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AI LITERACY AND RISK TOLERANCE AMONG UNIVERSITY STUDENTS

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Abstract

This study investigated the relationship between artificial intelligence (AI) literacy and risk tolerance among Indonesian university students. As generative AI tools became deeply embedded in students' academic and personal decision-making, understanding how different dimensions of AI literacy related to risk-taking dispositions became increasingly important. A correlational quantitative design was employed, involving 156 university students recruited through purposive sampling. AI literacy was measured using AI Literacy Scale, comprising application ability, morality, critical thinking, self-efficacy, cognitive ability, perceived ease of use, and perceived usefulness. Risk tolerance was assessed using the Risk Tolerance Scale developed. Spearman's correlation analysis was used to examine the relationship between variables. The results revealed that only the perceived ease of use dimension was significantly and negatively correlated with risk tolerance. These findings indicated that students who perceived AI tools as easier to use tended to display lower risk tolerance, suggesting that effortless interaction with AI may foster cognitive comfort that reduces willingness to engage with uncertainty. The study contributed to the AI literacy literature by demonstrating dimension-specific associations between AI literacy and psychological disposition.

Keywords: AI literacy, risk tolerance, perceived ease of use, university students.

Abstrak

Penelitian ini menyelidiki hubungan antara literasi kecerdasan buatan (AI) dan toleransi risiko di kalangan mahasiswa universitas di Indonesia. Karena alat AI generatif semakin tertanam dalam pengambilan keputusan akademis dan pribadi mahasiswa, pemahaman tentang bagaimana berbagai dimensi literasi AI berhubungan dengan disposisi pengambilan risiko menjadi semakin penting. Desain kuantitatif korelasional digunakan, melibatkan 156 mahasiswa universitas yang direkrut melalui pengambilan sampel bertujuan. Literasi AI diukur menggunakan Skala Literasi AI, yang terdiri dari kemampuan aplikasi, moralitas, berpikir kritis, efikasi diri, kemampuan kognitif, kemudahan penggunaan yang dirasakan, dan kegunaan yang dirasakan. Toleransi risiko dinilai menggunakan Skala Toleransi Risiko. Analisis korelasi Spearman digunakan untuk memeriksa hubungan antar variabel. Hasil penelitian menunjukkan bahwa hanya dimensi kemudahan penggunaan yang dirasakan yang berkorelasi signifikan dan negatif dengan toleransi risiko. Temuan ini menunjukkan bahwa mahasiswa yang menganggap alat AI lebih mudah digunakan cenderung menunjukkan toleransi risiko yang lebih rendah, menunjukkan bahwa interaksi yang mudah dengan AI dapat menumbuhkan kenyamanan kognitif yang mengurangi kemauan untuk terlibat dengan ketidakpastian. Studi ini memberikan kontribusi pada literatur literasi AI dengan menunjukkan asosiasi spesifik dimensi antara literasi AI dan disposisi psikologis.

Kata Kunci: Literasi AI, toleransi risiko, perceived ease of use, mahasiswa.

Introduction

The rapid diffusion of generative artificial intelligence (AI) tools, including ChatGPT, Gemini, and Claude, has fundamentally reshaped the academic and personal lives of university students. Within a few years, AI assistants have moved from peripheral curiosities to central instruments for learning, writing, problem-solving, and increasingly financial decision support (Cardona et al., 2023; Chiu et al., 2023). In Indonesia, where internet penetration among the 18–24 age group exceeds 95% (APJII, 2024) and digital financial services have expanded

rapidly among young adults (Otoritas Jasa Keuangan, 2024), university students are among the heaviest early adopters of AI tools, integrating them into coursework, research, budgeting, investment exploration, and career planning. This trajectory is further reinforced by the national policy environment articulated in the *Strategi Nasional Kecerdasan Artifisial 2020–2045*, which positions AI competency as a key human-capital priority. Against this backdrop, AI literacy defined as the constellation of competencies that enable individuals to understand, use, evaluate, and ethically engage with AI systems has emerged as a critical educational and psychological construct (Long & Magerko, 2020; Ng et al., 2021).

