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The Influence of Sustainable Skills Training on The Achievement of Decent Work and Economic Growth Through Improving Human Resources Competence: A Study at The Agricultural Extension Center in Indragiri Hilir District

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Abstract: Achieving SDG 8, Decent Work and Economic Growth, in the agricultural sector requires competent and adaptive human resources, particularly in agricultural extension institutions that directly support farmer empowerment, productivity improvement, and local economic development. However, empirical evidence explaining how sustainable skills training contributes to SDG achievement through human resource competence remains limited, especially in developing-country extension contexts. This study examines the influence of Sustainable Skills Training on SDG 8 Achievement through Human Resource Competency Improvement among agricultural extension workers at Agricultural Extension Centers (BPP) in Indragiri Hilir Regency, Indonesia. A quantitative approach using Structural Equation Modeling - Partial Least Squares (SEM-PLS) was applied to data collected from 104 agricultural extension workers through saturated sampling. The measurement model showed acceptable internal consistency and convergent validity, with Cronbach's Alpha values above 0.85, Composite Reliability values above 0.90, and AVE values above 0.73. The structural model demonstrated strong explanatory power, with $R^2 = 0.893$ for SDG Achievement and $R^2 = 0.837$ for HR Competence Improvement. Predictive relevance was indicated by a manually calculated Q-square value of 0.983, while the SRMR value of 0.100 indicated marginal model fit. The findings show that Sustainable Skills Training strongly contributes to HR Competence Improvement, and HR competence functions as the main mechanism linking training to SDG 8 Achievement. However, the path coefficient for HR Competence Improvement $\rightarrow$ SDG Achievement exceeded the conventional standardized range, indicating the need for cautious interpretation due to potential construct overlap and multicollinearity. The novelty of this study lies in demonstrating that HR competence serves as a central pathway through which sustainable skills training supports SDG 8 achievement in local agricultural extension institutions. Future studies should refine the measurement model, validate predictive relevance using Blindfolding or PLSpredict, and test alternative model specifications to improve construct discriminability.

Keyword: Sustainable Skills Training, Human Resource Competency Improvement, SDG 8, Decent Work and Economic Growth, Agricultural Extension.

INTRODUCTION

Sustainable economic development is the main agenda in achieving the 2030 Sustainable Development Goals (SDGs). One of the crucial targets is SDG number 8, which focuses on decent work and economic growth. The agricultural sector has a strategic role to play in realizing this goal, especially in developing countries like Indonesia, where most people still rely on agriculture as their main source of livelihood. However, the main challenge in this sector is to improve the competence of human resources (HR) to be able to adapt to increasingly dynamic changes in technology, policies, and global demands.

Indragiri Hilir Regency is one of the areas with great agricultural potential in Indonesia. With a large area dominated by the agricultural sector, this area requires optimal human resource management to ensure sustainable economic growth. The Agricultural Extension Center (BPP) has a central role as an institution tasked with providing education, assistance, and strengthening the capacity of farmers and extension workers in supporting agricultural productivity. In Indragiri Hilir Regency, there are 20 sub-districts, of which 8 of them have BPP which is a center for agricultural development with promising prospects.

Based on data from the Agricultural Extension Information System (SIMLUHTAN) of Indragiri Hilir Regency, the number of agricultural extension workers in this area reached 104 people, consisting of 39 State Civil Apparatus (ASN), 12 Government Employees with Employment Agreements (P3K), 49 Freelance Daily Workers (THL) from the central and regional governments, and 4 independent workers consisting of retired extension workers and agricultural activists. This diversity of personnel status creates its own challenges in terms of equalizing competencies and improving performance, which can ultimately have an impact on the effectiveness of agricultural extension and the achievement of SDGs number 8.

One of the main problems faced in the management of agricultural extension human resources is the competency gap due to differences in educational backgrounds, experience, and access to continuous training. This can affect the quality of extension services, labor productivity, and the welfare of farmers who depend on extension as the main source of agricultural information and technology. If this gap is not addressed, the achievement of decent work in the agricultural sector will be difficult to realize.

