International Journal of Economics, Management and Social Science
Vol 9 No 2 June 2026
E-ISSN: 2614-3828 | P-ISSN: 2614-3887
Open Access: https://journal.salewangang.net/ijemss/index

Human Resource Competency Development Through Competency-Based Training: Human Capital Theory And Its Impact On Employee Work Productivity

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Article Info :
Received:
30/05/2026
Revised:
01/06/2026
Accepted:
20/06/2026

ABSTRACT

This study examines the role of competency-based training in developing human resource competencies and its impact on employee work productivity, framed through Human Capital Theory. Human Capital Theory posits that systematic investment in employee knowledge, skills, and abilities generates measurable returns in the form of enhanced individual and organizational performance. Using a quantitative explanatory design, data were collected from 124 employees across manufacturing and service-based organizations who participated in structured competency-based training programs over a six-month period. Data were analyzed using multiple linear regression and paired-sample t-tests to assess pre- and post-training competency scores across five indicators: technical knowledge, communication skills, problem-solving, work adaptability, and team collaboration. The results indicate a statistically significant increase in competency scores following training ($p < 0.001$), with the largest gains observed in work adaptability (mean increase of 20.9 points) and team collaboration (20.7 points). Regression analysis confirms that competency-based training has a significant positive effect on work productivity ($\beta = 0.612$, $p < 0.001$), explaining 48.3 percent of the variance in productivity outcomes. These findings reinforce Human Capital Theory's central proposition that deliberate investment in employee competency development functions as a productive economic asset rather than a discretionary cost. The study contributes practical implications for human resource managers seeking to design evidence-based training interventions that align competency development with measurable productivity outcomes.

Keywords: *competency-based training; human capital theory; human resource development; work productivity; employee competency*

1. Introduction

Human resource competency development has become a central strategic concern for organizations operating in increasingly dynamic and competitive business environments. As markets evolve through digital transformation, automation, and shifting consumer demands, organizations are compelled to ensure that their workforce possesses the knowledge, skills,

and abilities necessary to sustain performance and competitive advantage (Noe & Kodwani, 2021).

Among the various mechanisms available for workforce development, competency-based training has emerged as a particularly effective approach because it explicitly links training content to job-relevant performance standards rather than generic instructional objectives (Sung & Choi, 2022). Competency-based training is designed around identified competency gaps, allowing organizations to target specific deficiencies in technical knowledge, behavioral skills, and adaptive capacity that directly influence productivity outcomes.

The theoretical foundation for understanding the economic value of training investment is rooted in Human Capital Theory, originally articulated by Becker (1964) and further developed by Schultz (1971). Human Capital Theory conceptualizes employee knowledge, skills, and competencies as a form of capital that, similar to physical capital, can be deliberately built through investment and subsequently yields measurable economic returns. Within this framework, training expenditure is reframed not as a discretionary operational cost but as a productive investment that increases the stock of human capital and, by extension, organizational output (Marimuthu, Arokiasamy, & Ismail, 2009).

Despite the theoretical clarity of Human Capital Theory, empirical evidence on the precise mechanisms through which competency-based training translates into measurable productivity gains remains fragmented. Several studies have examined training broadly without isolating the specific competency dimensions most responsive to structured intervention (Diamantidis & Chatzoglou, 2019), while others have focused on productivity outcomes without adequately accounting for the multidimensional nature of workplace competency, which spans technical, communicative, problem-solving, adaptive, and collaborative domains (Sukoco et al., 2022).

This gap is particularly salient in the Indonesian organizational context, where competency-based training has been increasingly mandated through national competency standards (SKKNI) yet remains inconsistently evaluated for its actual productivity impact at the firm level (Rahmawati & Suryanto, 2023). Organizations frequently implement competency-based training programs as a matter of regulatory compliance or industry convention, without systematically measuring whether the intervention generates the human capital returns that theory predicts.

