

From fear to action: Mediating effect of career anxiety between fear of AI replacement and upskilling intention among Indonesian undergraduates

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Abstract

The rapid advancement of artificial intelligence (AI) has intensified concerns about job displacement, particularly among undergraduate students preparing to enter the labor market. This study examines the effect of fear of AI replacement on upskilling intention, with career anxiety as a mediating variable. Using a quantitative approach, data were collected through an online survey from 267 Indonesian undergraduate students in social sciences and humanities disciplines with prior AI experience, of which 202 valid responses were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that fear of AI replacement has a positive and statistically significant effect on both upskilling intention and career anxiety. In addition, career anxiety positively and significantly influences upskilling intention and mediates the relationship between fear of AI replacement and upskilling intention. These findings indicate that fear of AI replacement acts not only as a direct motivational driver but also indirectly encourages upskilling intention through career anxiety as an adaptive psychological response. This study contributes to the literature by highlighting the adaptive role of career anxiety in transforming AI-related fear into proactive upskilling intention among undergraduate students and offers practical implications for higher education institutions and policymakers in responding to AI-driven labor market change.

Keywords

fear of artificial intelligence replacement; career anxiety; upskilling intention; undergraduate students; technological disruption

INTRODUCTION

The rapid advancement of global technology, particularly in the field of Artificial Intelligence (AI), has brought about fundamental changes in the employment landscape (Pratama et al., 2023). AI is no longer limited to automating physical or administrative tasks; it has increasingly penetrated domains requiring cognitive and analytical capabilities that were once considered uniquely human (Zárate et al., 2025). Its ability to analyze large-scale data, generate predictions, and make algorithm-based decisions has positioned AI as a disruptive force across numerous industries (Pambudi et al., 2023). As companies continue to adopt AI, particularly in strategic and operational functions, concerns

over human job displacement have intensified. This phenomenon is known as the *fear of AI replacement* an individual's anxiety regarding the potential loss of their job or role to AI-driven systems (Obradovi & Kova, 2024; Włoch et al., 2025; Weber et al., 2024).

In this context, undergraduate students, who are undergoing the critical transition from education to employment, represent a highly vulnerable group (Habibie et al., 2023). These students are not only expected to complete their studies successfully but also adapt to the rapidly shifting demands of the labor market. Uncertainty regarding future career prospects and the relevance of their acquired competencies has led to considerable psychological strain (Mallet et al., 2025; Muqarrama et al., 2022). The fear of being replaced by machines in various occupational

domains can trigger a psychological condition referred to as *career anxiety*, a state of mental unease caused by confusion, unpreparedness, and uncertainty about one's career direction, prospects, and success (Mallet et al., 2025; Muqarrama et al., 2022; Weber et al., 2024).

Interestingly, career anxiety does not always result in negative outcomes. When managed effectively, it can serve as a source of motivation for self-improvement (Pratama et al., 2023). In such cases, insecurity about future career pathways may encourage students to take proactive and adaptive actions, such as acquiring new skills aligned with evolving job market requirements (Weber et al., 2024). A key strategy that has emerged in this regard is *upskilling intention*, defined as an individual's effort to improve or acquire new technical and non-technical skills including digital literacy, communication, teamwork, and critical thinking to remain competitive and relevant amid rapid technological transformation (Elfina & Andriany, 2023).

Thus, upskilling intention is viewed as a critical response to the technological disruption caused by AI (Pratama et al., 2023). However, the motivation to pursue upskilling does not arise automatically; it is shaped by various psychological and contextual factors. One notable factor is the role of *career anxiety* as a psychological bridge between the fear of AI replacement and the intention to upskill. In this framework, career anxiety is hypothesized to mediate the transformation from fear into action (Pratama et al., 2023).

