

REDUCING AI ANXIETY IN AI-ENABLED WORKPLACES: THE ROLES OF AI LITERACY, LEARNING AGILITY, PSYCHOLOGICAL EMPOWERMENT, AND FUTURE TIME PERSPECTIVE

Shoukat Riaz^{*1}, Farukh Malik², Dr. Sardar Ahmad³, Amir Manzur Wain⁴, Dr. Bushra Rehman⁵, Dr. Nadeem Ahmad Bhatti⁶

^{*1,2,4}PhD Scholar Department of Business Administration Lahore Leads University, Lahore

³HOD Department of Business Administration Lahore Leads University, Lahore

⁵Assistant Professor Department of Business Administration Lahore Leads University, Lahore

⁶Vice Chancellor Lahore Leads University, Lahore

¹shaukat1925@gmail.com, ²farukh.malik@usa.edu.pk, ³drsardar.dba@leads.edu.pk

⁴amirmanzurwain@gmail.com, ⁵bushra.dba@leads.edu.pk, ⁶nadeemsidf@gmail.com

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Corresponding Author: *

Shoukat Riaz

Abstract

The opaque incorporation of artificial intelligence (AI) into the modern workplace has resulted in opportunities for increased productivity and optimizing tasks, but also raised psychological issues for employees pertaining to shifting work requirements, job skill requirements and employment prospects. For this reason, the present study examines how to manage anxiety triggering the use of AI in working environments and aims at developing a framework for dealing with such anxiety feelings by using the Conservation of Resources (COR) theory. In particular, the study aims to analyze the influence of AI literacy and learning agility on AI anxiety via the psychological empowerment toward AI and analyzes the role of the Future time perspective (FTP) as a moderator for this effect. The type of research was quantitative, descriptive survey, and the respondents of the main data were the employees in Organization where related to AI is present. A usable response rate of 66.25% was achieved from 400 questionnaires that were circulated. To test the hypothesised relationships, Partial Least Squares Structural Equation Modeling (PLS-SEM) was used. The results reveal that there is a positive relationship between AI literacy ($\beta = 0.361$, $p < 0.001$) and learning agility ($\beta = 0.398$, $p < 0.001$) and psychological empowerment, and psychological empowerment can have a negative relationship with AI anxiety ($\beta = -0.387$, $p < 0.001$). Additionally, the path on AI literacy to AI anxiety is found to significantly mediate through psychological empowerment ($\beta = -0.140$, $p < 0.001$), as well as between learning agility and AI anxiety ($\beta = -0.154$, $p < 0.001$). Additionally, future time perspective is a significant moderator in the relationship between psychological empowerment and Anxiety ($\beta = -0.126$, $p = 0.014$), and the relationship between the indirect effect of AI literacy and learning agility on Anxiety is stronger at higher levels of future time perspective. The results have

implications for COR theory by adding two factors: personal resources and psychological empowerment and perceptions for the future, as part of an explanation of employee responses to AI powered change in the workplace. The study further emphasizes that a combination of AI literacy development, ongoing learning, psychological empowerment and future-focused career guidance are key in organizational strategies for dealing with AI anxiety.

1. INTRODUCTION

A well-known innovation of the Information Age, Artificial Intelligence (AI), has evolved from being a niche technology to being part and parcel of the current work system. While AI advancements offer opportunities for other use cases through improved productivity and task optimization in AI information processing, decision support and customer interactions, task execution, knowledge work and automation, at same time there seem to be psychological demands related to technological uncertainty, skill change and work opportunities (Valtonen et al., 2025). While many employees feel more productive with AI, others concern themselves with job replacement, AI's new expectations and adapting AI into their jobs. Another worldwide survey of work-ready employees from 2026 found that people across the board anticipate that AI will impact their daily job performance, with younger workers displaying the most concern (Randstad, 2026). Therefore, beyond the implementation of technologies AI comes with effects, influencing employees' psychological reactions.

The most prominent implications have been highlighted as Artificial Intelligence (AI) anxiety, which relates to "fear and discomfort" with Artificial Intelligence, such as "learn about AI", "AI take my job", "uncertain about AI systems", and "difficulty in understanding the processing of AI" (Wang & Wang, 2022). AI anxiety is not the same as technology anxiety, since it is related to the kind of technology—AI—and the effects of it on society, and the ability of AI to execute cognitively what was previously performed by humans. Wang and Wang (2022) developed and validated the Artificial Intelligence Anxiety Scale (AIAS) which covers four types of AI anxiety: AI learning anxiety, job replacement anxiety, sociotechnical blindness,

and AI configuration anxiety, and showed that this scale is reliable and valid in terms of content, criterion-related, discriminant, convergent, and nomological validity.

AI anxiety plays a very real and pertinent role in organisations because, as humans, employees are the ones who are directly impacted by the changes in technology, in terms of their tasks, skills, autonomy, and employment opportunities. At least in this study by Chen et al. 2025, both job-replacement anxiety and AI-learning anxiety were negatively related to work passion, partly because of the presence of emotional exhaustion. Likewise, Tong et al. (2025) indicated that anxiety with AI can hinder employee creativity. There have been latest discoveries which once again establish its organization relevance. In the Indian context, Mirkhil (2026) suggested that AI anxiety is significant for the performance of employees in the banking, financial services and insurance sector and Ataseven et al. (2026) found a positive relationship between AI anxiety and occupational anxiety among healthcare workers from the Emergency Department. In another study, Alsudays (2026) found, that apart from job-replacement anxiety, there is a general AI anxiety, anxiety related to AI learning, AI ethics anxiety and configuration related anxiety and the fact that these areas are largely under-researched and there is a need to focus on factors which can either help develop coping mechanisms or lessen AI anxiety for workers.

