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DETERMINANTS OF GRADUATES' COMPETITIVENESS: RELIGIOUS CHARACTER, DUAL EDUCATION, AND ICT COMPETENCE

Dwi Enggal(✉)[1] Abd. Haris[2], Shonhadji[3]
Universitas KH. Abdul Chalim Pacet, Mojokerto, East Java, Indonesia

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(✉)Correspondence to:
enggaldwi115@gmail.com

Abstract: This study aimed to analyze the influence of religious character education, dual system education, and ICT mastery on the competitiveness of vocational high school graduates. The approach used was a mixed methods with an Explanatory Sequential Design. The quantitative stage was conducted on a sample of 120 graduates from a population of 250 people, analyzed using SEM-PLS. The qualitative stage was conducted through in-depth interviews with productive teachers, graduates, and IDUKA. Data were analyzed thematically using the Miles, Huberman, and Saldana approach, and assisted by NVivo 15 through Project Map, Treemap, Sunburst, and Word Cloud visualizations to strengthen meta-inference. The quantitative results showed that all variables have a significant effect on competitiveness. PSG had the largest direct effect (β = 0.209), as well as an indirect effect through ICT mastery (β = 0.112). ICT mastery also acted as a strong mediating variable (β = 0.288), while religious character education also had a significant influence (β = 0.243). These findings confirmed that religious values such as honesty and responsibility are the foundation of a professional work ethic; PSG served as a medium for shaping work attitudes through direct experience; and ICT mastery was considered a key adaptive skill in the digital era. This study demonstrated the implications of the competitiveness of graduates formed from the synergy between moral values, vocational experience, and digital skills. This study provided theoretical and practical contributions by expanding the theories of character education (Lickona), experiential learning (Kolb), and digital literacy (Gilster and UNESCO ICT-CFT) towards the profile of 21st-century graduates who were religious, productive, and adaptive.

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INTRODUCTION

In a global era marked by open competition and digital disruption, a nation's competitiveness no longer depends solely on its natural resource endowment (Holid et al., 2025; Sailin et al., 2024). Instead, competitiveness is

now determined more by the quality of its human resources (HR), as well as its capacity for innovation and mastery of technology (Arif et al., 2025; Hildayatuzzahra & Kurniawan, 2025). The World Bank and the World Economic Forum (WEF) have emphasized in various reports that innovation, creativity, technological mastery, and the ability to build collaborative networks are key pillars supporting national competitiveness amidst today's global dynamics. The rapid development of information and communication technology (ICT), along with changes in the job structure in the current global era, have driven the emergence of increasingly sophisticated artificial intelligence (AI). This situation demands the existence of qualified, resilient human resources (HR), capable of competing at various levels, both nationally and internationally (Liu, 2025; Liu et al., 2025). The quality of human resources referred to is not just having technical competence, but also includes the ability to compete openly, be adaptive and anticipatory towards change, and be open to updates in knowledge and technology (Düzgünçınar, 2025; Egan et al., 2024).

Superior human resources are those who possess the ability to learn how to learn, master various skills (multi-skilling), actively develop their superior competencies, and possess a broad, solid, and visionary foundation of knowledge and skills to meet future challenges. Vocational education in Indonesia, particularly Vocational High Schools (SMK), continues to be promoted as a strategic pillar in preparing the younger generation to enter the workforce and face the ever-changing dynamics of industry. However, a major challenge that still looms large is the low competitiveness of vocational high school graduates in the job market (Fraillon, 2023; Khan et al., 2024). In an era of globalization and rapid technological advancement, the competitiveness of college graduates is becoming an increasingly important issue. Graduates who possess not only strong academic knowledge but also non-academic skills, such as technological expertise and good character, are highly sought after by the workforce (Neill & Short, 2025; Rafiq-uz-zaman & Nadeem, 2025). However, despite many efforts to address these challenges, there are still several gaps that need attention, which are related to three main variables: religious character education, dual system education, and mastery of information and communication technology (ICT).

Religious character education, which should teach moral and ethical values, is often not integrated comprehensively into the educational process, resulting in graduates often lacking the character maturity needed in the workplace. This applied to dual-system education, which aims to provide practical skills needed in the workplace. Despite efforts to connect theory with practice, many institutions still lack sufficient partnerships with industry to create relevant, real-world experiences for students. Graduates' lack of ICT proficiency, in turn, impacted their competitiveness in the workforce. Graduates who lack the latest digital skills will struggle to meet the demands of increasingly technology-based jobs. This issue demonstrated the need for higher education in Indonesia to adapt more quickly to global and technological demands. Therefore, there needed to be an evaluation and improvement in the

education curriculum that focused more on character development, practical skills, and mastery of technology to increase the competitiveness of graduates in the global market.

