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Technology-Driven Digital Marketing Strategies and their Impact on E-commerce Purchase Decisions

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Abstract. The rapid growth of internet penetration and digital platforms has transformed marketing practices in Indonesian Vocational Training Centers (LPKs). However, inconsistent outcomes in trainee recruitment highlight a gap in understanding the effectiveness of digital marketing in this context. This study aims to examine the effect of digital marketing on purchase intention, with consumer engagement as a mediator and consumer trust as a moderator. Data were collected from 384 trainees in East and West Java using online surveys and analyzed with Structural Equation Modeling–Partial Least Squares (SEM-PLS 4.0). The structural model explained 62.1% of the variance in purchase intention (R^2 = 0.621). Digital marketing significantly influenced purchase intention (β = 0.455, $p < 0.001$), and consumer engagement partially mediated this relationship (β = 0.217, $p < 0.001$). In contrast, consumer trust did not moderate the relationship (β = 0.054, p = 0.055). These findings advance digital marketing system development in the education sector by highlighting the role of engagement-driven strategies over trust-building mechanisms during initial recruitment stages. The implications are aligned with Sustainable Development Goal (SDG) 9 on industry, innovation, and infrastructure, suggesting that localized and technology-driven approaches are essential for strengthening LPK competitiveness and sustainable labor mobility.

Keywords: digital marketing, consumer engagement, consumer trust, purchase intention, e-commerce technology, digital platforms, SDG 9, structural equation modeling

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1. Introduction

The expansion of digital infrastructure and online platforms has transformed how organizations manage interactions with potential users [1]. In Indonesia, vocational training centers (LPKs) serve as critical intermediaries in preparing workers for overseas employment, especially in Japan [2]. Despite widespread reliance on digital channels such as social media, websites, and e-commerce-like enrollment platforms, inconsistent outcomes remain. While some LPKs report rapid growth in applications, others face declining enrollment despite similar marketing strategies [3]. This divergence indicates gaps not only in communication strategies but also in the design, adoption, and utilization of digital systems to support sustainable labor mobility [4], [5].

Prior studies have established the influence of digital marketing on consumer behavior in sectors such as banking and retail [6], [7], [8]. However, these works are largely descriptive and focused on consumer psychology rather than the system-level integration of technology. Literature on digital transformation and e-commerce platforms emphasizes infrastructure readiness, platform usability, and trust-building mechanisms [9], [10], yet little has been explored in the context of vocational training systems. This underlines the need to shift the research perspective from purely behavioral explanations toward an integrated analysis of how digital infrastructures enable user engagement and decision-making [11], [12].

From a theoretical perspective, digital marketing refers to the integration of information technology into marketing practices through online presence, social media interaction, and platform-based enrollment [9]. Consumer trust functions as an evaluative mechanism reflecting perceptions of reliability and transparency in digital interactions [11], [13]. Consumer engagement, meanwhile, reflects active participation behaviors such as sharing, commenting, and interaction, which are crucial for building long-term user relationships [14], [15]. Purchase intention in this study is defined as the willingness of trainees to enroll in LPK programs, influenced by both engagement and trust in the system [10], [14], [16]. These constructs are well-documented in consumer research but remain under-investigated in the vocational training sector, where digital platforms play both marketing and infrastructural roles.

This study addresses three gaps. First, it integrates marketing constructs with a systems-engineering perspective, positioning digital marketing as part of digital infrastructure rather than solely a promotional activity. Second, it introduces the role of consumer engagement and trust within the context of platform-based vocational training services, highlighting how these constructs interact with technological adoption. Third, it contributes to discussions on Sustainable Development Goal (SDG) 9 by linking digital system development with innovation and infrastructure for education-to-employment pathways [2], [8]. The novelty lies in extending theories of engagement and trust into the digital system design of training organizations, thereby advancing knowledge in digital transformation, e-commerce system adoption, and labor mobility infrastructure.

Previous research across industries confirms that digital marketing positively influences purchase intention [6] [7] [8] [17] [18] [19]. Therefore:

H1: Digital marketing has a positive and significant effect on the purchase intention of LPKs in East Java and West Java.

H1a: Digital marketing has a positive and significant effect on the purchase intention of LPKs in East Java.

H1b: Digital marketing has a positive and significant effect on the purchase intention of LPKs in West Java.

