



## Beyond Skills and Tools: The Critical Role of Pyscap and Digital Fluency in Global Competence Development

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### ABSTRACT

To prepare graduates for global demands, vocational education in Indonesia is strengthening programs such as Factory Teaching and technopreneurship. This study examines how Digital Literacy, Psychological Wealth, Teaching Factory Application, and Technopreneurship affect the Global Competence of vocational school students in Central Java. Data collected from 346 students who actively use digital technology and have completed Field Work Practice were analyzed using an explanatory quantitative approach and a cross-sectional survey design. Structural Equation Modeling with Partial Least Squares (PLS-SEM) in SmartPLS 4 revealed that Digital Literacy ( $\beta = 0.531$ ) and Psychological Capital ( $\beta = 0.288$ ) have significant direct effects on Global Competence. In contrast, Teaching Factory and Technopreneurship influence Global Competence only indirectly, mediated by Psychological Capital. These findings highlight that digital and psychological skills play a more direct role than formal vocational programs in developing global competencies. The research empirically demonstrates that psychological wealth is a key mediator and that digital literacy, rather than infrastructure, is the main foundation of global competence in the digital age.

**Keywords:** global competence, digital literacy, psychological capital, teaching factory

### INTRODUCTION

Digitalization, globalization, and the complexity of 21st-century challenges have transformed the world of vocational education [1] [2]. According [3][4], Vocational education graduates must not only have technical skills in an increasingly digitally connected, cross-border work landscape. They must also be able to adapt, work collaboratively, and innovate in a dynamic, multicultural environment. Factors such as achievement orientation, adaptation, negotiation, self-awareness, and creativity are included in these competencies, which are the basis for active involvement in the world economy and society [5][6].

Parallel to that, according to [7][8] Digital literacy has evolved from just a technical skill to an important competency in the 21st century. According [9] Digital literacy now includes not only knowledge of specific devices and applications but also the ability to communicate ethically, create digital artifacts, and organize social-emotional interactions online. Individuals who are not proficient in using digital technologies are at risk of being marginalized from educational, economic, and social opportunities in the modern work environment [10].

Holistic digital literacy, according [11][12], not only facilitates access to information but also aids cross-

cultural collaboration, data-driven problem-solving, and professional identity formation. Vocational education is a key pillar for providing skilled labor in the industrial, service, and entrepreneurial sectors, especially in Central Java. Most vocational high schools (SMK) in this region use the learning factory model to combine academic learning and real industrial practice [13]. However, structural and pedagogical problems remain. Many teaching factories focus on manufacturing conventional goods or services. They do not systematically use project-based curricula, gather much industry feedback, or rely on ICT infrastructure to directly connect factories and classrooms [14][15]. This limits their influence on students' understanding of real industry challenges and their contribution to product processes or innovations [16]. Technopreneurship programs, which aim to build a technology-based entrepreneurial spirit, have also become widespread. According to [17][18], economic factors like value creation, profitability, and efficiency are often the main focus. However, innovation and digital transformation such as technology training and IT solution development are still lacking. True technopreneurship combines economic value with technology-based, sustainable innovation in today's digital ecosystem [17][19].

Interestingly, despite existing programs and infrastructure, a study [20][21] reports that using electronic devices for more than an hour a day indicates that technology is now essential to daily life. However [22] It emphasizes that, while usage is high, it does not meet a holistic digital literacy framework. Such a framework requires not just operational skills in creating digital artwork, but also social-emotional competencies such as communicating politely online and managing emotions during social media conflicts. Without these, digital literacy remains a consumption skill rather than a tool for cooperation and innovation [23][24].

A significant gap exists between program design and the expected global competencies in efforts to improve vocational education through the Teaching Factory model and the Technopreneurship program. Although industry and infrastructure partnerships have evolved [25][26] Vocational learning designers often overlook key psychological aspects of students' perseverance, resilience, self-efficacy, and optimism when implementing Factory Teaching in many vocational schools. This prompts a critical question: why do intensive vocational programs worldwide fail to produce graduates with the required abilities?

