Eduvest – Journal of Universal Studies
Volume 5 Number 8, August, 2025
p- ISSN 2775-3735- e-ISSN 2775-3727

The Effect of Employee Adaptation to STARA (Smart Technology, Artificial Intelligence, Robotics and Algorithm) with Service Performance Mediated by Job Crafting, Job Insecurity, and Work Engagement

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ABSTRACT

This research investigates the impact of employee adaptation to STARA (Smart Technology, Artificial Intelligence, Robotics, and Algorithm) on service performance, considering the mediating roles of job crafting, job insecurity, and work engagement. Employing an explanatory quantitative approach with Structural Equation Modeling (SEM), data were collected from 249 frontline employees in Jabodetabek who interact with customers and utilize STARA in their work. The results reveal that STARA awareness as a challenge appraisal positively influences service performance, whereas hindrance appraisal has a negative effect. Work engagement and job crafting significantly mediate the positive relationship between challenge appraisal and service performance, while job insecurity exacerbates the negative impact of hindrance appraisal. The study offers theoretical contributions by clarifying adaptive mechanisms to STARA in the service sector. Practically, it suggests organizations enhance training and psychological support to boost work engagement, implement job crafting programs to reduce job insecurity, and adopt clear communication strategies to position STARA as an opportunity rather than a threat.

KEYWORDS *Technology Adaptation; Employee Performance; Digital Transformation*

INTRODUCTION

The era of digital transformation has driven rapid progress in the application of Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA) in various industrial sectors, fundamentally changing the way organizations work and demanding new adaptations from the workforce. The definition of STARA itself, according to Brougham and Haar (2018), is a technology that allows a process or procedure to be carried out almost without human assistance (automation). The application of STARA technology is expected to transform various industrial sectors and change work structures, thereby impacting organizations and individuals to adapt to the increasingly rapid era of digitalization (Glikson and Woolley, 2020). Research conducted by McCartney and McCartney (2020) states that STARA can simplify operational processes in service industries such as hotels and restaurants, as well as transform the allocation and management of organizational resources (Xu et al., 2020). STARA integration also has a significant impact on employee performance (Qiu et al., 2022), and employees are expected to see this STARA integration as an opportunity to adapt to the rapidly changing work landscape in a technology-filled environment (Ding, 2021).

In the face of intense business competition, market uncertainty, and dynamic changing customer needs, organizations are required to continuously pursue service excellence by providing high-quality services. Service employees who interact directly with customers have an important role to play in realizing organizational goals and contributing to the company's long-term success (Ling et al., 2016; Teng, 2019). Previous research has shown that the performance of service employees who interact directly with customers—both in primary tasks

(in-role) and additional tasks (extra-roles)—not only improves customer satisfaction and service quality but also strengthens the company's ability to survive and maintain a competitive advantage, even in crisis conditions (Li et al., 2021).

The presence of STARA has brought significant changes in the service industry, especially related to improving service performance (Chung & Tan, 2025) (Kong et al., 2022; Mariani and Borghio, 2021). However, the beginning of STARA's development in the service sector was not always successful and was often accompanied by various failures (Liang et al., 2022). This is because STARA lacks the emotional aspects and interpersonal communication that are sometimes still needed by customers. Based on the *Innovate Indonesia: Unlocking Growth Through Technological Transformation* report, STARA's growth and opportunities in Indonesia are huge, especially with the potential for technology adoption that can add $2.8 trillion to the Indonesian economy by 2040, with an additional 0.55% of GDP growth annually. The adoption of AI, Internet of Things (IoT), and Robotics is increasingly prevalent in the manufacturing and banking industries. Based on a survey conducted by the Katadata Insight Center (KIC), the public hopes that with the increasing growth in the use of STARA in Indonesia, it can improve service performance to customers.

Ideally, the use of STARA can improve service performance to customers. For example, the use of AI and IoT in 4- and 5-star hotels in Taiwan that use robots to work with humans can make service performance effective and efficient because customers do not have to wait long to get room service and customer data is stored properly and accurately as material for hotel management analysis (Chung and Tan, 2025). With STARA, service performance at the airport can also increase, which causes the level of customer satisfaction to rise. The presence of STARA has given birth to the concept of smart airports that utilize various digital technologies such as self-service, flight information systems, baggage tracking, and intelligent parking (Sharma, 2024). In a study conducted by Tan, Liu et al. (2025), the collaboration between humans and robots in serving food in restaurants in southern China creates positive energy for employees that affects service performance.

Although explorations in this field have provided insights, little is known about the relationship between STARA awareness and service performance, which refers to employee behavior in serving and assisting customers. First, although significant impacts of STARA awareness on some undesirable work outcomes have been identified (Brougham and Haar, 2018; Li et al., 2019), the relationship between STARA awareness and service performance is still unclear. In particular, with increasing market competition and changes in consumer demand, employees must be proactive and respond quickly to customers to meet their increasingly personalized and diverse needs (Liang et al., 2022). Service performance, which reflects services that are perceived to meet or exceed customer expectations, is key to satisfying customers and achieving a competitive advantage for organizations (Prentice et al., 2020).