Engaging social content improves involvement and strengthens intention to purchase [8], [20]. Engagement acts as a psychological bridge transforming exposure into action [21], [22], [23]. Thus:

H2: Consumer engagement significantly mediates the relationship between digital marketing and purchase intention in LPKs in East Java and West Java.

H2a: Consumer engagement significantly mediates the relationship between digital marketing and purchase intention in LPKs in East Java.

H2b: Consumer engagement significantly mediates the relationship between digital marketing and purchase intention in LPKs in West Java.

Trust moderates digital marketing effectiveness in several sectors [8] [24] [25] [26]. Its role in fostering engagement is especially relevant where trust in online channels varies. Therefore:

H3: Consumer trust significantly moderates the relationship between digital marketing and consumer engagement in LPKs in East Java and West Java.

H3a: Consumer trust significantly moderates the relationship between digital marketing and consumer engagement in LPKs in East Java.

H3b: Consumer trust significantly moderates the relationship between digital marketing and consumer engagement in LPKs in West Java.

2. Methods

2.1. Research Design

This study adopted a quantitative approach under the positivist paradigm, which emphasizes empirical observation and hypothesis testing. A cross-sectional survey design was chosen because the data were collected at a single point in time. Structural Equation Modeling using Partial Least Squares (PLS-SEM) was applied for data analysis. PLS-SEM was selected instead of covariance-based SEM because it is more suitable for prediction-oriented studies, complex models with multiple constructs, and data that may not be normally distributed [8].

2.2. Population and Sampling

The study population consisted of vocational training center (LPK) trainees who were active social media users and expressed interest in overseas employment programs in Japan. Using an online sample size calculator with a 95% confidence level and a 5% margin of error, the required minimum sample size was 384 out of an estimated 126,197 trainees. A purposive and convenience sampling method was used. Recruitment was conducted in collaboration with LPK administrators, who distributed the survey link to trainees through institutional social media groups and official communication channels. Inclusion criteria were: (1) age 18 years and above, (2) active user of at least one major social media platform, and (3) follower of the official LPK account. Respondents who did not meet these criteria were excluded. Ethical clearance for the study was obtained from the Research Ethics Committee. All participants were informed of the study objectives, voluntary nature of participation, and data confidentiality. Informed consent was obtained electronically before respondents could access the questionnaire. No personal identifiers were collected, ensuring anonymity and compliance with ethical research standards.

2.3. Data Collection Procedures

Primary data were collected in June 2025 using an online questionnaire distributed via Google Forms. Before the main survey, the instrument was reviewed by three academic experts and industry practitioners to establish content validity. A pilot test was then conducted with 30 respondents to ensure clarity, consistency, and reliability of the items. Feedback from the pilot was used to refine the wording of several survey items. The final instrument contained measures adapted from Otopah et al. [8] and other validated sources. Secondary data from academic papers, government reports, and official websites were also used to support interpretation.

2.4. Data Validity and Reliability

Construct validity was assessed through outer loadings, Average Variance Extracted (AVE), and Heterotrait-Monotrait Ratio (HTMT). Internal consistency was evaluated using Cronbach's Alpha and Composite Reliability (CR), with thresholds above 0.70 considered acceptable [27]. These measures ensured that the constructs of digital marketing, consumer engagement, consumer trust, and purchase intention were both valid and reliable for subsequent analysis.

2.5. Multi-group Analysis (MGA)

Multigroup Analysis was conducted to examine the differences between geographic locations in the structural model as data were gathered from two provinces, West Java and East Java. SmartPLS 4.0 was used to ascertain whether path coefficients, indirect effects, and total effects significantly differed between the groups. MGA is best applied when the moderating variable is categorical and is hypothesized to influence all structural relationships in the SEM model.

2.6. Robustness Test

The robustness of the structural model was examined by testing for endogeneity, non-linear effects, and unobserved heterogeneity using SmartPLS 4.0. Tests were conducted to verify the validity of the results under varying analytical assumptions and to see if there exists any predictor-error correlations or latent data segments' bias [8].

3. Results and Discussion

3.1 Result

The process of collecting data was conducted in June 2025 by conducting a survey in the form of a questionnaire distributed using Google Forms to training attendees who were undergoing LPKs in East Java and West Java. A total of 384 valid responses were analyzed, consisting of 225 respondents from West Java and 159 from East Java. The demographic profile showed that most respondents were male (68%), single (97%), and high school graduates (97%). Given the descriptive focus of this data, only a summary table is presented here (Table 1), while the detailed breakdowns are provided.

