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The influence of training program quality, trainer quality, and training methods on overall training quality outcome provided by firms for the Japanese market

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Abstract: This study investigates the determinants of training quality outcomes in programs preparing workers for the Japanese labor market, with particular attention to training program quality, trainer quality, and training methods in the context of digital transformation and AI. Using survey data from 360 respondents, the study applies reliability testing, exploratory factor analysis, and multiple regression analysis to evaluate the relationships among key constructs. The results indicate that training program quality has the strongest positive impact on training outcomes, followed by trainer quality, while training methods show no statistically significant effect. These findings suggest that structural factors, such as curriculum design and instructor competence, remain critical, whereas methodological innovation has yet to fully translate into measurable outcomes. Importantly, the study highlights the role of governance and regulatory frameworks in shaping training effectiveness, particularly in ensuring alignment with Japanese labor standards and digital workplace requirements. The integration of AI and digital technologies presents both opportunities and challenges, requiring continuous adaptation of training systems. This study contributes to the literature by bridging vocational training theory with the sociology of economic action and digital transformation perspectives. Practical implications emphasize curriculum modernization, trainer upskilling, and policy support to enhance workforce readiness in global labor markets.

Keywords: *Artificial intelligence (AI), Business administration, Economics, Overall training quality outcome (TQO), Sociology of economics, Trainer quality (TQ), Training methods (TM), Training program quality (TPQ).*

1. Introduction

In the context of globalization and international labor mobility, the demand for high-quality vocational training has become increasingly critical, particularly for workers participating in overseas labor markets such as Japan. Japanese firms are known for their strict standards regarding technical skills, discipline, and work ethics, requiring training providers to ensure that trainees meet not only occupational competencies but also cultural and technological expectations. As a result, the quality of training programs plays a pivotal role in determining workforce readiness and employability.

Recent studies also indicate that Japanese enterprises increasingly require workers to possess not only technical competencies but also digital adaptability, teamwork capability, and intercultural communication skills in technology-intensive workplaces [1, 2].

From a theoretical perspective, training quality has been widely examined through vocational education and training (VET) frameworks, which emphasize the alignment between curriculum design,

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trainer capability, and training delivery methods [3, 4]. These frameworks highlight that effective training outcomes depend on the integration of program quality, trainer quality, and pedagogical approaches. In addition, the training transfer theory [5] suggests that the effectiveness of training is determined by the extent to which knowledge and skills are transferred to real work settings.

From a practical standpoint, the rapid advancement of digital technologies and artificial intelligence (AI) has transformed training environments. Training programs must now incorporate digital competencies, simulation-based learning, and blended learning approaches to prepare trainees for technology-driven workplaces. This is especially relevant for the Japanese labor market, where digitalization, automation, and standardized processes are increasingly prevalent.

Digital transformation has reshaped vocational training systems by promoting blended learning, AI-supported instruction, simulation-based training, and digital competency development [6, 7].

From the perspective of the sociology of economics, training quality should not be understood solely as a technical or managerial issue but also as a socially embedded process shaped by institutional norms, cultural expectations, and labor market structures [8]. In the context of training for the Japanese labor market, economic actions, such as skill acquisition, training participation, and employment outcomes, are deeply influenced by social factors, including work culture, discipline, and collective norms. Japanese firms emphasize not only technical competence but also behavioral attributes such as punctuality, teamwork, and adherence to standardized procedures. Therefore, training quality outcomes reflect the interaction between economic efficiency and social embeddedness, where both technical skills and socio-cultural adaptation are essential for successful labor integration. This perspective provides a broader analytical lens for understanding how training systems operate within global labor markets.

In Vietnam, enterprises providing training for overseas labor markets face increasing pressure to improve training quality to meet international standards. However, empirical evidence on the determinants of training quality outcomes remains limited, especially in the context of digital transformation and global labor integration.

Therefore, this study aims to examine the effects of training program quality, trainer quality, and training methods on overall training quality outcomes, providing insights for improving vocational training systems aligned with the Japanese labor market.

