

AI-BASED ENTREPRENEURSHIP LEARNING, DIGITAL LITERACY, AND PROJECT-BASED LEARNING IN FORMING ENTREPRENEURIAL INTENTION: EVIDENCE FROM HIGH SCHOOL STUDENTS

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ABSTRAK

Tingginya tingkat pengangguran lulusan sekolah menengah di Indonesia menuntut adanya penguatan pendidikan kewirausahaan berbasis teknologi digital. Penelitian kuantitatif eksplanatori ini bertujuan menganalisis pengaruh pembelajaran kewirausahaan berbasis Artificial Intelligence (AI), literasi digital, dan Project-Based Learning (PBL) terhadap intensi berwirausaha siswa, dengan kreativitas digital sebagai variabel mediasi serta self-efficacy sebagai variabel moderasi. Data kuantitatif dikumpulkan melalui instrumen kuesioner survei terhadap 218 siswa SMAN 1 Masbagik dengan teknik purposive sampling, lalu dianalisis menggunakan pendekatan Structural Equation Modeling berbasis Partial Least Squares (SEM-PLS) melalui perangkat lunak SmartPLS 4. Hasil penelitian menunjukkan bahwa kreativitas digital ($\beta=0,218$; $p=0,016$) dan self-efficacy ($\beta=0,426$; $p=0,000$) berpengaruh positif signifikan terhadap intensi berwirausaha. Pembelajaran AI berpengaruh positif langsung terhadap kreativitas digital ($\beta=0,140$; $p=0,006$) maupun intensi berwirausaha ($\beta=0,129$; $p=0,045$). Literasi digital dan PBL tidak berdampak langsung, namun berpengaruh tidak langsung secara signifikan melalui kreativitas digital sebagai full mediator. Kreativitas digital tidak memediasi pembelajaran AI, serta self-efficacy tidak memoderasi seluruh jalur. Model struktural memiliki $R^2=0,415$ dan $Q^2=0,325$. Simpulan utama penelitian ini membuktikan bahwa intensi berwirausaha siswa dapat ditingkatkan secara optimal melalui integrasi pembelajaran AI yang disinergikan dengan pengembangan kreativitas digital serta penguatan keyakinan efikasi diri siswa dalam menghadapi dinamika dunia kerja dan peluang bisnis di era transformasi digital yang terus berkembang pesat kini

Kata kunci: *Pembelajaran Kewirausahaan Berbasis Artificial Intelligence (AI), Literasi Digital, Project-Based Learning, Intensi Berwirausaha, Kreativitas Digital.*

ABSTRACT

The high unemployment rate among high school graduates in Indonesia demands the strengthening of digital technology-based entrepreneurship education. This explanatory quantitative research aims to analyze the effect of Artificial Intelligence (AI)-based entrepreneurship learning, digital literacy, and Project-Based Learning (PBL) on students' entrepreneurial intentions, with digital creativity as a mediating variable and self-efficacy as a moderating variable. Quantitative data were collected through a survey questionnaire instrument on 218 students of SMAN 1 Masbagik with a purposive sampling technique, then analyzed using a Structural Equation Modeling approach based on Partial Least Squares (SEM-PLS) through SmartPLS 4 software. The results showed that digital creativity ($\beta=0.218$; $p=0.016$) and self-efficacy ($\beta=0.426$; $p=0.000$) had a significant positive effect on entrepreneurial intention. AI learning had a direct positive effect on digital creativity ($\beta=0.140$;



$p = 0.006$) and entrepreneurial intention ($\beta = 0.129$ $p = 0.045$). Digital literacy and PBL did not have a direct impact, but had a significant indirect effect through digital creativity as a full mediator. Digital creativity did not mediate AI learning, and self-efficacy did not moderate all paths. The structural model had an $R^2 = 0.415$ and $Q^2 = 0.325$. The main conclusion of this study demonstrates that students' entrepreneurial intentions can be optimally enhanced through the integration of AI learning synergized with the development of digital creativity and strengthening students' self-efficacy beliefs in facing the dynamics of the workplace and business opportunities in today's rapidly evolving era of digital transformation

Keywords: *Artificial Intelligence (AI)-Based Entrepreneurship Learning, Digital Literacy, Project-Based Learning, Entrepreneurial Intention, Digital Creativity.*

INTRODUCTION

The progression of digital transformation in the era of the Fourth Industrial Revolution has brought substantial changes to the education sector and the world of work. Technological advancement requires educational institutions not only to produce job-ready graduates, but also to nurture individuals capable of independently creating business opportunities through the strengthening of technology-based entrepreneurship education. However, the unemployment rate among upper secondary education graduates in Indonesia remains relatively high, indicating that school leavers have yet to fully acquire competencies aligned with the ever-evolving demands of the digital labor market (OECD, 2023). This condition underscores the critical need to reinforce entrepreneurship learning as a means of cultivating students' creative, innovative, and adaptive capacities in response to technological developments.