This research builds on three main theoretical pillars: Self-Determination Theory [27], Human Capital Theory [28], and the 21st Century Competency Framework [29]. Self-Determination Theory proposes that competency growth depends greatly on internal psychological conditions that support autonomy and competence as embodied in Psychological Capital (PsyCap). Human Capital Theory considers Digital Literacy a strategic investment in human capital. The 21st Century Competency Framework calls Global Competency the main educational goal today.

Global Competency, Digital Literacy, Psychological Capital, Teaching Factory Implementation, and Technopreneurship were the valid and comprehensive research variables measured. However, there are still a few studies that test whether Psychological Capital mediates or Digital Literacy moderates the influence of these variables. Most existing research tests only the direct effect of programs on technical skills, without exploring how digital literacy and psychological capital interact to shape outcomes.

Vocational students lack clear global competence. Global competencies develop mainly through external programs such as factory learning and technopreneurship, and personal abilities, notably psychological capital and holistic digital literacy. However, no empirical evidence shows that simply providing technological infrastructure or industry collaboration automatically produces graduates who are globally ready. According to a study [30][31], focusing vocational education solely on technological improvements risks neglecting the true foundations of 21st-century competence. This study has three aims: (1) to evaluate how Digital Literacy, Psychological Capital, Teaching Factory Implementation, and

Technopreneurship directly impact Global Competencies; (2) to assess whether Digital Literacy moderates the relationship between vocational programs and Global Competencies; and (3) to determine if Digital Literacy serves as a moderator.

## RESEARCH METHODS

To study relationships between latent variables in the model, this research uses an explanatory quantitative approach and a cross-sectional survey design. This method supports simultaneous testing of influence, mediation, and moderation within a single analysis. The goal is to explain how global competence forms among vocational students. school students.

Population and Sample: 346 vocational students in Central Java participated in Field Work Practice and used digital technology in their studies. We purposively sampled: (a) grade XI or XII students, (b) those with at least one semester of street vending, and (c) those who used digital devices for at least one hour daily during learning. Respondents represented four expertise programs, reflecting the diversity of vocational contexts: engineering (42.6%), business (29.4%), tourism (15.6%), and arts (12.3%).

The study involves five key variables, measured using validated theoretical and practical tools: Global Competency, an internal concept that demonstrates a student's ability to function effectively worldwide. Digital Literacy is an exogenous construct measured by six reflective indicators consisting of four dimensions: technological knowledge, ICT capabilities, creation of digital artifacts, and digital social-emotional. Measured by eight reflective indicators. Its dimensions consist of adaptation, the ability to adapt, communication in a foreign language, negotiation, and creativity. Capital Psychologist is a multidimensional construct consisting of hope, resilience, success, and optimism. Measured by twelve reflective indicators.

However, the Factory of Teaching is an outstanding building that demonstrates the integration of academic and industrial learning. This integration includes five dimensions: academic-industry integration, ICT infrastructure and technology, real project-based curriculum, system flexibility, and impact on competence and innovation. Technopreneurship: an exogenous construct consisting of two dimensions: economics and innovation, and IT, measured by 8 reflective indicators.

The instrument uses the latest literature and is adapted for vocational education in Indonesia. Reliability and validity of the instrument were tested using PLS-SEM and confirmatory factor analysis (CFA). Convergent validity: All outer loadings  $\geq 0.70$  (except PC10 = 0.092, which was retained due to theoretical considerations). The Composite Reliability (CR) value of the entire construct is  $> 0.85$ , and Cronbach's Alpha is  $> 0.80$ . Average Variance Extracted (AVE)  $\geq 0.50$  for all constructs, except Technopreneurship, which is formative. Discriminant validity: Fulfilled based on the HTMT criterion  $< 0.85$ .

The data were collected through an online questionnaire distributed to vocational high school students in Central Java from August to December 2025. Before filling out the form, respondents were given an explanation of the research objectives and asked to provide voluntary consent to participate. The respondents' identities are protected, and the data is used only for academic purposes. Everyone can participate voluntarily and anonymously.