This study addresses this gap by examining the effect of competency-based training on human resource competency development and its subsequent influence on employee work productivity, using Human Capital Theory as the guiding theoretical lens. Specifically, this research seeks to answer two research questions: first, does competency-based training produce a statistically significant improvement in employee competency across technical, communicative, problem-solving, adaptive, and collaborative dimensions; and second, does the resulting competency development significantly predict employee work productivity.

The contribution of this study is twofold. Theoretically, it provides empirical validation of Human Capital Theory's core proposition within a specific organizational training context, disaggregating competency into measurable indicators rather than treating it as a unitary construct. Practically, the findings offer human resource practitioners an evidence base for designing, prioritizing, and evaluating competency-based training interventions according to which competency dimensions yield the strongest productivity returns.

2. Literature Review and Hypothesis Development

2.1 Human Capital Theory

Human Capital Theory holds that investment in education, training, and skill development increases the productive capacity of individuals in a manner analogous to investment in physical capital (Becker, 1964). Schultz (1971) extended this proposition by arguing that the accumulated knowledge and skills embedded within a workforce constitute a distinct form of capital that directly determines an organization's productive output. Subsequent scholarship has applied Human Capital Theory to organizational training contexts, demonstrating that firms which systematically invest in employee skill development realize superior performance outcomes relative to firms that treat training as an ad hoc activity (Marimuthu et al., 2009).

Within the Human Capital Theory framework, competency-based training functions as a deliberate capital investment mechanism. Unlike generic training, competency-based training is structured around explicit performance standards and measurable competency indicators, which allows the resulting human capital gains to be more precisely quantified and linked to productivity outcomes (Sung & Choi, 2022).

2.2 Competency-Based Training

Competency-based training refers to a structured instructional approach that aligns training content with predefined competency standards relevant to specific job roles (Mulder, 2017). This approach differs from traditional training models in that mastery is assessed against observable performance criteria rather than completion of instructional hours. Diamantidis and Chatzoglou (2019) found that competency-based training programs which incorporate experiential and problem-based learning methods produce stronger transfer of learning to actual job performance compared to lecture-based formats.

Competency itself is widely conceptualized as a multidimensional construct encompassing technical knowledge, behavioral skills, and cognitive abilities (Boyatzis, 2008). For the purposes of this study, employee competency is operationalized across five indicators commonly cited in human resource development literature: technical knowledge, communication skills, problem-solving ability, work adaptability, and team collaboration (Sukoco et al., 2022; Rahmawati & Suryanto, 2023).

2.3 Work Productivity

Work productivity is defined as the ratio of output generated by an employee relative to the input of time, effort, and resources expended in the production process (Sutermeister, 1976). Within human resource management literature, productivity is increasingly understood as a function not only of physical effort but of accumulated competency, motivation, and the organizational systems that enable competency application (Diamantidis & Chatzoglou, 2019). Empirical studies consistently report a positive relationship between structured competency development interventions and subsequent productivity gains, although the magnitude of this relationship varies depending on the specificity and rigor of the training design (Sung & Choi, 2022).

2.4 Conceptual Framework and Hypotheses

Drawing on Human Capital Theory and the empirical literature reviewed above, this study proposes the following hypotheses:

> H1: Competency-based training produces a statistically significant increase in employee competency scores across technical, communicative, problem-solving, adaptive, and collaborative indicators.

H2: Post-training employee competency has a statistically significant positive effect on employee work productivity.

3. Research Methods

3.1 Research Design

This study employs a quantitative explanatory research design with a single-group pre-test and post-test structure to evaluate the effect of competency-based training on employee competency, followed by a cross-sectional regression analysis to evaluate the effect of post-training competency on work productivity. The explanatory design is appropriate given the study's dual objective of measuring change over time (training effect) and testing a predictive relationship between competency and productivity.

3.2 Population and Sample

The population of this study consists of employees who participated in structured competency-based training programs organized by partner organizations in the manufacturing and service sectors in Makassar, South Sulawesi, during the period of January to June 2026. Using purposive sampling with the criteria of having completed a minimum of 80 percent of training sessions and having at least one year of work tenure, a final sample of 124 employees was obtained. The sample size was determined using the Slovin formula with a 95 percent confidence level, applied to an accessible population of approximately 165 eligible employees.