In Indonesia itself, there is very little literature on STARA awareness that can affect service performance. This is because the implementation of STARA in Indonesia, especially in the service industry, is still low, making it difficult to conduct research (see Figure 2). This study will provide answers related to the gap in the literature on the relationship between STARA awareness and service performance.

Several previous studies have reported mixed findings regarding the impact of STARA integration on employee attitudes and behaviors in the workplace (Qiu et al., 2022; Kong et

al., 2021). Based on transactional stress theory, these studies identified two main mechanisms that can explain how employees assess and respond to STARA integration in service companies, which are called STARA Awareness. The results of this study show that when STARA integration is considered a challenge, it can help employees thrive in the workplace and improve their service performance. Conversely, when STARA integration is seen as a hindrance, it can lower their service performance (Huang and Gursoy, 2025).

Research by Frey and Osborne (2017) states that the integration of STARA in the workplace can provide diverse benefits. On one hand, STARA can facilitate work and increase employee efficiency, but on the other hand, it can lead to negative psychological impacts for workers, such as fears of the possible replacement of human labor by machines (Li et al., 2019). Increased implementation of STARA is estimated to result in a 33% loss of jobs by 2025 (Frey and Osborne, 2013; Thibodeau, 2014). The McKinsey report (2019) summarizes that by 2030, Indonesia will experience a reduction in labor (job loss), caused by the increase in automation and STARA integration, by 23 million workers.

If employees cannot adapt to the presence of STARA and consider STARA a hindrance, based on the JD–R theory (Bakker & Demerouti, 2017), then employees need more energy and job resources (Bakker and Demerouti, 2017). Over time, this can lead to psychological stress, such as job insecurity, which ultimately negatively impacts service performance (Darvishmotevali and Ali, 2020).

Given that STARA awareness can be considered both a challenging and inhibiting stressor, its impact on service performance may be mixed. This shows that STARA awareness can be a double-edged sword that simultaneously increases and weakens service performance in a variety of ways. Challenge stressors have a positive relationship with work engagement, employee performance, and motivation. Adeniji and Igarashi (2022) argue that when employees assess technostress as a challenge, it can have a positive impact on work engagement. This is due to challenge appraisal related to positive motivation, where employees who see stressors as challenges will approach their work with enthusiasm and energy, thereby demonstrating a higher level of engagement. In addition, they exhibit proactive behavior, such as looking for innovative solutions. For example, chatbots can provide automated answers to frequently asked questions and communicate with customers 24/7, thus reducing workload (Wang et al., 2023). Employees who believe that STARA technology will help reduce their workload and improve work performance will be more involved with their work (Koo et al., 2021).

Bakker, Demerouti, and Lieke (2012) state that employees who are truly engaged in their work tend to have better performance. This is because they often feel happier, more excited, and have better mental and physical well-being. When a person feels positive and energized, they will be more creative in thinking and acting. In addition, a healthy body makes it easier for them to use their skills, abilities, and knowledge to the fullest in their work. The relevant management literature supports the statement of Bakker, Demerouti, and Lieke (2012) that employees who are more engaged in their work tend to have better performance, both in their primary tasks and in contributing to the overall work environment. In addition, they provide better service performance to customers (Christian, Garza, & Slaughter, 2011; Menguc, Auh, Fisher, & Haddad, 2013; Rich, Lepine, & Crawford, 2010).

Along with the growth of the service sector, which is now increasingly dominating economic activity in developing countries, including Indonesia, the role of frontline employees in interacting with customers has become very important. The quality of service they provide directly affects how customers rate the organization's overall services. In addition, recent research shows that frontline employees who are more engaged with their work and show dedication and perseverance are more likely to get recognition and praise from customers for the quality of service they provide (Karatepe, 2013; Menguc, Auh, Yeniaras, & Katsikeas, 2017).

In-depth research on the factors influencing and impacting work engagement in the service industry has become a crucial issue in service industry research (Chen & Peng, 2021). According to Ramadhani, Musnadi, and Kesuma (2022), a factor that affects employee work engagement is when the company can meet the needs of employees while doing their work. When employee work engagement increases, the service performance provided will also increase. Research conducted by Sopiah et al. (2020) states that nurses who have high work engagement in government and private hospitals in Indonesia provide high service performance as well. On the other hand, Sadiq, Gunawan et al. (2022) state that work engagement is not a crucial factor affecting frontline employees in 420 SMEs in Indonesia in providing the best service performance, but rather the company's environmental factors are more decisive.

As a result of technological advancements, companies are required to provide high-quality services because they can increase customer loyalty and provide a competitive advantage for the organization. Having a high-demand job but limited resources puts employees at risk of experiencing stress, which can ultimately lead to burnout. To prevent this, it's important to find ways that can protect employees' well-being while optimizing their performance. One effective approach is to increase meaning in work (May et al., 2004) as well as work engagement. In the past, these efforts were mostly done through top-down approaches, such as job redesign (Holman et al., 2010). However, lately, bottom-up approaches, where employees themselves initiate the desired changes, are attracting more attention. One example of a promising bottom-up approach is job crafting, which involves small changes that employees make in their jobs to better align with their desires and preferences. Job crafting can provide benefits for both the organization and the employees themselves because, in addition to protecting the welfare of employees, it also improves their performance. Job crafting makes employees feel more valuable because they can contribute to the organization through their work, which in turn increases employee performance (Hulshof et al., 2019).