Table 1. *Demographics of Respondents*

Description	Category	Number (n)	%
Gender	Male	262	68
	Female	124	32
Age	19	176	46
	20-24	169	44
	25-29	37	9
	30-34	2	1
Marital status	Single	374	97
	Married	10	3
Education	SMK/SMA	372	97
	D1	2	0.5
	D3	4	1
	D4	2	0.5
	S1	4	1
Income	< Minimum wage	36	9
	= Minimum wage	15	4
	>Minimum wage	7	2
	No Income	331	85
Training Location	East Java	159	41
	West Java	225	59

Note(s): N=384; SMK =Vocational High School; SMA: High School; D1=Diploma (1 year program); D3= Diploma (3 years program); D4= Diploma (4 years program); S1= Undergraduate

Table 1 presents the demographic profile of the respondents. The data show that the majority of participants were male (68%) and predominantly single (97%), with most being high school or vocational school graduates (97%). Age distribution was concentrated between 19–24 years (90%), reflecting the youth-dominated nature of LPK trainees. Geographically, 59% of respondents were from West Java and 41% from East Java. These demographics are consistent with the typical profile of trainees seeking overseas employment opportunities through vocational training centers.

3.1.1 Outer Model

Convergent validity was established as all indicators met recommended thresholds, with factor loadings above 0.60 and AVE above 0.50, except for one item (PI-West Java AVE = 0.486), which was retained due to high composite reliability (CR = 0.868). Discriminant validity was confirmed through HTMT values below 0.90, and reliability was satisfied with Cronbach's Alpha and CR above 0.70. These results indicate that the measurement items for digital marketing, consumer engagement, consumer trust, and purchase intention were valid and reliable constructs for further analysis.

Table 2. Convergent Validity & Reliability

Var	Items	East Java (n=159)			West Java (n=225)			Full Set (n=384)		
		AVE	CA	CR	AVE	CA	CR	AVE	CA	CR
DIGIT	SMM	0.693	0.888	0.918	0.538	0.785	0.853	0.652	0.866	0.903
	CT	0.719	0.922	0.939	0.587	0.860	0.895	0.683	0.907	0.928
	CE	0.675	0.904	0.925	0.522	0.820	0.867	0.581	0.858	0.892
	PI	0.674	0.919	0.935	0.486	0.824	0.868	0.592	0.885	0.910

Source(s): Processed data by authors, SmartPLS 4.0 (2025)

Note(s): DIGIT= Digital Marketing; SMM= Social Media Marketing; CE= Consumer Engagement; CT= Consumer Trust; CA=Cronbach's Alpha; CR=Composite Reliability

Table 2 summarizes the results of convergent validity and reliability testing across East Java, West Java, and the full dataset. All constructs exceeded the recommended thresholds, with AVE values mostly above 0.50 and CR values exceeding 0.70, confirming internal consistency. Although the AVE for Purchase Intention in the West Java subset was slightly below the threshold (0.486), it was retained due to adequate composite reliability (0.868). These results validate the adequacy of the measurement model.

Table 3. Heterotrait-Monotrait ratio of correlations

Full Set (n=384)			
Variables	DIGIT	CE	PI
DIGIT			
CE	0.765		
PI	0.832	0.776	
CT	0.892	0.651	0.863
East Java (n=159)			
Variables	DIGIT	CE	PI
DIGIT			
CE	0.762		
PI	0.863	0.840	

CT	0.856	0.681	0.844
	West Java (n=225)		
Variables	DIGIT	CE	PI
DIGIT			
CE	0.776		
PI	0.733	0.707	
CT	0.894	0.588	0.832

Source(s): Processed data by authors, SmartPLS 4.0 (2025)
Note (s): DIGIT= Digital Marketing; CE= Consumer Engagement; PI= Purchase Intention; CT = Consumer Trust.

Table 3 reports the discriminant validity of constructs using the HTMT ratio. All values were below the 0.90 threshold, indicating sufficient discriminant validity among digital marketing, consumer engagement, consumer trust, and purchase intention. The results were consistent across East Java, West Java, and the combined sample, confirming that each construct was empirically distinct.