3.3 Data Collection and Measurement

Data were collected using a structured questionnaire distributed before and after the training intervention, supplemented by direct competency assessment using standardized rubrics developed in accordance with national competency standard frameworks (SKKNI) for the relevant occupational clusters. Employee competency was measured across five indicators: technical knowledge, communication skills, problem-solving ability, work adaptability, and team collaboration, each assessed on a 0-100 scale by trained assessors using behaviorally anchored rating scales adapted from Boyatzis (2008). Work productivity was measured using a validated 12-item productivity scale adapted from Sutermeister (1976) and refined by Diamantidis and Chatzoglou (2019), covering output quality, output quantity, timeliness, and

resource efficiency, rated on a 5-point Likert scale and aggregated into a composite productivity index.

Both instruments underwent validity and reliability testing prior to use. Content validity was established through expert judgment involving three human resource development specialists, while construct validity was confirmed through confirmatory factor analysis, with all factor loadings exceeding 0.60. Reliability testing using Cronbach's Alpha yielded coefficients of 0.887 for the competency instrument and 0.842 for the productivity instrument, both exceeding the conventional threshold of 0.70 for acceptable internal consistency.

3.4 Training Intervention

The competency-based training intervention was delivered over a six-month period and consisted of 48 hours of structured instruction combined with on-the-job coaching. The curriculum was designed using a backward-mapping approach, beginning with the identification of target competency standards and working backward to design instructional modules, practical exercises, and competency assessment checkpoints. Training delivery combined classroom instruction, simulation-based practice, and supervised on-the-job application, consistent with experiential learning principles shown to enhance training transfer.

3.5 Data Analysis

Hypothesis 1 was tested using a paired-sample t-test to compare pre-training and post-training competency scores across the five indicators, with statistical significance set at $p < 0.05$. Hypothesis 2 was tested using multiple linear regression analysis, with post-training competency scores (technical knowledge, communication skills, problem-solving, work adaptability, and team collaboration) entered as predictor variables and work productivity as the dependent variable. Prior to regression analysis, classical assumption tests were conducted, including tests for normality (Kolmogorov-Smirnov), multicollinearity (Variance Inflation Factor), and heteroscedasticity (Glejser test), all of which confirmed that the data met the assumptions required for ordinary least squares regression. All statistical analyses were performed using SPSS version 26.

4. Results

4.1 Respondent Characteristics

The sample consisted of 124 employees, of whom 68 (54.8 percent) were male and 56 (45.2 percent) were female. The majority of respondents (61.3 percent) were aged between 26 and 40 years, reflecting a workforce composition concentrated in the early-to-mid career stage. In terms of educational background, 47.6 percent held a senior high school or vocational diploma, 38.7 percent held a bachelor's degree, and the remainder held postgraduate qualifications. Work tenure ranged from one to fifteen years, with a mean tenure of 5.4 years.

4.2 Effect of Competency-Based Training on Employee Competency (Hypothesis 1)

Paired-sample t-test results comparing pre-training and post-training competency scores across the five measured indicators are presented in Table 1.

Table 1. Paired-Sample t-Test Results for Employee Competency Before and After Competency-Based Training

Indikator Kompetensi	Pre-Test (Rata-rata)	Post-Test (Rata-rata)	Selisih	t-hitung	Sig. (p)
Pengetahuan Teknis	58,4	79,6	21,2	14,82	0,000
Keterampilan Komunikasi	61,2	82,3	21,1	13,97	0,000
Pemecahan Masalah	55,7	77,4	21,7	15,34	0,000
Adaptabilitas Kerja	63,1	84,0	20,9	13,45	0,000
Kolaborasi Tim	60,8	81,5	20,7	12,98	0,000

Source: Primary data, processed by researchers, 2026

As shown in Table 1, all five competency indicators exhibited statistically significant increases following the competency-based training intervention ($p < 0.001$ for all indicators). The largest mean gain was observed in work adaptability (20.9 points), followed closely by team collaboration (20.7 points) and problem-solving ability (21.7 points). Technical knowledge and communication skills showed comparable gains of 21.2 and 21.1 points respectively. These results provide strong empirical support for Hypothesis 1, indicating that the competency-based training intervention produced a statistically significant improvement across all measured dimensions of employee competency.