The SmartPLS 4 software uses Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the data. The analysis was carried out in two stages. Measurement models, or outside models, analyze reliability, convergent validity, and discriminant validity. The structural model, or inner model, analyzes the direct path hypothesis, the mediating effect (using the bootstrapping procedure of 5,000 iterations), and the moderation effect. The determination coefficient ( $R^2$ ) to assess predictive power, the effect size ( $f^2$ ) to assess influence strength, and the predictive relevance

( $Q^2$ ) to assess predictive relevance are metrics used to evaluate model quality.

**RESULT AND DISCUSSION**

Except for PC10 (0.092), which is maintained due to theoretical considerations, all external loads of the indicator must be more than 0.70. Excellent internal reliability is demonstrated by the Composite Reliability (CR) of the entire construct above 0.85 and Cronbach's Alpha above 0.80. The Average Variance Extracted (AVE) for all constructs must be more than 0.50, except for Technopreneurship, which has only 1 reflective indicator. However, AVE still meets the convergent validity criteria for formative constructs through the PLS approach. To test the model's discriminant validity, the Heterotrait-Monotrait Ratio (HTMT) is used, with a threshold of 0.85 or lower. The test results are presented in Table 1.

**Table 1.** Matriks Heterotrait-Monotrait Ratio (HTMT)

Construct	LD	PC	TF	TP	KG
Digital Literacy (LD)	-				
Psychological Capital (PC)	0.663	-			
Teaching Factory (TF)	0.602	0.710	-		
Technopreneurship (TP)	0.171	0.201	0.210	-	
Global Competencies (KG)	0.846	0.743	0.639	0.187	-

All HTMT values < 0.85, so that the discriminant validity is met. Global Competence had the highest correlation with Digital Literacy (0.846), indicating a strong empirical relationship between the two. Esting the quality of the measurement model in this study began with an evaluation of reliability and convergent validity to ensure that the research instrument accurately and consistently measures the constructs. Based on established criteria, all reflective indicators in the model met the requirements, with loading factor values above 0.70. This confirmed that each questionnaire item explained more than 49% of the variance in the construct it measured, making them worthy of being retained in the analysis.

Next, the internal consistency of each construct was tested using two primary metrics: Cronbach's Alpha and Composite Reliability (CR). The analysis showed that the Cronbach's Alpha values for all constructs were above the threshold of 0.80, while the Composite Reliability value exceeded the strict standard of 0.85. This achievement provides strong assurance that the research instrument has excellent reliability and is free from significant random error. Regarding convergent validity, the Average Variance Extracted (AVE) value for the reflective constructs has also met the criteria with a value above 0.50, which means that these constructs have succeeded in explaining an average of more than half of the variance of the indicators that form them.

There is a special treatment for the Technology Entrepreneurship (TP) construct, which has only one reflective indicator. In the Partial Least Squares (PLS) approach, constructs with this characteristic, which are treated as formative or single-item, cannot be evaluated

using conventional AVE criteria. Therefore, the validity of the TP construct is verified through appropriate alternative approaches, such as ensuring the significance of indicator weights (outer weights) and conducting redundancy analysis, if available. This step ensures that despite having a unique indicator structure, the TP construct still meets the validity standards required in the model.

After reliability and convergent validity were met, the analysis continued with discriminant validity testing using the Heterotrait-Monotrait Ratio (HTMT). The criterion used was that the HTMT value must be below 0.85 to ensure that theoretically distinct constructs were truly measured as separate concepts. The results of the HTMT matrix test showed that all pairs of constructs in this research model had values below the 0.85 threshold. This finding confirms that the measurement model has good discriminant validity, preventing conceptual overlap between variables.

Although all HTMT values met the criteria, one pair of constructs requires special attention: the relationship between Global Competence (GC) and Digital Literacy (DL), with an HTMT value of 0.846. This value is very close to the 0.85 threshold, indicating a very strong empirical correlation between the two variables. Theoretically, this close relationship is understandable, as digital literacy is a fundamental component of global competence in the modern era. However, methodologically, researchers need to be aware of the potential for multicollinearity. It is recommended to examine the Variance Inflation Factor (VIF) values in structural analysis to ensure that this

strong relationship does not distort the path coefficient estimates between the variables.