Continuous skills training is one of the main strategies in bridging the human resource competency gap in the agricultural sector. Effective training not only increases the capacity of individuals to understand and implement the latest agricultural technologies, but also contributes to the creation of more decent jobs and more inclusive economic growth. However, the extent of the effectiveness of the continuous skills training program in improving human resource competence and its contribution to the achievement of SDGs number 8 still needs to be systematically evaluated. This is important considering that large investments in training programs must be accounted for in their impact on increasing the productivity and welfare of extension workers and farmers who are their main partners.

Several previous studies have shown that continuous training has a positive influence on improving the competence and performance of extension workers. (Sadono, D., et al, 2021) found that training has a positive influence on improving the competence and performance of extension workers in West Java Province (Anderson, J.R., & Smith, 2022) at the international level also confirms that continuous training can increase the work effectiveness of agricultural extension workers.

In the context of the SDGs, (Wibowo, A., & Haryanto, 2022) human resource competence plays a mediator between training and the achievement of the SDGs in the

agricultural sector. These results are in line with findings (Wilson, M., & Thompson, 2023) which found that human resource development mediates the achievement of SDG 8. (Chen & Kumar, 2022) also revealed the positive influence of competence on decent work.

Efektivitas program pelatihan dalam Improving the competence of extension workers has also been proven by (Nugroho, R., & Sulistyowati, 2023) which shows an increase in the competence of extension workers through continuous training programs. (Martinez, C., & Rodriguez, 2023) there is a contribution of training programs to the achievement of the SDGs, while (Johnson, R., & Williams, 2022) states that sustainable skill development can increase the productivity of extension workers.

In Indonesia's agricultural sector, (Pratiwi, S., & Rahman, 2022) revealed that human resource development contributes to the achievement of decent work, while (Kusuma, H., & Wijaya, 2022) found that training has a significant impact on improving performance in their studies at the Agricultural Extension Center.

Based on these findings, it can be seen that there is a strong relationship between continuous skills training, human resource competency improvement, and the achievement of SDGs number 8. The consistency of previous research findings shows that continuous training interventions have a significant influence on improving the quality of human resources and achieving sustainable development targets.

This research highlights the strategic role of agricultural extension human resources in strengthening the agricultural sector in Indragiri Hilir Regency. The evaluation of the influence of sustainable skills training on decent work (SDGs 8) through improving human resource competencies aims to formulate a more effective human resource development strategy. The results of this study are expected to be recommendations for local governments in optimizing training policies, improving the welfare of extension workers and farmers, and encouraging inclusive and sustainable economic growth.

Sustainable development of the agricultural sector requires competent and adaptive human resources. In Indragiri Hilir Regency, the Agricultural Extension Center (BPP) plays an important role in increasing the capacity of extension workers, but there is still a competency gap that has the potential to affect the achievement of decent work (SDGs number 8).

Continuous skills training is the main solution, but its effectiveness in improving human resource competencies and their contribution to the achievement of the SDGs still needs to be further researched.

Based on this, the formulation of the problem in this study is: "How Does Sustainable Skills Training Affect the Achievement of SDGs (Decent Work and Economic Growth) through Human Resource Competency: A Study on the Agricultural Extension Center (BPP) in Indragiri Hilir Regency?".

METHOD

This study employed Structural Equation Modeling - Partial Least Squares (SEM-PLS) to analyze the relationship between Sustainable Skills Training, Human Resource Competency Improvement, and SDG Achievement related to Decent Work and Economic Growth. The research was conducted at Agricultural Extension Centers (BPP) in Indragiri Hilir Regency, involving 104 respondents consisting of ASN, P3K, central and regional THL, and independent agricultural extension workers. Data were collected through questionnaires, documentation, and observation. The SEM-PLS analysis was conducted in two stages: evaluation of the measurement model (outer model) and evaluation of the structural model (inner model). Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS.