Despite the growing relevance of this issue in the digital era, empirical studies explicitly examining the relationship between fear of AI replacement, career anxiety, and upskilling intention among university students remain scarce particularly in Indonesia (Kidwai et al., 2025). Previous research has predominantly focused on active workers, organizations, or industry-wide transformations, leaving a significant gap in understanding how the younger generation is preparing for an increasingly digitized job market (Kidwai et al., 2025). In reality, today's students represent the future workforce that will be the first to confront automation challenges directly (Muqarrama et al., 2022). This study aims to address this gap by investigating the following research questions:

RQ1. What is the relationship between fear of AI replacement and career anxiety in fostering upskilling intention?

RQ2. Does career anxiety mediate the relationship between fear of AI replacement and upskilling intention?

Given these considerations, this study aims to empirically explore the relationship between fear of AI replacement and undergraduate students' intention to upskill, while examining the mediating role of career anxiety in this relationship. By focusing on university students as the primary research population, this study seeks to provide theoretical contributions to the development of career adaptation models in the era of technological disruption. It also aims to offer practical insights for higher education institutions, training providers, and labor policy designers in crafting interventions that are relevant and responsive to the psychological needs of the younger generation (Habibie et al., 2023; Muqarrama et al., 2022).

This research contributes to the existing literature in several ways. Drawing on Protection Motivation Theory (PMT) and Conservation of Resources Theory (COR), it explains how technological threats arising from artificial intelligence can trigger adaptive, career-oriented behaviors among undergraduate students. The findings highlight fear of AI replacement as a motivational trigger that encourages students to protect and strengthen their career-related resources through upskilling, as well as the role of career anxiety as a psychological response associated with the intention to enhance competencies. By focusing on undergraduate students in Indonesia, this study enriches the understanding of career adaptation and readiness in the context of rapid technological change.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Protection motivation theory (PMT)

To explain students' adaptive responses to technological threats, Protection Motivation Theory (PMT) is used as the main theoretical framework. This theory explains that individuals are motivated to engage in protective actions when they perceive a significant threat to their future (Rogers, 1975). In the context of artificial intelligence (AI) development, fear of AI replacement reflects students' awareness that AI may threaten career sustainability and the relevance of their

skills, thereby encouraging anticipatory actions. Upskilling intention subsequently emerges as a form of protective behavior aimed at enhancing competencies in order to remain relevant and competitive in an increasingly digitalized labor market (Rogers, 1983).

Conservation of resources theory (COR)

This dynamic can be reinforced by the Conservation of Resources (COR) theory. This theory states that individuals will seek to protect and enhance resources that are considered important for their survival, including career resources. When students feel threatened by the loss of job opportunities due to AI, they are motivated to acquire new skills as a form of protection for these resources (Hobfoll et al., 2018; Rahman et al., 2022). In this context, career anxiety acts as a psychological indicator that an individual's resources in the form of career readiness are under pressure. The intention to upskill emerges as a response to this anxiety. Thus, the act of learning or training skills is not only a reflection of market needs but also a self-defense strategy against the loss of future potential.

Fear of AI replacement and upskilling intention

Fear of AI replacement does not only generate emotional reactions but may also encourage adaptive actions. According to the Protection Motivation Theory (PMT), in the context of artificial intelligence (AI) development, fear of AI replacement reflects students' awareness of threats to career sustainability and skill relevance, thereby prompting anticipatory responses through learning and competency development.

Empirical evidence supports this argument, as Chen et al. (2024) demonstrate that AI-related anxiety has a positive effect on motivated learning behavior among university students. Similarly, anxiety regarding AI-driven job replacement (AI job replacement anxiety) has been shown to increase learning motivation and learning intention, functioning as an adaptive mechanism for coping with technological threats. Thus, fear of AI replacement can serve as a motivational trigger that encourages students to enhance their skills through upskilling.

Accordingly, the first hypothesis is presented as:

H1: Fear of AI replacement is positively related to upskilling intention.