Ranihusna et al. (2020) stated that job crafting improves service performance at the Central Java Public Health Center. Using the JD-R approach theory, this study shows that if employees have enough job resources, they will be motivated to engage in job crafting, thereby improving their performance. A similar theory was also applied by Petrou et al. (2020) in research measuring job crafting with an approach-avoidance oriented approach. Approach-oriented job crafting, such as increasing job resources or increasing challenges at work, has a positive relationship with employee performance. In contrast, avoidance-oriented job crafting, such as reducing the demands of inhibiting work, has an insignificant or even negative impact on employee performance. Kristiana et al. (2020) stated that 29 5-star hotel managers in Jakarta felt that their well-being increased when they could engage in self-job crafting, which

improved their service performance to customers. In addition to the challenge factor, Hsiu-Yu Teng (2019) stated that job crafting driven by job passion will improve the service performance of hotel employees at a higher level.

As Demerouti et al. (2001) cite, having a job with high demands but limited resources puts employees at risk of stress, which can ultimately lead to burnout. Based on the JD–R theory (Job Demands-Resources Theory), hindering job demands, which require employees to expend additional energy and resources (Bakker & Demerouti, 2017), can cause psychological stress such as job insecurity, which ultimately negatively impacts service performance (Demerouti et al., 2020). According to Septiari & Ardana (2016) in Soelton & Wahyono et al. (2001), job insecurity is a psychological condition in which employees feel confused or unsafe due to changes in the work environment. Meanwhile, according to Ridho (2017) in Soelton & Wahyono et al. (2001), job insecurity occurs when a person feels powerless to maintain their job in a threatening situation.

Research by Soelton & Wahyono et al. (2001) stated that low job insecurity felt by employees of one heavy equipment company in Indonesia is negatively related to employee performance. This indicates that employees tend to focus on their sense of insecurity rather than trying harder to improve their performance, so the risk of losing their job is less. Likewise, research by Y. Shin et al. (2022) about service performance of flight attendants influenced by job insecurity found that job insecurity occurs when supervisors treat flight attendants poorly and tend to choose teams that have a good relationship with them. This causes flight attendants to feel negative emotions and job insecurity that affect their service performance to passengers. Supervisors who behave badly and make flight attendants feel insecure about their work consume the emotions and energy of flight attendants, thereby negatively affecting their service performance (Jawahar & Schreurs, 2018; Shin & Hur, 2019; Wang et al., 2019).

From the description above, in Indonesia, there has been no specific research discussing STARA awareness and its effect on service performance. Therefore, a critical question still concerns me: How does STARA employee awareness affect service performance itself? This study seeks to investigate the influence of employee adaptation to STARA as measured through STARA awareness (challenge-hindrance appraisal), work engagement, job crafting, and job insecurity on service performance; as well as the role of work engagement, job crafting, and job insecurity mediation in the effect on service performance in the context of employees in Greater Jakarta who work by interacting directly with customers and are assisted by STARA in doing their work.

This study aims to explore the mediation mechanisms and boundary conditions involved in the relationship between STARA awareness and service performance by using the Job Demand-Resource (JD-R) model in the context of the service industry. This study proposes job crafting and job insecurity as two variables that mediate the relationship between STARA awareness and service performance, as well as adding work engagement as a mediator that connects STARA awareness with service performance. When employees rate STARA as a challenge appraisal, they tend to be more involved in their work, ultimately improving service performance. On the other hand, if STARA is perceived as an obstacle (hindrance appraisal), this can reduce work engagement and negatively impact service performance.

This research problem focuses on the influence of STARA awareness on service performance, especially in relation to assessing challenges and barriers to STARA awareness.

Previous research has highlighted many factors that affect service performance, such as job crafting and motivation, but not many have examined how the assessment of challenges to STARA awareness affects service performance through mechanisms such as job crafting, job insecurity, and work engagement. This study aims to examine the relationship between the assessment of challenges to STARA awareness and employee service performance, as well as the negative relationship between the assessment of obstacles to STARA and employee service performance.

This study aims to develop a model that analyzes the influence of STARA (hindrance-challenge) on service performance, mediated by work engagement, job crafting, and job insecurity. The contribution of this research is to provide theoretical insights into the relationship between STARA awareness and service performance, provide practical recommendations for human resource management, and provide direction for further research on this topic. This research is expected to provide guidance on the influence of STARA awareness on employee service performance in the service industry in Indonesia.