2. Theoretical Background and Hypothesis

2.1. Literature Review

Recent studies emphasize the importance of training quality in enhancing workforce readiness in global labor markets.

The Organisation for Economic Co-operation and Development [3] highlights that training program relevance and alignment with labor market needs are critical determinants of training effectiveness. However, the study primarily focuses on policy-level analysis rather than firm-level empirical evidence.

International Labour Organization [4] emphasizes the role of trainer quality in improving learning outcomes, particularly in vocational education systems. While the study underscores the importance of instructor competence, it does not examine the combined effects of multiple training factors.

Recent evidence further suggests that digital learning environments and technology-enhanced pedagogies significantly influence workforce preparedness and training effectiveness [9, 10].

Salas et al. [11] provide a comprehensive review of training effectiveness, demonstrating that training methods significantly influence knowledge transfer and performance. However, their study focuses on general organizational contexts rather than specific labor markets, such as Japan.

Noe et al. [12] argue that workplace learning in the twenty-first century extends beyond formal classroom-based instruction and increasingly involves informal learning, digital interaction, collaborative knowledge sharing, and technology-enabled development activities. The authors emphasize that workforce capability and organizational competitiveness are strongly influenced by continuous learning and adaptability. In the context of digital transformation and AI-supported workplaces, this perspective

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suggests that vocational training quality should incorporate not only technical instruction but also digital literacy, problem-solving ability, and continuous learning capability.

Jackson and Bridgstock [13] examine the determinants of graduate employability and emphasize that workforce readiness depends not only on technical competencies but also on communication ability, teamwork, adaptability, and practical learning experiences. Their findings suggest that experiential learning and applied training significantly improve labor market integration. However, the study mainly focuses on higher education contexts in developed economies and does not specifically address vocational training systems for international labor mobility, particularly the Japanese labor market.

UNESCO [14] emphasizes that future education and training systems should move toward flexible, technology-enabled, and lifelong learning models. The report highlights that workforce adaptability and continuous learning capability are becoming essential in rapidly changing labor markets. This perspective is particularly relevant to labor migration and international workforce mobility, where workers must adapt not only to technical tasks but also to cultural and technological changes. However, the study provides a broad conceptual perspective and does not specifically examine training quality factors in vocational enterprises.

Although prior studies examine individual aspects of training quality, few studies integrate program quality, trainer quality, and training methods simultaneously, particularly in the context of training for international labor markets such as Japan. This study addresses this gap by providing a comprehensive analysis.

Overall, prior studies confirm that training quality, trainer competence, and technology-supported learning environments significantly influence workforce readiness and employability. Nevertheless, several important gaps remain. First, most existing studies focus on higher education or general workforce development rather than vocational training systems preparing workers for international labor markets such as Japan. Second, although digital transformation and AI are increasingly emphasized in recent literature, limited empirical evidence exists regarding how these contextual changes influence training quality outcomes in labor-export enterprises. Third, previous studies often examine program quality, trainer quality, or training methods independently rather than integrating them into a unified analytical framework. Therefore, this study addresses these gaps by examining the combined effects of training program quality, trainer quality, and training methods on overall training quality outcomes in the context of digital transformation and international labor mobility.

2.2. Theoretical Background

2.2.1. Training Transfer Theory

Training transfer theory [5] explains how training inputs are transformed into workplace performance. It emphasizes the importance of training design, learner characteristics, and the work environment.

In this study, training program quality and methods are key inputs that determine how effectively trainees acquire and apply knowledge in Japanese workplaces.

2.2.2. Human Capital Theory

Human capital theory [15] suggests that investment in education and training enhances productivity and employability.

Applied to this study, high-quality training programs and competent trainers improve trainees' skills, enabling them to meet the demands of the Japanese labor market.

2.3. Hypothesis Development

H_1: Program quality positively affects overall training quality.

This hypothesis extends the VET quality literature, where curriculum relevance, responsiveness, and measurable learning outcomes are treated as core dimensions of quality. OECD and ILO reports consistently argue that future-ready VET systems must align training content with changing labor-

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market needs. In the current context, Japanese employers are increasingly operating in digitized workplaces, which means that a strong program should not only cover occupational content but also digital routines, standard operating procedures, and basic technology-enabled work practices. Accordingly, curriculum quality is expected to improve overall training quality.