Fear of AI replacement and career anxiety

Fear of AI replacement reflects individuals' concerns that AI and automation may substitute human roles and undermine future career opportunities. Prior research shows that perceived automation threat particularly beliefs that technology diminishes human relevance heightens automation-related fear (Ivanov et al., 2020).

Consistently, evidence in the education context indicates that greater awareness of AI's labor-market impact increases anxiety about future employment prospects (Liang & Zhai, 2025). Moreover, organizational evidence suggests that stronger perceptions of AI in the workplace are associated with higher career anxiety (Sohail & Ahmad, 2025).

Based on the above, the second hypothesis is proposed as follows:

H2: Fear of AI replacement is positively related to career anxiety.

Career anxiety and upskilling intention

Career anxiety creates pressure for individuals to maintain their relevance in an AI-disrupted labor market. According to the Conservation of Resources (COR) theory (Hobfoll, 1989), individuals strive to protect and acquire new resources to cope with threats to their existing ones in this case, their skills and jobs. Empirical evidence among undergraduate students shows that higher levels of job-seeking anxiety are positively associated with job preparation behavior, including proactive efforts such as skill development and career-related preparation activities (Kim et al., 2022). In the context of higher education, this may translate into participation in additional training, online courses, or professional certification in digital skills. Hootegem, Witte & Cuyper (2018) also add that AI awareness leads to job insecurity, which culminates in emotional exhaustion and the need for coping mechanisms such as proactive skill development. This suggests that career anxiety may function as a trigger for constructive actions, including upskilling. Thus, the third hypothesis is formulated as:

H3: Career anxiety is positively related to upskilling intention.

Mediating effect of career anxiety

Fear of AI replacement may influence upskilling intention indirectly through career anxiety. Xu et al. (2023) state that AI awareness activates threat appraisal mechanisms, which increase perceptions of job insecurity and motivate individuals to compensate by setting learning goals or engaging in proactive behaviors. From the perspective of Conservation of Resources (COR) theory, such threat appraisals signal potential loss of valued career-related resources, thereby eliciting anxiety that shapes subsequent coping-oriented intentions (Hobfoll et al., 2018). In the context of AI-related disruption, prior studies indicate that anxiety concerning AI's impact on future careers may encourage learning-oriented and career preparation behaviors, reflecting an adaptive response to perceived uncertainty (Chen et al., 2024; Wang et al., 2024). Moreover, research in career development suggests that career anxiety can function as a psychological mechanism linking perceived career threats to proactive career-related actions (Vignoli, 2015).

Based on these insights, the fourth hypothesis is formulated as:

H4: The relationship between fear of AI replacement and upskilling intention will be positively mediated by career anxiety

Figure 1 illustrates the conceptual framework of this study. This research investigates the mediating role of career anxiety in the relationship between fear of AI replacement and upskilling intention, using data collected from undergraduate students in Indonesia.

METHODS

Research design and data collection

This study adopted a quantitative research approach using an online-based questionnaire administered through Google Forms. The use of an online survey enabled efficient data collection and facilitated access to respondents from multiple universities.

Data collection was conducted over a two-month period, from March to May 2025, in Indonesia. The questionnaire was distributed through university-affiliated networks and social media platforms commonly used by undergraduate students, including WhatsApp, Instagram, and Telegram.

To ensure the inclusion of participants with adequate exposure to AI technologies, a screening process was implemented. Prior to accessing the main questionnaire, respondents were required to indicate their academic major and answer a key eligibility question: "Have you ever used artificial intelligence (AI)?" These screening criteria ensured that the sample consisted of undergraduate students from relevant academic disciplines with prior experience using AI technologies. Respondents who did not meet the eligibility criteria were excluded from further participation. Participation in the study was voluntary, and respondents were informed that their responses would remain anonymous and confidential.