Among the consequential decisions facing university students, financial choices occupy a distinctive position. Indonesian young adults are simultaneously navigating the early stages of personal finance; including digital banking, equity and crypto-asset investment, pay later services, and peer-to-peer lending, while exhibiting a persistent gap between high digital financial inclusion and comparatively low financial literacy (Otoritas Jasa Keuangan, 2024). Within this context, financial risk tolerance, defined as an individual's willingness to accept uncertainty in financial outcomes when potential rewards or losses cannot be known in advance (Grable & Lytton, 1999; Nobre & Grable, 2015), constitutes a foundational psychological disposition that shapes portfolio choices, investment behavior, and vulnerability to high-risk digital financial products. Prior research has primarily examined demographic, personality, and socio-economic antecedents of financial risk tolerance (Hallahan et al., 2004; Ryack, 2011), while psychological correlates of technology engagement and AI literacy in particular have remained largely outside the explanatory frame. Given that AI tools now mediate how students gather information about financial products, evaluate market signals, and weigh investment alternatives, the question of whether AI literacy shapes financial risk-taking dispositions has become both timely and theoretically consequential.

Although AI literacy and financial risk tolerance have each attracted growing scholarly interest, the nexus between these constructs remains substantially underexplored. Existing AI literacy research has concentrated on educational outcomes, learning self-efficacy, and ethical attitudes in instructional contexts (Kong et al., 2021; Wang et al., 2023), while financial dispositions have rarely been theorized as downstream psychological consequences of AI competency. Where prior studies have linked technological engagement to financial behavior, they have typically relied on global indicators of technology use rather than on dimensional measures of AI competency, such as perceived ease of use, AI evaluation, or ethical AI awareness that may exert distinct effects on risk-related decision-making. This empirical gap is particularly pronounced in the Indonesian context, where the rapid co-evolution of generative AI adoption and digital financial services among university students creates a uniquely consequential setting that nevertheless remains absent from the international literature on AI literacy and financial behavior.

This study addresses the identified gap by examining the relationship between the seven dimensions of AI literacy and financial risk tolerance among Indonesian university students. Specifically, the research aims to identify which dimensions of AI literacy are significantly associated with financial risk tolerance, thereby offering a more nuanced account than aggregate AI literacy scores can provide. In doing so, the study contributes to the literature in three ways: (1) extending the psychological reach of AI literacy research into the domain of financial dispositions; (2) refining understanding of which specific AI competencies matter for risk-related decision-making; and (3) situating these dynamics within the underrepresented Indonesian higher-education context.

Theoretical Study and Hypothesis

This section presents theoretical and empirical foundations of AI literacy and risk tolerance, followed by the formulation of research hypotheses derived from previous findings.

AI Literacy

AI literacy refers to the set of competencies that enable individuals to critically evaluate AI technologies, communicate and collaborate effectively with AI, and use AI as a tool online, at home, and in the workplace (Long & Magerko, 2020). Unlike traditional digital literacy, AI literacy specifically addresses the unique characteristics of AI systems, including their probabilistic outputs, opacity, and capacity for autonomous decision-making. Contemporary conceptualizations of AI literacy recognize that the construct is multidimensional, encompassing cognitive, behavioral, affective, and ethical aspects (Ng et al., 2021; Kong et al., 2021). In this study, AI literacy was operationalized through the seven-dimensional AI Literacy Scale developed by Nong et al. (2024), comprising application ability, morality, critical thinking, self-efficacy,

cognitive ability, perceived ease of use, and perceived usefulness. Application ability refers to the practical capacity to apply AI tools to solve real-world tasks and problems; morality concerns the awareness of ethical principles and moral responsibilities surrounding AI use; critical thinking reflects the capacity to scrutinize, question, and evaluate AI outputs and limitations; self-efficacy captures the individual's belief in their own competence to use AI tools effectively; cognitive ability denotes the underlying conceptual understanding of how AI systems function and process information; perceived ease of use captures the extent to which individuals find AI tools effortless to operate (Davis, 1989); and perceived usefulness reflects the perceived value and benefit of using AI tools.

Risk Tolerance

Risk tolerance is defined as the maximum level of uncertainty an individual is willing to accept when making a financial or behavioral decision (Grable & Lytton, 1999). It is a psychological disposition that influences a broad range of behaviors, including investment choices, consumption patterns, entrepreneurial intentions, and academic decisions (Roszkowski & Davey, 2010; Nobre & Grable, 2015). In this study, risk tolerance was operationalized using the Financial Risk Tolerance Scale developed by Grable and Lytton (1999), which captures an individual's general willingness to accept uncertainty across decision contexts. Among university students, risk tolerance has been linked to consequential behaviors such as career exploration, investment activity, and entrepreneurial engagement (Yao & Hanna, 2005; Sahi, 2013). As a relatively stable trait-like disposition, risk tolerance is shaped by a combination of demographic factors, personality, prior experience, and cognitive factors, including information access and perceived control.