When viewed from the tri-domain of education, or what we know as Bloom's theory, namely the cognitive, affective, and psychomotor domains. When reduced to the 1945 Constitution, specifically Law No. 20 of 2003, the affective system is more dominant, tending toward attitude formation. This certainly indicates that the value system, in this case related to noble morals, functions as a protector of the other domains. This means that intelligence and skills must be based on values related to noble morals, such as faith, good deeds, honesty, and aesthetics, all of which are rooted in religious teachings (Islam) (Kholikov, 2025; Yi & Siqian, 2025). A nation that aspires to compete globally requires human resources who excel not only in knowledge and skills, but also possess integrity, a strong work ethic, and the ability to adapt to changing times. Within the framework of national development, improving the quality of human resources is inseparable from the strategic role of education as a primary instrument. Education serves not only as a means of transmitting knowledge but also as a vehicle for character formation, developing individual potential, and increasing national productivity. Therefore, developing a quality, equitable, and just education sector is an absolute requirement for developing superior human resources capable of contributing to the long-term progress of the nation and state (Kiram et al., 2025; Liando et al., 2025).

Akpojotor (2024); Hidayat & Mulkhan (2024) In their quantitative study, they concluded that the implementation of PSG, which combines school learning and internships, effectively improves the quality of graduates, making them suitable for the needs of society and the workplace. This model also facilitates on-the-job training that enhances students' skills. Vocational schools, with their PSG model, aim to produce graduates who are ready to work, become self-employed, and continue their education. Other research from Cristian (2025); Julaiha (2025) PISA data-based studies confirm that ICT literacy has a significant influence on work readiness, especially in relation to non-cognitive skills such as motivation, responsibility, and self-management. Similarly, a systematic study by Feifei & Norbaya (2024); Ishaq & Dayati (2024), stated that ICT mastery is closely related to 21st-century skills such as problem-solving, communication, and digital collaboration, emphasizing the importance of integrating technical and non-technical digital skills (cognitive and social). Therefore, ICT mastery in the context of vocational high school education encompasses not only the use of digital tools but also how students are able to adapt, innovate, and collaborate effectively in a technology-based work environment.

Referring to the study, this research brought a focus on the competitiveness of vocational school graduates which must be seen as the result of synergy between religious character values (morality), dual system education (real work experience), and mastery of ICT (digital literacy). Based on this, the research was a new breakthrough that is closely related to Religious Character Education, Dual System Education (PSG) and Mastery of Information and

Communication Technology (ICT) with the Competitiveness of Vocational High School Graduates. These three were crucial aspects that interact with each other in shaping graduates who are adaptive, productive, and ready to compete globally. So, the author will conduct a research entitled: "The Influence of Religious Character Education, Dual System Education (PSG), and Mastery of Information and Communication Technology (ICT) on the Competitiveness of Vocational High School Graduates at SMK Yapia Parung"

RESEARCH METHOD

The approach used in this study was a quantitative-qualitative (mixed methods) approach. The research design used is a sequential explanatory design, or a combination of quantitative and qualitative research methods. The first stage used quantitative methods and the second stage used qualitative methods. The quantitative stage was conducted on a sample of 120 12th-grade graduates of SMK YAPIA Parung in the 2022–2023 academic year, from a population of 250, analyzed using SEM-PLS. The qualitative stage was conducted through in-depth interviews with productive teachers, graduates, and IDUKA (Islamic Student Association). The sample or respondents in this mixed methods study used purposive sampling, using sequential techniques: quantitative first, then qualitative, but preferably within the same population. The sample criteria included 12th grade SMK students or graduates who have participated in Dual System Education (DSE), have received religious and ICT-based character learning, and are willing and able to fill out the questionnaire honestly and completely.

The data collection techniques used in this study were observation, interviews, questionnaires, and documents. The type of questionnaire used was a closed questionnaire, with a Likert scale assessment form. Quantitative data were analyzed using Structural Equation Modeling (SEM) analysis techniques using Smart PLS Software. The SEM analysis is based on variance where the nature of the research is predictive. Testing was carried out through two stages: the first stage of testing using a measurement model (Outer model), namely testing the validity and reliability of the construct of each indicator including testing outer loading, Average Variance Extracted (AVE), and Composite Reliability (Crombach Alpha). The second stage carried out a structural test (inner model) which aimed to determine whether there was an influence between variables. Inner Model testing was carried out by looking at the R square value (goodness fit model), Path Coefficient, and two-tail t-significance test. Then, qualitative data were analyzed thematically with the Miles, Huberman, and Saldana approach, and assisted by NVivo 15 through Project Map, Treemap, Sunburst, and Word Cloud visualizations to strengthen meta-inference. This procedure consisted of five main stages: preparation, quantitative data collection, initial analysis, qualitative data collection, and synthesis of findings.

RESULT AND DISCUSSION

Result

The researchers' findings are derived from quantitative and qualitative data. This section will reveal all the findings to determine whether or not character education, dual education systems, and ICT mastery influence the competitiveness of 12th-grade vocational school graduates at SMK YAPIA Parung.

Inferential Analysis of Structural Equation Modeling (SEM)

Results of the Measurement Model Test (Outer Model)

In the Measurement Model Test, several tests must be completed. First, construct validity testing involves testing factor loading values (Outer Loading). Second, construct reliability testing involves testing Average Variance Extracted (AVE) and Composite Reliability (Crombach's Alpha). These tests are discussed below:

Construct Validity Test Results (Convergent Validity)

The measurement model validity test in this study was conducted to determine whether a variable accurately measures what it is supposed to measure.