Population and sample

The target population consisted of active undergraduate students enrolled in social sciences and humanities-related disciplines at universities across Indonesia who is having prior experience using artificial intelligence (AI). This population was selected because students in these academic fields are

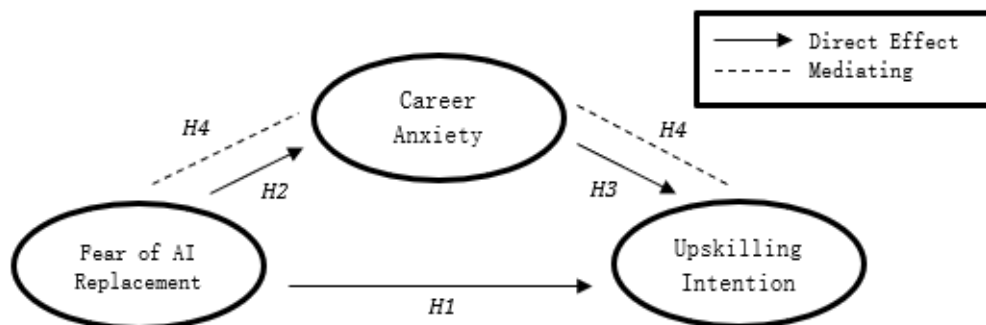


Figure 1. Conceptual Framework

increasingly exposed to the implications of artificial intelligence (AI) in learning activities and future career planning. No specific age restrictions were imposed, provided that respondents were currently registered as undergraduate students.

According to Sekaran & Bougie (2016) purposive sampling begins when the researcher identifies a specific research problem and determines the target population that can provide relevant information. Besides the nature of the research problem, purposive sampling was chosen over probability sampling due to its simplicity, ease of implementation, and lower cost (Bagozzi & Yi, 2012).

The sample size was determined using the rule of thumb for SEM analysis, which recommends a minimum of 5 to 10 respondents per estimated parameter. Assuming 30 indicators in the model, a minimum of 150–300 respondents is needed. In this study, data were collected from 267 respondents, and 202 were selected as samples based on the criteria.

Respondent profile

Regarding sample size, Hair et al. (2014) suggest that a minimum of five times the number of variables to be analyzed is required. A total of 267 online questionnaires were distributed. Of these, 202 were considered valid for further analysis. According to Hair et al. (2014), a sample size of 202 provides a strong basis for statistical estimation. Thus, the sample size used in this study ($n = 202$) is deemed adequate for applying PLS-SEM to test the proposed hypotheses.

To describe the characteristics of the research participants, respondents' demographic profiles were examined, including gender, age, educational level, university origin, and current semester. The results show that 55 respondents (27.2%) were male and 147 respondents (72.8%) were female. Most respondents were aged between 18 and 25 years (97.0%), indicating that the sample largely consisted of students approaching the transition to the labor market. The majority were enrolled in middle to late academic semesters, particularly semester 4 (52.0%), followed by semesters 5 and 6.

Measurement

Data were collected using an online questionnaire distributed through social media and academic networks. All instruments utilized a 7-point Likert scale, ranging from "Strongly Disagree" (1) to "Strongly Agree" (7), as employed by Chen et al. (2024). A total of 33 items were included in this study. Fear of being replaced by AI in the workplace was measured using 6 items adapted from Chen et al. (2024). The career anxiety variable was assessed using 15 items developed by Boo et al. (2021). The intention to upskill variable was measured using 5 items, also adapted from the model by Chen et al. (2024).

Data analysis

Data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4. This method was chosen due to its strong statistical power, minimal distributional assumptions, and suitability for small to moderate sample sizes, as well as its effectiveness in testing complex and mediation models (Hair et al. 2019). The analysis followed a two-step approach, consisting of measurement model evaluation and structural model evaluation (Hair et al. 2019; Rahman et al., 2025).