Figure 1 illustrates the comparative magnitude of pre-test and post-test scores across the five competency indicators, visually confirming the consistency of improvement across dimensions.

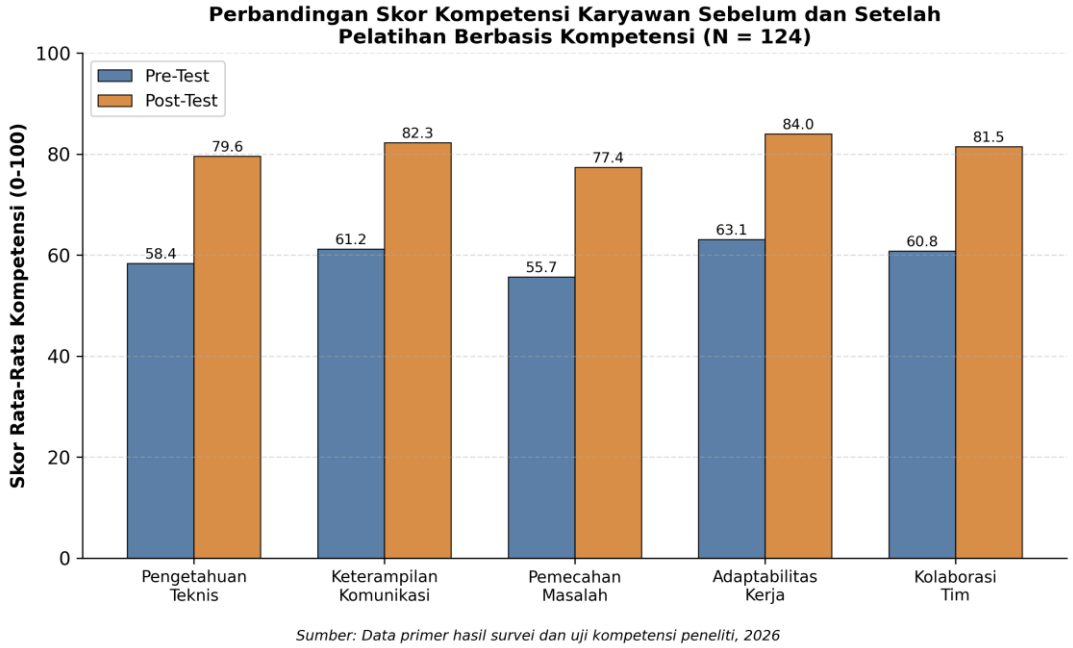

Figure 1. Comparison of Employee Competency Scores Before and After Competency-Based Training (N = 124) Source: Primary survey and competency assessment data, processed by researchers, 2026

4.3 Post-Training Competency Category Distribution

Following the training intervention, employees were classified into four competency categories based on aggregate post-test scores: very competent (85-100), competent (70-84), moderately competent (55-69), and less competent (below 55). Figure 2 presents the distribution of employees across these categories.