H_2: Trainer quality positively affects overall training quality.

This hypothesis is grounded in VET teacher-quality research and training-transfer theory. Trainer capability shapes how knowledge is conveyed, how practice is supervised, and how trainees are prepared for real work environments. Recent systematic reviews further indicate that effective professional development among VET teachers improves instructional practice and learning transfer. In the era of digitalization and AI, trainer quality increasingly includes digital teaching competence and the ability to scaffold learning in technology-rich settings. Therefore, trainer quality is expected to have a positive effect on training quality.

H_3: Training methods positively affect overall training quality.

This hypothesis builds on Baldwin and Ford's transfer-of-training framework and subsequent systematic reviews on vocational training methods. The literature shows that active, practice-based, and context-relevant methods improve retention, transfer, and workplace preparedness. Under current labor-market conditions, particularly where Japanese firms rely on standardized routines, digital monitoring, and technology-assisted workflows, training methods need to move beyond lecture-based delivery toward simulation, structured practice, and blended modes. Hence, more effective methods are expected to raise training quality.

3. Methodology

This study adopts a quantitative research design to examine the determinants of training quality outcomes. Data were collected from 360 respondents, including trainees and stakeholders involved in training programs for the Japanese labor market. The sample size exceeds the minimum threshold recommended for multivariate analysis, ensuring statistical reliability [16, 17].

Measurement scales are developed based on established frameworks from OECD, ILO, ADB, and the Kirkpatrick [18] evaluation model. Each construct, training program quality (TPQ), trainer quality (TQ), training methods (TM), and training quality outcome (TQO), is measured using four observed variables on a five-point Likert scale (see Table 1).

Data analysis is conducted using SPSS and includes:

Reliability testing (Cronbach's Alpha): Cronbach's Alpha is used to assess the internal consistency of measurement scales. According to Nunnally and Bernstein [19], a threshold of 0.7 is acceptable, while values above 0.8 indicate high reliability. In this study, all constructs, TPQ (0.938), TQ (0.894), TM (0.898), and TQO (0.871), exceed the recommended threshold, demonstrating strong reliability. Additionally, corrected item-total correlations are all above 0.7, confirming that each observed variable contributes meaningfully to the overall construct. The absence of items requiring deletion further indicates the robustness of the measurement scales.

Exploratory Factor Analysis (EFA): EFA is conducted to evaluate construct validity and identify the underlying factor structure. The Kaiser-Meyer-Olkin (KMO) value of 0.905 indicates excellent sampling adequacy, while Bartlett's Test of Sphericity (Sig = 0.000) confirms that the data are suitable for factor analysis [16, 17]. The total variance explained (79.916%) exceeds the acceptable threshold of 50%, indicating strong explanatory power. Furthermore, all factor loadings exceed 0.7, demonstrating high convergent validity. The results confirm that the four constructs are distinct and align with the theoretical framework.

Multiple regression analysis: Multiple regression analysis is employed to examine the relationships between independent variables (TPQ, TQ, TM) and the dependent variable (TQO). The model achieves an R^2 value of 0.294, indicating moderate explanatory power. The F-test (Sig = 0.000) confirms the overall significance of the model. Multicollinearity diagnostics show that all VIF values are below 2, indicating

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no multicollinearity issues. The Durbin–Watson statistic (2.002) suggests no autocorrelation. These results confirm that the regression model satisfies key assumptions and provides reliable estimates.

This methodological approach ensures both measurement reliability and model validity, allowing for robust hypothesis testing.

Table 1.
Scales for the independent and dependent variables.