Relationship between AI Literacy and Risk Tolerance

Financial risk tolerance is theoretically grounded in the broader literature on decision-making under uncertainty, in which two psychological processes have been consistently identified as proximal antecedents: uncertainty reduction and self-efficacy. The first proposition derived from ambiguity-aversion theory (Ellsberg, 1961; Heath & Tversky, 1991) and reaffirmed in the financial literacy literature (Hallahan et al., 2004; Van Rooij et al., 2011; Lusardi & Mitchell, 2014). It holds that individuals' willingness to accept financial uncertainty is shaped by the degree to which their subjective ambiguity about outcomes is reduced through knowledge, comprehension, or informational scaffolding. The second proposition, drawn from social cognitive theory (Bandura, 1997), holds that confidence in one's capability to navigate a task is a robust antecedent of engagement with its inherent risks. AI literacy plausibly operates through both mechanisms in the contemporary financial environment, where AI tools have become a primary information-search and decision-support technology for young Indonesian investors navigating digital banking, equity markets, pay later, and crypto-assets (Otoritas Jasa Keuangan, 2024). However, because each AI literacy dimension activates a distinct psychological pathway, some that scaffold confident risk-taking, and others that activate prudential or skeptical reasoning. The dimensions are theorized to relate to financial risk tolerance in opposing directions.

Application ability dimension, defined as the behavioral competency to operate AI tools effectively is hypothesized to relate positively to financial risk tolerance through habituation and behavioral fluency mechanisms. Repeated, effective interaction with algorithmic decision support reduces task novelty and dampens the affective uncertainty signals that typically suppress risk-taking, while building a behavioral disposition to engage with AI-mediated financial environments (Chiu et al., 2023).

Morality dimension, defined as ethical awareness regarding AI use is hypothesized to relate negatively to financial risk tolerance through prudential reasoning. A heightened ethical orientation sensitizes individuals to potential harms and downside consequences, aligning with loss-aversion tendencies that suppress risk acceptance (Tversky & Kahneman, 1992). Students with stronger AI-ethical sensibilities are expected to extend this cautionary disposition to financial decisions involving uncertain outcomes.

Critical thinking dimension is the capacity to evaluate, question, and challenge AI outputs, hypothesized to relate negatively to financial risk tolerance. Although critical thinking enables calibration, its dominant cognitive signature is deliberative skepticism: individuals high in critical thinking attend more carefully to potential errors, biases, and downside scenarios in AI-generated information, which heightens perceived uncertainty about AI-mediated financial recommendations and discourages risk acceptance (Long & Magerko, 2020).

Self-efficacy with AI tools is hypothesized to relate positively to financial risk tolerance, consistent with Bandura's (1997) proposition that perceived capability is a robust antecedent of willingness to engage with uncertain and consequential tasks. In financial contexts specifically, confidence in one's ability to navigate AI-

assisted decision-making has been shown to support engagement with risk-bearing alternatives (Forbes & Kara, 2010).

Cognitive ability defined as conceptual understanding of how AI systems generate outputs is hypothesized to relate positively to financial risk tolerance through ambiguity-reduction processes. Students who better understand the mechanisms producing AI-generated financial information experience reduced epistemic ambiguity about its outputs, lowering perceived uncertainty in AI-assisted financial decisions and supporting greater willingness to accept calculated financial risks (Ellsberg, 1961; Van Rooij et al., 2011).

Perceived ease of use is hypothesized to relate negatively to financial risk tolerance. While the Technology Acceptance Model (Davis, 1989) frames perceived ease of use as a driver of adoption, in financial contexts excessive cognitive comfort with AI tools may foster overreliance and superficial processing of financial information, undermining the deliberation required to commit to risk-bearing choices. Recent research on AI-assisted decision-making suggests that frictionless AI use can promote cognitive offloading and risk-averse default behavior rather than engaged risk acceptance (Vaccaro et al., 2024).