Alongside this, a crucial management question is not just how and why a person feels anxious, but the individual capabilities that can help them psychologically deal with their own uncertainty and bring down the anxiety when handling AI. Recent studies highlight the fact that the reactions to technological transformation need to be

understood in the context of employees' expertise, attitudes, psyche and adaptability (Valtonen et al., 2025).

There is certainly one capability that might be relevant: 'AI literacy', which is defined as "the knowledge and competence of individuals to understand, use, evaluate and critically engage with AI technologies". An empirically derived AI Literacy Scale (MAILS) was developed to assess aspects of AI literacy and psychological skills regarding AI by Carolus et al. (2023). This was later validated by Koch et al. (2024) and a shorter version was explored. Carolus et al. (2023) and Koch et al. (2024) have created an original instrument that measures AI literacy, AI competencies, and self-efficacy. More recently, however, Markus et al. (2025) created and validated the AI Competency Objective Scale (AICOS), cognizant of some of the issues with exclusively subjective measures of AI-literacy and considering innovations like generative AI-literacy. These advancements have rendered AI literacy a tangible, measurable skill of the individual that may help them deepen their insight into AI capabilities and limitations, and interactively communicate with AI to potentiate effective AI use in their work (Markus et al., 2025).

But, with AI technologies constantly changing, AI literacy might not be enough. It also needs to be able to learn new things, and keep up with changing technology in the workplace. This overall adaptive ability is expressed in learning agility – the ability to learn from experience, adapt to context and use learning transfer to new situations. Milani et al. (2024) created and gave a preliminary validation to the Individual Differences in Learning Agility at Work (IDLAW) scale that comprised 11 items along two dimensions: mastery orientation. It is also shown to be reliable and with nomological validity in several countries, but it was only developed to measure learning agility at the individual (not leadership) level with variance across job roles (Milani et al., 2024).

The two of AI literacy and learning agility are so double as well as separable. AI Literacy refers to employers' own understanding of AI and learning agility refers to the way that employees efficiently

learn and adapt to various scenarios when presented. Those who are understanding the current AI systems may be afraid to continuously adapt, while agile learners may learn to adapt, but lack basic knowledge of the AI systems. This provides a more expansive description of response shifts from employees when AI-enabled transformation is combined into them.

However, despite all these capabilities, these do not automatically reduce the anxieties, but earlier on can affect the psychological perception of the employees. The psychological empowerment is recommended as the underlying mechanism. Psychological empowerment is an internal subjective feeling of meaning, competence, self-determination and impact on the job (Spreitzer, 1995). AI-literate workers may be more confident in tackling AI tools and learning-agile workers may perceive technological changes, including AI, as something less threatening to them and more learnable and adaptable. The processes can positively influence perceptions of competence, autonomy, meaning and impact and thus enhance psychological empowerment.

AI anxiety might then be lowered as psychologists' sense of empowerment suggests that empowered employees may not feel they are completely at the mercy of the changes in technology and think more highly of their impact. This agency can help to decrease fears around the incompleteness danger of AI. Emerging research also suggests that notions of ownership and control of AI's performance in relation to human work are pertinent to job-replacement anxiety (Grobelyny et al., 2026).

However, psychological empowerment can not be used as an anxiety reduction for everybody. Future Time Perspective (FTP) is suggested as a boundary condition thereafter. The occupational future time perspective is concerned with people's perspective of their future career and includes: occupational remaining time, work future opportunities and limitation (Topa et al., 2018). The possible future prospects may increase the acceptance and for participants to generate opportunities for empowerment, learning and adaptation, and thus reduce concern issues regarding AI. Yet when employees think there's

not a lot of potential to move forward with, chances are that they'll consider AI-related change even more urgent threats to their skills, work identity and career opportunities. This can make individuals feel less empowered to use AI, and continue reinforcing the negative association between psychological empowerment and AI anxiety.

In line with the evidence of employee response to AI which depends on individual and contextual factors, this second stage modulation is carried out. In the two studies, factors were either perceptions and contextual factors for the two studies, and learning goal orientation was used as a moderator to examine how they affect the relationship between different components of AI anxiety and work outcomes, respectively, by Chen et al. (2025) and Ma et al. (2026). Existant studies have also used mediated or moderated approaches, such as the study by Sahu et al. (2025) which focused on mediated technostress and tech-savviness variables between AI anxiety and quiet-quitting intentions, and that of Chen et al. (2025) that incorporated both mediated and moderated variables of emotional exhaustion and work passion between AI anxiety and intention to quit. Less attention has been given to a competency-centric individual scope framework that considers Artificial Intelligence (AI) specific competency and Adaptive learning capability as antecedents and the outcome of the psychological empowerment framework as explanatory factors for reducing AI anxiety. The research on AI anxiety has focused primarily on its predictiveness of or link to outcomes such as work passion (Chen et al., 2025), creativity (Mirkhil, 2026), occupational anxiety (Ataseven et al., 2026) and performance (Tong et al., 2025).

In this sense this research contributes as an exploratory study by theorizing the capacity for learning with AI combined to the learning agility (AI Literacy + Learning Agility), acting as a moderator variable between psychological empowerment and AI anxiety (AI Literacy + Learning Agility → Psychological Empowerment → AI Anxiety). The idea behind the framework is to shift away from dread of the technological

changes that could be on the horizon due to AI and emphasize an individual's capabilities that could enable them to adjust. Hence it emphasises AI-specific competency as opposed to adaptive learning capabilities, assumes that its invigorating effect is not necessarily attributable to AI itself, but to how the AI is perceived as an opportunity and a constraint by the employees, and assumes that there is a psychological empowerment mechanism.