RESULT AND DISCUSSION

This study uses the Structural Equation Modeling - Partial Least Square (SEM-PLS) method to analyze the relationship between continuous skills training, human resource competency improvement, and the achievement of SDGs (Decent Work and Economic Growth). The object of the research is the Agricultural Extension Center (BPP) in Indragiri Hilir Regency, with 104 respondents, consisting of ASN, P3K, Central and Regional THL, and independent workers. Data was collected through questionnaires, documentation, and observations. The analysis was carried out in two stages: evaluation of the measurement model (outer model) and structural model (inner model), with hypothesis testing using the bootstrapping method. Data processing using SmartPLS.

Measurement Model

The measurement model was evaluated to assess the validity and reliability of the constructs used in this study. The evaluation included internal consistency reliability using Cronbach's Alpha and Composite Reliability, convergent validity using outer loading and Average Variance Extracted (AVE), and discriminant validity using the Fornell-Larcker Criterion and the Heterotrait-Monotrait Ratio (HTMT). This assessment was conducted to ensure that the indicators adequately measured their respective latent constructs before proceeding to the structural model evaluation.

Table 1. Internal Consistency Reliability Testing

Variable	Cronbach Alpha
Improving Human Resource Competence	0,883
Continuous Skills Training	0,882
Achievements SDGs (Decent Work and Economic Growth)	0,851

Source: SmartPLS Output, 2025

The results show that all constructs have Cronbach's Alpha values above 0.70 (Hair, *et al*, 2017), indicating acceptable internal consistency reliability. The Composite Reliability values for Human Resource Competency Improvement (0.916), Sustainable Skills Training (0.907), and SDG Achievement - Decent Work and Economic Growth (0.912) are also above the recommended threshold of 0.70. Therefore, the constructs can be considered reliable. In addition, the AVE values for Human Resource Competency Improvement (0.732), Sustainable Skills Training (0.764), and SDG Achievement - Decent Work and Economic Growth (0.777) are above 0.50, indicating that each construct has adequate convergent validity (Hair, *et al*, 2017).

Table 2. Convergent Validity Testing

Indicators	Outer	AVE
KSDM1	0,869	0,732
KSDM2	0,889	
KSDM3	0,809	
KSDM4	0,852	
PKB1	0,763	0,764
PKB2	0,748	
PKB3	0,903	
PKB4	0,726	
PKB5	0,914	
PSDGs1	0,923	0,777
PSDGs2	0,790	
PSDGs3	0,924	

Source: SmartPLS Output, 2025.

Based on the outer loading results, all indicators have values above 0.70. This indicates that each indicator adequately represents its respective construct. Therefore, the measurement model demonstrates acceptable indicator reliability and convergent validity. However, further assessment of discriminant validity is required to ensure that each construct is empirically distinct from the others.

Discriminant Validity

Discriminant validity was assessed using the Fornell-Larcker Criterion and HTMT. The Fornell-Larcker Criterion compares the square root of AVE with the correlations among latent constructs. The results are presented in Table 3.

Table 3. Fornell-Larcker Criterion

	Sustainable Skills Training	SDG Achievement	HR Competence Improvement
Sustainable Skills Training (PKB)	0.875		
SDG Achievement (PSDGs)	0.792	0.881	
HR Competence Improvement (KSDM)	0.915	0.933	0.855

Source: SmartPLS Output, 2025

The Fornell-Larcker results indicate that discriminant validity was not fully established. The diagonal values represent the square root of AVE for each construct. Although the diagonal value for SDG Achievement is higher than its correlation with Sustainable Skills Training, several construct correlations exceed the diagonal values. In particular, the correlation between HR Competence Improvement and SDG Achievement is 0.933, which is higher than the square root of AVE for HR Competence Improvement (0.855). This indicates that the two constructs are highly correlated and may not be sufficiently distinct.