RESULTS AND DISCUSSION

Measurement model evaluation

In the first stage, the measurement model was assessed using SmartPLS 4 to ensure that the constructs in this study exhibited strong correlations with the proposed variance. Convergent validity and construct reliability were examined to evaluate the adequacy of the measurement model. Convergent validity was assessed based on the factor loadings (outer loadings) of the indicators associated with each latent construct. Following Hair et al. (2019), indicators with outer loading values of 0.50 or higher were considered acceptable. All measurement items in this study demonstrated loading values above the 0.50 threshold, indicating that each item significantly contributes to explaining its respective construct.

Table 1.
Measurement Model

Construct	Loadings	CR	CA	AVE
Fear of AI replacement		0.901	0.868	0.604
I am afraid that AI may make us dependent	0.769			
I am afraid that AI may make us even lazier	0.756			
I am afraid that AI may replace humans	0.766			
I am afraid that widespread use of humanoid robots will take jobs away from people	0.772			
I am afraid that if I begin to use AI, I will become dependent upon them and lose some of my reasoning skills	0.734			
I am afraid that AI will replace someone's job	0.859			
Career anxiety		0.952	0.945	0.568
I am concerned about future employment due to fear of new environments, especially those influenced by technologies such as AI	0.774			
I am concerned about future employment because I fear taking on responsibilities related to the use and implementation of AI	0.795			
I am concerned about future employment because I feel I lack strong interpersonal skills, which remain a human advantage over AI	0.820			
I am concerned about future employment because my university does not provide sufficient support to prepare students for challenges posed by AI technology	0.706			
I am concerned about future employment due to the limited job opportunities available for my skills as a result of automation and AI	0.829			
I am concerned about future employment because my parents influence my career choices	0.614			
I am concerned about future employment because I feel I have not acquired adequate knowledge and skills relevant to the digital era and AI during my studies	0.732			
I am concerned about future employment due to the possibility of an economic recession	0.676			
I am concerned about future employment because of intense competition in the labor market caused by the use of AI across various sectors	0.760			
I am concerned about future employment because the future work environment may not meet my expectations	0.786			
I am concerned about future employment because my salary may not meet my desired standards	0.726			
I am concerned about future employment because I am uncertain whether my skills and interests will remain relevant amid AI advancements	0.826			
I am concerned about future employment because I might not find a job that aligns with my interests	0.765			
I am concerned that I may not be able to apply what I have learned in my workplace	0.740			
I am concerned about future employment because I lack adequate professional skills	0.726			
Upskilling intention		0.913	0.880	0.676
I am willing to work hard to learn another professional skill	0.833			
Learning another professional skill is one of the most important aspects in my life	0.846			
I am determined to push myself to learn another professional skill	0.774			
I can honestly say that I am really doing my best to learn another professional skill	0.805			
It is very important for me to learn another professional skill.	0.850			

Table 2.
Validity—Fornell Larcker Criteria

Construct	Mean	SD	Career anxiety	Fear of AI replacement	Upskilling intention
Career anxiety	5.49	1.19	0.754		
Fear of AI replacement	4.72	1.28	0.687	0.777	
Upskilling intention	5.41	1.30	0.605	0.682	0.822

Subsequently, Composite Reliability (CR) was calculated to evaluate the internal consistency of the constructs. The CR values ranged from 0.901 to 0.952, which surpass the minimum acceptable threshold of 0.70 as recommended by Hair et al. (2020).

In addition, Cronbach’s Alpha (CA) values were also examined as a complementary indicator of internal reliability, with results ranging from 0.868 to 0.945, further confirming