2. Theory and Hypotheses Development

2.1 Theoretical Foundation: Conservation of Resources Theory

Conservation of Resources (COR) theory (Hobfoll, 1989; Hobfoll, 2001) guided the present study, as proposed in this theory, individuals attempt to obtain, maintain, defend and augment resources that will facilitate coping with demands and prevent the occurrence of psychological strain. Resources can be anything from personal attributes, skill capabilities, psychological states and conditions which enable effective adaptations in difficult situations. It is the lack of available resources that causes stress and negatively affects the mind in hard-to-improve circumstances and when they don't feel like they have them.

COR is a theoretical underpinning appropriate for comprehending responses of employees to AI supported change processes, particularly. AI's implementation might introduce uncertainty regarding acquired skills, working practices and career opportunities and it may also follow a natural psychological pressure on workers. So, AI literacy and learning agility may be viewed as individual assets that can help individuals cope with and embrace the various changes in technology. The transfer of such capabilities into increased feelings of competence, autonomy, meaning and impact is achieved via an important psychological resource, psychological empowerment. These should in turn mitigate the perception of the 'uncontrollable AI threat' which should consequently lessen AI anxiety. This resource-logic aligns with previous studies that utilised COR on future time perspective and employment uncertainty (Hu & Chen, 2026) and on future time perspective immersed in the

occupation in the context of sustainable work-life (Oliveira et al., 2026).

2.2 AI Literacy and Psychological Empowerment

AI literacy empowers employees to gain knowledge and competency to understand, assess and leverage AI. This type of knowledge is personal resource and capability from COR perspective, it would improve employees' ability to cope with the technological requirements. If employees know the strengths and weaknesses of AI, then they are likely to have better competencies and their control of how to make use of it for work. This can strengthen those cognitions of empowerment that are related to competence, self-determination, meaning and impact as described by Spreitzer (1995).

Recent empirical support for the validity of this argument. Alshowkan and Shdaifat (2025) revealed that AI literacy positively influenced psychological empowerment and this in turn resulted in a reduction in anxiety. So, AI literacy may not only be a technology skill acquisition modality, but a way to start developing the psychological skills of workers for dealing with AI related change.

H1: AI literacy is positively related to psychological empowerment.

2.3 Learning Agility and Psychological Empowerment

Learning agility is a person's ability and curiosity to learn from their experience, respond to challenges to adjust and apply what they have learned to new contexts. Learning agility is an adaptive advantage which can be used repeatedly, over time, when new and new technologies are adopted in an AI-powered workplace. Agile learners are not just learning from the old knowledge, they can learn new skills and change their action when the technological requests change.

This adaptive capacity should lead to enhanced psychological empowerment as workers who see this believe that they are capable of learning and adapting are more likely to see themselves as competent and able to handle their own affairs in

evolving work-conditions. The results reflect the tight relationship between psychological empowerment and employees' adaptability to their environment as established in the general workforce-agility literature. Thus learning agility should relate to greater employee beliefs that they are able to control and influence the evolving work demands.

H2: Learning agility is positively related to psychological empowerment.

2.4 Psychological Empowerment and AI Anxiety

The psychological empowerment can be seen on the perception of the employees regarding the meaningfulness and impact, competence and autonomy felt in their work. These cognitions are important, particularly given the uncertain technological change. Those who are more empowered tend to perceive themselves as less victim to AI transformation, experience increased agency, competence and control.

Psychological Empowerment for the COR conceptualized as a psychological resource, that can buffer employees against threatening to resources situations. AI's call for being an unmanageable threat can be mitigated by having workers feel autonomous in handling the job or having workers obtain effective responses to technological demands. This mechanism is backed up by current empirical evidence: there is a positive relationship between the use of AI literacy and empowerment and vice versa: there is a negative relationship between empowerment and anxiety (Alshowkan & Shdaifat, 2025). Accordingly, it is expected that greater psychological empowers will be related to reduced anxiety of AI.

H3: Psychological empowerment is negatively related to AI anxiety.

2.5 Mediating Role of Psychological Empowerment

Items such as AI literacy and learning agility can be seen as a single resource, but COR theory also posit that a resource can produce a resource and a positive psychology. Hence, do not simply assume that being AI literate and learning agile represents high AI Anxiety levels. Their effects can take place

on the psychological level. AI literacy is the source of AI knowledge and competence, which learning agility leverages to be continuously adapted. Together, these can help to bolster employee sense of competence, autonomy, meaning and impact, and thus reduce anxiety surrounding AI.

There is some evidence to show that the empowerment process can be a mediator variable between AI literacy and anxiety (Alshowkan & Shdaifat, 2025), which supports the mediation role of AI literacy and empowerment. Thus, the proposed mediation process, none of which assumes that employee capabilities reduces AI anxiety by itself, helps clarify the relationship between employee capabilities and reducing the AI anxiety.

H4: Psychological empowerment mediates the negative relationship between AI literacy and AI anxiety.

H5: Psychological empowerment mediates the negative relationship between learning agility and AI anxiety.

2.6 Moderating Role of Future Time Perspective

COR theory also posits that people vary in the way that they assess, invest and mobilize resources. Future Time Perspective (FTP) proposes that employees' perception of future opportunities, time left and future possibilities in work context (Topa et al., 2018). Knowing there is peace of mind about the future brings a more positive outlook to viewing current resources as investments that will benefit in the future. These more recent, COR based studies also show that FTP relates to future job insecurity (Hu & Chen, 2026).

Based on this, FTP needs to be enhanced to provide greater protection from psychological empowerment to AI anxiety. When employees feel: competent, autonomous, meaningful and impactful, perceived opportunities for the future are more likely to be seen as assets to invest in

learning and adapting to change impelled by AI. Thus, psychological empowerment should exert more anxiety reduction among those employees who have high FTP. Conversely, individuals who approach their work from a shorter time frame see the potential impact of AI as a threat to their livelihoods, which may limit empowerment's ability to abate anxiety.