Table 1. Outer Loading

Laten	Manifest	SLF	Critical value	Note
Religious Islamic Education (X1)	X1.01	0.712	0.700	Valid
	X1.02	0.707	0.700	Valid
	X1.03	0.725	0.700	Valid
	X1.04	0.715	0.700	Valid
	X1.05	0.711	0.700	Valid
	X1.06	0.733	0.700	Valid
	X1.07	0.711	0.700	Valid
	X1.08	0.766	0.700	Valid
	X1.09	0.754	0.700	Valid
	X1.10	0.747	0.700	Valid
Dual System Education (X2)	X2.01	0.740	0.700	Valid
	X2.02	0.732	0.700	Valid
	X2.03	0.755	0.700	Valid
	X2.04	0.749	0.700	Valid
	X2.05	0.744	0.700	Valid
	X2.06	0.741	0.700	Valid
	X2.07	0.775	0.700	Valid
	X2.08	0.740	0.700	Valid
	X2.09	0.718	0.700	Valid
	X2.10	0.725	0.700	Valid
Mastery of ICT	X3.01	0.785	0.700	Valid
	X3.02	0.745	0.700	Valid
	X3.03	0.741	0.700	Valid
	X3.04	0.724	0.700	Valid
	X3.05	0.705	0.700	Valid
	X3.06	0.735	0.700	Valid
	X3.07	0.707	0.700	Valid

Competitiveness of Vocational School Graduates (Y)	X3.08	0.778	0.700	Valid
	X3.09	0.739	0.700	Valid
	X3.10	0.714	0.700	Valid
	Y.01	0.762	0.700	Valid
	Y.02	0.759	0.700	Valid
	Y.03	0.755	0.700	Valid
	Y.04	0.758	0.700	Valid
	Y.05	0.732	0.700	Valid
	Y.06	0.741	0.700	Valid
	Y.07	0.711	0.700	Valid
	Y.08	0.719	0.700	Valid
	Y.09	0.795	0.700	Valid
	Y.10	0.759	0.700	Valid

Source: Data processed by SmartPLS, 2025

Based on the table above, each construct/indicator of the latent research variable had an outer loading value > 0.7, which is sufficient to meet the requirements for convergent validity. The data above indicated that no variable indicator had an outer loading value below 0.5, thus all indicators were suitable or valid for research use and can be used for further analysis.

Composite Reliability and Average Variance Extracted Test Results

The measurement model reliability test in this study aimed to determine the consistency of the measurements taken. High reliability indicates that the construct/indicator variables had high consistency in measuring their latent constructs.

Table 2. Cronbach's Alpha, Composite Reliability, and Average Variance Extracted

	Cronbach's Alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average Variance extracted
X1 (Religious Islamic Education)	0.902	0.905	0.919	0.530
X2 (Dual System Education)	0.909	0.912	0.924	0.551
X3 (Mastery of ICT)	0.907	0.910	0.923	0.544
Y (Competitiveness of Vocational School Graduates)	0.914	0.924	0.927	0.561

Source: Data processed by SmartPLS, 2025

Based on the above, it can be seen that the composite reliability value for all latent variables in the study was >0.7, the Crombach's alpha value for all latent variables is >0.7, and the Average Variance Extracted (AVE) value is >0.5. Therefore, it can be concluded that all constructs/indicators that measure or form the latent variables have fairly good reliability. Therefore, all indicators for each latent variable in the measurement model (Outer Model) consistently measure their latent variables, thus allowing the measurement model (Outer Model) to be used to answer the research hypothesis.

Inner Model Test Results

The Structural SEM (Inner Model) test requires several tests, including the R-square value, the direct effect path coefficient, and the indirect effect path coefficient. The tests were then followed by testing the significance of the direct and indirect effects. The explanation of these tests was as follows.

R-Square Test Results (Goodness of Fit Model)

R-Square indicated how much exogenous variables influence endogenous variables. The results of the R-Square calculation can be seen in the table below.

Table 3. R-Square Values

	R-square	R-square adjusted
X3 (Mastery of ICT)	0.348	0.337
Y (Competitiveness of Vocational School Graduates)	0.381	0.365

Source: Data processed by SmartPLS, 2025

Based on Table 3, the R-square (R^2) value for the ICT Mastery variable (X3) was 0.348, or 34.8%. This meant that the Religious Character Education (X1) and Dual System Education (X2) variables explained 34.8% of the influence on ICT Mastery (X3), while the remaining 65.2% is influenced by other variables outside this research model. The R-square value for the Competitiveness of Vocational High School Graduates (Y) variable is 0.381, or 38.1%. This indicated that the variables Religious Character Education (X1), Dual System Education (X2), and ICT Mastery (X3) simultaneously contribute 38.1% to the increase in Competitiveness of Vocational High School Graduates, while the remaining 61.9% was explained by other factors not examined in this model.