After establishing convergent validity, discriminant validity of the measurement model was assessed. To measure discriminant validity, the square root of the AVE was compared with the correlations between constructs. Discriminant validity is considered achieved if the square root of the AVE of a construct is greater than its correlations with other constructs (Fornell & Larcker, 1981; Hair et al., 2019). The square root of the AVE values for each construct (0.777 for fear of AI replacement, 0.754 for career anxiety, and 0.822 for upskilling intention) were all greater than the correlations with other constructs (see Table 2). The respondents’ answers were then interpreted using the three-box method. Based on the criteria for response selection on a seven-point Likert scale, the range of values was divided into three categories: low (1.00–3.00), moderate (3.01–5.00), and high (5.01–7.00). These categories were subsequently used as the basis for interpreting the mean scores of the study variables variabel (Idrus et al., 2019; Myint et al., 2023). Based on respondents’ evaluations of the research variables (fear of

high internal consistency among the constructs. To reinforce the assessment of convergent validity, the Average Variance Extracted (AVE) was also analyzed. The AVE values for all constructs were found to be above the recommended minimum value of 0.50, ranging from 0.568 to 0.676. The results show (Table 1) that there are no problems in the data of this study.

AI replacement = 4.72; career anxiety = 5.49; upskilling intention = 5.41), one latent variable fall into the moderate category, while two latent variables fall into the high category. Additionally, the HTMT approach was employed to further assess discriminant validity. HTMT values must be below 0.90 to ensure that there is no conceptual overlap between constructs (Henseler et al., 2015). All variables were well below the 0.90 threshold, indicating that the model strongly satisfies discriminant validity based on the HTMT criterion (Table 3).

Structural model evaluation

The evaluation of the structural model (inner model) was conducted by examining the R-square (R²) values of the endogenous constructs, which reflect the proportion of variance in the dependent variables explained by the independent variables in the model. Based on the analysis results, the R-square value for the career anxiety construct was 0.444, indicating that 44.4% of the variance in career anxiety can be explained by fear of AI

Table 3.
Discriminant Validity—HTMT

Construct	Career Anxiety	Fear of AI replacement	Upskilling Intention
Career Anxiety			
FAR	0.719		
Upskilling Intention	0.652	0.779	

Table 4.
Hypothesis Testing of Direct and Indirect Relationships

Relationship	Coefficient	t-statistics	p-value	Decision
Direct effect				
Fear of AI replacement > upskilling intention	0.502	4.705	0.000	Accepted
Fear of AI replacement > career anxiety	0.667	15.782	0.000	Accepted
Career anxiety > upskilling intention	0.270	2.820	0.005	Accepted
Indirect effect				
Fear of AI replacement > career anxiety > upskilling intention	0.180	2.728	0.006	Accepted
Level significance (5%): t-statistics ≥ 1.96 ; p-value < 0.05				

replacement. According to the classification by Chin (1998), this falls into the moderate category. Meanwhile, the R-square value for the upskilling intention construct was 0.506, indicating that only 50.6% of the variance in upskilling intention can be explained by fear of AI replacement and career anxiety, which is considered weak.

It has been recommended to report path coefficients, p-values, and t-statistics in the structural model to evaluate hypothesis significance (Hair et al., 2019). The structural model is assessed by examining significance values to determine the influence between variables through the bootstrap procedure. Table 4 presents the results of hypothesis testing for direct and indirect effect. The hypothesis testing results indicate that fear of AI replacement has a positive and significant effect on upskilling intention ($\beta = 0.502$; $p < 0.05$); therefore, H1 is accepted. This result suggests that concerns about potential AI-driven job displacement directly encourage students to improve their skills as a form of preparedness for technological changes.

Furthermore, fear of AI replacement positively and significantly affects career anxiety ($\beta = 0.667$; $p < 0.05$); thus, H2 is accepted, indicating that perceived threats from AI substantially increase students' anxiety regarding their future careers.

The findings also reveal that career anxiety has a positive and significant effect on upskilling intention ($\beta = 0.270$; $p < 0.05$); therefore, H3 is accepted. This implies that higher levels of career anxiety motivate students to engage in upskilling activities as a coping response to career uncertainty.