One innovation increasingly adopted to strengthen these competencies is entrepreneurship learning that leverages Artificial Intelligence (AI) technology. The integration of AI into learning activities holds the potential to create more interactive, personalized, and problem-solving-oriented educational processes. Within the context of entrepreneurship, AI can assist students in exploring business ideas, conducting market analysis, and developing digitally grounded business strategies (Solórzano Solórzano et al., 2024). Furthermore, the emergence of Generative AI provides opportunities for students to nurture creativity and business innovation through broader utilization of digital technology (Kasneci et al., 2023). The adoption of such technologies is particularly significant, as today's younger generation is expected to adapt continuously to the dynamics of the digital economy.

Beyond AI, digital literacy also plays an essential role in fostering entrepreneurial intentions among students. Digital literacy reflects an individual's capacity to comprehend and utilize digital technology effectively in support of productive activities. Individuals with strong digital literacy tend to be more adept at identifying business opportunities, understanding market demands, and leveraging digital media as a platform for business development. Research indicates that digital literacy and technological competency contribute to the formation of entrepreneurial intention among young people in the digital economy era (Kang et al., 2024). Accordingly, the reinforcement of digital literacy constitutes one of the core components of entrepreneurship education in schools.

On the other hand, the implementation of Project-Based Learning is regarded as an effective approach for enhancing students' active participation through the completion of real-world, contextually grounded projects. This pedagogical model encourages students to think critically, creatively, and collaboratively in addressing problems. Project based learning holds the potential to enhance students' skills through meaningful project-based learning experiences, particularly when combined with the utilization of digital technology in instruction (Chen &



Yang, 2019). Through this approach, students not only grasp entrepreneurial concepts theoretically, but also gain direct experience in developing technology-based business ideas.

The utilization of AI, digital literacy, and project based learning in entrepreneurship learning must also be supported by digital creativity. Digital creativity refers to an individual's ability to generate ideas and innovations through the application of digital technology. In the entrepreneurship context, digital creativity is an essential factor, given that technology use extends beyond mere information access to encompass the creation of economic value through product innovation and the development of more adaptive and competitive business strategies. Prior research has demonstrated that the integration of digital technology in entrepreneurship education can enhance individuals' creativity and entrepreneurial motivation (Udekwe & Iwu, 2024). Additionally, psychological factors such as self-efficacy also shape students' entrepreneurial intentions. Self-efficacy describes an individual's belief in their capacity to complete tasks and overcome challenges. Individuals with high self-efficacy tend to exhibit greater confidence in translating business ideas into reality (Nurfaizal, 2025). This is consistent with the Theory of Planned Behavior (TPB) proposed by (Ajzen, 1991), which posits that entrepreneurial intentions are influenced by attitudes, subjective norms, and perceived behavioral control. In the digital context, this control dimension is reflected in students' self-efficacy, which is positioned as a moderating variable expected to amplify the influence of digital creativity on students' entrepreneurial intentions.

Empirically, this phenomenon is also evident among students at SMAN 1 Masbagik. Based on preliminary observations involving 35 students, their use of digital technology remains predominantly confined to completing academic assignments and has not been optimized for business idea development. Although 77.1% of students already actively use AI for academic tasks, only 11.4% utilize it to design business concepts. Furthermore, a portion of students still harbor reservations about starting their own businesses independently, despite having received entrepreneurship instruction. This situation reveals a gap between students' mastery of digital technology and their capacity to implement it within productive and innovative entrepreneurial activities.

Several prior studies have examined the influence of Artificial Intelligence, digital literacy, and Project-Based Learning on entrepreneurship. However, the majority of these studies have been conducted within higher education settings and have examined variables in isolation. Research that integrates AI-based entrepreneurship learning, digital literacy, and Project-Based Learning in relation to the entrepreneurial intentions of senior high school students remains relatively scarce. Moreover, studies that position digital creativity as an intervening variable and self-efficacy as a moderating variable have yet to be comprehensively investigated. The novelty of this study lies in its integration of AI-based entrepreneurship learning, digital literacy, and Project-Based Learning in relation to senior high school students' entrepreneurial intentions, with digital creativity as an intervening variable and self-efficacy as a moderating variable.