Path Coefficient Test Results

Direct Effect

The direct effect test for the research model was conducted by examining the path coefficient values for each hypothesized research path and then using a t-test to determine the path coefficient value or influence value in the significant category. Based on the research results, the direct effect value and t-value can be described as follows:

Table 4. Table of Direct Effect Path Coefficients and Calculated T-values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 (Religious Islamic Education) -> X3 (Mastery of ICT)	0.270	0.279	0.070	3.860	0.000
X1 (Religious Islamic Education) -> Y (Competitiveness of Graduates)	0.243	0.247	0.081	3.012	0.003
X2 (Dual System Education) -> X3 (Mastery of ICT)	0.389	0.394	0.061	6.393	0.000
X2 (Dual System Education) -> Y (Competitiveness of Graduates)	0.209	0.214	0.087	2.390	0.017

X3 (Mastery of ICT) -> Y (Competitiveness of Graduates)	0.288	0.288	0.079	3.628	0.000

Source: Data processed by SmartPLS, 2025

Table 4 displayed the results of testing the direct influence paths between variables using the Partial Least Squares (PLS) approach. Based on the analysis, all paths showed a t-value > 1.96 and a p-value < 0.05, indicating that the influence between the variables is statistically significant.

Indirect Effect

Testing the indirect effect in the research model was conducted by examining the path coefficient values for each hypothesized research path and then using a t-test to determine whether the path coefficient or influence value was categorized as significant.

Table 5. Table of Indirect Influence Path Coefficients and T-Values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 (Religious Islamic Education) -> X3 (Mastery of ICT) -> Y (Competitiveness of Graduates)	0.078	0.081	0.032	2.466	0.014
X2 (Dual System Education) -> X3 (Mastery of ICT) -> Y (Competitiveness of Graduates)	0.112	0.114	0.037	3.061	0.002

Source: Data processed by SmartPLS, 2025

Table 5 presented the results of the analysis of the indirect influence between variables through the mediation pathway of ICT Mastery (X3) on the variable Competitiveness of Vocational High School Graduates (Y). This analysis used a bootstrapping approach in the Partial Least Squares (PLS) method. The Indirect Effect of Religious Character Education (X1) on Competitiveness of Vocational High School Graduates (Y) through ICT Mastery (X3). This pathway showed an indirect effect coefficient of 0.078, with a t-test of 2.466 and a p-value of 0.014. Since the p-value is <0.05, it can be concluded that there was a significant indirect effect of Religious Character Education on Competitiveness of Vocational High School Graduates through ICT Mastery.

Results of the Goodness of Fit Test

Goodness of fit (GoF) was a measure of the extent to which the structural model in a study is able to comprehensively and validly explain the relationships between latent variables. The full SEM model fit test can be seen in the following table:

Table 6. Goodness of fit of the Structural SEM Model

	Saturated model	Estimated model
SRMR	0.072	0.072
d_ULS	4.244	4.244
d_G	1.642	1.642
Chi-square	928.408	928.408
NFI	0.710	0.710

SRMR value < 0.10

Source: Data processed by SmartPLS, 2025

Based on Table 6 above, several key indicators are used to evaluate the feasibility of the structural model, namely the SRMR, d_ULS, d_G, Chi-square, and NFI values. The Standardized Root Mean Square Residual (SRMR) value for the saturated and estimated models is 0.072, which is below the maximum limit of 0.10. This indicated that the model has a good level of fit.

Hypothesis Testing

Hypothesis testing based on the SEM analysis results above is clearly and concisely shown in the following table:

Table 7. Results of the Direct Path Hypothesis Testing

NO	Path of Influence	Coefficient Path (β)	t-Values	p-Value	Hypothesis Decision	Interpretation
1	X1 → X3 (Religious Islamic Education → ICT)	0,270	3,860	0,000	H_0 was rejected, H_1 was accepted	There was a positive and significant direct influence between Religious Character Education on ICT Mastery of Vocational High School students.
2	X2 → X3 (Dual System Education → ICT)	0,389	6,393	0,000	H_0 was rejected, H_1 was accepted	There was a positive and significant direct influence between Dual System Education on ICT Mastery of Vocational High School students.
3	X1 → Y (Religious Islamic Education → Competitiveness of Graduates)	0,243	3,012	0,003	H_0 was rejected, H_1 was accepted	There was a direct positive and significant influence between Religious Character Education on the Competitiveness of Vocational High School Graduates.
4	X2 → Y (Dual System Education → Competitiveness of Graduates)	0,209	2,390	0,017	H_0 was rejected, H_1 was accepted	There was a positive and significant direct influence between Dual System Education on the Competitiveness of Vocational School Graduates.
5	X3 → Y (ICT → Competitiveness of Graduates)	0,288	3,628	0,014	H_0 was rejected, H_1 was accepted	There is a positive and significant direct influence between ICT Mastery and the Competitiveness of Graduates.

The results of the analysis of hypothesis 1 in the table above showed that religious character education (X1) had a positive and significant influence on ICT mastery (X3) of vocational high school students with a path coefficient value of py1 of 0.270 and a calculated T of 3.860, a p-value of 0.000 because the calculated T value (3.860) ≥ 1.96. Therefore, the decision H_0 was rejected and H_1 was accepted.