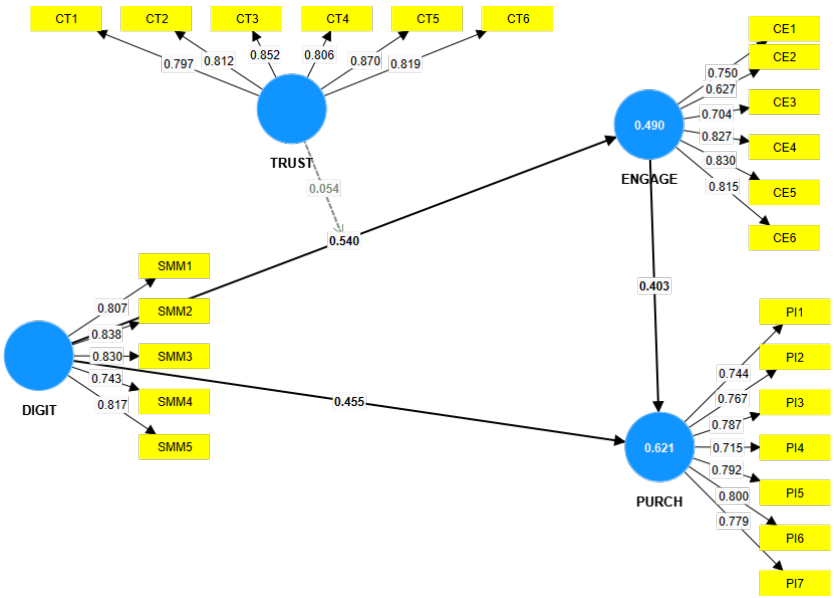

Figure 1. Output of Outer Model on SmartPLS 4.0. (2025)

Figure 2 displays the results of the outer model assessment generated using SmartPLS 4.0. The diagram shows the factor loadings of observed variables on their respective constructs, with most values exceeding the acceptable threshold of 0.70. This visualization confirms the validity and reliability of the measurement model.

3.1.2 Inner Model

The inner model was examined through SmartPLS 4.0 to evaluate structural relationships among constructs on the basis of R^2, Q^2, effect size (f^2), and path coefficients as the evaluation measure. For the East Java sample, Digital Marketing and Consumer Trust collectively explained 53.7 percent of variance in Consumer Engagement and 72.6 percent of variance in Purchase Intention. For the West Java sample, explanatory power was lower at 42.5 percent and 46.7 percent variance, respectively. The full dataset revealed high predictive accuracy, with R^2 values of 0.49 for Engagement and 0.621 for Purchase Intention. All Q^2 values exceeded zero, indicating strong predictive relevance of the model.

Effect size analysis indicated medium to large effects of Digital Marketing for both Engagement (f^2 = 0.209) and Purchase Intention (f^2 = 0.29). Consumer Engagement moderately affected Purchase

Intention ($f^2 = 0.227$). Consumer Trust had a small effect on Engagement ($f^2 = 0.035$) and no moderating effect ($f^2 = 0.012$). The structural model indicated higher strengths of relationships in the East Java sample, which might suggest regional differences in consumer behavior.

Bootstrapping analyses verified the significance of all the direct and indirect paths. Hypothesis 1 (Digital Marketing → Purchase Intention) was verified across all samples, including the whole dataset ($\beta = 0.455$, $t = 7.001$, $p < 0.001$). Hypothesis 2 (Digital Marketing → Engagement → Purchase Intention) was also verified across all samples ($\beta = 0.217$, $t = 7.575$, $p < 0.001$). However, Hypothesis 3, where Consumer Trust was postulated as a moderator, failed to be supported in the whole sample ($\beta = 0.054$, $t = 1.916$, $p = 0.055$), showing that trust may have no influence on initial involvement but can potentially be relevant at subsequent stages such as customer loyalty.

Amongst the six demographic variables that were input, geographic location remained significant at a statistical level in determining Purchase Intention ($p = 0.003$), in favor of context at a regional level compared to individual demographic attributes.