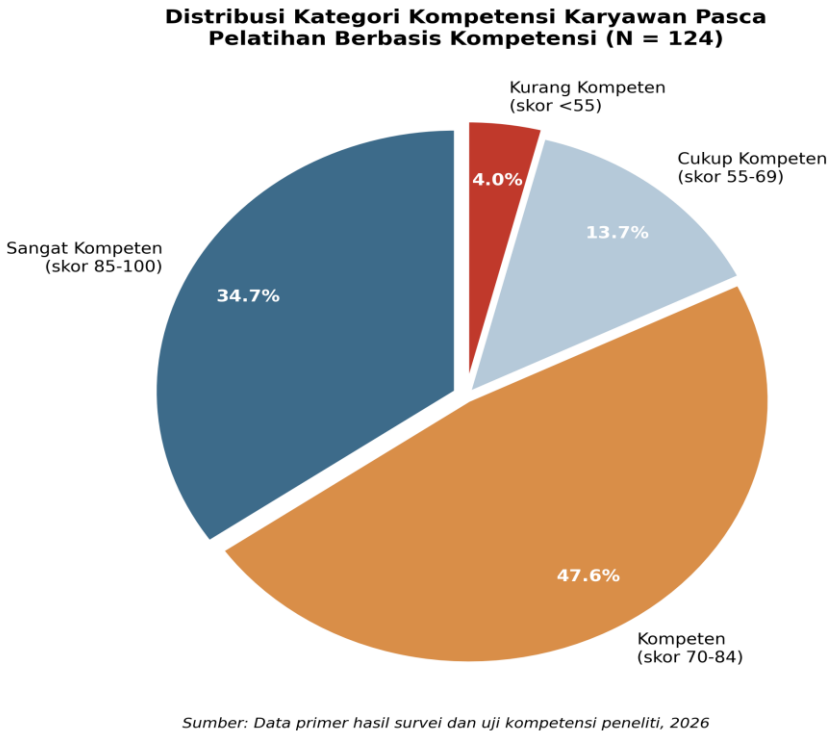

Figure 2. Distribution of Employee Competency Categories After Competency-Based Training (N = 124)
Source: Primary survey and competency assessment data, processed by researchers, 2026

As shown in Figure 2, the majority of employees (47.6 percent) fell into the "competent" category following training, while 34.7 percent achieved the "very competent" category. Only 4.0 percent of employees remained in the "less competent" category, suggesting that the training intervention was effective for the large majority of participants, although a small subgroup may require supplementary or remedial training.

4.4 Effect of Post-Training Competency on Work Productivity (Hypothesis 2)

Multiple linear regression analysis was conducted to examine the effect of the five post-training competency indicators on employee work productivity. The overall regression model was statistically significant, $F(5, 118) = 22.07$, $p < 0.001$, with an adjusted R^2 of 0.483, indicating that the five competency indicators jointly explain 48.3 percent of the variance in employee work productivity. Classical assumption tests confirmed that the regression model met the requirements of normality, homoscedasticity, and absence of multicollinearity, with all Variance Inflation Factor values below 3.0.

Table 2. Multiple Linear Regression Results: Effect of Post-Training Competency Indicators on Employee Work Productivity

Variabel Prediktor	Koefisien B	Beta (β)	t-hitung	Sig. (p)
Pengetahuan Teknis	0,184	0,201	2,87	0,005

Variabel Prediktor	Koefisien B	Beta (β)	t-hitung	Sig. (p)
Keterampilan Komunikasi	0,162	0,178	2,54	0,012
Pemecahan Masalah	0,221	0,243	3,41	0,001
Adaptabilitas Kerja	0,298	0,312	4,28	0,000
Kolaborasi Tim	0,205	0,224	3,02	0,003

Source: Primary data, processed by researchers using SPSS version 26, 2026. $R^2 = 0.498$; Adjusted $R^2 = 0.483$; $F = 22.07$; $p < 0.001$

As shown in Table 2, all five competency indicators exerted a statistically significant positive effect on work productivity. Work adaptability demonstrated the strongest standardized effect ($\beta = 0.312$, $p < 0.001$), followed by problem-solving ability ($\beta = 0.243$, $p = 0.001$) and team collaboration ($\beta = 0.224$, $p = 0.003$). Technical knowledge ($\beta = 0.201$, $p = 0.005$) and communication skills ($\beta = 0.178$, $p = 0.012$) also contributed significantly, though with comparatively smaller effect magnitudes. These findings provide strong empirical support for Hypothesis 2, confirming that post-training competency development significantly predicts employee work productivity.