Similarly, the second stage logic reflects the one present in previous studies that demonstrated how FTP can influence what execution of the link between positive psychological states and employee outcomes looks like (Jiang et al., 2019).

H6: Future time perspective moderates the negative relationship between psychological empowerment and

AI anxiety such that the relationship is stronger when future time perspective is high.

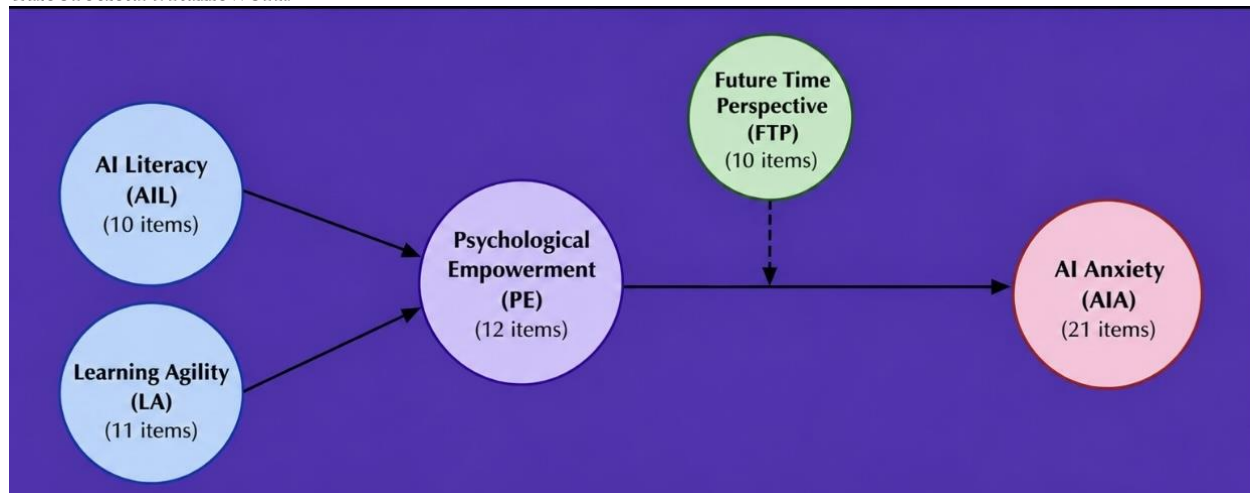
2.7 Mediated moderation

Combining the former ideas, AI literacy and learning agility are complementary personal resources that can increase psychological empowerment, in turn decreasing AI anxiety. The strength of this indirect resource-protection mechanism, however, is related to employees' future time perspective. Thus, it is suggested that the model is a second stage mediated moderation mode; the FTP acts as the moderator variable and determines the effect of psychological empowerment on the lessening of AI anxiety.

H7: Future time perspective moderates the indirect negative relationship between AI literacy and AI anxiety through psychological empowerment, such that the indirect effect is stronger when future time perspective is high.

H8: Future time perspective moderates the indirect negative relationship between learning agility and AI anxiety through psychological empowerment, such that the indirect effect is stronger when future time perspective is high.

Theoretical Framework



3. Methodology

3.1 Research Design

The research in this study was quantitative cross sectional study design which aimed to explore the relationship of AI literacy with learning agility, psychological empowerment, future time perspective, and AI anxiety. The proposed model examines three aspects: first, the use of AI literacy and learning agility as predictors for psychological empowerment, an impact which serves as a mediator on the relationship between empowerment and AI anxiety, and a future time perspective as a second-order moderator of the empowerment-AI anxiety relationship. This is aligned with Conservation of Resources (COR) approaches in the study which place a focus on coping with stressful environments in the workplace by looking at individual capacities and psychological resources. So, the undesirable psychological state is AI anxiety and the concepts such as AI literacy and learning agility can rather be seen as an aspect of personal resources and psychological empowerment as a psychological mechanism.

This study used the structured self-administered questionnaire for the collection of Primary data. The interrelationships of multiple underlying latent constructs were explored at a single point in time through a cross sectional survey in this study. It can also be used for the direct, indirect and interaction and conditional indirect effects.

3.2 Population, Sampling and Data Collection

The focus group participants will be staff members in an organizational context that AI-powered technologies could be relevant to their work activities. Concerning the adoption of AI in this population, there is the potential for a shift in job, abilities and autonomy about the job perceptions, and perhaps psychological problems might arise regarding the use of AI.

A questionnaire was developed to find out the information from the target groups/replies that were eligible for the study. In total 400 questionnaires were sent out, of which 265 were returned and usable; giving us a 66.25% usable response rate. Responses that were incomplete and/or could not be used were thrown out before final statistical analysis. The sample size was deemed to be sufficient to perform the proposed PLS-SEM model. They, however, warn that beside the traditional “10-times rule”, even harder ways to estimate minimum value of sample size such as “inverse square-root” method and “gamma-exponential” method should be considered as had been suggested by Kock and Hadaya (2018). PLS-SEM is particularly suitable for models involving multiple latent variables and complex relationships, like mediation and moderation between latent variables (Hair et al., 2019; Hair & Alamer, 2022).

3.3 Measurement Instruments

Previously built measurement instruments were utilized for the measurement of each of the five constructs. Regarding AI literacy, existing measurement approach was used which focused on AI literacy. In particular, Carolus et al. (2023) create the Meta AI Literacy Scale (MAILS). It encompasses aspects like AI usage proficiency, comprehension, the identification of AI issues, and ethical thinking regarding AI, and also includes psychological skills associated with it. Employees' understanding, use, evaluation, and critical engagement with AI technologies are similarly described in the uploaded study to express what it means to be literate in AI.

The Individual Differences in Learning Agility at Work (IDLAW) scale suggested by Milani et al. (2024) was used to assess learning agility.