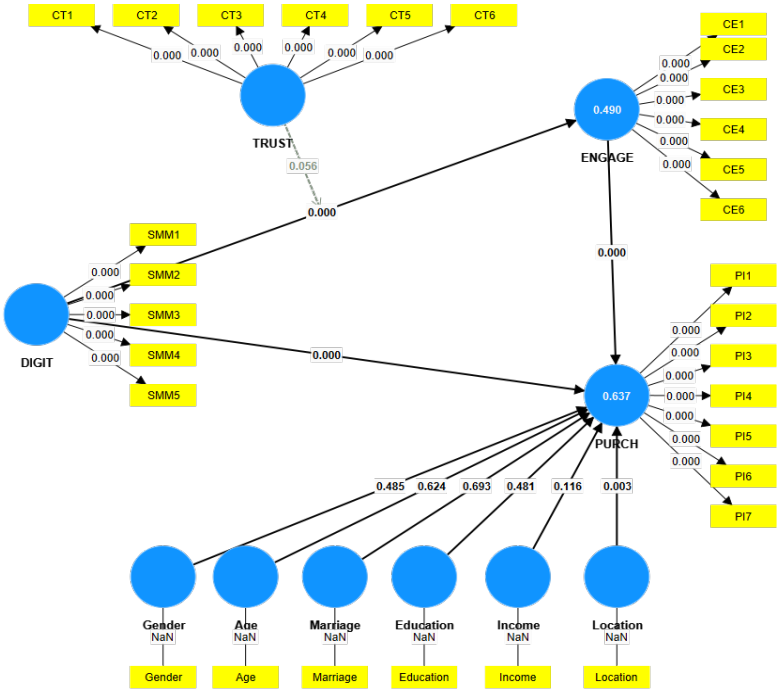

Figure 3. Output Path Coefficient Test with Demographic Variables, SmartPLS 4.0 (2025)

Figure 3 presents the path coefficient testing results, incorporating demographic control variables. The model demonstrates significant relationships between digital marketing, consumer engagement, and purchase intention. Among the demographic factors, only geographic location emerged as statistically significant ($p = 0.003$), underscoring the importance of regional context in shaping purchase intention.

3.1.3 Multi-group Analysis

Multigroup Analysis (MGA) was conducted using SmartPLS version 4.0 to test structural path coefficients between respondents of East Java and West Java. The non-parametric bootstrapping test was applied with the $p < 0.05$ or $p > 0.95$ significance.

No statistically significant differences for either of the hypothesized relationships were found between the two regions:

Digital Marketing → Purchase Intention: $\Delta = 0.081$; $p = 0.546$

Digital Marketing → Engagement → Purchase Intention: $\Delta = 0.017$; $p = 0.801$

Trust × Digital Marketing → Engagement: $\Delta = 0.001$; $p = 0.985$

These findings validate that the structural model works soundly over both provincial samples, suggesting regional context does not significantly impact the relationships between the primary constructs.

3.1.4 Robustness Test

For the sake of testing the reliability of the structural model, robustness testing was conducted by evaluating three essential dimensions: nonlinear effects, endogeneity, and unobserved heterogeneity. Nonlinearity was tested using the Quadratic Effect (QE) method. The analysis did not reveal any substantial nonlinear relationships between Digital Marketing and Purchase Intention ($p = 0.274$) or between Consumer Engagement and Purchase Intention ($p = 0.441$), and thus testifying to the sufficiency of linear modeling for such constructs [Table 4.].

Endogeneity was tested via the Gaussian Copula method with 5,000 bootstrapping samples [Table 5.]. Endogeneity in the Digital Marketing variable was identified by p-values of 0.025 in Model 1 and 0.012 in Model 3 (CDIGIT), suggesting dependence on the error terms of the dependent variables. Consumer Engagement did not prove endogeneity, as indicated by the p-value of 0.965 in Model 2 (CENGAGE). Unobserved heterogeneity was determined by using the FIMIX-PLS methodology. Fit indicators like AIC, CAIC, BIC, and MDL5, and entropy (EN) were utilized for model selection [Table 6.]. The optimal solution was three latent segments on the basis of the lowest CAIC and reasonable entropy score of 0.592. This suggests that there is heterogeneity present but it is small and acceptable. Overall, the robustness tests confirm that the structural model is statistically stable and sound and fit for use in interpreting Digital Marketing, Consumer Engagement, and Purchase Intention relationships in vocational training institutes (LPKs).