Based on the foregoing, this study aims to examine the influence of AI-based entrepreneurship learning, digital literacy, and Project-Based Learning on students' entrepreneurial intentions, positioning digital creativity as an intervening variable and self-efficacy as a moderating variable among students at SMAN 1 Masbagik. This research is expected to make both theoretical and practical contributions to the advancement of technology-based entrepreneurship education at the senior high school level.

RESEARCH METHOD

This empirical study implements a quantitative approach featuring an explanatory research design to systematically analyze the causal relationships among the variables. The field data collection was physically conducted at *SMAN 1 Masbagik*, an educational institution located within the East Lombok *Kabupaten*. The target population encompasses all high school students enrolled in the entrepreneurship courses during the academic period. To select representative participants, a non-probability purposive sampling technique was applied based on 3 operational criteria. These requirements ensured that the chosen respondents were active students who had experienced intelligence-based entrepreneurship instructional materials, regularly utilized digital applications for project assignments, and voluntarily agreed to complete the investigation. Through this specific selection process, a final sample size of 218 respondents was successfully secured to fill out the surveys. This statistical power meets the necessary threshold required for a comprehensive structural equation modeling evaluation, allowing the researcher to map the behavioral intentions of Indonesian students regarding digital business creation without incorporating any abstract conceptual theories within this operational and structural methodology description of the school framework.

The structural research instrument utilized for primary data collection consisted of a highly organized survey questionnaire employing a 5-point Likert scale ranging from 1 to 5. This measurement tool captured student perspectives across multiple indicators, while secondary information was collected from internal school records and relevant academic journals to support the analysis. The gathered quantitative data were processed electronically using *SmartPLS 4* software to run partial least squares structural equation modeling. The evaluation phase was strictly executed in 2 consecutive steps, beginning with the assessment of the measurement *outer model* to verify construct validity and reliability metrics. Confirmatory factor analysis ensured that all reflective indicators achieved factor loading values above 0.70 and an average variance extracted exceeding 0.50. Internal consistency was confirmed as Cronbach's alpha and composite reliability values surpassed the 0.70 threshold. Finally, the structural *inner model* was calculated using a *bootstrapping* algorithm at a 5% significance level to statistically evaluate the direct, indirect, mediating, and moderating paths within this comprehensive technology-based high school entrepreneurship study framework without altering true respondent anonymity.

RESULTS AND DISCUSSION

Result

Respondent Demographics

Table 1. Distribution of Research Respondents

Respondent Characteristics		Total	Percentage
Gender	Male	103	47.2%
	Female	115	52.8%
Age	Middle Adolescence (15–16 years)	34	15.6%
	Late Adolescence (17–19 years)	184	84.4%
Grade Level	Grade 10	29	13.3%

Grade 11	90	41.3%
Grade 12	99	45.4%
Use of AI Tools in Have Used Entrepreneurship Assignments	209	95.9%
Have Not Used	11	4.1%

Based on table 1 the study respondents at SMAN 1 Masbagik consisted of 218 students from the school, with females accounting for the majority at 115 respondents (52.8%), while males numbered 103 respondents (47.2%). Most respondents were in the adolescent age group, with the largest number being late adolescents aged 17–19 years (184 people; 84.4%), followed by mid-adolescents aged 15–16 years (34 people; 15.6%). In terms of educational level, respondents came from various grade levels, with the largest group being 12th graders, comprising 99 respondents (45.4%), followed by 11th graders with 90 respondents (41.3%), and 10th graders with 29 respondents (13.3%). In terms of technology experience, the majority of students have integrated artificial intelligence into their entrepreneurship assignments, with 209 respondents (95.9%) having used artificial intelligence tools such as ChatGPT, Canva Magic, and artificial intelligence for data analysis, while only 11 respondents (4.1%) have never used them.