Code	Description	Sources
Training program quality (TPQ)		
TPQ1	The training curriculum aligns with job requirements in the Japanese labor market.	VET quality-assurance and training-evaluation frameworks used by ILO, OECD, ADB, and the Kirkpatrick [18] tradition
TPQ2	The curriculum is updated in a timely manner to reflect technological change, digital skill requirements, and AI-related demands from Japanese employers, ensuring relevance and accuracy.	
TPQ3	The curriculum provides a balanced combination of theory, occupational practice, and workplace skills.	
TPQ4	The expected learning outcomes are clearly defined and measurable.	
Trainer quality (TQ)		
TQ1	Trainers possess professional expertise relevant to the training content.	VET quality-assurance and training-evaluation frameworks used by ILO, OECD, ADB, and the Kirkpatrick [18] tradition
TQ2	Trainers have a practical understanding of Japanese workplaces.	
TQ3	Trainers are able to use digital technologies in teaching and assessment.	
TQ4	Trainers effectively support trainees throughout learning and practice.	
Training methods (TM)		
TM1	The enterprise uses training methods that emphasize practice and simulation of real work.	VET quality-assurance and training-evaluation frameworks used by ILO, OECD, ADB, and the Kirkpatrick [18] tradition
TM2	Training methods encourage active participation, interaction, and problem-solving.	
TM3	The enterprise appropriately combines face-to-face training with digital learning resources or platforms.	
TM4	Training assessment methods accurately reflect trainees' practical competencies.	
Overall training quality outcome (TQO)		
TQO1	The training program enables trainees to achieve the required occupational competencies.	The authors' proposal is based on expert opinion.
TQO2	After training, trainees are better able to meet job requirements in Japan.	
TQO3	Training outcomes reflect clear improvement in trainees' competencies.	
TQO4	Overall training quality meets its intended objectives.	

Next, we propose a research model (see Figure 1) based on the results of previous studies and the analyses above.

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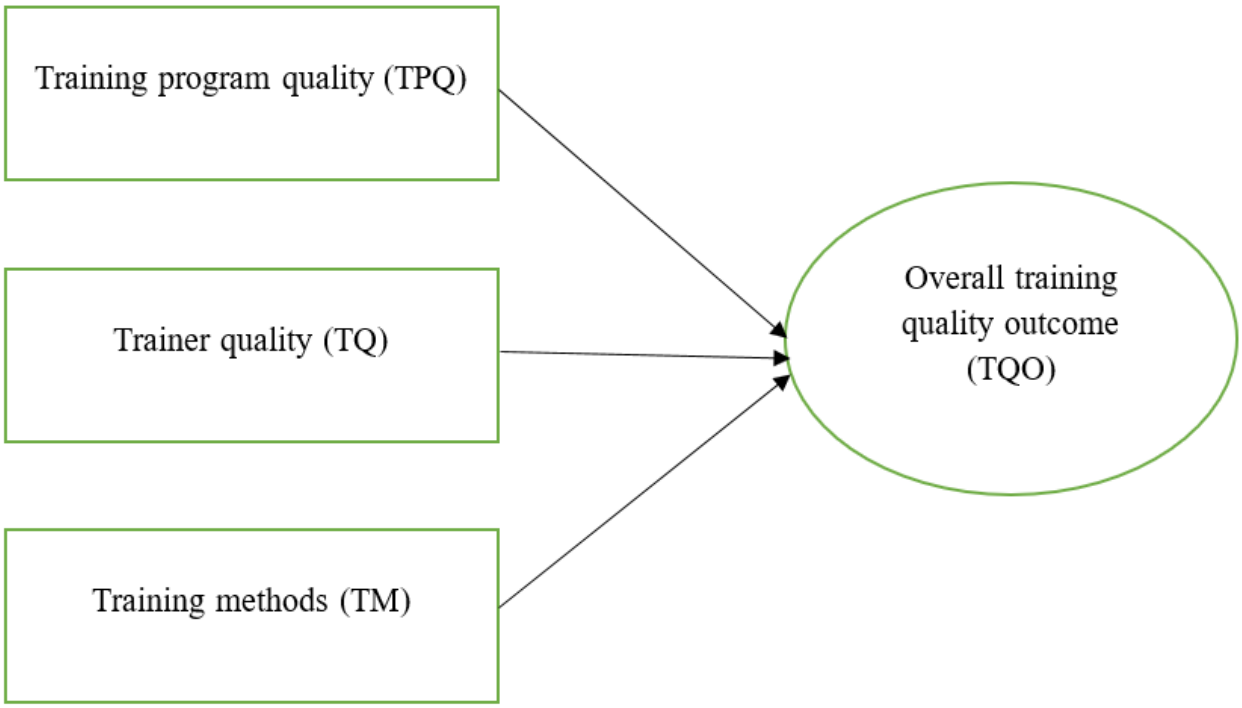

Figure 1.
Research model.