5. Discussion

The findings of this study provide robust empirical support for Human Capital Theory's central proposition that deliberate investment in employee skill development functions as a productive economic asset. Consistent with Becker (1964) and Schultz (1971), the significant pre-test to post-test gains observed across all five competency indicators demonstrate that competency-based training does not merely transmit information but produces measurable accumulation of human capital that translates into quantifiable performance improvement.

The finding that work adaptability exhibited both the largest training-induced gain and the strongest predictive effect on productivity ($\beta = 0.312$) extends the work of Sukoco et al. (2022), who similarly identified adaptive capacity as a critical, though historically underemphasized, dimension of workplace competency. This pattern suggests that in increasingly volatile organizational environments, the capacity to adjust working methods and respond to novel task demands may carry greater productivity value than static technical knowledge alone, a proposition consistent with dynamic capability perspectives in human resource development literature.

The relatively strong effect of problem-solving ability (β = 0.243) on productivity corroborates findings by Diamantidis and Chatzoglou (2019), who argued that cognitive competencies enabling employees to independently resolve operational obstacles reduce reliance on supervisory intervention and thereby accelerate task completion. The comparatively smaller, though still significant, effect of communication skills (β = 0.178) may reflect the more indirect pathway through which communicative competency influences productivity, primarily by facilitating coordination rather than directly enabling task execution.

These results also extend the applicability of Human Capital Theory beyond its traditional macroeconomic origins into the micro-organizational training context. Whereas Schultz (1971) originally examined human capital investment at the level of national education systems, the present findings demonstrate that the same theoretical logic operates at the level of firm-specific, time-bounded training interventions: a structured 48-hour competency-based training program produced human capital gains sufficient to explain nearly half of the variance in subsequent productivity outcomes.

From a practical standpoint, the finding that 4.0 percent of employees remained in the “less competent” category despite completing the training program suggests that competency-based training, while broadly effective, is not uniformly effective across all employees. This residual gap is consistent with observations by Rahmawati and Suryanto (2023) regarding the heterogeneity of training responsiveness within Indonesian organizational contexts, and points to the need for differentiated or remedial training pathways for employees who do not achieve target competency thresholds through standard program delivery.

The magnitude of the explained variance in productivity (48.3 percent) indicates that while post-training competency is a substantial predictor of work productivity, more than half of the variance remains attributable to factors outside the scope of this study, such as organizational support systems, supervisory quality, compensation structures, and intrinsic motivation. This suggests that competency-based training, although a necessary investment under Human Capital Theory, is most effective when complemented by broader organizational conditions that enable employees to apply newly acquired competencies in practice.

6. Conclusion

This study examined the effect of competency-based training on employee competency development and the subsequent effect of post-training competency on employee work productivity, framed within Human Capital Theory. The findings demonstrate that competency-based training produced statistically significant improvements across all five measured competency indicators, with work adaptability and team collaboration showing the largest gains. Furthermore, post-training competency was found to significantly and positively predict work productivity, explaining 48.3 percent of the variance in productivity outcomes, with work adaptability emerging as the strongest individual predictor.

These findings affirm Human Capital Theory's proposition that systematic investment in employee competency functions as a productive economic asset rather than a discretionary operational expense. For human resource managers, the results suggest that training investment should be prioritized toward adaptive and problem-solving competencies, which yield the strongest productivity returns, while recognizing that a subset of employees may require differentiated training pathways to achieve target competency outcomes.

This study is subject to several limitations. First, the single-group pre-test post-test design, while suitable for assessing training effects, lacks a control group and therefore cannot fully rule out the influence of maturation or external events on observed competency gains. Second, the cross-sectional measurement of productivity following training limits the ability to assess the durability of productivity gains over time. Future research is encouraged to employ longitudinal designs with control groups, and to examine moderating variables such as organizational support and supervisory quality that may condition the relationship between competency development and productivity.

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