To further assess discriminant validity, the HTMT criterion was also examined

Table 4. Heterotrait-Monotrait Ratio (HTMT)

Relationship	HTMT Value	Decision
Sustainable Skills Training - SDG Achievement	0.921	Not fully acceptable
Sustainable Skills Training - HR Competence Improvement	1.037	Problematic
HR Competence Improvement - SDG Achievement	1.074	Problematic

The HTMT results further confirm the discriminant validity concern. All HTMT values exceed the recommended threshold of 0.90. The HTMT value between Sustainable Skills Training and SDG Achievement is 0.921, between Sustainable Skills Training and HR Competence Improvement is 1.037, and between HR Competence Improvement and SDG Achievement is 1.074. These results indicate substantial overlap among the constructs, particularly between HR Competence Improvement and SDG Achievement. Therefore, although the constructs show acceptable reliability and convergent validity, discriminant validity has not been fully achieved and the results should be interpreted cautiously.

Structural Model Quality Criteria

After evaluating the measurement model, the structural model was assessed using R-square, Q-square predictive relevance, and SRMR. R-square was used to evaluate the explanatory power of the model, Q-square was used to assess predictive relevance, and SRMR was used to evaluate model fit.

Table 5. R-Square

	R Square	R Square Adjusted
SDG Achievement (PSDGs)	0,893	0,891
HR Competence Improvement (KSDM)	0,837	0,835

Source: SmartPLS Output, 2025

The R-square value for SDG Achievement is 0.893, indicating that Sustainable Skills Training and HR Competence Improvement explain 89.3% of the variance in SDG Achievement. Meanwhile, the R-square value for HR Competence Improvement is 0.837, indicating that Sustainable Skills Training explains 83.7% of the variance in HR Competence Improvement. These values indicate that the model has strong explanatory power. However, the interpretation of these values should be made cautiously because the discriminant validity results indicate high correlations and overlap among the constructs.

Predictive relevance was assessed using Q-square. In this study, Q-square was calculated manually based on the R-square values of the endogenous constructs using the formula $Q^2 = 1 - [(1 - R^2_1) \times (1 - R^2_2)]$. The R-square value for SDG Achievement was 0.893, while the R-square value for HR Competence Improvement was 0.837. Based on this calculation, the Q-square value was 0.983. Since the Q-square value is greater than zero, the model has strong predictive relevance. However, this value should be interpreted as a global predictive relevance estimate based on R-square values, while future studies may further validate predictive relevance using Blindfolding or PLSpredict in SmartPLS

The Q-square value was calculated as follows:

$$Q^2 = 1 - [(1 - 0.893) \times (1 - 0.837)]$$

$$Q^2 = 1 - (0.107 \times 0.163)$$

$$Q^2 = 1 - 0.017$$

$$Q^2 = 0.983.$$

Table 6. Q-Square Predictive Relevance

Construct	R-square	1 - R-square
SDG Achievement - Decent Work and Economic Growth	0.893	0.107
HR Competence Improvement	0.837	0.163
Q-square Predictive Relevance		0.983

Source: Processed SmartPLS Output, 2025.

The Q-square value of 0.983 indicates that the model has strong predictive relevance. This means that the structural model has substantial predictive ability for the endogenous constructs. Nevertheless, because the Q-square value was calculated manually from R-square values, future research is recommended to confirm predictive relevance using Blindfolding or PLSpredict in SmartPLS.

Model fit was assessed using the Standardized Root Mean Square Residual (SRMR). The result is presented in Table 7.

Table 7. SRMR (Goodness of Fit)

	Saturated Model	Estimated Model
SRMR	0,100	0,100

Source: SmartPLS Output, 2025

The SRMR value for both the saturated model and the estimated model is 0.100. This value indicates marginal model fit. Therefore, the model should not be described as having strong or good fit. Instead, the SRMR result should be interpreted cautiously and acknowledged as a limitation, particularly because the discriminant validity results show high overlap among constructs.