In conclusion, the correlation profiles between the other constructs show clear differentiation. The Technology Entrepreneurship (TP) construct, for example, exhibits very low HTMT values (ranging from 0.171 to 0.210) relative to the other constructs, confirming that TP is a highly unique concept and distinct from the other variables in the model. Overall,

based on the analytical narrative above, it can be concluded that the measurement model in this study has met the strict standards of PLS-SEM. This model is declared reliable, convergently and discriminantly valid, and is suitable for use in hypothesis testing in the next stage of structural analysis.

From Table 2 summarizes the results of the hypothesis test based on path coefficients, t-statistical values, and p-values ( $\alpha = 5\%$ , bootstrap 5,000):

**Table 2.** Structural Model Hypothesis Testing Results

Hypotesis	Influence Path	Coefficient ( $\beta$ )	T-Statistics	p-value	Verdict
H1	Digital Literacy → Global Competencies	0.531	18.327	0.000	Accepted
H2	Psychological Capital → Kompetensi Global	0.288	6.319	0.000	Accepted
H3	Teaching Factory → Global Competence	0.098	1.892	0.058	Rejected
H4	Technopreneurship → Global Competencies	0.019	0.401	0.688	Rejected
H5	Technopreneurship → Psychological Capital	0.183	3.765	0.000	Accepted
H6	Psychological Capital → Teaching Factory	0.630	14.872	0.000	Accepted

Table 2 shows that the most dominant predictor of global competence is digital literacy ( $\beta = 0.531$ ;  $p < 0.001$ ). This shows that mastery of digital technology is key to students' global capacity. Factory Engineering and Technopreneurship did not have a direct impact on Global Competence ( $p > 0.05$ ), but did have a significant, though supportive, impact ( $p = 0.288$ ;  $p < 0.001$ ). In addition, the Capital Psychologist serves as a key mediator, with Technopreneurship → PsyCap → Global Competency ( $p = 0.061$ ). The model's predictive power was moderate ( $R^2 = 0.358$ ), and there was no moderation effect of Digital Literacy ( $p > 0.05$ ).

Based on the results of the structural model hypothesis testing presented in the table, the analysis reveals varying relationship dynamics between the research variables, with some relationship paths proving significant while others not. Digital literacy emerged as the most dominant factor influencing global competence, with a path coefficient of 0.531, a very high T-statistic of 18.327, and a p-value of 0.0000, confirming the strong acceptance of the first hypothesis. In addition to digital aspects, psychological capital also contributed significantly to global competence, as seen in the results of the second hypothesis, with a coefficient of 0.288 and a significance value of 0.00000, indicating that mental toughness is a crucial component in shaping individual readiness to face global challenges.

On the other hand, several relationship paths were not statistically proven, although theoretically expected to be influential. The implementation of teaching factories did not significantly influence global competence, as the p-value of 0.058 remained above the significance threshold of 0.05, although the coefficient was a small positive value of 0.098. The same thing happened to the influence of technopreneurship on global competence which was rejected with a very high

p-value of 0.688 and a very small path coefficient of 0.019, so it can be concluded that these two variables do not have a real direct impact on global competence in this research model.

Although they do not directly influence global competence, technopreneurship and teaching factories play a significant role in the internal relationships of the other models. Technopreneurship has been shown to strengthen individuals' psychological capital, with a coefficient of 0.183 and a significance value of zero point zero, indicating that a technological entrepreneurial orientation can build psychological aspects such as optimism and self-efficacy. The strongest relationship in the overall model is found in the influence of psychological capital on teaching factories, where the path coefficient reached the highest value of 0.630 with a T-statistic of 14.872, indicating that the success of teaching factory programs is highly dependent on the psychological maturity of students.

Overall, these findings illustrate that digital literacy is a key driver of global competence, while psychological capital serves as a vital internal foundation for the success of industry-based programs. The role of technopreneurship is more visible in building mental resilience than directly enhancing global competence, and the effectiveness of teaching factories is largely determined by an individual's psychological capital. Therefore, global competence development strategies should prioritize strengthening digital literacy while building mental resilience as prerequisites for optimal implementation of industry-based and entrepreneurship programs and achieving their desired impact. The analysis of the mediating effect was conducted to uncover the psychological mechanisms underlying the relationships among the

variables in the research model. The test results are presented in Table 3.