4. Results

4.1. The Quality Scale Analysis Result

The quality scale analysis results are presented in Tables 2 and 3.

Table 2.
Analysis of factors' confidence of scales.

Determinants	N	Cronbach's Alpha	Corrected Item-Total Correlation
Training program quality (TPQ)	4	0.938	0.811
Trainer quality (TQ)	4	0.894	0.723
Training methods (TM)	4	0.898	0.751
Overall training quality outcome (TQO)	4	0.871	0.713

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Table 3.
Results of Cronbach's alpha testing of attributes and item-total statistics.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Training program quality (TPQ)				
TPQ1	10.861	3.897	0.888	0.909
TPQ2	10.939	3.695	0.844	0.923
TPQ3	10.872	3.867	0.877	0.912
TPQ4	10.803	3.930	0.811	0.933
Trainer quality (TQ)				
TQ1	8.597	4.364	0.723	0.879
TQ2	8.706	4.036	0.784	0.857
TQ3	8.717	4.103	0.808	0.848
TQ4	8.564	4.274	0.750	0.869
Training methods (TM)				
TM1	10.978	4.880	0.802	0.862
TM2	11.100	4.335	0.772	0.871
TM3	10.997	4.638	0.751	0.877
TM4	11.025	4.509	0.784	0.865
Overall training quality outcome (TQO)				
TQO1	9.364	3.993	0.733	0.831
TQO2	9.344	4.327	0.744	0.830
TQO3	9.233	3.940	0.716	0.839
TQO4	9.375	4.062	0.713	0.839

The Cronbach's Alpha values for all constructs exceed 0.87, indicating excellent reliability. All item-total correlations are above 0.7, confirming strong internal consistency.

Training quality factors are consistently perceived, indicating standardized training practices across firms.

4.2. Exploratory Factor Analysis (EFA)

The Exploratory Factor Analysis (EFA) results are presented in Tables 4 and 5.

Table 4.
KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.905
Bartlett's Test of Sphericity	Approx. Chi-Square	3,446.182
	Df	66
	Sig.	0.000

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Table 5.
Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.511	54.256	54.256	6.511	54.256	54.256	3.489	29.079	29.079
2	1.610	13.413	67.668	1.610	13.413	67.668	3.126	26.051	55.130
3	1.470	12.248	79.916	1.470	12.248	79.916	2.974	24.787	79.916
4	0.453	3.775	83.691						
5	0.382	3.185	86.877						
6	0.299	2.492	89.368						
7	0.278	2.320	91.688						
8	0.255	2.124	93.812						
9	0.230	1.914	95.726						
10	0.216	1.798	97.524						
11	0.178	1.483	99.007						
12	0.119	0.993	100.000						

KMO = 0.905 and variance explained = 79.9% confirm strong construct validity. The extracted factors align with theoretical expectations. Training quality is a multidimensional construct with clear factor separation.

4.3. Result of Regression Model Analysis

The results of the regression model analysis are presented in Tables 6, 7, and 8.

Table 6.
Model Summary[b].

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate	Durbin-Watson
1	0.542[a]	0.294	0.288	0.55647	2.002

Note: a. Predictors: (Constant), TM, TPQ, TQ.
b. Dependent Variable: TQO

Table 7.
ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	45.804	3	15.268	49.307	0.000[b]
	Residual	110.237	356	0.310		
	Total	156.041	359			

Note: a. Dependent Variable: TM, TPQ, TQ.
b. Predictors: (Constant), TQO

Table 8.
Regression model.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.951	0.186		5.107	0.000		
	TPQ	0.432	0.057	0.424	7.648	0.000	0.644	1.552
	TQ	0.112	0.055	0.114	2.061	0.040	0.643	1.554
	TM	0.073	0.052	0.078	1.396	0.164	0.637	1.569

Note: a. Dependent Variable: TQO.