The structural model demonstrates strong explanatory power based on the R-square values. However, the model also shows important limitations. The HTMT values exceed the recommended threshold, indicating discriminant validity concerns, while the SRMR value of 0.100 indicates marginal model fit. Therefore, although the model explains a large proportion of variance in SDG Achievement, the findings should be interpreted cautiously and future research should refine the measurement model.

Collinearity Assessment

The results show that the inner VIF values for Sustainable Skills Training and HR Competence Improvement as predictors of SDG Achievement were both 6.117. Since these values exceed the recommended threshold of 5, the structural model indicates a serious multicollinearity concern. This finding helps explain why the path coefficient for the relationship between HR Competence Improvement and SDG Achievement exceeded the conventional standardized coefficient range.

Table 8. Collinearity Statistics

Relationship	Inner VIF	Decision
Sustainable Skills Training → SDG Achievement	6.117	Multicollinearity concern
HR Competence Improvement → SDG Achievement	6.117	Multicollinearity concern
Sustainable Skills Training → HR Competence Improvement	1.000	No collinearity concern

Source: SmartPLS Output, 2025.

The collinearity results indicate that Sustainable Skills Training and HR Competence Improvement are highly correlated when predicting SDG Achievement. Therefore, the path coefficient of HR Competence Improvement to SDG Achievement, which exceeded 1.0, should not be interpreted as an exceptionally strong substantive effect. Instead, it should be understood as a possible indication of multicollinearity, suppressor effect, or model specification problems. Thus, the structural model results should be interpreted cautiously.

Structural Model Evaluation

The next step after evaluating the measurement model is to evaluate the structural model to test the previously proposed hypothesis. This analysis was carried out by examining the direct and indirect influence between the hypothesized variables. Table 3 below are the results of the PLS-SEM analysis.

Table 8. Hypothesis Test Results

Hypotesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDE)	P Values
Continuous Skills Training -> Achievements SDGs (<i>Decent Work and Economic Growth</i>)	0,373	0,376	0,092	4,068	0,000
Continuous Skills Training -> Increased Competence SDM	0,915	0,915	0,022	41,119	0,000
Increased Competence SDM -> Achievements SDGs (<i>Decent Work and Economic Growth</i>)	1,274	1,276	0,079	16,199	0,000
Continuous Skills Training -> Increased Competence SDM -> Pencapaian SDGs (<i>Decent Work and Economic Growth</i>)	1,165	1,168	0,083	14,043	0,000

Source: SmartPLS Output, 2025.

The hypothesis testing results indicate that Sustainable Skills Training has a strong and significant effect on HR Competence Improvement. However, the structural results should be interpreted cautiously because the path coefficient for HR Competence Improvement to SDG

Achievement exceeded the conventional standardized range, while the collinearity assessment indicated VIF values above the recommended threshold. Therefore, the significance of the paths should not be interpreted without considering the presence of multicollinearity and discriminant validity concerns. Continuous Skills Training has a significant effect on SDG Achievement and HR Competence Improvement. In addition, HR Competence Improvement significantly influences SDG Achievement. The indirect effect result also confirms that HR Competence Improvement mediates the relationship between Continuous Skills Training and SDG Achievement (Decent Work and Economic Growth).

The next step after evaluating the measurement model is to evaluate the structural model to test the previously proposed hypothesis. This analysis tested the direct and indirect influences between the hypothesized variables. Figure 1 below shows the results of the PLS-SEM analysis.