Results of Partial Least Squares - Structural Equation Modeling (PLS-SEM) Data Analysis

The data analysis technique used in this study is Partial Least Square Structural Equation Modeling (PLS-SEM) with the assistance of SmartPLS Version 4 software. The PLS-SEM data management process includes testing the measurement model (outer- -model), evaluating model goodness and fit, and testing the structural model (inner-model). The research model is presented in Figure 1 below:

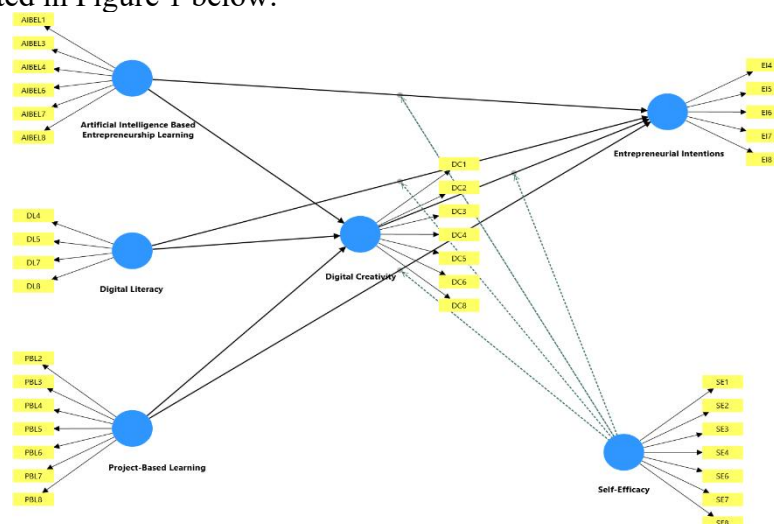


Figure 1. PLS-SEM Research Model

Based on figure 1 this study presents a conceptual model analyzed via *Partial Least Squares Structural Equation Modeling* (PLS-SEM) to examine factors influencing entrepreneurial intentions. The framework incorporates three *exogenous* constructs: Artificial Intelligence-based entrepreneurship learning, digital literacy, and project-based learning, each

measured by eight reflective indicators. These predictors are hypothesized to directly influence the primary *endogenous* construct, entrepreneurial intention (eight indicators), and indirectly affect it through digital creativity, which serves as an *intervening* variable (eight indicators). Furthermore, self-efficacy (eight indicators) is integrated as a *moderator* variable. It is posited to strengthen or weaken both the direct impact of the predictors and the mediating path from digital creativity to entrepreneurial intention. Ultimately, this structural model comprehensively elucidates how differing self-efficacy levels interact with modern educational approaches to shape students' entrepreneurial aspirations in digital environments.

Evaluation of the Measurement Model (Outer Model)

The initial stage in PLS-SEM analysis involves evaluating the measurement model or outer model. This assessment is conducted to examine indicator validity and construct reliability. In this research, all latent variables are developed using reflective indicators. For reflective measurement models, outer model evaluation includes convergent validity, discriminant validity, and reliability testing. The results of the outer model assessment in this study are presented as follows:

Convergent Validity Assessment

Convergent validity assessment was conducted to determine whether the indicators used genuinely represent the construct variables in a significant manner. Reflective indicators are considered valid when their outer loading/factor loading values exceed 0.7 (Hair et al., 2019)

Table 2. Convergent Validity Assessment: Average Variance Extracted (AVE)

Latent Variable	AVE	Remark
Entrepreneurial Intention	0.680	Valid
Digital Creativity	0.552	Valid
Digital Literacy	0.555	Valid
AI-Based Entrepreneurship Learning	0.566	Valid
Project-Based Learning	0.588	Valid
Self-Efficacy	0.565	Valid

Based on Table 2, all variables exhibit AVE values above 0.5; therefore, the model in this study satisfies the convergent validity criteria.

Discriminant Validity Assessment

Discriminant validity was conducted to ensure that each latent construct has clear distinctions and does not overlap with other constructs. Discriminant validity can be evaluated through the HTMT test with a recommended value below 0.9, indicating that the constructs in the model are truly distinct from one another (Henseler et al., 2020). In addition, discriminant validity can be evaluated through the *Fornell-Lacker Criterion*, based on the criteria of *Fornell-Lacker Criterion* discriminant validity is considered satisfied when the square root of the *Average Variance Extracted* (AVE) of a construct is higher than its correlations with other constructs in the model (Hair et al., 2021). The results of the *fornell larcker criterion* are obtained as follows:

Table 3. Discriminant Validity Assessment: Fornell-Larcker Criterion

Variable	EI	DC	DL	AIBEL	PBL	SE
Entrepreneurial Intention (EI)	0.825					

Digital Creativity (DC)	0.520	0.743			
Digital Literacy (DL)	0.361	0.575	0.745		
AI-Based Entrepreneurship Learning (AIBEL)	0.352	0.509	0.529	0.752	
Project-Based Learning (PBL)	0.368	0.657	0.565	0.534	0.767
Self-Efficacy (SE)	0.597	0.619	0.496	0.309	0.427
					0.751