Perceived usefulness is likewise hypothesized to relate negatively to financial risk tolerance. Although perceived usefulness drives AI adoption (Davis, 1989; Venkatesh & Davis, 2000), students who perceive AI as highly useful may delegate financial judgment to AI tools, leading to dependence on conservative algorithmic recommendations and reduced personal willingness to assume financial risk independently of AI guidance.

H_1: Application ability is positively associated with risk tolerance.
H_2: Morality is negatively associated with risk tolerance.
H_3: Critical thinking is negatively associated with risk tolerance.
H_4: Self-efficacy is positively associated with risk tolerance.
H_5: Cognitive ability is positively associated with risk tolerance.
H_6: Perceived ease of use is negatively associated with risk tolerance.
H_7: Perceived usefulness is negatively associated with risk tolerance.

Research Framework

The research framework is presented in Figure 1, illustrating the hypothesized relationships between the seven dimensions of AI literacy as predictor variables and risk tolerance as the criterion variable.

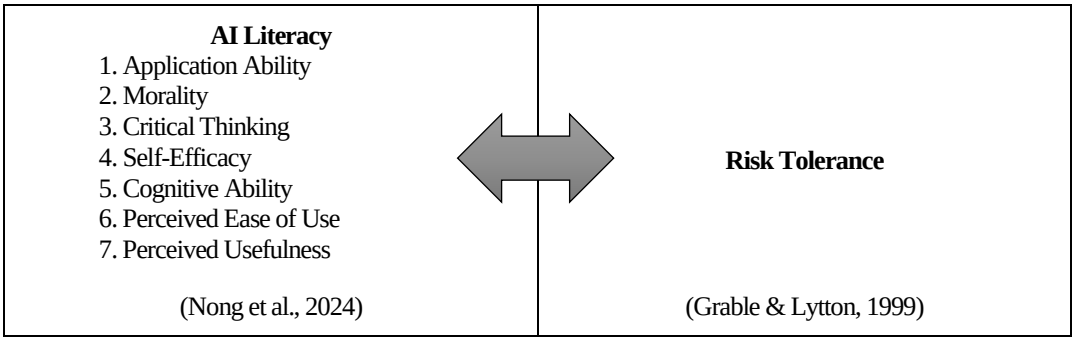

Figure 1. Research framework

Research Methods

This study employed a quantitative correlational design to examine the relationship between dimensions of AI literacy and risk tolerance. The research population consisted of active undergraduate students enrolled in Indonesia during the 2025/2026 academic year. A purposive sampling technique was used to recruit 156 participants who met the following criteria: (1) currently enrolled as an undergraduate student, (2) had used at least one generative AI tool (e.g., ChatGPT, Gemini, Claude, Copilot) within the previous three months, and (3) provided informed consent to participate. Data collection was conducted online through a structured questionnaire distributed via institutional channels and social media platforms between January and March 2026.

AI literacy was measured using the seven-dimensional AI Literacy Scale developed by Nong et al. (2024), consisting of 15 items measuring application ability (3 items), morality (2 items), critical thinking (2 items), self-efficacy (2 items), cognitive ability (2 items), perceived ease of use (2 items), and perceived usefulness (2 items). All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument was translated into Bahasa Indonesia using a back-translation procedure and pilot-tested with 30

students before deployment. The Cronbach's alpha coefficients for the seven dimensions are 0.723, indicating acceptable to excellent internal consistency. Also, all Cronbach Alpha AI literacy scale dimensions are shown in Table 1.

Table 1
Cronbach Alpha of AI Literacy Dimension

Dimension	Cronbach Alpha
Application Ability	0.704
Morality	0.684
Critical Thinking	0.554
Self-Efficacy	0.564
Cognitive Ability	0.543
Perceived ease of use	0.670
Perceived Usefulness	0.640

Risk tolerance was measured using the Financial Risk Tolerance Scale (Grable & Lytton, 1999), a 13-item instrument designed to assess an individual's willingness to engage in behavior with uncertain outcomes across financial and decision-making contexts. Items were scored according to the original scoring protocol, with higher composite scores reflecting greater risk tolerance. The scale was translated and adapted to the Indonesian context.

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were computed to characterize the sample. Because preliminary tests of normality (Kolmogorov–Smirnov) indicated that several variables deviated from a normal distribution, Spearman's rho correlation was selected as the appropriate nonparametric measure of association. Statistical significance was evaluated at the $p < 0.05$ level.