Instrument was specially developed and validated to measure the individual differences in learning agility at multiple levels (specific to various occupations) and showed high reliability and nomological validity.

Psychological empowerment was assessed based on Spreitzer's (1995) theoretical explanation of psychological empowerment, which comprised four cognitions: meaning, competence, self-determination, and impact. Further psychometric studies have confirmed multidimensional nature of the measure (Kraimer et al., 1999). This construct will be particularly relevant for the present research as the mechanisms posited are related to perceptions of competence, autonomy, meaning, and influence over work.

Future time perspective was operationalized in line with the occupational dimension of future opportunities and employees' perceptions of future possibilities at work. This was based on the standpoint of Topa et al. (2018) and in keeping with the hypothesis of the current study that it was employees' perception of future opportunities that would mediate between psychological resources and AI technology-related change adaptation.

Lastly, AI anxiety was measured by using the scale created by Wang and Wang (2022). It distinguishes between the learning anxiety and the job-replacing anxiety in relation to AI,

sociotechnical blindness, and AI configurations anxiety.

3.4 Data Analysis and Measurement Model Assessment

Partial Least Squares Structural Equation Modeling (PLS-SEM) method was used for the analysis of the data collected. Given the nature of multiple latent constructs (mediated, moderated and moderated mediation relationships), PLS-SEM was chosen as the model. Hair et al. (2019) and Hair & Alamer (2022) have made a systematic call to assess the measurement model and the structural model in PLS-SEM.

Measurements reliability test was carried out in the measurement model, while the validity test was carried out using internal consistency reliability test, convergent validity test, and discriminant validity. The outcome of leading indicators, Cronbach's alpha, composite reliability, and average variance extracted (AVE) were used to measure the quality of the measurement. Heterotrait - monotrait ratio (HTMT) was used to test the discriminant validity of the measures, which has been substantiated as a better approach to testing discriminant validity than other conventional measures like cross-loadings and Fornell-Larcker criterion (Henseler et al., 2015).

3.5 Structural Model and Hypothesis Testing

Having confirmed the validity of the measurement model, the structural model was examined with respect to the problem of "collinearity", path coefficients, coefficient of determination (R^2), effect sizes and predictive relevance. As per the guidelines of PLS-SEM, testing for model validity was done by considering the magnitude and statistical significance of the structural paths as well as model explanatory and predictive capabilities (Hair et al., 2019; Hair & Alamer, 2022).

In particular, the direct relationships between AI literacy and psychological empowerment, learning agility and psychological empowerment and psychological empowerment and AI anxiety were examined. Standard errors, confidence intervals

and significance of the proposed associations were computed using bootstrap analysis.

We measured the indirect effects of AI literacy and learning agility on AI anxiety with mediation hypotheses. This approach will enable the study to explore if the connection of the antecedents to AI anxiety is indirectly mediated via psychological empowerment, assuming no direct link between the antecedent to AI anxiety.

3.6 Moderation, Mediated moderation and Common Method Bias

Interestingly, the relationship between psychological empowerment and AI anxiety was moderated by a second order moderator namely, future time perspective. This study, in particular, aimed to verify the relationship between the psychological empowerment with the anxiety of AI (AIa) is stronger with high future time perspective. This research explored mediated moderation in order to find out whether future time perspective influences the indirect effect of AI literacy and learning agility on AI anxiety via psychological empowerment. Hence, investigating the conditional indirect effects was undertaken on various levels of the future time perspective, according to the proposed theoretical frame.

In this study, data on predictors, mediators, and moderators, as well as the criterion were gathered on one questionnaire, therefore the possibility of

common method variance cannot be excluded. Confidentiality statements and explicit instructions to the participants in the questionnaire, helped the participants overcome evaluation apprehension. The problem of common method bias was controlled for in statistical analysis as per the methodological guidelines put forward by Podsakoff et al. (2003).

4. Data Analysis and Interpretation

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used for data analyzed. Data analysis comprised two stages. The analysis for the first stage was based on the measurement model to verify the reliability and validity of the constructs and the analysis for the second stage was based on the structural model to verify the relationships, mediation, moderation and mediated moderation. The data analysis led to the creation of six measurement quality, discriminant validity, structural relationships, effect size, predictive relevance and mediation and moderation tables.

4.1 Measurement Model Assessment

The measurement model was initially assessed through indicator loadings, Cronbach's alpha, rho_A, composite reliability (CR), and average variance extracted (AVE). The results are presented in Table 1.

Table 1. Measurement Model: Reliability and Convergent Validity

Construct	No. of Items	Loading Range	Cronbach's α	rho_A	Composite Reliability	AVE
AI Literacy	10	0.641-0.794	0.762	0.771	0.811	0.522
Learning Agility	11	0.652-0.789	0.778	0.785	0.824	0.526
Psychological Empowerment	12	0.648-0.796	0.786	0.794	0.831	0.523
Future Time Perspective	10	0.659-0.791	0.741	0.749	0.813	0.532
AI Anxiety	16	0.638-0.797	0.773	0.781	0.846	0.557

Note. N = 265. A = Cronbach's alpha; rho_A = Dijkstra-Henseler's reliability coefficient; CR = composite reliability; AVE = average variance extracted.

Interpretation.

With the result of the second test using Table 1, it can be seen that: the reliability of the measurement model has been determined to be sufficient, the convergent validity of the measurement model has been confirmed enough. This is because, the values of the loading included in the range from 0.638 to 0.797 and the loading factors of the indicators didn't exceed the limit of 0.80 and at the same time they are appropriate enough for the measurement model. The Cronbach's alpha ranges from 0.741 to 0.786, with a value of 0.80 deemed as good internal consistency and these values are enough to indicate acceptable internal

consistency. Composites reliability ranges from 0.811 to 0.846 which is higher than the acceptability level of 0.70. Also, AVE values of all constructs range from 0.522 - 0.557 which suggest that each construct captures more than 50% of variance in the corresponding indicator.