**Table 3.** Mediation Effects Test Results (Indirect Effects)

Mediation Pathway	Coefisien	t-statistic	p-value	Conditions
Technopreneurship → PC → Global Competencies	0.053	2.981	0.003	Significance
Psychological Capital → TF → Global Competencies	0.061	2.847	0.004	Significance
Technopreneurship → PC → TF → Global Competence	0.011	2.103	0.035	significance

Based on the results of the mediation effect test presented in Table 3, all indirect pathways tested in this study proved statistically significant, revealing the complex mechanisms by which the research variables interact to influence global competence. The first mediation pathway indicates that Psychological Capital acts as a significant mediator in the relationship between Technopreneurship and Global Competencies, with an indirect effect coefficient of 0.053, a t-statistic of 2.981, and a p-value of 0.003. This finding indicates that a technopreneurship orientation does not directly enhance global competence but rather works by first strengthening an individual's psychological capital. Thus, individuals with a technopreneurial spirit will develop mental resilience, ultimately contributing to their readiness to face global challenges.

Furthermore, the test results also demonstrate that the Teaching Factory functions as a significant mediator between Psychological Capital and Global Competencies, with an indirect effect coefficient of 0.061, a t-statistic of 2.847, and a p-value of 0.004. This means that an individual's psychological capital does not directly increase global competence, but rather its influence is channeled through active involvement in the teaching factory program. In other words, individuals with high levels of hope, self-efficacy, resilience, and optimism will maximize their practical experience in the teaching factory, which then serves as a bridge to developing global competence.

As seen in table 3, Psychological Capital has been proven to play a key mediator in three significant pathways, namely Technopreneurship → Psychological Capital → Global Competence ( $\beta = 0.053$ ;  $p = 0.003$ ), Psychological Capital → Teaching Factory → Global Competence ( $\beta = 0.061$ ;  $p = 0.004$ ), Technopreneurship → Psychological Capital → Teaching Factory → Global Competency ( $\beta = 0.011$ ;  $p = 0.035$ ). These findings indicate that the influence of Technopreneurship and Teaching Factory on Global Competence is indirect, mediated by strengthening students' psychological

dimensions, such as hope, resilience, self-efficacy, and optimism.

The most interesting aspect of this analysis is the significant serial mediation pathway: Technopreneurship → Psychological Capital → Teaching Factory → Global Competence, with an indirect effect coefficient of 0.011, a t-statistic of 2.103, and a p-value of 0.035. This pathway illustrates a stepwise causal flow where a technopreneurship orientation strengthens an individual's psychological capital, which in turn increases the effectiveness of participation in the teaching factory, and ultimately, the teaching factory experience contributes to the development of global competence. Although the coefficient for this serial pathway is relatively small compared to the single mediation pathway, its statistical significance confirms that the influence mechanism in this model is systemic and multilevel, rather than a simple direct relationship.

Overall, the results of this mediation test provide a more comprehensive understanding that the influence of technopreneurship and psychological capital on global competence operates largely through indirect mechanisms. Psychological Capital and Teaching Factory not only act as predictor variables but also serve as connecting mechanisms that transform initial inputs of technopreneurship orientation and mental toughness into outcomes of global competence. The practical implication of these findings is that vocational education interventions should not only focus on developing technical or entrepreneurial skills alone, but also need to deliberately build students' psychological capital and optimize industry-based learning designs so that these mediating mechanisms can function optimally and produce graduates who are truly globally competent.

The analysis of the moderating effect was conducted using the product-indicator method to determine whether Digital Literacy strengthens or weakens the relationship between the variables. Table 4 shows the test results.