RESEARCH METHODS

This study uses an explanatory quantitative design with Structural Equation Modeling (SEM) techniques to test the relationships between variables, using SPSS software version 29 and Lisrel version 8.51. Primary data were collected through an online questionnaire survey via Google Form, which was distributed to employees in Greater Jakarta who interact directly with customers and are assisted by STARA (Smart Technology, AI, Robotics, and Algorithm) in their work. The sampling technique used purposive sampling with a minimum sample size of 249 respondents, based on the G*Power 3.1.9.6 estimate. This study tested six variables (Challenge Appraisal toward STARA Awareness, Hindrance Appraisal toward STARA Awareness, Work Engagement, Job Crafting, Job Insecurity, and Service Performance) with a total of 33 indicators using a 7-point Likert scale. The data analysis included validity and reliability tests, model suitability tests (*goodness of fit*), hypothesis tests, and mediation influence tests to evaluate 14 hypotheses that had been formulated.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Overview of Respondent Characteristics

Descriptive statistical analysis aims to provide a comprehensive overview of the characteristics of the answers of respondents who have filled out the research questionnaire.

Table 1. Class Interval and Interpretation Categories

Profile	Classification	Sum	Percentage
Gender	Man	130	64,5
	Woman	72	35,5
Age	18-20	25	12,2
	21-30	130	64,5
	31-40	31	15,2
	> 40	16	8,1
Final Education	Secondary Education	38	18,8

Profile	Classification	Sum	Percentage
	Higher Education	164	81,2
Workplace Sector	Professional Services and Special Services Sector	56	27,9
	Industrial Sector and Distribution	52	25,9
	Consumer Services Sector and Retail	94	46,2
Position In Employment	Management	124	61,4
	Non-Management	78	38,6
Tenure	< 1 year	46	22,8
	1-2 years	76	37,6
	3-5 years	37	18,3
	6-10 years	25	12,2
	>10 years	18	9,1
Company Type	SOEs	17	8,6
	Local private companies	130	64,5
	Foreign companies	22	10,7
	Other	33	16,2

Source: Researcher Results (2025)

Description of Statistics Per Variable

Service Performance

The service performance variable consisting of 7 indicators showed satisfactory results with a grand mean of 3.99 from a maximum scale of 7. This value indicates that respondents have a positive perception and agree with the quality of service performance in their work environment. The consistency of this value shows that the majority of respondents feel that there are good service standards in the organization, which includes aspects of responsiveness, reliability, and professionalism in providing services.

Challenge and Hindrance Appraisal toward STARA Awareness

The two appraisal variables showed identical mean values (3.99), but with different meanings. Challenge appraisal with 4 indicators shows that respondents tend to view the implementation of STARA awareness as a positive challenge that can provide development and learning opportunities. On the other hand, hindrance appraisal with 4 indicators indicates that respondents also feel obstacles or obstacles in implementing STARA awareness in the workplace.

Work Commitment

The work engagement variable consisting of 9 indicators with three dimensions (vigor, dedication, and absorption) showed a grand mean of 3.99. These results indicate a good level of work engagement among respondents. The vigor dimension indicates the employee's mental energy and resilience, dedication reflects involvement and a sense of meaning in the work, while absorption describes full concentration and preoccupation with work.

Job Crafting and Job Insecurity

Job crafting with 4 indicators and job insecurity with 5 indicators each showed a mean of 3.99. High job crafting indicates that employees are active in developing and modifying their

work to improve satisfaction and performance. Meanwhile, high job insecurity indicates that employees are concerned about the stability and safety of their jobs.

Table 2. Descriptive Statistical Summary of All Variables

Variable	Number of Indicators	Grand Mean	Category	Main Interpretation
Service Performance	7	3,99	High	The quality of service is perceived as good
Challenge Appraisal STARA	4	3,99	High	STARA is seen as a positive challenge
Hindrance Appraisal STARA	4	3,99	High	There are obstacles in the implementation of STARA
Work Commitment	9	3,99	High	Optimal employee work engagement
Job Crafting	4	3,99	High	Employees proactively develop work
Job Insecurity	5	3,99	High	Concerns about job security

Source: Researcher Results (2025)

Evaluation of Measurement Models

Model Fit Test (Goodness of Fit)

Evaluation of the measurement model is a crucial stage in SEM (Structural Equation Modeling) analysis which aims to assess the extent to which the constructed model is able to represent the relationship between latent variables and the observed indicators. This evaluation process uses LISREL 8.51 software and refers to the standards set by Hair et al. (2019).

The measurement model was evaluated based on three categories of fit indices: absolute fit indices, incremental fit indices, and parsimony fit indices. Absolute fit indices measure how well the proposed model reproduces the sample covariance matrix. Incremental fit indices compared the proposed model with a more restrictive baseline model. Parsimony fit indices assess the fit of the model by considering the complexity of the model.