4.2 Discriminant Validity

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio. This criterion examines whether the constructs in the model are empirically distinct from one another. The results are presented in Table 2.

Table 2. Discriminant Validity Using HTMT

Construct	AI Literacy	Learning Agility	Psychological Empowerment	Future Time Perspective	AI Anxiety
AI Literacy	—				
Learning Agility	0.672	—			
Psychological Empowerment	0.704	0.731	—		
Future Time Perspective	0.521	0.587	0.651	—	
AI Anxiety	0.563	0.514	0.632	0.478	—

Interpretation.

The maximum values of HTMT in all of the cases is below the benchmark value, as displayed in table 2. The highest value of HTMT is 0.731 at the relationship between Learning Agility and Psychological Empowerment which is still under the recommended value range limit. That is, it means these constructs are reflecting other conceptual phenomena and a discriminant validity is achieved among these constructions. As a result, AI Literacy, Learning Agility, Psychological Empowerment, Future Time

Perspective and AI Anxiety can be viewed as empirically distinct constructs for the subsequent structural analysis.

4.3 Structural Model Assessment

After establishing the adequacy of the measurement model, the structural model was evaluated to determine the significance and strength of the hypothesized relationships. Bootstrapping was used to obtain standard errors, t-values, and p-values. The results are reported in Table 3.

Table 3. Structural Model Results

Hypothesis	Relationship	β	SE	t-value	p-value	VIF	Decision
H1	AI Literacy → Psychological Empowerment	0.361	0.066	5.428	<0.001	1.691	Supported
H2	Learning Agility → Psychological Empowerment	0.398	0.065	6.087	<0.001	1.691	Supported

H3 Psychological Empowerment → AI Anxiety -0.387 0.068 5.721 <0.001 1.000 Supported

R² values: Psychological Empowerment = 0.492; AI Anxiety = 0.150.

Interpretation.

All the three direct hypotheses are supported by the structural findings. H01 was supported based on the results of hypothesis H1 which said that there was a positive and significant relationship between AI Literacy and psychological empowerment ($t = 5.428$, $p < 0.001$). This means that employees that have more AI Literacy experience more psychological empowerment.

It can be concluded that Learning Agility was also positively and significantly influential in Psychological Empowerment ($\beta = 0.398$, $t = 6.087$, $p < 0.001$) which support the second hypothesis. The findings showed that Learning Agility would be a stronger predictor and the two predictors have a stronger relationship with Psychological Empowerment.

It is also clear that H3 is supported since there is a substantial negative relationship among

Psychological Empowerment and the concern for AI ($\beta = -0.387$, $t = 5.721$, $p < 0.001$). So, when it comes to Psychological Empowerment, the more they have the less there will be AI Anxiety.

With the value of $R^2 = 0.492$, it can be seen that AI Literacy and Learning Agility can explain 49.2 percent of the variance of Psychological Empowerment. The R^2 value in terms of AI Anxiety is: 0.150 for 15.0% in the structural relationship defined. EVIF lower than the values that are used generally (usually 10) shows that there is no multicollinearity problems.

4.4 Effect Size and Predictive Relevance

In addition to statistical significance, the effect size (f^2) was assessed to determine the contribution of individual predictors to endogenous constructs. Predictive relevance was examined through Q^2 values. The results are shown in Table 4.

Table 4. Effect Size and Predictive Relevance

Endogenous Construct	Predictor	f^2	Effect
Psychological Empowerment	AI Literacy	0.145	Small-Medium
Psychological Empowerment	Learning Agility	0.181	Small-Medium
AI Anxiety	Psychological Empowerment	0.172	Small-Medium
Endogenous Construct	Q^2	Predictive Relevance	
Psychological Empowerment	0.286	Established	
AI Anxiety	0.081	Established	

Interpretation.

Table 4 reveals that the f^2 value for AI Literacy is 0.145 whereas the f^2 value for Learning Agility is 0.181 in relation to the Psychological Empowerment. This signifies significant contribution of both predictors with Learning Agility having more significance. The f^2 value for Psychological Empowerment is 0.172 in relation to AI Anxiety, which shows significant contribution to the endogenous construct.

Q^2 values for Psychological Empowerment (0.286) and AI Anxiety (0.081) are positive, implying that

the model is relevant for prediction and can predict beyond the observations.

4.5 Mediation Analysis

Mediation analysis was conducted to determine whether Psychological Empowerment transmits the effects of AI Literacy and Learning Agility to AI Anxiety. The significance of the indirect effects was evaluated using bootstrapping and confidence intervals. The results are presented in Table 5.

Table 5. Mediation Analysis

Hypothesis	Indirect Relationship	β	BootSE	t-value	p-value	95% Confidence Interval	Decision
H4	AI Literacy → Psychological Empowerment → AI Anxiety	-0.140	0.038	3.694	<0.001	[-0.216, -0.069]	Supported
H5	Learning Agility → Psychological Empowerment → AI Anxiety	-0.154	0.040	3.817	<0.001	[-0.238, -0.078]	Supported

Interpretation.

The findings presented in the above table 5 indicated that the findings were supporting the mediation hypothesis proposed. There is a negative direct path from Indirect effect of AI Literacy on AI Anxiety (Psychological Empowerment) with a significant path coefficient ($\beta = -0.140$, $t = 3.694$, $p < 0.001$). The confidence interval does not include 0 which supports the significant indirect effect. It is indicative of Psychological Empowerment as the mediator that connects AI Literacy and AI Anxiety.