Data Analysis and Discussion

A total of 156 university students participated in the study. The sample consisted of 96 females (61.5%) and 60 males (38.5%) participants, with ages ranging from 18 to 24 years (M = 20.4, SD = 1.6). Participants were drawn from various faculties, including Education, Economics, Social Sciences, and Engineering. The Spearman's rho correlation analysis was conducted to test the seven research hypotheses. The results of the correlation analysis between each dimension of AI literacy and risk tolerance are presented in Table 1.

Table 2
Spearman's Rho Correlation between AI Literacy Dimensions and Risk Tolerance

Hypothesis	Dimension	Spearman's Rho	*p-value*	Remark
H_1	Application Ability	-0.173	0.164	Not supported
H_2	Morality	-0.038	0.762	Not supported
H_3	Critical Thinking	-0.087	0.489	Not supported
H_4	Self-Efficacy	0.057	0.648	Not supported
H_5	Cognitive Ability	0.039	0.609	Not supported
H_6	Perceived Ease of Use	-0.326*	0.008	Supported (negative)
H_7	Perceived Usefulness	-0.064	0.610	Not supported

Note: *$p < 0.05$; $N = 156$.

The analysis revealed that only perceived ease of use was significantly correlated with risk tolerance (r= -0.326, p = .008), thereby supporting H_6 in the negative direction. The remaining six dimensions; including application ability, morality, critical thinking, self-efficacy, cognitive ability, and perceived usefulness showed no significant association with risk tolerance; thus, H_1–H_5 and H_7 were not supported. This single significant finding warrants careful interpretation, as it suggests that risk tolerance among university students is related to a specific affective–evaluative facet of AI literacy rather than to AI literacy as an aggregate construct.

The negative correlation between perceived ease of use and risk tolerance indicates that students who find AI tools effortless to operate tend to display lower risk tolerance. This finding could be explained through several theoretical lenses. First, when individuals find AI tools easy to use, they may delegate cognitively demanding decisions to AI systems, gaining greater access to information about potential downsides and uncertainties associated with risky choices. This information-rich environment may amplify perceived risk and lead to more cautious decision-making (Lusardi & Mitchell, 2014). Second, ease of use may foster a sense of cognitive

comfort and predictability that, paradoxically, reduces tolerance for the discomfort and uncertainty associated with risk-taking (Kahneman, 2011). Students accustomed to the seamlessness and predictability of well-designed AI interfaces may develop a preference for low-uncertainty environments, which in turn reduces their willingness to engage in risk-taking behavior in non-AI domains. Third, drawing on the Technology Acceptance Model (Davis, 1989), perceived ease of use may reflect a habitual reliance on AI for decision support, thereby diminishing the cognitive effort of independently confronting uncertainty, which is a process foundational to risk tolerance.

Table 3
Perceived Ease of Use as Contributor to Risk Tolerance

r	R^2	*Coefficient B*	*t*	*F*	*Sig.*
-0.326	0.073	-0.270	-3.203	10.258	0.012

Note: $*p < 0.05$. $N = 156$.

Because only the perceived ease of use dimension was significant, the coefficient of determination R^2 was then examined. An R^2 value of 0.073 indicates that perceived ease of use explains 7.3% of the variance in financial risk tolerance, with the remaining explained by variables outside the model. A standardized beta coefficient of -0.270 indicates that each 1 unit increase in perceived ease of use, is associated with a 0.270-unit decrease in financial risk tolerance, holding other variables constant. This negative trend reinforces the interpretation that AI ease of use contributes to students decreased willingness to take financial risks.

A plausible explanation lies in cognitive offloading. When AI tools are perceived as effortless to use, students may delegate deliberative reasoning to the algorithm rather than engaging in the independent evaluation required to commit to risk-bearing financial choices (Vaccaro et al., 2024). The result is greater reliance on AI's typically conservative default recommendations and reduced willingness to assume personal financial risk. This interpretation aligns with broader concerns that frictionless AI interaction may dampen, rather than enrich, autonomous decision-making.

The non-significance of the other six dimensions is also informative. It suggests that financial risk tolerance is not shaped by AI competency in aggregate, but rather by the affective experiential quality of AI interaction, how comfortable the engagement feels more than by cognitive understanding, ethical orientation, or self-efficacy. This pattern reframes AI literacy's role in financial decision-making as predominantly affective rather than cognitive, an insight that aggregate AI literacy scores would have obscured.