The calculation results for hypothesis 2 showed a direct and significant influence of Dual System Education (X2) on ICT Mastery (X3) with a path coefficient value of py2 of 0.389, a p-value of 0.000 and a calculated T of 6.393. Because the calculated T value (6.393) ≥ 1.96, the decision H_0 was rejected and H_1 was accepted.

The results of the calculation of hypothesis 3 indicated that there is a direct effect of religious character education (X1) on the competitiveness of vocational high school graduates (Y) with a path coefficient value of py1 of 0.243 and a calculated T of 3.012, a p-value of 0.003. Because the calculated T value (3.012) ≥ 1.96, the decision H_0 was rejected and H_1 was accepted. This can be interpreted as meaning that religious character values contribute to the competitiveness of vocational high school graduates, for example in terms of work ethics, honesty, and responsibility.

The results of the calculation of hypothesis 4, there iwa a direct and statistically significant effect of Dual System Education (X2) on the competitiveness of vocational high school graduates (Y) with a path coefficient value of py2 of 0.209 and a calculated T of 2.390, a p-value of 0.017. Because the calculated T value (2.390) ≥ 1.96, the decision H_0 was rejected and H_1 was accepted. With a positive path coefficient (0.209), it can be concluded that the better the implementation of dual education systems such as PKL or industrial internships, the higher the competitiveness of vocational high school graduates, both in terms of work skills, mental readiness, and professional discipline.

The results of the calculation of Hypothesis 5 indicated that there was a direct and statistically significant effect of ICT Mastery (X3) on the Competitiveness of Vocational High School Graduates (Y) with a path coefficient of py3 of 0.288 and a calculated T of 3.628, with a p-value of 0.014. Because the calculated T value (3.628) ≥ 1.96, the decision H_0 was rejected and H_1 was accepted. The calculated t value = 3.628 (≥ 1.96) and p-value = 0.014 (< 0.05) indicated that the effect was statistically significant. The path coefficient of 0.288 indicates that the higher the ICT mastery, the higher the competitiveness of vocational high school graduates. This means that digital literacy played a crucial role in students' job readiness in the modern industrial era.

The calculation of the path (mediation) results is shown in the following data:

Table 8. Results of the Indirect Effect (Mediation) Test

NO	Path of Influence	Coefficient Path (β)	t-Values	p-Value	Hypothesis Decision	Interpretation
1	X1 → X3 → Y (Religious → ICT → Competitiveness of Graduates)	0,078	2,466	0,014	H_0 was rejected, H_1 was accepted	There was a positive and significant indirect effect, indicating that X3 significantly mediates the effect of X1 on Y.
2	X2 → X3 → Y (Dual System Education → ICT → Competitiveness of Graduates)	0,112	3,061	0,002	H_0 was rejected, H_1 was accepted	There was a positive and significant indirect effect, indicating that X3 significantly mediates the effect of X2 on Y.

The calculation results of hypothesis 6 (point 1) in the table above showed a positive and significant indirect effect of religious character education on ICT Mastery through ICT Mastery of 0.078 with a calculated T value of (2.466), a p-value of 0.014. Because the calculated T value (2.466) was greater than 1.96, the decision H_0 is rejected and H_1 is accepted. These results indicate a significant mediating effect of students' religious character values that encourage them to master ICT, and this had an impact on increasing competitiveness.

The calculation results of hypothesis 7 (point 2) showed that the path coefficient (mediation) indicated a positive and significant indirect effect of Dual System Education (X2) on the Competitiveness of Vocational High School Graduates (Y) through ICT Mastery (X3) of 0.112 with a calculated T value of (3.061), a p-value of 0.002. Because the calculated T value (3.061) is greater than 1.96, the decision H0 is rejected and H1 is accepted.

Based on the results of testing the 7 (seven) hypothetical paths involving direct and indirect influence between latent variables, it can be concluded that all influence paths were statistically significant at the 5% significance level ($p < 0.05$). This indicated that the relationship between: Religious Character Education (X1), Dual System Education (X2), and Mastery of Information and Communication Technology (ICT) (X3/Z) had a significant contribution to increasing the Competitiveness of Vocational High School Graduates (Y). Specifically, the ICT Mastery variable (X3), which acted as an intervening (mediating) variable, proved significant in strengthening the relationship between Religious Character Education (X1) and the Competitiveness of Vocational High School Graduates and the Dual Education System (PSG) and the Competitiveness of Vocational High School Graduates. It can be said that ICT mastery is a crucial link that expands the influence of religious character and students' practical experience on their readiness and competence in facing the world of work. This finding strengthens ICT's position as a catalyst for the competitiveness of vocational high school graduates in the digital era.