Reliability Assessment

Reliability testing was performed to evaluate the internal consistency level of indicators in measuring particular constructs or latent variables. Construct reliability is commonly assessed through Cronbach's alpha and composite reliability values above 0.70 (Gudergan et al., 2025). The reliability test findings are statistically displayed in the following table:

Table 4. Reliability Assessment

Variable	Cronbach's Alpha	Composite Reliability	Remark
Entrepreneurial Intention	0.882	0.884	Reliable
Digital Creativity	0.864	0.866	Reliable
Digital Literacy	0.735	0.742	Reliable
AI-Based Entrepreneurship Learning	0.846	0.851	Reliable
Project-Based Learning	0.883	0.888	Reliable
Self-Efficacy	0.871	0.877	Reliable

Table 4 indicates that all research variables exhibit Cronbach's alpha and composite reliability values exceeding 0.7. Therefore, all construct indicators can be considered to satisfy the established reliability criteria, enabling the analysis to continue with the structural model assessment.

Model Fit and Goodness Evaluation

The next stage of PLS-SEM analysis evaluates the structural model's goodness of fit to confirm its reliability and accuracy through several criteria, including SRMR, Q^2 predictive relevance, VIF multicollinearity testing, and R^2 determination coefficient.

1) Testing of *Standardized Root Mean Square Residual* (SRMR)

After fulfilling the requirements of the measurement model, the next step is the model fit test (Goodness of Fit Model). *Standardized Root Mean Square Residual* (SRMR) measures the average difference between the observed correlations and those explained by the model. A PLS model is considered to have a good Goodness of Fit when the SRMR value is below 0.08, while an SRMR value below 0.1 is still acceptable (Hair et al., 2021). The following are the SRMR values for the PLS model in this research:

Table 5. Standardized Root Mean Square Residual (SRMR) Values

	Saturated Model	Estimated Model
SRMR	0.066	0.078

The Goodness of Fit Model results presented in Table 5 indicate that the SRMR values for the Saturated Model and the Estimated Model are 0.066 (≤ 0.1) and 0.078 (≤ 0.1), respectively. Since both values are below the recommended threshold of 0.10, the proposed model satisfies the acceptable model fit criteria. Although an SRMR value of 0.10 represents the upper boundary of model acceptability, the obtained values suggest that the model demonstrates an adequate level of fit rather than an excellent one. Therefore, the structural model can be considered fit and sufficiently capable of representing the observed data, making it appropriate for further analyses, including the assessment of relationships among variables within the PLS-SEM structural model.

2) Coefficient of Determination (R^2)

The coefficient of determination (R^2) indicates the amount of variance in the endogenous construct explained by the exogenous constructs within the structural model. R^2 values range from 0 to 1; higher values indicate greater explanatory capability of the model (in-sample explanatory power).

Table 6. R Square (R^2) Values

Endogenous Variable	R^2
Digital Creativity	0.505
Entrepreneurial Intention	0.415

Based on the structural model assessment presented in Table 6 using the coefficient of determination (R^2) Based on table 6 structural model evaluation using the coefficient of determination (R^2), Digital Creativity has an $R^2 = 0.505$. This value indicates that 50.5% of the variation in Digital Creativity can be explained by the predictor constructs in the model, namely AI-Based Entrepreneurship Education, *Artificial Intelligence*, Literasi Digital, dan *Project-Based Learning*, while the remaining 49.5% is influenced by other factors outside the model. Thus, the model demonstrates strong explanatory power regarding the development of students' digital creativity through the applied learning interventions.

Furthermore, the main endogenous variable, Student Entrepreneurial Intention, obtained $R^2 = 0.415$, indicating that 41.5% of the variance in Student Entrepreneurial Intention is accounted for by the model constructs, including AI-Based Entrepreneurship Education, Digital Literacy, and Project-Based Learning, with the moderating variable represented through interaction terms in the hypothesized relationships. Meanwhile, the remaining 58.5% of the variation is explained by other determinants not included in the research model. These high R^2 values indicate that the relationship structure formed, including moderation effect testing based on interactions, has very strong explanatory power in explaining the factors influencing students' entrepreneurial intention at the research location. Overall, the R^2 values obtained for both endogenous variables indicate that the proposed research model exhibits substantial explanatory capability in accounting for variations in students' digital creativity and entrepreneurial intention.