Table 4. Nonlinearity Test Results

Nonlinear Relationship (n=384)	**β**	**t**	**p**
QE (DIGIT) → PURCH	-0.048	1.093	0.274
QE (ENGAGE) → PURCH	0.058	0.771	0.441

Source(s): Processed data by Authors, SmartPLS 4.0 (2025)
Note(s): β= Beta Coefficient; t= t-statistics, p= p-value

Table 4 provides the results of nonlinearity testing using the Quadratic Effect method. The analysis revealed no significant nonlinear relationships between digital marketing and purchase intention ($p = 0.274$) or between consumer engagement and purchase intention ($p = 0.441$). These results indicate that linear modeling was sufficient for the constructs analyzed in this study.

Table 5. Endogeneity Test Results

Test (n=384)	***Construct***	***Path Coefficient***	***p-value***
Gaussian copula model 1 (Endogen variable: *DIGIT*)	ENGAGE	0.540	0.000
	PURCH	0.763	0.000
	^{C}DIGIT	-0.299	0.025*
Gaussian copula model 2 (Endogen variable: *ENGAGE*)	PURCH	0.393	0.121
	^{C}ENGAGE	0.010	0.965
Gaussian copula model 3 (Endogen variables: *DIGIT, ENGAGE*)	ENGAGE	0.540	0.000
	PURCH	0.815	0.000
	^{C}DIGIT	-0.346	0.012*
	^{C}ENGAGE	0.188	0.431

Source(s): Processed data by Authors, SmartPLS 4.0 (2025)
Note(s): DIGIT = Digital Marketing; ENGAGE= Consumer Engagement; PURCH= Purchase Intention; ^{C}DIGIT= Copula Digital Marketing; ^{C}ENGAGE= Copula Consumer Engagement. *The endogeneities are significant when p-value < 0.05.

Table 5 shows the outcomes of endogeneity testing using the Gaussian Copula approach with 5,000 bootstraps. Results suggested potential endogeneity in the digital marketing construct (p-values = 0.025 and 0.012 in Models 1 and 3), whereas consumer engagement did not exhibit endogeneity. These findings suggest that while some bias may exist in digital marketing, the overall model remains robust and valid for interpretation.

Table 6. Unobserved Heterogeneity Test Results

Criteria	Number of Segments (n=384)				
	1	2	3	4	5
AIC	1563.329	1324.183	1256.71	1222.05	1212.698
AIC3	1570.329	1339.183	1279.71	1253.05	**1251.698**
CAIC	1597.984	1398.442	**1370.574**	1375.52	1405.773
AIC4	1577.329	1354.183	1302.71	**1284.05**	1290.698
BIC	1590.984	1383.442	1347.574	**1344.52**	1366.773
MDL5	1757.602	**1740.481**	1895.034	2082.4	2295.073
EN	0	0.863	0.592	0.61	0.651

Source(s): Processed data by Authors, SmartPLS 4.0 (2025)

Note(s): AIC: Akaike's information criterion; AIC3: modified AIC with Factor 3; AIC4: modified AIC with Factor 4; CAIC: consistent AIC; BIC: Bayesian information criterion; MDL5: minimum description length with factor 5; EN: normed entropy statistic."

Table 6 presents the results of unobserved heterogeneity testing using FIMIX-PLS. The optimal solution indicated three latent segments, supported by the lowest CAIC value and reasonable entropy (0.592). This suggests that while heterogeneity exists in the dataset, its magnitude is small and manageable. These results support the generalizability and robustness of the structural model.

3.2. Discussion of Results and Implications

The results confirm that digital marketing significantly influences purchase intention among LPKs in East Java and West Java, thereby confirming hypotheses H1, H1a, and H1b. This outcome aligns with prior studies in service industries [7], [8], [18] but diverges from findings in B2B companies in Vietnam, where digital marketing had weaker effects on purchase intention [6]. The consistency of results across the two provinces highlights the strategic relevance of online platforms for effective communication with potential trainees, regardless of regional differences.

Moreover, consumer engagement was found to mediate the relationship between digital marketing and purchase intention, supporting hypotheses H2, H2a, and H2b. This underscores that marketing efforts are more effective when they drive active consumer involvement. The finding corroborates previous research emphasizing the role of emotional and interactive engagement in enhancing the persuasiveness of digital content [20]–[23]. In the LPK context, this suggests that interactive system features such as online testimonials, virtual training demonstrations, and social media participation play a decisive role in shaping trainees' enrollment intentions.