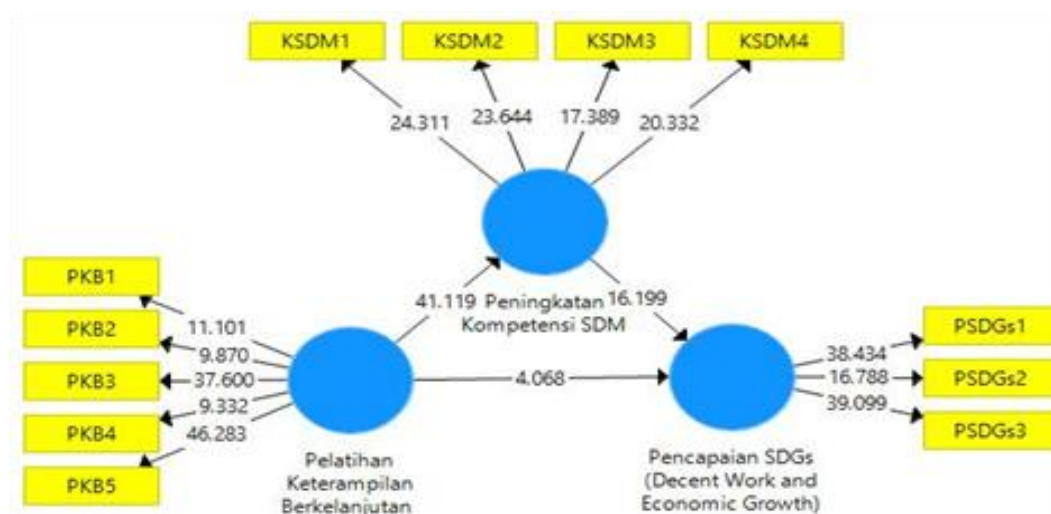


Figure 1. Structural Model Testing

The structural model shows that Sustainable Skills Training has a strong and significant effect on HR Competence Improvement ($\beta = 0.915$; $t = 41.119$). HR Competence Improvement also significantly predicts SDG Achievement, but the coefficient value exceeds the conventional standardized range ($\beta = 1.274$; $t = 16.199$), indicating the need for cautious interpretation. These results suggest that HR Competence Improvement plays an important mediating role in linking Sustainable Skills Training to SDG Achievement. However, the structural relationship requires further refinement due to multicollinearity and discriminant validity concerns.

Discussion

The findings of this study indicate that Sustainable Skills Training contributes to the achievement of SDG 8: Decent Work and Economic Growth mainly through the improvement of Human Resource Competence. This result suggests that training activities do not automatically produce sustainable development outcomes unless they are transformed into measurable competencies that can support extension services, farmer empowerment, productivity improvement, and decent work practices. In the context of Agricultural Extension Centers (BPP), HR competence becomes a central mechanism that connects training programs with broader SDG-oriented outcomes.

This finding is consistent with Human Capital Theory (Becker, 1964) which argues that investment in training and education strengthens individual capability and work productivity. It also aligns with the findings of Sadono, D., et al (2021), who demonstrated that structured

training positively influenced the competence and performance of agricultural extension workers in West Java, and Anderson, J.R., & Smith (2022), who confirmed that continuous training improves the effectiveness of agricultural extension workers at the international level. However, the present study extends these earlier findings by placing the training-competence relationship within an SDG achievement framework. This provides a more specific contribution because the study does not only examine training as a human resource development activity but also connects it with the achievement of SDG 8 in a local agricultural extension institution.

The novelty of this study lies in its emphasis on HR competence as the main mechanism through which Sustainable Skills Training contributes to SDG achievement. Previous studies have generally examined the effect of training on competence, performance, or organizational outcomes separately. In contrast, this study integrates training, competence development, and SDG achievement into a single SEM-PLS model. This approach is consistent with Strategic Human Resource Development (SHRD), which emphasizes that human resource development must be linked to organizational strategies and broader development agendas (Garavan, T. N., et al, 1999). Therefore, the contribution of this study is not merely to confirm that training is important, but to show that training becomes meaningful for SDG achievement when it produces practical and measurable improvements in human resource competence.