In addition, the indirect effect analysis confirms that career anxiety significantly mediates the relationship between fear of AI replacement and upskilling intention ($\beta = 0.180$; $p < 0.05$); hence, H4 is accepted. This

indicates that fear of AI replacement influences upskilling intention not only directly but also indirectly through increased career anxiety

Discussion

The findings of this study indicate that fear of AI replacement has a positive and significant effect on upskilling intentions (H1 is supported), in line with Protection Motivation Theory (PMT) (Rogers, 1975, 1983). These results confirm the theoretical direction proposed in previous literature and are consistent with studies conceptualizing AI-related threats as drivers of adaptive learning behavior, where individuals who perceive their skills and career prospects to be at risk are motivated to engage in competency development. These findings are also consistent with evidence showing that the perceived impact of AI on education and professional development increases the demand for training and new competencies among students (Santos-jaén et al., 2025). Furthermore, perceived technological threats influence individuals' evaluations of their position in the labor market and their motivation to adapt (No et al., 2024).

Furthermore, the results show that fear of AI replacement has a positive and significant effect on career anxiety (H2 supported). This finding strengthens the theoretical argument that perceptions of technological threats can increase concerns about career sustainability and skill relevance. The result is consistent with evidence from educational contexts indicating that heightened awareness of AI's labor market impact is associated with increased anxiety about employment prospects (Bai et al., 2024), as well as organizational studies showing that perceptions of AI in the workplace are linked

to higher levels of career anxiety (Yaşar & Karagucuk, 2025). Awareness of AI's impact on job opportunities may heighten perceived risk and concerns about future work, while learning orientation can influence how such threats are processed and responded to. From a Conservation of resources theory (COR) perspective, career anxiety can be understood as a psychological indicator that individuals perceive their career resources to be under pressure or at risk of loss (Hobfoll et al., 2018).

Moreover, career anxiety was found to have a positive and significant effect on upskilling intention, indicating that anxiety related to future career uncertainty can motivate proactive skill development. This finding is consistent with career development research showing that future-oriented anxiety can stimulate adaptive preparatory behaviors among students facing uncertain career transitions (Vignoli, 2015). Studies on AI-related threat appraisal further suggest that psychological responses to perceived technological risks can foster learning-oriented and proactive coping intentions when learning is viewed as a viable response (Xu et al., 2023). Empirical evidence also demonstrates that career or job-seeking anxiety among undergraduates is positively associated with career preparation behaviors, including skill acquisition and training participation (Boo et al., 2021; Kim et al., 2022), which aligns with the Conservation of Resources perspective that individuals invest in new skills to protect threatened career resources (Hobfoll et al., 2018; A. Van Hootegeem et al., n.d.).

Consistent with the proposed framework, the findings indicate that career anxiety significantly mediates the relationship between fear of AI replacement and upskilling intention (H4 supported). This result suggests that perceived threats related to AI-driven job displacement first elicit emotional responses in the form of career anxiety, which subsequently motivate adaptive career behaviors such as upskilling. This mechanism is consistent with evidence showing that awareness of AI-related employment risks heightens anxiety, which then shapes learning-oriented and career preparation intentions among students (Liang & Zhai, 2025). Supporting this view, prior research demonstrates that anxiety arising from AI job replacement concerns can function as an explanatory pathway linking technological threats to proactive skill development and learning intentions (Liang & Zhai, 2025; Wang

et al., 2024) In line with Protection Motivation Theory and Conservation of Resources theory, the present findings indicate that career anxiety operates as an adaptive emotional mechanism that channels perceived technological threats into protective resource-investment behavior rather than inhibiting action.

Theoretical implications

This study advances the literature on AI-driven career disruption by explaining how undergraduate students respond adaptively to perceived technological threats. By integrating fear of AI replacement, career anxiety, and upskilling intention, the findings extend prior research that has predominantly focused on organizational or employee contexts.

First, the results extend Protection Motivation Theory (PMT) by demonstrating that fear of AI replacement operates as a salient threat appraisal that directly motivates upskilling intention as a protective behavioral response (Chen et al., 2024; Rogers, 1983; Wang et al., 2024). This confirms that perceived career threats can stimulate proactive self-development rather than avoidance.