Evaluation of the Structural Model (Inner Model)

The significance analysis of path coefficients in PLS-SEM was performed using the bootstrapping procedure to examine both the direction and significance of the relationships between exogenous latent constructs and endogenous variables. The evaluation of these relationships is based on the t-statistic and p-value obtained from the bootstrapping results. Given that all hypotheses proposed in this study are directional (positive), a one-tailed test with a 5% significance level ($\alpha = 0.05$) was applied. Accordingly, a hypothesis (H1) is accepted

when the t-statistic exceeds 1.645 and the one-tailed p-value is below 0.05, indicating a significant positive effect of the exogenous construct on the endogenous variable. Conversely, if the t-statistic is less than or equal to 1.645 or the path coefficient is not positive and the one-tailed p-value exceeds 0.05, the hypothesis is rejected, suggesting that the effect is not significant in the hypothesized direction (Hair et al., 2019). The complete results of the structural model assessment are presented in Table 7.

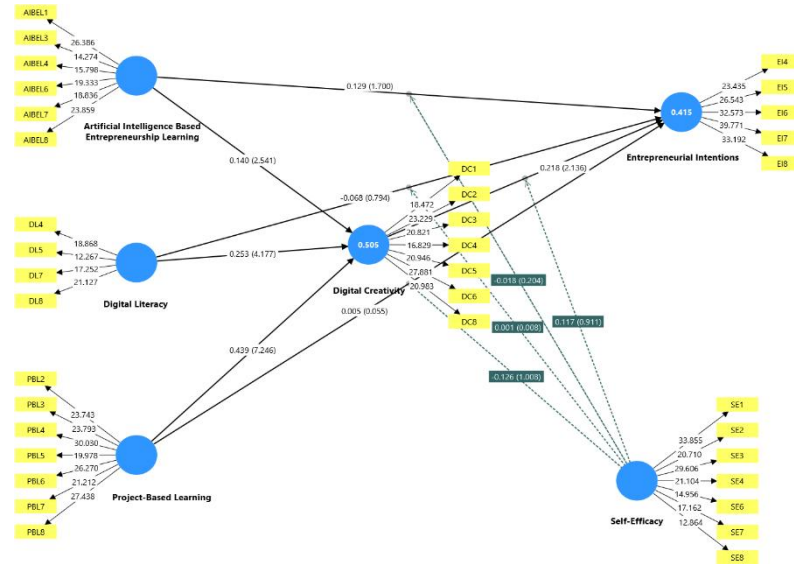


Figure 2. Structural Model (Inner Model)

Table 7. Hypothesis Testing Results

Hyp.	Path	Original Sample	Sample Mean	Std. Dev.	T-stat.	P-value	Decision
Direct Effects							
H1	Digital Creativity → Entrepreneurial Intention	0.218	0.231	0.102	2.136	0.016	Accepted
H2	Self-Efficacy → Entrepreneurial Intention	0.426	0.426	0.087	4.894	0.000	Accepted
H3	AI-Based Entrepreneurship Learning → Digital Creativity	0.140	0.143	0.055	2.541	0.006	Accepted
H4	AI-Based Entrepreneurship Learning →	0.129	0.124	0.076	1.700	0.045	Accepted

	Entrepreneurial Intention						
H5	Digital Literacy → Digital Creativity	0.253	0.257	0.061	4.177	0.000	Accepted
H6	Digital Literacy → Entrepreneurial Intention	-0.068	-0.066	0.086	0.794	0.214	Rejected
H7	Project-Based Learning → Digital Creativity	0.439	0.436	0.061	7.246	0.000	Accepted
H8	Project-Based Learning → Entrepreneurial Intention	0.005	-0.003	0.090	0.055	0.478	Rejected
Indirect Effects (Mediation)							
H9	AI-Based Entrepreneurship Learning → Digital Creativity → Entrepreneurial Intention	0.031	0.034	0.021	1.432	0.076	Rejected
H10	Digital Literacy → Digital Creativity → Entrepreneurial Intention	0.055	0.060	0.032	1.733	0.042	Accepted
H11	Project-Based Learning → Digital Creativity → Entrepreneurial Intention	0.096	0.100	0.045	2.134	0.016	Accepted
Moderation Effects							
H12	Self-Efficacy × AI-Based Entrepreneurship Learning →	-0.018	-0.017	0.089	0.204	0.419	Rejected