Qualitative Data Analysis

The conclusions drawn are not final from the outset, but are continually verified through data review, consistency between sources, and linkages with quantitative findings, resulting in valid, credible, and meaningful qualitative findings. Qualitative data were obtained from interviews, observations, and documentation. The data analysis technique utilized four types of visualizations that complemented each other in depicting the complexity of the data. The Project Map serves as a macro framework that displays relationships between variables and causal flows, while the Treemap emphasizes the dominance of themes based on the number of references. The Sunburst Chart outlines the hierarchical structure of themes down to the code level, and the Word Cloud captures the strength of informants' perceptions in natural language. These four elements synergistically form a comprehensive picture of the competitiveness of vocational school graduates based on Religious Character Education, Dual System Education, and ICT Mastery. More details were in the following figure:

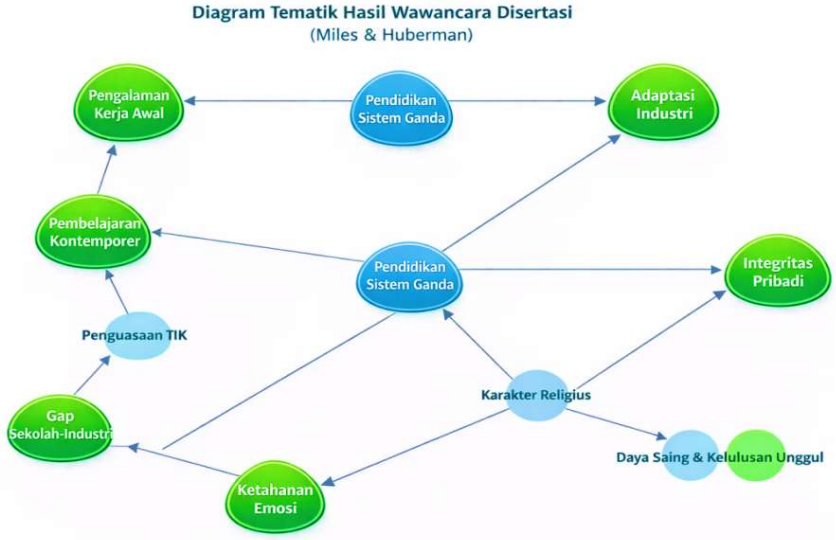

Figure 1. Thematic diagram of the relationships between themes from interviews.
Source: primary data, processed by researchers, 2025).

The results of this analysis are visualized in a following Project Map :

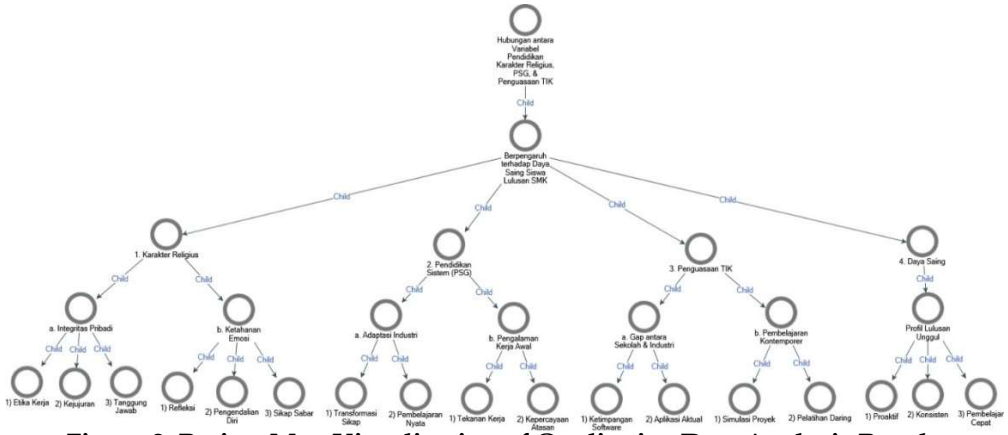

Figure 2. Project Map Visualization of Qualitative Data Analysis Results

Thematic Treemap Visualization

To understand the dominant themes from the interview results, a treemap visualization of the thematic coding results from NVivo 15 was used. The treemap displays the distribution of data proportions based on the number of references, indicating the thematic focus of the informants. For more details, see the following image:

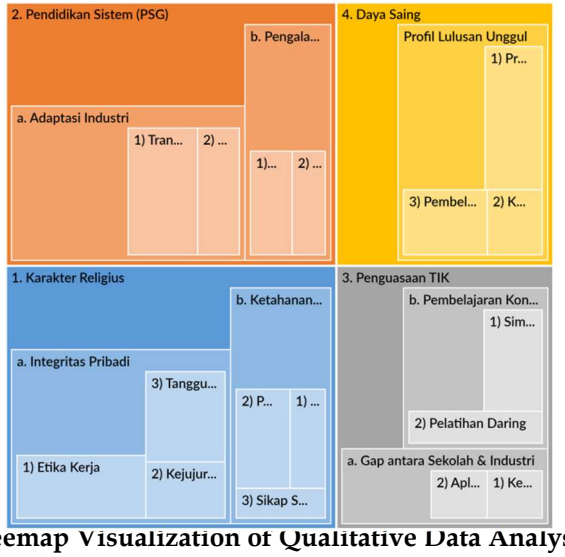

Figure 3. Treemap Visualization of Qualitative Data Analysis Results

Source: Results of qualitative data analysis using Nvivo 15 software (primary interview data, processed by researchers, 2025)

The treemap showed that Dual System Education (PSG) was the most dominant theme, demonstrating the importance of industrial practice experience in shaping graduates' work readiness. The largest subthemes, such as Industry Adaptation and Early Work Experience, demonstrated that real-world experience was far more meaningful than classroom theory. Furthermore, the Religious Character theme, such as Work Ethic and Honesty, also appears large, confirming that moral aspects and integrity are valued by the industry. ICT Mastery, although slightly smaller in visual scope, still appears strongly in Project Simulation and Online Training, indicating that digital competency was an important complementary dimension in graduates' work readiness.