Second, from a Conservation of Resources (COR) perspective, the findings conceptualize upskilling as a resource acquisition strategy aimed at safeguarding future career resources under conditions of perceived technological threat (Hobfoll et al., 2018). This extends COR to the context of AI-related career disruption among students.

Finally, the study refines that career anxiety can function adaptively, both directly motivating upskilling and mediating the relationship between fear of AI replacement and upskilling intention. This supports the view that anxiety can serve as a psychological transmission mechanism that channels perceived technological threats into adaptive career behavior, rather than merely inhibiting action (Boo et al., 2021; Kim et al., 2022; Liang & Zhai, 2025; Qian et al., 2025).

Practical implications

This study offers important implications for higher education institutions, training providers, and education policymakers in responding to AI-driven labor market disruption. The finding that fear of AI replacement directly promotes upskilling intention suggests that perceptions of AI-

related threats can be constructively leveraged to foster career readiness. Accordingly, universities should integrate balanced discussions of AI's labor market impact into curricula and career development services, emphasizing evolving skill demands alongside concrete pathways for adaptation through upskilling (Chen et al., 2024; Zhang et al., 2021). Training providers and certification bodies are encouraged to design applied, industry-aligned programs that clearly demonstrate the career value of skill development in an AI-driven economy.

In addition, the significant role of career anxiety both as a direct driver and a mediator highlights the importance of supporting students' psychological readiness alongside skill development. Career counseling services should not aim to eliminate anxiety entirely, but rather help students manage it productively by strengthening self-efficacy, perceived control, and career goal clarity, enabling anxiety to function as a motivational force rather than a barrier (Kleine et al., 2021). At the policy level, promoting comprehensive AI literacy that encompasses technical, social, and ethical dimensions can further empower students to view AI as a manageable challenge and translate AI-related concerns into sustained engagement in upskilling and lifelong learning (Kidwai et al., 2025).

Limitations and future research directions

This study has several limitations that should be addressed in future research. First, the cross-sectional design does not allow observation of changes in student attitudes or behavior over time. Longitudinal studies are recommended to capture the dynamic responses to AI development, especially as students enter the workforce. Second, the use of self-report measures may introduce social desirability bias. Future research could incorporate mixed methods or third-party assessments for more objective insights. Third, the sample was limited to social sciences and humanities-related disciplines undergraduate from a few institutions, restricting the generalizability of the findings. Future studies should include a more diverse population, such as postgraduate students or participants in vocational training programs. Fourth, the study only tested career anxiety as a mediator, though other factors such as self-efficacy and learning motivation may also play significant roles. Fifth, moderating variables

such as gender, field of study, or technological experience were not analyzed. Finally, future research should explore the dimensions of fear of AI replacement in more detail, for instance by distinguishing between fear of job loss, fear of skill irrelevance, and fear of career uncertainty. Such depth would help design more personalized skill development strategies to support students in navigating the era of artificial intelligence.

CONCLUSION

This study examines how fear of AI replacement influences students' upskilling intention, both directly and indirectly through career anxiety, in the context of AI-driven labor market disruption. The findings show that fear of AI replacement serves as a significant trigger for students' intention to enhance their skills, indicating that perceptions of AI-related threats can stimulate adaptive, future-oriented responses rather than merely negative emotional reactions.

In addition, the results demonstrate that fear of AI replacement increases career anxiety, which in turn positively influences upskilling intention and mediates the relationship between fear of AI replacement and upskilling intention. These findings extend Protection Motivation Theory and Conservation of Resources Theory by highlighting upskilling as both a protective response to perceived technological threats and a strategic investment in career-related resources. Practically, the results underscore the importance of educational strategies that support both competency development and students' psychological readiness to adapt to AI-related career challenges.

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