Conversely, consumer trust did not moderate the relationship between digital marketing and engagement, leading to the rejection of H3, H3a, and H3b. Unlike findings in banking and e-commerce sectors where trust is pivotal [8], [24]–[26], trust in LPK services appears to be shaped more by offline reputation, alumni networks, and government accreditation than by online interactions. This divergence indicates that in vocational training, engagement mechanisms dominate the digital adoption process, while trust may only become relevant at later stages such as long-term retention or post-enrollment satisfaction.

Among the demographic factors tested, only geographic location had a statistically significant effect on purchase intention ($p = 0.003$). This highlights that regional setting exerts greater influence than individual attributes such as age or gender. Nevertheless, Multigroup Analysis confirmed that the structural relationships remained invariant across East and West Java, suggesting that the proposed

model is robust across contexts. Additional robustness tests confirmed linearity, minimal unobserved heterogeneity, and general stability of the model, despite some endogeneity observed in the digital marketing construct. These results justify the reliability of the structural framework for informing digital interventions in LPKs.

Compared with high-impact studies on digital transformation and e-commerce systems, this study extends the discourse by embedding vocational training within broader digital ecosystems. Ibrahim and Aljarah [26], for instance, found that social media marketing drives self–brand connection in retail, while Goel and Garg [25] showed the role of anthropomorphized virtual influencers in trust and engagement. In contrast, this study demonstrates that in training organizations, engagement mechanisms, rather than trust signals, play the central role in fostering purchase intention. This sector-specific insight enriches digital system adoption literature by showing how engagement-oriented system design is essential for workforce development platforms.

In sum, the discussion strengthens the theoretical position that digital marketing functions not merely as promotion but as part of a digital system that must prioritize user participation. Engagement-focused strategies, such as interactive features, peer sharing, and emotional resonance, have stronger impacts than generic trust-building signals in this context. These findings contribute to digital marketing and system design theory while providing practical guidance for LPK administrators to develop localized, technology-driven platforms aligned with Sustainable Development Goal 9 (Industry, Innovation, and Infrastructure).

Beyond the empirical findings, this study offers both theoretical and managerial implications. Theoretically, this study extends digital marketing research into the underexplored context of training organizations in developing markets, demonstrating that consumer engagement, rather than trust, serves as the decisive mediator linking digital platforms to purchase intention. This highlights the need for localized models that account for regional differences and shifts the emphasis from exposure to active participation. Methodologically, the application of MGA, FIMIX-PLS, and the Gaussian Copula method demonstrates rigorous approaches to handling heterogeneity and endogeneity in service-based digital research. From a managerial perspective, the findings encourage LPK administrators to prioritize interactive and emotionally resonant content, leverage high-conversion digital platforms, and tailor messages to local cultural norms. While trust was not a strong moderator at the recruitment stage, it remains critical for sustaining long-term relationships, suggesting that digital strategies should balance immediate engagement with credibility-building mechanisms to align with sustainable workforce development goals.

4. Conclusion

This study confirms that digital marketing significantly increases purchase intention in vocational training centers, with consumer engagement serving as a crucial mediating factor, while consumer trust does not act as a moderator. These findings highlight that in the Indonesian context, engagement-driven system design is more decisive than trust-building during early recruitment stages. The study contributes novelty by examining digital infrastructures in training organizations, an area that has received less attention compared to retail and finance sectors, and by situating the findings within the framework of Sustainable Development Goal 9. The unique dataset from East and West Java adds further insight into how regional differences shape digital adoption in workforce development platforms.

Despite its contributions, the study is limited by its cross-sectional design, geographic scope, and potential endogeneity in the digital marketing construct. Future research should expand to other provinces, adopt longitudinal or mixed-method approaches, and explore additional constructs such as perceived value, e-WOM, and system usability. By doing so, further studies can better capture technological dynamics and post-enrollment outcomes such as satisfaction and labor market integration. Overall, this research underscores that digital marketing should be viewed not only as a communication tool but as part of system-level engineering, guiding LPK administrators to prioritize interactive, localized, and sustainable digital strategies.

Declaration of AI and AI assisted technologies in the writing process
The authors confirm that the manuscript was prepared, written, and revised without the use of generative artificial intelligence or AI-assisted technologies. All analyses, interpretations, and written content presented in this study are the original work of the authors.

Declaration of Competing Interest
The authors state that there are no financial, professional, or personal conflicts of interest that could have influenced the research, analysis, or publication of this manuscript.

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