Sunburst Chart Visualization (Thematic Hierarchy and Proportion)

The Sunburst Chart visualization is used to show the relationships between coded themes and subthemes in a radial hierarchy. This diagram combines two dimensions: structure and proportion. For more details, see the following image:

Figure 4. Sunburst Chart Visualization of Qualitative Data Analysis Results
Source: Results of qualitative data analysis using Nvivo 15 software (primary interview data, processed by researchers, 2025)

The Sunburst Chart results showed that: 1) The Religious Character theme has many branches with a fairly even distribution, indicating that character is cited not only in a moral context, but also in work resilience, emotions, and habits. 2) The PSG theme is very prominent in the Attitude Transformation branch. 3) The ICT theme showed a two-branch structure: the Technology Gap and online learning. It is explained that students who are able to conduct online project simulations tend to be better prepared to adapt to digital work systems.

Word Cloud Visualization (Informants' Natural Language)

The Word Cloud reveals the dominant perceptions emerging in the informants' natural language. Figure 5 shows that words such as "work," "graduate," "character," "student," and "religious" appear large, indicating they are frequently mentioned and are a primary focus in the informants' narratives. More details can be seen in the following figure:

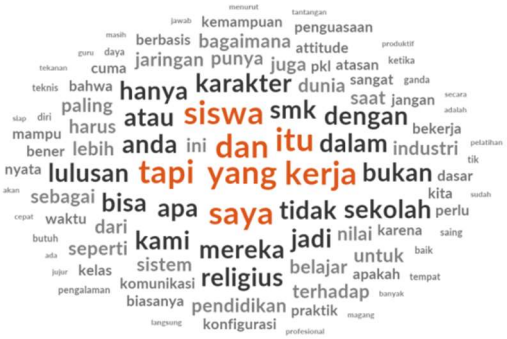

Figure 5. World Cloud Visualization of Qualitative Data Analysis Results
Source: Results of qualitative data analysis using Nvivo 15 software (primary interview data, processed by researchers, 2025)

Words such as "work" and "graduate" indicate an orientation toward job readiness, while "character" and "religious" indicate that moral and spiritual dimensions remain prominent in vocational education practices, particularly in faith-based vocational high schools. Informants assessed that the job readiness of

vocational high school graduates is determined not only by technical skills but also by the development of a strong religious character.

Statistical analysis results indicated that PSG has the greatest influence on competitiveness, but in-depth interviews revealed that the cultivation of religious character and mastery of ICT were determinants of stable work attitudes and efficiency in the workplace. Religious character education played not only a moralistic role but also a strategic role as a driver of intrinsic motivation, while mastery of ICT serves as a form of adaptive work skills that strengthen students' readiness to face the challenges of work in the digital era.

Discussion

This finding can be explained through the Character Education Theory by Thomas Lickona (dalam Alam & Ogawa, 2024; Rohman et al., 2023), which stated that character is not just knowledge of values, but that character education is a conscious effort to help individuals understand, love, and practice good moral values, such as honesty, responsibility, and respect. Prasetyo and Trisyani (dalam Arthur, 2024; Julaiha, 2025) explains that digital literacy is the main key to vocational high school students' job readiness in the Industry 4.0 era, as it encompasses the ability to think digitally, collaborate online, and learn independently through online platforms. From a learning perspective, Anderson and Garrison (dalam Khoir et al., 2023; Nurbayan et al., 2022) also emphasized that independence in e-learning is a hallmark of the modern workforce and a crucial indicator for developing competitiveness through sustainable ICT literacy. From a global policy and education perspective, UNESCO's ICT Competency Framework for Teachers emphasized that ICT proficiency must be transformed into the ability to manage information, solve problems, and support work productivity, rather than simply technical skills.

Quantitative results from SEM-PLS (Structural Equation Modeling-Partial Least Squares) data processing indicated that all variables have a significant direct influence on competitiveness. PSG was the most dominant variable directly ($\beta = 0.209$) and also through ICT proficiency as a mediator ($\beta = 0.112$). ICT proficiency itself acted as a highly significant connecting variable ($\beta = 0.288$), while religious character education ($\beta = 0.243$) also demonstrated a significant influence on work readiness. Quantitative findings provided statistical evidence that the three independent or exogenous variables (X_1, X_2, X_3) contributed to the competitiveness of vocational high school graduates (Y) (Dependent or Endogenous Variable). While qualitative findings explained the mechanism and context of the relationship between variables that religious character instills basic work values, PSG provided concrete experiences that shape work habits, and ICT mastery enabled students to adapt to the digital workplace. Triangulation of this method showed consistency of meaning across approaches and strengthens the structural and thematic validity of the findings.