**Table 4.** Table of Moderation Effect Test Results

Interaction	$\beta$	p-value	Verdict
Digital Literacy × Technopreneurship → Global Competencies	-0.020	0.276	Insignificant
Digital Literacy × Teaching Factory → Global Competencies	0.024	0.152	Insignificant
Digital Literacy × Psychological Capital → Global Competencies	0.016	0.389	Insignificant

Table 4 shows that there was no significant moderation effect on the interaction of Digital Literacy ×

Technopreneurship, Digital Literacy × Teaching Factory, and Digital Literacy × Psychological Capital, each with a

p-value greater than 0.05. The predictive quality of the model was evaluated using three main indicators: the determination coefficient ( $R^2$ ), the effect size ( $f^2$ ), and the predictive relevance ( $Q^2$ ).

From Based on the results of the moderation effect test presented in Table 4, all interactions between Digital Literacy and other predictor variables were not proven to be significant in influencing Global Competence. Specifically, the interaction between Digital Literacy and Technopreneurship on Global Competence produced a path coefficient ( $\beta$ ) of -0.020 with a p-value of 0.276 with an Insignificant status, indicating that digital literacy neither strengthens nor weakens the influence of technopreneurship on global competence. Similarly, the interaction between Digital Literacy and Teaching Factory on Global Competence showed a coefficient ( $\beta$ ) of 0.024 with a p-value of 0.152 with an Insignificant status, so it can be concluded that a person's digital literacy level does not moderate the relationship between teaching factory experience and the achievement of global competence. Furthermore, the interaction between Digital Literacy and Psychological Capital on Global Competencies also showed insignificant results with a coefficient value ( $\beta$ ) of 0.016 and a p-value of 0.389 with an Insignificant status, which means that the influence of psychological capital on global competencies runs consistently without being influenced by variations in individual digital literacy levels.

The consistency of the insignificant results in these three moderation paths, with all p-values of 0.276, 0.152, and 0.389 far exceeding the critical threshold of

0.05, provides an important illustration that Digital Literacy in this research model functions as an independent predictor with a stable direct effect. The very small interaction coefficient values, both negative -0.020 and positive 0.024 and 0.016, further strengthen the conclusion that there is no significant synergistic or conditional effect between digital literacy and other variables in predicting global competence. This finding suggests that the mechanism of global competence formation is more determined by the contribution of each variable directly and through mediation pathways, rather than through complex moderating interactions.

From an implication perspective, the test results with these statistical values suggest that global competency development strategies do not need to be designed with a complex contingency approach based on a specific combination of digital literacy and other factors. Instead, digital literacy can be developed as a standardized basic competency for all students, because its effectiveness in supporting global competency is universal and does not depend on the technopreneurship profile ( $\beta = -0.020$ ;  $p = 0.276$ ), the intensity of participation in teaching factories ( $\beta = 0.024$ ;  $p = 0.152$ ), or the level of psychological capital ( $\beta = 0.016$ ;  $p = 0.389$ ) possessed by individuals. Thus, educational resources and interventions can be focused on strengthening the direct effects and mediating mechanisms that have been proven significant, while approaches to digital literacy can be carried out in parallel and evenly without the need for adjustments based on moderating interactions.

**Table 5.** Predictive Quality and Measure of Fashion Effects

Indicator	Value	Interpretasi
$R^2$ Global Competence	0.358	Moderate predictive effect
$f^2$ Digital Literacy	0.456	Large size effect
$f^2$ Psychological Capital	0.129	Medium-sized effect
$Q^2$ Predictive Relevance	0.214	The model has predictive relevance

The results are summarized in Table 5 shows that the Global Competency  $R^2$  is 0.358 and falls in the moderate predictive effects category. This shows that the model explains 35.8% of the variation in the Global Competencies of vocational school students. Factors outside the model, such as family background, hands-on work experience, and school context, make up the rest.

A paradigm shift in modern vocational education is evident in the finding that digital literacy is the most important predictor of global competence ( $\beta = 0.531$ ;  $p < 0.001$ ). Digital literacy has evolved from a mere learning tool to an essential 21st-century skill that underpins global participation. This aligns with [9]. View that the ability to access, evaluate, create, and collaborate digitally is now a major prerequisite in the modern work ecosystem.

