate,

( ) master,

( ) bachelor,

( ) associate degree,

( ) high school,

( ) secondary school,

( ) primary school

What is your position in the organization?

( ) Doctor

( ) Nurse

( ) Technician

( ) Administrative Personnel

Questionnaire Form

STARA Awareness Scale

Below, you see a list of items. Please read each and circle the best answer choice that fits you.
1: strongly disagree, 2: Disagree, 3: somewhat disagree, 4: Neither agree nor disagree, 5: somewhat agree, 6: Agree, 7: strongly agree
Note: STARA: Smart Technology, Artificial Intelligence, Robotics, And Algorithms

No.	Items	Answer Choices						
1	I think my job could be replaced by STARA	1	2	3	4	5	6	7
2	I am personally worried that what I do now in my job will be able to be replaced by STARA	1	2	3	4	5	6	7
3	I am personally worried about my future in my organisation due to STARA replacing employees	1	2	3	4	5	6	7
4	I am personally worried about my future in my industry due to STARA replacing employees	1	2	3	4	5	6	7

Employee Creativity Scale

Below, you see a list of items. Please read each and circle the best answer choice that fits you. 1: Never, 2: Almost never, 3: Rarely, 4: Sometimes, 5: Often, 6: Very Often, 7: Always

No.	Items	Answer Choices						
1	I try to find and suggest new methods to achieve goals or objectives.	1	2	3	4	5	6	7
2	I try to produce new and practical ideas to increase performance.	1	2	3	4	5	6	7
3	I try to research and find new technologies, methods, techniques and ideas related to my profession.	1	2	3	4	5	6	7
4	I try to find and suggest new methods to improve quality.	1	2	3	4	5	6	7
5	I consider myself a good source of creative ideas in the environment I work in.	1	2	3	4	5	6	7
6	I do not hesitate to take risks in my work.	1	2	3	4	5	6	7
7	I support new ideas and defend them to others.	1	2	3	4	5	6	7
8	When given the opportunity, I can show my creativity in my work.	1	2	3	4	5	6	7
9	I try to develop the plans and programs necessary for the implementation of new ideas.	1	2	3	4	5	6	7
10	I often try to have new and creative ideas.	1	2	3	4	5	6	7
11	I try to produce creative solutions for problems that occur in my work.	1	2	3	4	5	6	7
12	I often identify a new approach to solving problems.	1	2	3	4	5	6	7
13	I try to find and suggest new methods for completing tasks.	1	2	3	4	5	6	7

Psychological Resilience Scale

Below, you see a list of items. Please read each and circle the best answer choice that fits you.
1: strongly disagree, 2: Disagree, 3: somewhat disagree, 4: Neither agree nor disagree, 5: somewhat agree, 6: Agree, 7: strongly agree

1	When I have a setback at work, I have trouble recovering from it, moving on. (R)	1	2	3	4	5	6	7
2	I usually manage difficulties one way or another at work.	1	2	3	4	5	6	7
3	I can be “on my own,” so to speak, at work if I have to.	1	2	3	4	5	6	7
4	I usually take stressful things at work in stride.	1	2	3	4	5	6	7
5	I can get through difficult times at work because I’ve experienced difficulty before.	1	2	3	4	5	6	7
6	I feel I can handle many things at a time at this job	1	2	3	4	5	6	7

APPENDIX 2.

FORMULAIRE DE CONSENTEMENT ÉCLAIRÉ

Cher participant,

Ceci est une étude intitulée « Étude transversale sur la relation entre la sensibilisation à la STARA et la créativité des employés : rôle modérateur de la résilience psychologique », supervisée par le Professeur associé Ufuk BAŞAR et réalisée par KAWTHAR NADAH, inscrite à l'Université d'Istanbul Ticaret, Institut des études supérieures, programme de master en administration des affaires (en anglais).

L'objectif de cette recherche est d'examiner les relations entre la sensibilisation à la STARA (technologies intelligentes, intelligence artificielle, robotique et algorithmes), la créativité des employés et leur résilience psychologique, chez des employés âgés de plus de 18 ans.

Votre participation à cette recherche est entièrement volontaire. Les informations recueillies auprès de vous seront évaluées de manière anonyme, et aucune donnée personnelle ne vous sera demandée. Vos réponses resteront confidentielles et seront utilisées uniquement à des fins scientifiques par le chercheur. En ce sens, afin d'obtenir des résultats fiables, il est très important de répondre sincèrement aux questions et de ne pas laisser de réponses vides.

Cette étude ne comporte généralement pas de questions susceptibles de provoquer un inconfort personnel. Cependant, si, pour une quelconque raison, vous ressentez un malaise durant la recherche, vous pouvez mettre fin à votre participation. Pendant l'étude, vous êtes prié(e) de répondre à toutes les questions et de ne laisser aucun blanc. La participation à l'étude prendra environ 7 minutes.

Je participe volontairement à cette étude et je comprends que je peux mettre fin à ma participation à tout moment. J'accepte que les informations fournies soient utilisées à des fins scientifiques.

Oui ( ) Non ( )

FORMULAIRE D'INFORMATIONS DÉMOGRAPHIQUES

Quel est votre âge ? Veuillez l'écrire en chiffres ( )
Quel est votre sexe ? ( ) homme ( ) femme
Quel est votre état civil ? ( ) marié(e) ( ) célibataire
Quel est votre niveau d'études ?
( ) doctorat
( ) master
( ) licence
( ) diplôme universitaire de technologie (DUT)/BTS

( ) lycée

( ) collège

( ) école primaire

Quelle est votre profession ?