The relationship between HR Competence Improvement and SDG Achievement also supports the logic of Dynamic Capabilities Theory (Shuen, 1997), which argues that internal capabilities enable organizations to adapt to environmental change and achieve strategic outcomes. This finding is also in line with Wibowo, A., & Haryanto (2022), who found that HR competence plays a mediating role in the relationship between training and SDG achievement in the agricultural sector (Wilson, M., & Thompson, 2023), who confirmed that human resource development supports SDG 8 achievement at the organizational level. However, the present study differs from those previous studies because the relationship between HR Competence Improvement and SDG Achievement in this model produced an unusually high path coefficient.

The path coefficient for the relationship between HR Competence Improvement and SDG Achievement was 1.274. This value requires careful interpretation because standardized path coefficients in PLS-SEM are generally expected to fall within the range of -1 to +1. Therefore, the coefficient should not be interpreted as an exceptionally strong substantive effect. Instead, it should be understood as a possible indication of multicollinearity, suppressor effect, or model specification problems. This interpretation is supported by the discriminant validity and collinearity results, where the correlation between HR Competence Improvement and SDG Achievement was very high, the HTMT values exceeded the recommended threshold, and the inner VIF values for predictors of SDG Achievement exceeded the recommended limit. These results indicate that HR Competence Improvement and SDG Achievement may not be sufficiently distinct in the current model.

The high association between HR Competence Improvement and SDG Achievement may be explained by the institutional context of BPP. Agricultural extension workers with higher competence are directly involved in activities that are closely related to SDG 8 outcomes, such as improving farmer capacity, supporting agricultural productivity, strengthening decent work practices, and encouraging local economic growth. As a result, respondents may perceive HR competence and SDG achievement as closely connected outcomes. This contextual condition helps explain why the relationship between HR competence and SDG achievement appears very strong in the model. However, this explanation does not eliminate the need for model refinement in future studies.

The indirect effect of Sustainable Skills Training on SDG Achievement through HR Competence Improvement reinforces the important mediating role of competence development. In the perspective of the Mediation Model (Baron, R. M., & Kenny, 1986), this pattern suggests that competence functions as the pathway through which training contributes to development outcomes. This finding extends the work of (Nugroho, R., & Sulistyowati, 2023), who documented the effectiveness of continuous training in improving extension worker competence, by showing that competency improvement can also be linked to SDG 8 achievement. It also differs from (Martinez, C., & Rodriguez, 2023), whose study focused more on the relationship between training programs and SDG achievement at the program level without explicitly examining HR competence as a mediating mechanism.

The findings also differ from studies that assume a direct and straightforward relationship between training and development outcomes. In this study, training contributes positively to SDG achievement mainly through HR competence improvement. This suggests that training activities alone may not be sufficient to produce sustainable development outcomes if they are not followed by real improvements in knowledge, skills, attitudes, and field-level application. Thus, the present study provides a more nuanced explanation of how training contributes to SDG 8 achievement in agricultural extension institutions.

The Capability Approach (Sen, 2020), provides an additional perspective for interpreting these findings. In this approach, human beings are not merely production factors, but active agents of development who require capabilities to participate in economic and social progress. Sustainable Skills Training can therefore be understood as a capability-enhancing intervention that equips agricultural extension workers with the knowledge and skills needed to support decent work and inclusive economic growth. This interpretation is consistent with Pratiwi, S., & Rahman (2022), who found that human resource development contributes to decent work outcomes in the Indonesian agricultural sector, and Chen, L., & Kumar (2022), who emphasized the importance of competence in supporting decent work indicators.

From a practical standpoint, the findings highlight the importance of competency-based training design. In the framework of the Learning Organization (Senge, 1990), institutions that continuously develop internal capacity are better positioned to respond to changing development demands. For BPP, this means that training programs should not be evaluated only based on the number of participants or frequency of implementation. Instead, training should be assessed based on whether it produces measurable competence improvements, better extension services, stronger farmer assistance, and outcomes that are aligned with SDG 8 indicators.