R^2 = 0.294 indicates moderate explanatory power; other factors, such as digital skills and governance, may also influence training outcomes.

The model is statistically significant (Sig = 0.000), confirming overall model fit.

TQO = 0.424TPQ + 0.114TQ + £

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TPQ (β = 0.424): strongest effect, TQ (β = 0.114): moderate effect, TM (not significant).

Curriculum quality is the most critical factor in training outcomes, while training methods may need modernization.

Next, Table 9 presents the results of testing the research hypotheses, H1 and H2 supported; H3 rejected.

Table 9.
Results of testing the research hypotheses.

No	Hypotheses	Test results	Trends of influence
1	H1	Accept	+
2	H2	Accept	+
3	H3	Reject	#

4.4. Residual Analysis Result

Residual analysis result is presented in Figure 2.

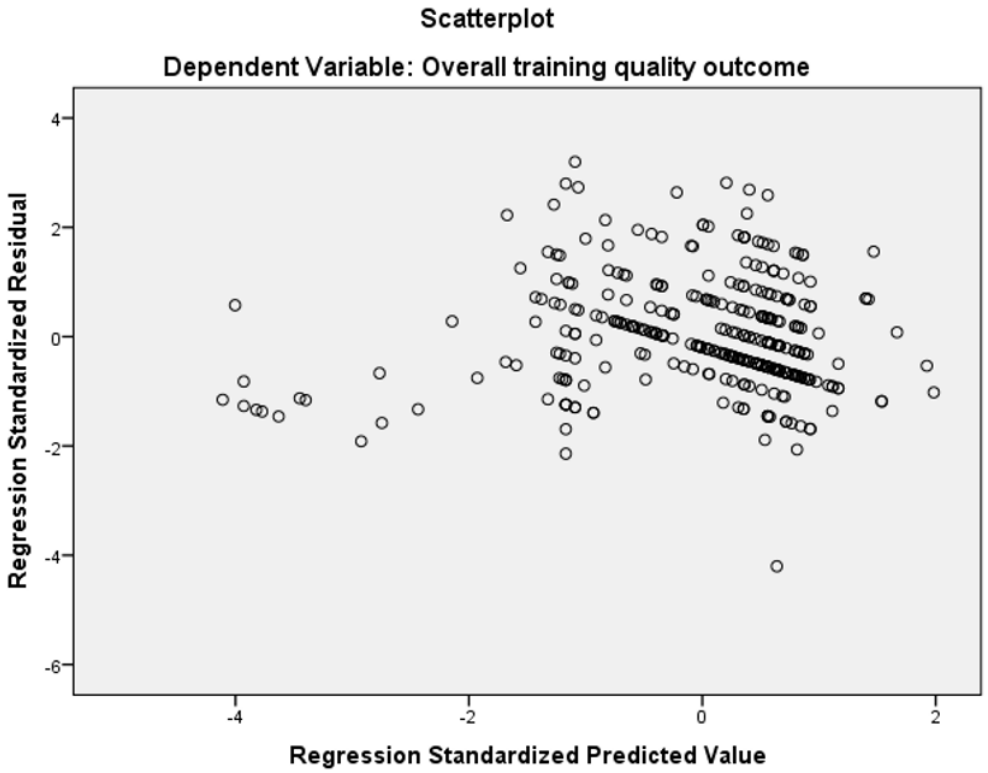

Figure 2.
Regression Standardized Predicted Value.

The Durbin–Watson statistic (2.002) shows no evidence of autocorrelation, and the residual distribution points to normality. These findings demonstrate the accuracy of the estimation results and the validity of the regression model assumptions [16, 17].