( ) Médecin

( ) Infirmier(-ère)

( ) Technicien(-ne)

( ) Secrétaire

FORMULAIRE DE QUESTIONNAIRE

Échelle de Sensibilisation à la STARA

Vous trouverez ci-dessous une liste d'éléments. Veuillez lire chacun d'entre eux et entourer la réponse qui vous convient le mieux.
1: Pas du tout d'accord, 2: Pas d'accord, 3: Plutôt pas d'accord, 4: Ni d'accord ni pas d'accord, 5: Plutôt d'accord, 6: D'accord, 7: Tout à fait d'accord

Note : STARA signifie Technologies intelligentes, intelligence artificielle, robotique et algorithmes

N°	Éléments	Choix de réponses						
1	Je pense que mon travail pourrait être remplacé par STARA	1	2	3	4	5	6	7
2	Je suis personnellement inquiet(e) que ce que je fais actuellement dans mon travail puisse être remplacé par STARA.	1	2	3	4	5	6	7
3	Je suis personnellement inquiet pour mon avenir au sein de mon organisation à cause du remplacement des employés par STARA.	1	2	3	4	5	6	7
4	Je suis personnellement inquiet pour mon avenir dans mon secteur d'activité à cause du remplacement des employés par STARA	1	2	3	4	5	6	7

Échelle de Créativité des Employés

Vous trouverez ci-dessous une liste d'éléments. Veuillez lire chacun d'entre eux et entourer la réponse qui vous convient le mieux.
1: Jamais, 2: Presque jamais, 3: Rarement, 4: Parfois, 5: Souvent, 6 : Très souvent, 7: Toujours

N°	Éléments	Choix de réponses
1	J'essaie de trouver et de proposer de nouvelles méthodes pour atteindre les buts ou les objectifs.	1 2 3 4 5 6 7
2	J'essaie de produire des idées nouvelles et pratiques pour augmenter la performance.	1 2 3 4 5 6 7
3	J'essaie de rechercher et de trouver de nouvelles technologies, méthodes, techniques et idées liées à ma profession.	1 2 3 4 5 6 7
4	J'essaie de trouver et de proposer de nouvelles méthodes pour améliorer la qualité.	1 2 3 4 5 6 7
5	Je me considère comme une bonne source d'idées créatives dans l'environnement dans lequel je travaille.	1 2 3 4 5 6 7
6	Je n'hésite pas à prendre des risques dans mon travail.	1 2 3 4 5 6 7
7	Je soutiens les nouvelles idées et les défends auprès des autres.	1 2 3 4 5 6 7
8	Lorsque j'en ai l'opportunité, je peux démontrer ma créativité dans mon travail.	1 2 3 4 5 6 7
9	J'essaie de développer des plans et des programmes nécessaires à la mise en œuvre de nouvelles idées.	1 2 3 4 5 6 7
10	J'essaie souvent d'avoir des idées nouvelles et créatives.	1 2 3 4 5 6 7
11	J'essaie de produire des solutions créatives aux problèmes qui se posent dans mon travail.	1 2 3 4 5 6 7
12	J'identifie souvent une nouvelle approche pour résoudre les problèmes.	1 2 3 4 5 6 7
13	J'essaie de trouver et de proposer de nouvelles méthodes pour accomplir les tâches.	1 2 3 4 5 6 7

Échelle de Résilience Psychologique

Vous trouverez ci-dessous une liste d'éléments. Veuillez lire chacun d'entre eux et entourer la réponse qui vous convient le mieux.
1: Pas du tout d'accord, 2: Pas d'accord, 3: Plutôt pas d'accord, 4: Ni d'accord ni pas d'accord, 5: Plutôt d'accord, 6: D'accord, 7: Tout à fait d'accord

N°	Éléments	Choix de réponses
1	Lorsque j'ai un échec au travail, j'ai du mal à m'en remettre, à aller de l'avant. (R)	1 2 3 4 5 6 7
2	Je gère généralement les difficultés d'une manière ou d'une autre au travail.	1 2 3 4 5 6 7
3	Je peux être « seul(e) », pour ainsi dire, au travail si nécessaire.	1 2 3 4 5 6 7
4	Je prends généralement les choses stressantes au travail avec calme.	1 2 3 4 5 6 7
5	Je peux traverser des moments difficiles au travail parce que j'ai déjà connu des difficultés.	1 2 3 4 5 6 7
6	Je me sens capable de gérer beaucoup de choses à la fois dans ce travail.	1 2 3 4 5 6 7

APPENDIX 3.

Tarih: 30/12/2024 16:27
Sayı: E-65836846-044-341664
REKTÖRLÜK

341664

İSTANBUL TİCARET ÜNİVERSİTESİ

T.C.
İSTANBUL TİCARET ÜNİVERSİTESİ REKTÖRLÜĞÜ

Sayı : E-65836846-044-341664 30.12.2024
Konu : Etik Onayı

Sayın Kawthar NADAH

İlgi : 17.12.2024 tarihli dilekçeniz.

İlgi yazınız ile "A Cross-Sectional Study on The Relationship Between STARA Awareness and Employee Creativity: Moderating Role of Psychological Resilience" isimli çalışmanın anket sorularına Etik Kurul onayı talep edilmektedir.

Adı geçen ve ekte yer alan anket soruları, Üniversitemiz Etik Kurulunca incelenerek etik tanım, değer ve ilkelere aykırı bir düzenleme tespit edilmediği, önerilen anket sorularının etik kurallara uygun olduğu ve etik onayının verildiği ifade edilmiştir.

Konuya ilişkin bilgilerinizi rica ederim.

Prof. Dr. Hanifi PARLAR
Rektör a.
Rektör Yardımcısı

Ek: Etik Onaylı Anket Soruları

Bu belge güvenli elektronik imza ile imzalanmıştır.

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Ayrıntılı Bilgi İçin: Bahadır ÖZ
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