	Entrepreneurial Intention						
H13	Self-Efficacy × Digital Literacy → Entrepreneurial Intention	0.001	0.001	0.077	0.008	0.497	Rejected
H14	Self-Efficacy × Project-Based Learning → Entrepreneurial Intention	-0.126	-0.116	0.125	1.008	0.157	Rejected
H15	Self-Efficacy × Digital Creativity → Entrepreneurial Intention	0.117	0.105	0.128	0.911	0.181	Rejected

Significant at $\alpha = 5\%$ (p-value < 0.05)

Table 7 details the comprehensive structural model results covering 15 distinct hypotheses across direct, indirect, and moderation pathways. Statistical analysis confirms 8 accepted hypotheses and 7 rejected ones at a significance threshold of 0.05. Direct effects indicate that self-efficacy exerts the strongest positive influence on student entrepreneurial intentions with a path coefficient of 0.426 and t-value of 4.894, followed by digital creativity at 0.218 and AI-based entrepreneurship learning at 0.129. Conversely, direct paths from digital literacy and project-based learning to entrepreneurial intentions are rejected due to p-values of 0.214 and 0.478, respectively. Mediation tests reveal that digital creativity successfully mediates the impact of both digital literacy and project-based learning on entrepreneurial intentions, yielding significant indirect coefficients of 0.055 and 0.096. However, all 4 moderation hypotheses involving self-efficacy are rejected, demonstrating that self-efficacy does not significantly alter any predictor relationships within this empirical model framework.

Discussion

The structural equation model showed moderate levels of explanatory power and predictive capacity, explaining 41.5% of the variance in students' entrepreneurial intentions with an R^2 value of 0.415 and a Q^2 value of 0.325. An assessment of the direct paths indicates that self-efficacy exerts the strongest positive effect on entrepreneurial intent, with a path coefficient of $\beta = 0.426$, a t-statistic of 4.894, and a p-value of 0.000; this is because students who have strong confidence in their abilities demonstrate a greater tendency to face entrepreneurial challenges and risks (Sahid et al., 2024; Wardana et al., 2020). Digital creativity also significantly strengthens entrepreneurial intent with a path coefficient β of 0.218, a t-statistic of 2.136, and a p-value of 0.016, through the ability to utilize technology to generate innovative ideas and solutions that foster self-confidence in overcoming business obstacles (Ridwan et al., 2024; Wibowo et al., 2024). Meanwhile, artificial intelligence-based entrepreneurship education produces a modest yet statistically significant direct effect with a path coefficient β of 0.129, a t-statistic of 1.700, and a p-value of 0.045, as the integration of this technology can facilitate access to business information, opportunity analysis, and the

formulation of digital marketing strategies more effectively (Duong, 2024; Solórzano et al., 2024). In contrast, digital literacy with a negative path coefficient of $\beta = 0.068$, a t-statistic of 0.794, and a p-value of 0.214 and project-based learning with a path coefficient of $\beta = 0.005$, a t-statistic of 0.055, and a p-value of 0.478, failed to directly stimulate entrepreneurial intent, demonstrating that technical proficiency, consumption of academic information, and project task completion alone are insufficient without intrinsic psychological triggers and a deep entrepreneurial orientation (Mustain et al., 2023; Woraphiphat & Roopsuwankun, 2023).

Further structural analysis highlights digital creativity as a key prerequisite and mediating mechanism within the educational ecosystem. This enhancement of digital creativity is positively driven by artificial intelligence-based learning, with a path coefficient of $\beta = 0.140$, a t-statistic of 2.541, and a p-value of 0.006, which helps students generate innovative ideas and create content adaptively (Xie & Wang, 2025). A similar effect is demonstrated by digital literacy, with a path coefficient of 0.253, a t-statistic of 4.177, and a p-value of 0.000, which facilitates information exploration (Rudyanto et al., 2023; Zhao et al., 2021), as well as project-based learning, with a path coefficient of $\beta = 0.439$, a t-statistic of 7.246, and a p-value of 0.000, which hones students' creative thinking (Almulla, 2020; Safaruddin et al., 2020). Nevertheless, in its role as a mediator toward entrepreneurial intent, digital creativity was not found to be significant in AI-based learning, with a path coefficient of $\beta = 0.031$, a t-statistic of 1.432, and a p-value of 0.076, as it still requires support from other psychological factors (Baier-Fuentes et al., 2024). Conversely, digital creativity was found to successfully bridge the influence of digital literacy with an indirect effect of $\beta = 0.055$, a t-statistic of 1.734, and a p-value of 0.042 in fostering a business orientation (Lopes et al., 2025). This variable also successfully mediated the effect of project-based learning, with an indirect effect of 0.096, a t-statistic of 2.134, and a p-value of 0.016, as effective project experiences can trigger entrepreneurial intentions (Santoso et al., 2023; Ridwan et al., 2024). This confirms that creative ideation serves as a crucial catalyst that transforms technical knowledge and practical project experience into a tangible entrepreneurial orientation.