This finding aligned with the view that risk tolerance is a relatively stable psychological disposition shaped primarily by individual traits, demographics, and direct experience with risk, rather than by general patterns of technology comprehension (Grable & Lytton, 1999; Hallahan et al., 2004). Similarly, the absence of a significant association with application ability suggested that simply being able to apply AI tools more proficiently did not translate into systematic shifts in risk tolerance; what matters appears to be the subjective experience of how AI feels to use, rather than how skillfully it is used.

The null finding for morality was also noteworthy. Although moral and ethical awareness has been theorized to encourage prudential behavior, the present results suggested that moral concerns about AI may operate in a domain-specific manner, shaping AI-related decisions without generalizing to broader financial or life-domain risk tolerance. The non-significant correlation with self-efficacy was somewhat unexpected, given that self-efficacy has been linked to risk-taking and exploratory behavior in other domains (Bandura, 1997); one possibility is that confidence in operating AI tools does not transfer to confidence in handling uncertainty in non-AI domains such as financial decisions. Likewise, the non-significant correlation involving perceived usefulness indicated that instrumental appraisals of AI utility did not relate to risk tolerance, even though the closely related construct of perceived ease of use did. This dissociation underscores that the two technology acceptance constructs (Davis, 1989), although correlated, may have distinct downstream psychological correlates.

These findings contributed to the AI literacy literature by demonstrating that AI literacy and risk tolerance were related in a dimension-specific rather than diffuse manner. Studies that rely on global AI literacy scores may overlook such granular associations and risk drawing misleading conclusions about how AI competencies relate to behavioral dispositions. The findings also extended prior work on the antecedents of risk tolerance (Grable & Lytton, 1999; Hallahan et al., 2004) by identifying a novel correlate, affective comfort with AI tools that may inform future research on student decision-making in increasingly AI-mediated contexts.

Conclusions, Limitations, and Suggestions

Conclusions

This study examined the relationship between the seven dimensions of AI literacy and risk tolerance among Indonesian university students. The findings demonstrated that risk tolerance was significantly and negatively associated with only one dimension of AI literacy which is perceived ease of use, while the remaining six dimensions (application ability, morality, critical thinking, self-efficacy, cognitive ability, and perceived usefulness) showed no significant correlation with risk tolerance. Students who found AI tools easier to operate tended to exhibit lower risk tolerance, possibly because effortless interaction with AI fosters cognitive ease and habitual reliance on AI for decision support, which in turn diminishes their willingness to engage with uncertainty independently. These results suggest that AI literacy and risk tolerance are related in a dimension-specific rather than uniform manner, highlighting the importance of multidimensional measurement in research on AI competencies and psychological dispositions among university students.

Limitations

Several limitations should be acknowledged. First, the cross-sectional correlational design precluded causal inferences about the direction of the observed relationship between perceived ease of use and risk tolerance, it remains possible that risk-averse students gravitate toward AI tools they find easy to operate, rather than the reverse. Students who found AI tools easier to operate tended to exhibit lower risk tolerance, possibly because effortless interaction with AI fosters cognitive comfort and habitual reliance on AI for decision support, which in turn diminishes their willingness to engage with uncertainty independently. Third, the study focused on financial risk tolerance using the Grable–Lytton scale, which may not fully capture other forms of risk-taking such as health, academic, or interpersonal risk.

Suggestions

The findings carry concrete implications for three stakeholders at the intersection of digital finance and higher education in Indonesia. Educators and curriculum designers should embed productive cognitive friction into AI literacy modules within entrepreneurship, finance, and business courses, framing AI as a decision-support partner requiring active deliberation rather than an "easy-to-use" tool, and pairing AI training with structured autonomous risk-evaluation exercises. Policymakers, within the framework of *Strategi Nasional Kecerdasan Artifisial 2020–2045* and *Otoritas Jasa Keuangan (OJK)*'s national financial literacy agenda, should ensure that national AI literacy standards extend beyond technical proficiency to include autonomous financial judgment, ideally through coordinated *Kemendikbudristek–OJK* curricula addressing the gap between high digital financial inclusion and low financial literacy. Financial advisors and student counselors should recognize that greater AI comfort is associated with reduced financial risk tolerance, which may produce systematically conservative preferences misaligned with long-term wealth accumulation and pose a barrier to venture initiation among entrepreneurially oriented students.

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