4.5. Discussion

The regression results indicate that training program quality (β = 0.424) has the strongest positive effect on training outcomes, followed by trainer quality (β = 0.114), while training methods are not statistically significant. This finding aligns with the Organisation for Economic Co-operation and

Development [3], which emphasizes the importance of curriculum alignment with labor market needs. Similarly, the International Labour Organization [4] highlights that program relevance is a critical determinant of training effectiveness in vocational systems.

The significant effect of trainer quality supports prior research by Salas et al. [11], who argue that instructor competence is essential for effective knowledge transfer. In the context of digital transformation, trainer quality increasingly includes the ability to integrate digital tools and AI-based learning systems. This aligns with Noe et al. [12], who emphasize the growing importance of digital pedagogical skills.

Kraiger and Ford [20] emphasize that effective workplace training depends not only on instructional content but also on learning design, trainer competence, learner engagement, and the application of technology-supported instructional methods. Their study highlights that modern workforce training increasingly requires flexible and adaptive learning approaches capable of responding to changing organizational and technological environments. This perspective is particularly relevant in the context of vocational training for the Japanese labor market, where workers are expected to adapt quickly to disciplined, technology-intensive, and standardized workplace systems.

Interestingly, the non-significant effect of training methods contrasts with previous findings [5, 11], which suggest that training methods play a crucial role in learning outcomes. This discrepancy may be explained by the limited adoption of innovative methods in the studied context. Traditional lecture-based approaches may not be sufficient in preparing trainees for technology-driven workplaces.

Furthermore, the moderate R^2 value suggests that additional factors, such as digital competencies, governance mechanisms, and institutional support, may influence training outcomes. This aligns with recent studies highlighting the role of AI and digital transformation in shaping training effectiveness [12].

Overall, the findings indicate that training quality is primarily driven by structural factors (curriculum and trainers), while methodological innovation remains an area for improvement.

5. Implications

Training providers should prioritize curriculum alignment with international labor standards: Given the dominant role of program quality, curricula must be continuously updated to reflect technological advancements, AI integration, and workplace practices in Japan. This includes incorporating digital workflows, automation processes, and standardized operating procedures.

Trainer development should focus on digital and intercultural competencies: trainer quality is a key determinant of training outcomes. Trainers must not only possess technical expertise but also be capable of using digital tools and understanding Japanese work culture. Continuous professional development programs are essential.

Training methods must be modernized through technology integration: The insignificant effect of training methods suggests the need for innovation. Firms should adopt simulation-based learning, virtual reality training, and AI-supported platforms to enhance learning effectiveness.

Governance and quality assurance mechanisms should be strengthened: Regulatory frameworks should ensure that training programs meet international standards. Quality assurance systems should incorporate digital monitoring and performance evaluation tools.

International collaboration should be expanded: partnerships with Japanese firms can provide practical insights and ensure that training programs are aligned with real-world requirements. Such collaboration enhances both relevance and effectiveness.

6. Conclusion

This study provides empirical insights into the determinants of training quality outcomes in the context of preparing workers for the Japanese labor market. The findings demonstrate that training program quality is the most influential factor, followed by trainer quality, while training methods do not exhibit a significant impact. These results underscore the importance of structural and human capital

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dimensions in shaping training effectiveness, particularly in environments characterized by high standards and technological advancement.

From a broader perspective, the study highlights the increasing importance of governance and regulatory frameworks in ensuring training quality and labor market alignment. In the era of digital transformation and AI adoption, training systems must not only deliver technical knowledge but also foster adaptability, digital competence, and socio-cultural integration. The sociology of economics perspective further suggests that training outcomes are embedded within institutional and cultural contexts, particularly in cross-border labor markets such as Japan.

Despite its contributions, this study has several limitations. The analysis is based on cross-sectional data, which limits causal inference. Additionally, the model does not incorporate emerging variables such as digital competencies, institutional governance, or psychological readiness. Future research should extend the model by integrating these factors and employing advanced analytical techniques such as structural equation modeling (SEM) or longitudinal analysis. These approaches would provide deeper insights into the dynamic interactions between training systems, technological change, and global labor market integration.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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References

[1] Organisation for Economic Co-operation and Development, *Recruiting immigrant workers: Japan 2024*. Paris, France: OECD Publishing, 2024.