Interestingly, the structural analysis revealed that self-efficacy did not play a significant role in moderating the predictive relationship with entrepreneurial intent. This is evident in the moderating effect of artificial intelligence-based learning ($\beta = -0.018$, $t = 0.204$, $p = 0.419$), which remained consistent regardless of variations in students' beliefs (Baier-Fuentes et al., 2024; Solesvik, 2023), digital literacy ($\beta = 0.001$, $t = 0.008$, $p = 0.497$)—since technical skills alone are not sufficient to directly foster entrepreneurial intent (Manullang & Waspada, 2022)—project-based learning ($\beta = -0.126$, $t = 1.008$, $p = 0.157$), which focuses more on practical skills (Santoso et al., 2023), and digital creativity ($\beta = 0.117$, $t = 0.911$, $p = 0.181$), whose impact remains consistent regardless of students' levels of self-confidence (Anjum et al., 2022). These empirical findings indicate that while self-efficacy independently drives entrepreneurial intent, it neither strengthens nor weakens the influence of the external education model or technical competencies. Digital creativity and self-efficacy thus operate as independent, parallel pillars, where creativity generates innovative business solutions while self-efficacy provides the psychological confidence needed for commercial execution.

The practical and theoretical implications of this study provide critical guidance for secondary education curriculum developers, vocational instructors, and educational policymakers. Practically, school administrators must redesign entrepreneurship curricula to transition away from passive digital literacy and purely academic project execution toward experiential learning frameworks that actively foster digital creativity. Teachers should leverage generative artificial intelligence tools and project-based modules not merely for



technical task completion, but as ideation incubators that encourage students to prototype commercial digital solutions. Theoretically, this research extends the application of intentionality frameworks within secondary education in East Lombok by demonstrating that digital literacy requires creative mediation to influence career intentions. Educational policymakers should therefore prioritize training educators in technology-driven creative pedagogy and self-efficacy building exercises, ensuring that digital competencies are effectively transformed into real-world youth venture creation.

Despite offering comprehensive structural insights, several limitations of this study should be acknowledged to inform future research endeavors. The sample was geographically restricted to students at SMAN 1 Masbagik in East Lombok using a cross-sectional survey design, which limits the regional generalizability of the findings and precludes definitive causal claims over time. Additionally, the model relied on self-reported questionnaire data to measure digital creativity and entrepreneurial intentions, which may introduce subjective reporting bias. Future research should employ longitudinal or experimental designs across diverse geographical regions and school types to track the actual conversion of entrepreneurial intentions into real business startups. Scholars are also encouraged to incorporate objective performance metrics, such as business plan evaluations or digital product prototypes, and explore additional boundary conditions such as institutional support, peer influence, and family entrepreneurial background.

CONCLUSION

The results of this quantitative study concluded that high school students' entrepreneurial intentions are significantly determined by the synergy between artificial intelligence-based entrepreneurship learning, digital literacy, and project-based learning. The core findings confirm that self-efficacy and digital creativity act as the most influential direct drivers in boosting business resilience and students' courage to design independent business opportunities. Digital literacy and project-based learning methods were not shown to have an automatic direct effect; instead, they must first be transformed through digital creativity as a full mediator. Meanwhile, *self-efficacy* was shown not to function as a moderating variable but rather as a fundamental direct predictor. Overall, the integration of artificial intelligence technology and strengthening self-efficacy has proven highly reliable in boosting the courage of the digital entrepreneurial ecosystem of the younger generation.

The implications of this explanatory research emphasize the need for educational institutions to design entrepreneurship curricula that focus beyond mere introduction to technical technology. Schools are required to integrate contextual learning experiences to hone digital creativity and strengthen students' *self-efficacy* so they are mentally prepared to face business risks. For future research, researchers are advised to shift to a mixed methods approach by expanding the sample population across schools in various regions. Further research should also explore variations in other external psychological variables, such as subjective norms and perceived behavioral control within the theory of planned behavior framework. This comprehensive approach is projected to yield a precise, accurate, transparent, and accountable learning intervention model to sustainably reduce the unemployment rate among school graduates.

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