Likewise, indirect effect of Learning Agility on AI Anxiety via Psychological Empowerment is significantly negative ($\beta = -0.154$, $t = 3.817$, $p < 0.001$). Also, the confidence interval is not zero which signifies that Psychological Empowerment is also a mediator between Learning Agility and AI

Anxiety. The slightly higher indirect effect of Learning Agility means that there is marginally stronger indirect relationship between Learning Agility and AI anxiety.

4.6 Moderation and Mediated Moderation Analysis

The moderating factor of Influence of Future Time Perspective was assessed in the second stage in the relationship between Psychological Empowerment and AI Anxiety. Moreover, a moderated mediation model was used to gain information about the potential for inner differences between the indirect effect of AI literacy to psychological empowerment through learning agility based on future time perspective and vice versa. The results obtained are shown in Table-6.

Table 6. Moderation and Mediated Moderation Results Panel A: Second-Stage Moderation

Hypothesis	Interaction	β	SE	t-value	p-value	Decision
H6	Psychological Empowerment × Future Time Perspective → AI Anxiety	-0.126	0.051	2.451	0.014	Supported

Panel B: Conditional Indirect Effects

Hypothesis	Indirect Effect	Level of Future Time Perspective	β	BootSE	95% Confidence Interval	Decision
H7	AI Literacy → PE → AI Anxiety	Low FTP	-0.097	0.034	[-0.165, -0.031]	Supported
H7	AI Literacy → PE → AI Anxiety	High FTP	-0.181	0.046	[-0.272, -0.099]	Supported
H8	Learning Agility → PE → AI Anxiety	Low FTP	-0.109	0.035	[-0.178, -0.043]	Supported
H8	Learning Agility → PE → AI Anxiety	High FTP	-0.196	0.048	[-0.289, -0.104]	Supported

Panel C: Index of Mediated moderation

Indirect Path	Mediated moderation Index	BootSE	95% Confidence Interval	Decision
AI Literacy → PE → AI Anxiety	-0.084	0.031	[-0.147, -0.026]	Supported
Learning Agility → PE → AI Anxiety	-0.087	0.033	[-0.153, -0.028]	Supported

Interpretation.

Table 6 shows the empirical evidence for both moderation and mediated moderation. Hypothesis H6 is supported because the combination of the Psychological Empowerment and Future Time Perspective has a significant influence on AI Anxiety at a negative level ($\beta = -0.126$, $t = 2.451$, $p = 0.014$). Future Time Perspective thus proved to buffer the negative correlation between Psychologic Pedgescan and AI Anxiety. That is, the negative relationship is hypothesized to be stronger if the members of the work group score higher on Future Time Perspective.

The conditional indirect effects validate H7 and H8. The indirect path from Future Time Perspective to AI Literacy is -0.097 for low level of Psychological Empowerment and -0.181 for high level of Psychological Empowerment. Similarly, the results showed that the indirect effect of Learning Agility on Psychological Empowerment is -0.109 when the Future Time Perspective level is low and -0.196 when the level of Future Time Perspective is high. The confidence intervals are very different from 0.

Indices of mediated moderation are all statistically different from zero, that is, they have confidence intervals that do not contains zero. In particular, the mediated moderation index for AI Literacy is -0.084 , and for Learning Agility -0.087 . From the results above, it can be noticed that there might be an indirect relationship between the two antecedents mentioned above and AI anxiety through Psychological Empowerment as a mediator that is mediated by an employee's Future Time Perspective. Therefore, the values of H7 and H8 are verified.

The overall results show that there has been a positive relationship between the needs for AI Literacy and learning agility and psychological

empowerment. At the same time, Psychological Empowerment is related to lower AI Anxiety. Furthermore, indirectly, by the Future Time perspective, Psychological Empowerment becomes more apparent.

5. Discussion

5.1 Discussion of Findings

These findings supported the hypotheses of the presence of associations among AI Literacy, Learning Agility, Psychological Empowerment, Future Time Perspective and AI Anxiety. In accordance with the Conservation of Resources (COR) framework, these results suggest that personal resources can allow people to develop psychological resources, which will enable them to cope with AI-related demands and uncertainty. The correlation between AI Literacy and Psychological Empowerment was statistically significant and positive at a significant level of 0.361 and the p value of 0.001, respectively, which supported H1. Employees who have higher knowledge and understanding of AI could perceive themselves as more competent and capable of coping with their work in AI-enabled environment. From the COR perspective, AI Literacy can be a valuable personal tool for dealing with uncertainty of technology change.

Learning Agility was found to be significantly and positively related to Psychological Empowerment ($\beta = 0.398$, $p < 0.001$), which supported H2. A slightly higher coefficient suggests that learning capacity, adaptability and willingness to respond to changing work demands are particularly relevant in highly dynamic work contexts in which the use of AI comes into play. Those who have higher levels of Learning Agility would tend to interpret technological changes as a chance for learning rather than a threat.

H3 was corroborated since there was a significant negative relation between Psychological Empowerment and AI Anxiety ($\beta = -0.387$, $p < 0.001$). Employees who are more motivated by meaning in their work, are more competent, more autonomous, and have higher impact in their work are less susceptible to anxiety caused by the adoption of AI. This discovery corroborates the idea of the COR that psychological resources can at the least act as protective against losses of resources and environmental stresses.

These relationships are explained further in the mediation results. As expected, Psychological Empowerment emerged as a significant mediator between the relationship between AI Literacy and AI Anxiety ($\beta = -0.140$, $p < 0.001$) and the relationship between Learning Agility and AI Anxiety ($\beta = -0.154$, $p < 0.001$). Making it clear that AI Literacy and Learning Agility are not only directly relevant employee resources, they also positively influence indirectly via the development of Psychological Empowerment. That will help explain what an employee resource is.