Religious character themes such as work ethic and honesty also feature prominently, confirming that morals and integrity are valued dimensions in the industry. This aligned with Lickona's theory of Character-Based Employability, which emphasizes the importance of honesty, responsibility, and work ethic as

personal competitive forces (Pike et al., 2024; Surasman, 2025). This finding also confirmed the study from Alam & Ogawa (2024); Mcguire & Mcguire (2025) which stated that the inculcation of religious values in vocational schools is positively correlated with students' discipline and responsibility during fieldwork. Religious character has many branches with a fairly even distribution, indicating that character is not only cited in a moral context, but also in work endurance, emotions, and habits. This supports the findings Erdogdu (2024); Lavasani & Khandan (2024), explained that character development in vocational students is a predictor of job success in the manufacturing and hospitality sectors. Then, the PSG theme (Bell, 2024; Kong, 2024; Salinas-Navarro et al., 2024) This is particularly prominent in the Attitude Transformation branch, consistent with Kolb's Experiential Learning theory, which stated that direct experience produces more profound attitudinal changes than theoretical learning. The students who underwent PSG were more resilient to stress and more adaptable in the real world of work.

Furthermore, the ICT theme demonstrated a two-pronged structure: the Technology Gap and online learning. It explained that students who are able to conduct online project simulations tend to be better prepared to adapt to digital work systems. This was further supported by the findings of Alam & Ogawa (2024); Cristian (2025), which stated that ICT skills are highly correlated with self-directed learning and work motivation in the context of Chinese vocational schools based on PISA data. Liu (2025); Liu et al. (2025) assessing the job readiness of vocational high school graduates was determined not only by technical skills but also by the development of a strong religious character. Vocational high school students who practiced religious practices daily tend to be better prepared to face work pressure and are more loyal to their companies.

Meta-inference reveals that graduate competitiveness is not shaped by a single factor, but rather by a synergistic combination of religious character education, industrial internship experience (IPE), and ICT mastery. These three factors complemented each other in shaping graduates who were work-ready, adaptable, and possess integrity. When students are accustomed to being honest, responsible, and consistent in their practical assignments at school, they have entered the "doing the good" stage, which involved applying character values in the form of professional habits that are carried into the workplace. This demonstrated that religious character education had not only a spiritual but also a functional impact on the competitiveness of vocational high school graduates. This finding can be explained through David Kolb's Experiential Learning Theory, which stated that effective learning occurs through a cycle of real-life experience, reflection, conceptual understanding, and reapplication. In the context of dual education systems (PSG), vocational high school students undergoing fieldwork (PKL) gained concrete experience in the workplace, reflect on it, and then develop a new understanding of professional values such as discipline and responsibility.

This study reinforced Thomas Lickona's theory of character education, particularly the values of honesty, responsibility, and hard work. These values

were not only a moral domain in vocational high school learning but also proven to be applicable in the workplace. Findings from teacher and industry informants indicated that religious character instilled through contextual learning significantly contributes to the professional work ethic of vocational high school graduates. This confirmed that character education is not merely normative, but operational in a vocational context. This study contributed to the development of an integrative model that positions religious character education as a foundation of values that work through ICT mastery in increasing the competitiveness of vocational high school graduates. Using a mixed methods approach, this study did not only examine the relationships between variables but also explained the mechanisms by which religious values transform into competitive advantage. Theoretically, this study expanded the theory of religious character education by demonstrating that religious values are not limited to the affective domain but have structural implications for the development of 21st-century competencies. Thus, this study constituted a theoretical extension that connected the theory of religious character education with the theory of digital competency and human resource competitiveness.

CONCLUSION

In this study, meta-inference reveals that graduate competitiveness is not shaped by a single factor, but rather by a synergistic combination of religious character education, industrial practice experience (PSG), and ICT mastery. All three complement each other in shaping the profile of graduates who are work-ready, adaptive, and possess integrity. This finding expanded the scope of character education theory (Lickona) and experiential learning (Kolb), and reinforces the findings of international research on ICT literacy in student work readiness by Zhang et al. Religious character education in this study plays not only a moralistic role but also a strategic driver of intrinsic motivation, while ICT mastery serves as a form of adaptive work skill that strengthens students' readiness to face work challenges in the digital era. Productive teachers, graduates, and IDUKA (Indonesian Industrial Association) revealed that religious values such as honesty and responsibility are not only moral norms but also the foundation of a professional work ethic formed during work practice. PSG is seen as a medium for transforming attitudes through direct experience in the field, while ICT mastery is viewed as a critical 21st-century competency, reflecting not only technical skills but also independent learning, work flexibility, and operational efficiency, which are highly valued in the industrial world.

This research had implications for extending Lickona's theory of moral knowing, moral feeling, and moral action to the realm of vocational education. Conceptually, the influence of religious character education on competitiveness was not only moralistic, but also strategic because it provides intrinsic motivation for students to work consistently, responsibly, and develop autonomously. The context of this study indicated that ICT literacy is emerging as a determinant of adaptability and work efficiency, not just the ability to use

applications. Future research was expected to strengthen the integration of religious character values in industry-based curricula (not only technically but also mentally) and expand access to project-based ICT training.

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