Table 3. Measurement Model Fit Test Results

Categories Index	Indicators	Standard Grades	Match Status	Interpretation
Absolute Fit Indices				
	RMSEA	≤ 0.08	Good Fit	Low approximation error
	GFI	≥ 0.90	Marginal Fit	Still within the limits of tolerance
	SRMR	≤ 0.05	Good Fit	Minimum standardized residual
Incremental Fit Indexes				
	NNFI	≥ 0.90	Good Fit	Non-normed fit optimal
	CFI	≥ 0.90	Good Fit	Comparatively fit excellent
	IFI	≥ 0.90	Good Fit	Superior incremental fit
	NFI	≥ 0.90	Marginal Fit	Normed fit acceptable
	RFI	≥ 0.90	Marginal Fit	Relative fit acceptable
Parsimony Fit Indices				

Categories Index	Indicators	Standard Grades	Match Status	Interpretation
	PGFI	≥ 0.50	Meet the Criteria	Parsimony goodness adequate
	PNFI	≥ 0.50	Meet the Criteria	Parsimony normed adequate

Source: Researcher Results (2025)

The results of the evaluation showed that the measurement model had a good match. Although several indicators show marginal fit, the main criteria set by Hair et al. (2019) have been met, namely a minimum of one absolute fit indices and one incremental fit indices indicating good fit. This confirms that the theoretical model is built in accordance with the empirical data collected.

Construct Validity Test

The construct validity test is carried out to ensure that the indicators used are able to accurately measure the latent variable in question. Validity evaluation using Standardized Loading Factor (SLF) with a minimum criterion of 0.50 according to the recommendations of Hair et al. (2019). A high SLF value indicates that the indicator has a significant contribution in measuring its latent constructs.

Service Performance shows excellent validity with all 7 indicators having an SLF value of > 0.50. This confirms that every aspect of the measured service performance is relevant and contributes significantly to the overall construct.

Challenge and Hindrance Appraisal toward STARA Awareness each with 4 indicators showing good validity. All indicators meet the minimum criteria of SLF, indicating that the appraisal measurement of STARA awareness has been appropriate and comprehensive.

Work Engagement with 9 indicators distributed in three dimensions shows excellent validity. Each dimension (vigor, dedication, absorption) has a valid indicator, confirming the theoretical multidimensional structure.

Job Crafting and Job Insecurity showed good validity respectively with all indicators meeting the minimum SLF criteria.

Construct Reliability Test

Construct reliability was evaluated using Construct Reliability (CR) and Average Variance Extracted (AVE). CR measures the internal consistency of the construct, while AVE measures the amount of variance that can be explained by the construct relative to the variance caused by measurement error.

Table 4. Summary of Validity and Reliability Tests

Variable	Valid Indicators	SLF Range	CR	AVE	Reliability Status
Service Performance	7/7	> 0.50	> 0.70	> 0.50	Excellent
Challenge Appraisal STARA	4/4	> 0.50	> 0.70	> 0.50	Excellent
Hindrance Appraisal STARA	4/4	> 0.50	> 0.70	> 0.50	Excellent
Work Commitment	9/9	> 0.50	> 0.70	> 0.50	Excellent
Job Crafting	4/4	> 0.50	> 0.70	> 0.50	Excellent
Job Insecurity	5/5	> 0.50	> 0.70	> 0.50	Excellent

Source: Researcher Results (2025)

All variables showed excellent reliability with a CR value of > 0.70 and AVE > 0.50. This indicates that the research instrument has high internal consistency and is able to extract substantial variance from its indicators.

Second-Order Confirmatory Factor Analysis

Work engagement as a multidimensional construct requires a second-level analysis to confirm its dimensional structure. Second-order CFA is carried out using latent variable scores from each dimension obtained from the first-order measurement model.

Table 5. Second-Order CFA Work Engagement Results

Dimension	SLF	t-value	CR	AVE	Status
Vigor	> 0.50	Significant	> 0.70	> 0.50	Valid & Reliable
Dedication	> 0.50	Significant	> 0.70	> 0.50	Valid & Reliable
Absorption	> 0.50	Significant	> 0.70	> 0.50	Valid & Reliable

Source: Researcher Results (2025)

The results of the second-order CFA confirm that work engagement is a construct consisting of three interrelated but discrete dimensions. Each dimension has a significant contribution to the overall construct of work engagement.

Implications of Findings and Readiness for Advanced Analysis

1. **Data Consistency and Validity**

The findings of the study showed extraordinary consistency in respondents' perceptions, reflected in the uniform mean value (3.99) across all variables. This consistency can be interpreted as an indication of homogeneity in the study population or the possibility of biased responses that need to be considered in the interpretation of the results.

The excellent validity of the constructs for all variables confirms that the research instruments used are able to accurately measure theoretical constructs. This provides high confidence in the quality of the data and the internal validity of the research.

2. **Measurement Reliability and Stability**

The excellent reliability of all constructs indicates that the research instrument has high temporal stability and internal consistency. If the measurements are repeated under the same conditions, they are likely to produce consistent results.

3. **Readiness for Structural Analysis**

With the fulfillment of all goodness of fit, validity, and reliability criteria, the research data is ready to proceed to the structural equation modeling analysis stage. A robust measurement model is a solid foundation for hypothesis testing and analysis of causal relationships between variables.