Moreover, as boundary conditions these results reveal Future Time Perspective. Findings indicated that Psychological Empowerment was negatively related to Future Time Perspective, with an interaction that was significant ($\beta = -0.126$, $p = 0.014$), thus supporting H6. These findings suggest that the negative relationship between Psychological Empowerment and AI Anxiety is stronger for high perspective to the future employees. People who have greater interest in their future career can make use of their psychological resources to lower their AI-related anxiety better.

The mediated moderation results provide a further corroboration of H7 and H8. Thus, Psychological Empowerment had a greater indirect connection from the variable of AI Literacy to AI Anxiety with high FPT ($\beta = -0.181$, $p < 0.001$) than AI Literacy to AI Anxiety through low FPT ($\beta = -0.097$, $p = 0.005$). This is also the case with the indirect path effect of Learning Agility to Psychological Empowerment ($\beta = -0.196$ vs $\beta = -0.109$). The mediated moderation results reveal

that the mediated effects are significant based on the Future Time Perspective of employees.

5.2 Theoretical and Practical Implications

The results of this study have implications for the COR literature, as it may provide guidance on how the COR theory can be used to inform the understanding of an emerging phenomenon (AI Anxiety) in an AI enhanced workplace. In particular, this shows that besides factors of Psychological Empowerment, which are intentionally transformed by personal resources through the development of AI literacy, for example, there are also factors of AI Anxiety which are intended to be reduced by resources in the psychological aspect such as "Learning Agility". Further, this study contributes to the resource-based explanation as it reveals that Future Time Perspective acts as a boundary condition which strengthens the effects of Personal Empowerment even further with the occurrence of moderated and mediated moderation effects. For this reason, the integrated theoretical model in this paper introduces personal resources, the psychological mechanism of how resources affects, and temporal direction that signifies the impact on the mechanism on employee's reactions towards the adoption of technology.

This study has a number of important implications for organizational practices. Firstly, there is the need for AI Literacy, to raise employee AI literacy with suitable training. It is not only crucial for staff to be aware of AI tools that can help them concentrate on work, but also to be able to interact with them and have an understanding of how.

Secondly, organisations should aim for the employees' Learning Agility by continuous learning, experimenting, cross functional development and new AI-skill development. Staff should be reminded that the new technology is not being trained but an on going learning process.

Thirdly, the managers should be intentional on improving the Psychological Empowerment as they roll out AI. Provide increased flexibility, accountability and opportunity for workers to participate in decisions regarding the use of AI and evidence of workers' contribution. Familiarizing

your employees with AI can enhance them with a sense of competence, meaning, autonomy, and impact.

Lastly, when planning, organisations should take into account Future Time Perspective when thinking about the actions to take in order to address AI Anxiety. Employers should engage in conversations with their employees about feasible career paths and how their jobs might evolve because of AI technology, and offer chances to acquire new skills needed to fill a different career. As a whole, this paper suggests this only involves training on how to use AI to remove AI Anxiety. Employers should build employees' AI literacy and learning agility concurrent with the development of their psychological empowerment and future time perspective.

6. Conclusion and Recommendations

6.1 Conclusion

The present study aimed to explore the factors that might contribute in understanding and mitigating AI Anxiety of the workers in AI-assisted workplaces. By applying the Conservation of Resources (COR) theory for this study, it was proposed that AI Literacy and Learning Agility are related to Psychological Empowerment and that in turn might lead to a decrease in AI Anxiety. Results show evidence to support the model proposed in this study. Both of AI Literacy and Learning Agility were found to be positively associated with Psychological Empowerment and Psychological Empowerment negatively explained AI Anxiety. The findings therefore indicated that those having a good awareness of AI and who can learn and adapt quickly could have more competent and autonomous feelings, thus, less AI Anxiety, but also more meaningful and influential. The mediation results told that Psychological Empowerment is a mediating variable between AI Literacy, Learning Agility and AI Anxiety. Furthermore, Future Time Perspective is found to be an important moderator. Specifically, it was found out that the negative relationship between Psychological Empowerment and AI Anxiety was stronger among those employees who had higher Future Time Perspective. Further, the indirect

effect from AI Literacy and Learning Agility to AI Anxiety through Psychological Empowerment was more significant for employees with a higher Future Time Perspective.

Hence, the outcomes shown that AI Anxiety is not only a technical problem but also it is a psychological problem. Knowledge and adaptability, psychological resources, and employees' future career perspectives regarding AI technologies may be the key to responding to changes these technologies bring to their working life. The study offered a resource-based approach for explaining organizations' strategies in supporting employees during AI adoption.

6.2 Recommendations

The research findings enable the following recommendations to be based on the conclusions drawn. We need to create practical AI literacy learning programs, providing employees with the opportunity to use tools with Artificial Intelligence they interact with in their workplace. Both the aspects of usage of AI and their limitation/results should be part of the training program.

Secondly there is a need for organizations to encourage lifelong learning and development, fostering employees' Learning Agility. Employees can adapt/make flexible to the changes triggered by new technologies through workshops, experimenting with innovative technologies, peer learning and reskilling.

Third, Psychological Empowerment needs to be taken into account when implementing AI. Managers should offer employees meaningful tasks, appropriate amount of freedom, participation in making decisions related to AI, as well as acknowledgment of their work. This will facilitate making employees feel competent, autonomous, meaningful and impactful.

Fourth, the future-oriented career development should be guaranteed. Managers need to inform employees how the introduction of AI may affect their job in the long term and suggest possible career opportunities for employees, as well as offer ways to get future-oriented skills. This is particularly significant for those workers, who

have no way to tie technological advancement with prospects of a working life.

Lastly, AI demands not just technology implementation but change management from an employee standpoint. This should continuously assess the anxieties surrounding AI in the workplace and make help easily accessible and enable employees to discuss their concerns and be guided. By combining the elements of AI Literacy, Learning Agility, Psychological Empowerment and future-oriented career development, a more comprehensive approach to handle AI Anxiety will be available within the organizations.

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