[2] World Bank, *Vietnam digital transformation: Opportunities and challenges for skills development*. Washington, DC, USA: World Bank Group, 2022.

[3] Organisation for Economic Co-operation and Development, *Vocational education and training for the future of work*. Paris, France: OECD Publishing, 2021.

[4] International Labour Organization, *Skills development and lifelong learning: Resource guide for policy-makers*. Geneva, Switzerland: International Labour Organization, 2022.

[5] T. T. Baldwin and J. K. Ford, "Transfer of training: A review and directions for future research," *Personnel Psychology*, vol. 41, no. 1, pp. 63-105, 1988. https://doi.org/10.1111/j.1744-6570.1988.tb00632.x

[6] G. Vial, "Understanding digital transformation: A review and a research agenda," *The Journal of Strategic Information Systems*, vol. 28, no. 2, pp. 118-144, 2019. https://doi.org/10.1016/j.jsis.2019.01.003

[7] J. Dempere, K. Modugu, A. Hesham, and L. K. Ramasamy, "The impact of ChatGPT on higher education," *Frontiers in Education*, vol. 8, p. Article 1206936, 2023. https://doi.org/10.3389/feduc.2023.1206936

[8] M. Granovetter, "Economic action and social structure: The problem of embeddedness," *American Journal of Sociology*, vol. 91, no. 3, pp. 481-510, 1985. https://doi.org/10.1086/228311

[9] M. Bond, S. Bedenlier, V. I. Marín, and M. Händel, "Emergency remote teaching in higher education: Mapping the first global online semester," *International Journal of Educational Technology in Higher Education*, vol. 18, p. 50, 2021. https://doi.org/10.1186/s41239-021-00282-x

[10] A. Schleicher, *AI and the future of skills, volume 1: Capabilities and assessments*. Paris, France: OECD Publishing, 2023.

[11] E. Salas, S. I. Tannenbaum, K. Kraiger, and K. A. Smith-Jentsch, "The science of training and development in organizations: What matters in practice," *Psychological Science in the Public Interest*, vol. 13, no. 2, pp. 74-101, 2012. https://doi.org/10.1177/1529100612436661
[12] R. A. Noe, A. D. Clarke, and H. J. Klein, "Learning in the twenty-first-century workplace," *Annual Review of Organizational Psychology and Organizational Behavior*, vol. 1, no. 1, pp. 245-275, 2014. https://doi.org/10.1146/annurev-orgpsych-031413-091321
[13] D. Jackson and R. Bridgstock, "What actually works to enhance graduate employability? The relative value of curricular, co-curricular, and extra-curricular learning and paid work," *Higher Education*, vol. 81, no. 4, pp. 723-739, 2021. https://doi.org/10.1007/s10734-020-00570-x
[14] UNESCO, *Reimagining our futures together: A new social contract for education*. Paris, France: UNESCO Publishing, 2021.
[15] G. S. Becker, "Investment in human capital: A theoretical analysis," *Journal of Political Economy*, vol. 70, no. 5, Part 2, pp. 9-49, 1962. https://doi.org/10.1086/258724
[16] J. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*. Upper Saddle River: Prentice Hall, 2009.
[17] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*. Boston, MA: Cengage Learning, 2019.
[18] D. L. Kirkpatrick, "Techniques for evaluation training programs," *Journal of the American Society of Training Directors*, vol. 13, pp. 21-26, 1959.
[19] J. C. Nunnally and I. H. Bernstein, *Psychometric theory*, 3rd ed. New York: McGraw-Hill, 1994.
[20] K. Kraiger and J. K. Ford, "The science of workplace instruction: Learning and development applied to work," *Annual Review of Organizational Psychology and Organizational Behavior*, vol. 8, no. 1, pp. 45-72, 2021. https://doi.org/10.1146/annurev-orgpsych-012420-060109

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