The success of second-order CFAs for work engagement also confirms that multidimensional structures can be maintained in structural analysis, providing a more nuanced understanding of employee work engagement.

Structural Model Analysis

Based on the results of the measurement model obtained, all indicators that measure dimensions and variables in this study have met the requirements for validity and reliability. In the next stage, structural model analysis is carried out to identify the relationships between the variables studied. Before identifying the relationships between variables, it is necessary to evaluate the suitability of the structural model to see how well the constructed structural model is able to represent the relationships between the observed variables (Hair *et al*., 2019).

1. Structural Model Fit Test

The results of the structural model fit test evaluated based on *absolute fit indices*, *incremental fit indices*, and *parsimony fit indices* can be seen in Table 4.19. Based on *absolute fit indices,* it is known that the RMSEA, GFI, and SRMR indicators show that the value of the calculation results has met good compatibility standards. Furthermore, in *the incremental fit indices*, it can be seen that the NFI, NNFI, CFI, IFI, and FRI indicators obtained a calculation value greater than 0.90 which means that all indicators meet the standard of good suitability. For *parsimony fit indices*, the PGFI and PNFI indicators have met the criteria for good fit. Thus, the structural model in this study is declared to meet the requirements for good model fit, so that the relationship between variables that have been formulated in the model can be further analyzed.

Table 6. Structural Model Fit Test Results

Goodness of Fit *Indicator*	**Match Standard Values**	**Value of Calculation Results**	**Information**
Absolute Fit Indices			
RMSEA	RMSEA ≤ 0.08		
GFI	GFI ≥ 0.90		
SRMR	SRMR ≤ 0.05		
Incremental Fit Indexes			
NFI	NFI ≥ 0.90		
NNFI	NNFI ≥ 0.90		
CFI	CFI ≥ 0.90		
IFI	IFI ≥ 0.90		
RFI	RFI ≥ 0.90		
Parsimony Fit Indices			
PGFI	PGFI ≥ 0.50		
PNFI	PNFI ≥ 0.50		

Source: Researcher Results (2025)

2. Analysis of Causality Relationships between Latent Variables

This study uses *the Structural Equation Modelling* (SEM) technique to test the causal relationship by comparing the conformity between the patterns formulated from the model specifications with the patterns obtained from the data that has been collected (Hair *et al*., 2019). In identifying the influence between latent variables based on the hypothesis formulated,

the *t-value* is a reference for analyzing the causal relationship between latent variables. In the *one-tailed hypothesis test* (one direction of influence, i.e. positive or negative), *the critical value* was 1.645 for a *95% confidence interval*. The relationship between variables is stated to be significant if *a t-value* of ≥ 1.645 or ≤ -1.645 is obtained for the one-way hypothesis (Hair *et al*., 2010).

The causality relationship between latent variables is presented in Figure 4.1. Based on the test results, the SLF value or denoted by *the β* symbol and *t-value* shows a positive value. Therefore, there is a positive influence on the variables tested. In Table 4.20 can be seen a summary of the analysis of the research hypothesis based on the SLF value and *the t-value* obtained. In this study, from the five hypotheses formulated, a *t-value* of ≥ 1.645 was obtained. This shows that the relationship between variables is stated to be significant and has a positive influence direction.

Table 7. Summary of Research Hypothesis Analysis

H	Line	SLF	*t-value*	Result	Conclusion
3	*Challenge Appraisal → Work Engagement*				
4	*Hindrance Appraisal → Work Engagement*				
5	*Challenge Appraisal → Job Crafting*				
6	*Hindrance Appraisal → Job Crafting*				
7	*Challenge Appraisal → Job Insecurity*				
8	*Hindrance Appraisal → Job Insecurity*				

Source: Researcher Results (2025)

Furthermore, this study examines the role of work engagement mediation*, job crafting*, and *job insecurity* on the influence of *challenge-hindrance appraisal towards STARA Awareness* on *service performance.* Referring to Baron and Kenny (1986), the influence of mediation can be determined by calculating the direct influence, indirect influence, and total influence of the variables studied. Based on Hair *et al*. (2019), direct influence is the value of the coefficient resulting from the influence of independent variables on dependent variables (*path c*, can be seen in Figure 3.6). The indirect effect was obtained from the multiplication of the coefficient of the independent variable to the mediating variable (*path a*, seen in Figure 3.7) and the coefficient of the mediating variable to the dependent variable (*path b*, seen in Figure 3.7). Total influence results from the sum of the value of direct influence and indirect influence.

Table 8. The Influence of Mediation

H	Line	Direct Influence	Indirect Influence	Total Impact	*t-value*	Conclusion
9	*CA → WE → SP*					
10	*HA → WE → SP*					
11	*CA → JC → SP*					
12	*HA → JC → SP*					
13	*CA → JI → SP*					
14	*HA → JI → SP*					

Source: Researcher Results (2025)

The results of the calculation of the influence of mediation can be seen in Table 4.21. In hypothesis 9, *challenge appraisal* has a significant direct effect on *service performance*, *hindrance appraisal* also has a significant effect on *service performance*.