In the context of vocational schools in Central Java, these findings show that digital literacy has become the main competency, not just a complement. 89.5% of respondents use digital devices for more than an hour every day [22]. However, it should be noted that Digital Literacy does not function

as a moderator in the relationship between the variables of the Technopreneurship program and the Factory of Teaching and Global Competence ( $p > 0.05$ ). This shows that digital capabilities do not depend on psychological or pedagogical processes. In other words, unless it is integratively designed in the curriculum, increasing digital literacy does not automatically increase the effectiveness of the teaching factory [23]. These findings reinforce the warning from previous studies that without deliberate pedagogical integration, technology risks becoming only a means of consumption, not a means of collaboration or innovation [11].

Psychological Capital (PsyCap), which comprises optimism, fortitude, and independence, serves as a "hidden machine" that transforms exposure to industrial projects into tangible global capacities. However, the effect was more moderate ( $\beta = 0.288$ ;  $p < 0.001$ ) and was proven to be the main mediator in the relationship between vocational programs (Teaching Factory and Technopreneurship) and Global Competence.

This directly supports the Self-Determination Theory [27], which states that optimal competency growth occurs when individuals feel competent, autonomous, and connected [1]. Without this psychological foundation, students may master technical skills, but they will be more susceptible to international stress, less excited, and less adaptable across cultures. This issue is also emphasized in Indonesian vocational studies [30].

The results challenge the common assumption that vocational school revitalization can only be achieved through industrial or infrastructure partnerships. Instead, psychological factors such as mental resilience, optimism, and hope should be incorporated into the design of vocational learning [23][24]. This aligns with the findings [30], which show that mastery of technical skills alone is insufficient to determine long-term career resilience.

Teaching Factory and Technopreneurship did not directly affect Global Competency ( $p > 0.05$ ), but both had a significant indirect influence on PsyCap ( $\beta = 0.053-0.061$ ). This shows that the implementation approach of both programs still focuses on technical productivity rather than the development of global citizens [23][24].

Notably, Teaching Factories typically don't pay attention to industry feedback, real-time classroom connections, and the impact of innovation. In contrast, technopreneurship functions as a psychological reinforcer (such as increasing optimism and self-efficacy) rather than as a direct global skill developer. Implicitly, the redesign of Teaching Factory and Technopreneurship should integrate components such as global case studies, cross-cultural collaboration projects, and sustainable innovation challenges, as recommended in the 21st-century competency framework [5][6]. Without this shift, vocational programs risk producing graduates who are locally skilled but not globally relevant.

Therefore, this discussion not only explains the empirical findings but also connects them to the theories and research mentioned in the introduction, providing a clear academic path from background to implications

## CONCLUSION

The purpose of this study is to evaluate the influence of Digital Literacy, Psychological Wealth, Learning Factory Implementation, and Technopreneurship on the Global Competence of Vocational School Students in Central Java. In addition, the study also investigated the role of mediation and moderation in the model. The results show that Digital Literacy and Psychological Capital significantly affect Global Competence, while Teaching Factories and Technopreneurship do not. Statistical data support these findings: Digital Literacy has the dominant influence ( $\beta = 0.531$ ;  $p = 0.001$ ), while Psychological Wealth contributes significantly, albeit to a lesser extent ( $\beta = 0.288$ ;  $p = 0.001$ ). Teaching Factory ( $\beta = 0.098$ ;  $p = 0.058$ ) and Technopreneurship ( $\beta = 0.019$ ;  $p = 0.688$ )

had no statistically significant influence. However, psychological capital, which has been shown to serve as an important mediator in the model, affects both indirectly.

The main focus of this research is the discovery of two mechanisms for global competency formation: (1) Digital Literacy as a technological foundation, and (2) Psychological Capital as a psychological driver that connects vocational programs with competency outcomes. These findings challenge the idea that automated technopreneurship programs or teaching factories produce graduates worldwide without improving their digital and psychological skills. This research has several limitations. These include cross-sectional designs, which preclude long-term causal inference; potential self-report bias from questionnaire use; and the fact that samples are drawn only from the Central Java region. To deepen our understanding of the dynamics of global competency formation in vocational contexts, advanced research is recommended that uses longitudinal or blended methods.

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