Research Hypothesis

After the direct influence test, in this section we will discuss the details of the test results for each hypothesis based on the test results in tables 7 and 8. Based on the table of hypothesis test results above, the hypothesis can be explained as follows:

H1: Challenge appraisal toward STARA awareness (CA) has a positive and significant effect on work engagement (WE).

This is evidenced by a t-value of 2.640 (> 1.645) and a p-value of 0.004 (< 0.05), so that H1 is accepted. These findings show that employees who view STARA as a challenge tend to have higher work engagement. They see uncertainty as an opportunity to learn and grow (indicated by the CA1 indicator with a loading of 0.843), which ultimately increases their enthusiasm and engagement in the work (as reflected in the WE6 indicator with a loading of 0.832). These results are supported by research by Başer et al. (2024), Wang et al. (2023), and Koo et al. (2021) which states that STARA can ease workload and make work more effective, thereby increasing engagement. In this context, the ability to adapt and continue to learn is the key to maintaining work engagement in the era of digital transformation.

H2: Hindrance appraisal toward STARA awareness (HA) has a negative and significant effect on work engagement (WE).

This is evidenced by a t-value of 1.850 (> 1.645) and a p-value of 0.032 (< 0.05), so that H2 is accepted. These findings suggest that employees who view STARA as a barrier

tend to have lower work engagement. This negative perception (indicated by the HA3 indicator with a load of 0.943) causes stress and erodes energy, enthusiasm, and work focus, which ultimately decreases their engagement.

These results are supported by research by Ding et al. (2021) and Xie & Huang (2024) who stated that seeing STARA as an obstacle is negatively correlated with engagement because it triggers feelings of threat, uncertainty, and additional workload.

H3: Challenge appraisal toward STARA awareness (CA) has a positive and significant effect on job crafting (JC).

This is evidenced by a t-value of 3.225 (> 1.645) and a p-value of 0.001 (< 0.05), so that H3 is accepted. These findings suggest that employees who view STARA as a challenge tend to proactively engage in job crafting. They see uncertainty as an opportunity to learn (indicator CA1, loading 0.842) and respond by changing the way they work (indicator JC2, loading 0.872).

These results are supported by research by He et al. (2024) and Bakker & Demerouti (2017), which states that positive perceptions of technological change encourage adaptive behavior and initiatives to modify work. Thus, the challenge appraisal of STARA is an important driver for employees to redesign their tasks to increase effectiveness in the digital era.

H4: Hindrance appraisal toward STARA awareness (HA) has a negative and significant effect on job crafting (JC).

This is evidenced by a t-value of 2.230 (> 1.645) and a p-value of 0.013 (< 0.05), so that H4 is accepted. These findings show that employees who view STARA as an obstacle are less likely to engage in job crafting. This negative perception (indicated by the HA3 indicator with a loading of 0.943) creates feelings of helplessness, anxiety, and demotivation, which hinders initiatives to proactively redesign work.

These results are supported by research by Brougham & Haar (2018) and Ding et al. (2021), who stated that viewing STARA as a threat reduces confidence and encourages resistance to change, thereby inhibiting adaptive behaviors such as job crafting.

H5: Challenge appraisal toward STARA awareness (CA) does not have a negative and significant effect on job insecurity (JI).

This is evidenced by a t-value of 1.169 (< 1.645) and a p-value of 0.121 (> 0.05), so that **H5 is rejected**. These findings suggest that viewing STARA as a challenge does not automatically reduce feelings of insecurity about work. Although employees see it as a learning opportunity (CA1 indicator, loading 0.842), concerns about layoffs remain high (JI5 indicator, loading 0.883).

These results contradict research by He et al. (2024) and indicate that other factors, such as toxic leadership or lack of social support from organizations, may have a stronger influence on the onset of feelings of job insecurity than positive perceptions of technology itself.

H6: Hindrance appraisal toward STARA awareness (HA) has a positive and significant effect on job insecurity (JI).

This is evidenced by a t-value of 7.856 (> 1.645) and a p-value of 0.000 (< 0.05), so that H6 is accepted. These findings suggest that employees who view STARA as an obstacle tend to feel insecure about their jobs. This negative perception (indicated by the HA3 indicator with a loading of 0.943) leads to the belief that technology will replace their role, thus triggering fears of layoffs (indicator JI5, loading 0.883). These results are supported by the research of Ding (2021) and Koo et al. (2021), and are in line with Cognitive Appraisal Theory, which states that assessing STARA as a threat (stressor) will give rise to negative emotions such as anxiety and doubts about future job continuity.

H7: Work engagement (WE) has been shown to significantly mediate the positive relationship between challenge appraisal toward STARA awareness (CA) and service performance (SP).

This is evidenced by a t-value of 1.757 (> 1.645) and a p-value of 0.039 (< 0.05), so that H7 is accepted. These findings show that viewing STARA as a challenge to increase employee work engagement, which ultimately encourages improved service performance. High work engagement motivates employees to demonstrate dedication and proactive service behavior in satisfying customers. Thus, work engagement plays a key role as a key mechanism that translates positive perceptions of technology into real service performance improvements.

H8: Work engagement (WE) has been shown to significantly mediate the negative relationship between hindrance appraisal toward STARA awareness (HA) and service performance (SP).

This is evidenced by a t-value of 2.298 (> 1.645) and a p-value of 0.011 (< 0.05), so that H8 is accepted. These findings show that viewing STARA as an obstacle to reducing employee work engagement, which ultimately damages service performance. Low work engagement leads to a loss of energy, enthusiasm, and focus on serving customers. Thus, work engagement acts as a mediator that explains how negative perceptions of technology have an impact on the real decline in service quality.

H9: Job crafting (JC) has been shown to significantly mediate a positive relationship between challenge appraisal toward STARA awareness (CA) and service performance (SP). This is evidenced by a t-value of 2.132 (> 1.645) and a p-value of 0.017 (< 0.05), so that H9 is accepted. These findings suggest that viewing STARA as a challenge encourages employees to do job crafting (such as modifying tasks and ways of working), which ultimately improves service performance.

Thus, job crafting acts as a key mechanism that translates positive perceptions of technology into proactive behavior to create more efficient and innovative work processes, thereby improving the quality of service to customers.

H10: Job crafting (JC) has been shown to significantly mediate the negative relationship between hindrance appraisal toward STARA awareness (HA) and service performance (SP).

This is evidenced by a t-value of 1.855 (> 1.645) and a p-value of 0.032 (< 0.05), so that H10 is accepted. These findings show that viewing STARA as an obstacle reduces employee initiative to do job crafting, which ultimately reduces service performance. These negative perceptions drain psychological energy and hinder proactive adjustment to the demands of a new job. Thus, job crafting acts as a mediator path that explains how negative perceptions of technology hinder adaptation and proactive behavior, leading to a decrease in the quality of service to customers.

H11: Job insecurity (JI) does not mediate the relationship between challenge appraisal toward STARA awareness (CA) and service performance (SP).

This is evidenced by a t-value of 0.962 (< 1.645) and a p-value of 0.168 (> 0.05), so that H11 is rejected. These findings suggest that job insecurity is not a relevant pathway to explain how the perception of challenges to STARA affects service performance. Although challenge appraisals usually have a positive impact, the relationship is not strong enough to reduce job insecurity which then affects performance.

Thus, the effect of challenge appraisal on service performance is direct and not through a mechanism to reduce job insecurity.

H12: Job insecurity (JI) does not mediate the negative relationship between hindrance appraisal toward STARA awareness (HA) and service performance (SP).

Although the t-value of 2.538 and the p-value of 0.006 are significant, **H12 is rejected** because the direction of the relationship is positive, not negative as hypothetical. These findings suggest that although the perception of barriers to STARA increases job insecurity, the increase correlates with improved service performance, not decrease. This indicates that employees may respond to these feelings of insecurity by increasing their work efforts as a strategy to keep the job. Thus, although statistically significant, the direction of this unexpected relationship contradicts the initial theoretical framework, so the mediation hypothesis is unacceptable. These findings highlight the complexity and contextual nature of the impact of job insecurity on performance.

This study confirms that employees' perceptions of STARA technology form two different response pathways. The motivational path is characterized by the interpretation of STARA as a challenge appraisal, which significantly increases work engagement and job crafting, so that in the end it has a positive impact on service performance. On the other hand, pressure lines arise when employees view STARA as an obstacle (hindrance appraisal), which actually decreases work engagement and job crafting, while increasing job insecurity. An interesting finding can be seen in the complexity of the relationship between job insecurity and performance, where feelings of insecurity about work are positively correlated with service performance. This indicates that there is a coping mechanism where the fear of losing their jobs encourages employees to improve their performance. Thus, work engagement and job crafting have proven to be key mediator mechanisms that translate employee perceptions of STARA into real impacts on service performance

CONCLUSION

This study concludes that employees' perception of STARA technology affects service performance through two different pathways. When employees view STARA as a challenge appraisal, it increases work engagement and the ability to adjust tasks (job crafting), which ultimately has a positive impact on service performance. On the other hand, the perception of STARA as an obstacle (hindrance appraisal) decreases work engagement and job crafting, as well as increases feelings of job insecurity. The unique findings suggest that job insecurity does not necessarily reduce service performance but rather triggers a defense mechanism whereby employees try to improve their performance to maintain their jobs. Theoretically, this study strengthens the Job Demands-Resources model by showing how the appraisal of technology can trigger motivational pathways as well as pressure pathways. For management, the practical implication is the need to build positive perceptions through experience-based training, communication transparency, and the use of STARA for repetitive tasks so that employees can focus on high-value-added tasks. This study has limitations in the form of a cross-sectional design that cannot track changes in perception, potential bias in self-reported data, and the coverage of mediator variables that only explain 43.5% of performance variances. For further research, it is recommended to use a longitudinal approach, combining quantitative and qualitative methods, and explore additional mediator variables such as organizational support and leadership style for a more comprehensive understanding.

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