This study contributes to the literature by showing that human resource development is not merely a supporting function, but a central mechanism in achieving inclusive and sustainable economic progress. While previous development approaches often emphasize infrastructure, technology transfer, or policy reform, this study highlights the importance of cultivating human competence through structured and continuous training. Nevertheless, the findings should be interpreted cautiously because the model shows high inter-construct correlations, discriminant validity concerns, multicollinearity, and a path coefficient exceeding the conventional standardized range. Future studies should refine the measurement indicators, test alternative model specifications, and distinguish more clearly between HR competence as an internal capability and SDG achievement as a broader development outcome.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that Sustainable Skills Training contributes to SDG 8 Achievement mainly through HR Competence Improvement among agricultural extension

workers at the Agricultural Extension Center (BPP) in Indragiri Hilir Regency. The model demonstrates strong explanatory power, as indicated by the R-square values for SDG Achievement and HR Competence Improvement. However, the findings should be interpreted cautiously because the model shows discriminant validity concerns, multicollinearity, and marginal model fit.

The path coefficient for HR Competence Improvement to SDG Achievement exceeded the conventional standardized range, indicating that the relationship may be affected by multicollinearity, suppressor effect, or model specification problems. Therefore, the results should be understood as evidence of a strong mediated relationship between training, competence, and SDG achievement, rather than as proof of an unusually large direct causal effect. These findings remain theoretically relevant to Human Capital Theory (Becker, 1964), Dynamic Capabilities Theory (Teece, 2018) and the Capability Approach (Sen, 2020) but their empirical interpretation should remain cautious due to the statistical limitations identified in the model.

Limitations of this Study. Although this study provides meaningful theoretical and empirical insights, several limitations must be acknowledged. First, the cross-sectional design captures a single point in time, which limits the ability to draw definitive causal conclusions about the relationships between Sustainable Skills Training, competency development, and SDG achievement. Thus, causal claims arising from this study should be interpreted with caution, and longitudinal research designs are recommended to track how competencies develop over time and how they cumulatively influence sustainable development outcomes. Second, the scope of research is limited to a specific institutional context the Agricultural Extension Center (BPP) in Indragiri Hilir Regency which constrains the generalizability of findings to other sectors or geographical regions. Factors such as organizational culture, leadership support, and regional economic conditions may moderate the observed relationships and warrant investigation in future comparative studies. Third, while the study integrates several key theoretical frameworks, potentially relevant variables such as organizational support, digital readiness, employee motivation, and leadership quality were not included in the structural model. These variables may act as moderators or additional mediators and their inclusion in future research could enhance the comprehensiveness of the model. Additionally, the high inter-construct correlations observed in the discriminant validity assessment suggest the need for further model refinement, including VIF diagnostics and possible construct re-specification. This study also has important statistical limitations. First, discriminant validity was not fully achieved, as indicated by HTMT values exceeding the recommended threshold and high correlations among constructs. Second, the inner VIF values for predictors of SDG Achievement exceeded 5, indicating multicollinearity in the structural model. Third, the path coefficient for HR Competence Improvement to SDG Achievement exceeded the conventional standardized coefficient range, suggesting a potential suppressor effect or model specification problem. Fourth, the SRMR value of 0.100 indicates marginal model fit. Finally, the Q-square value was calculated manually from R-square values; therefore, future studies should validate predictive relevance using Blindfolding or PLSpredict in SmartPLS.

Theoretical Implications. This study advances the literature by integrating Human Capital Theory, Dynamic Capability Theory, and the Capability Approach into a coherent mediational model that empirically links training, competence, and sustainable development outcomes. The confirmation of HR competence as a strong mediator enriches existing Strategic Human Resource Development (SHRD) frameworks and adds conceptual depth to the discourse on SDG implementation at the organizational level. Distinctively, this study goes beyond prior research by situating the training-competence-SDG chain within a rural agricultural extension institution in a developing-country context, a combination that has

received limited empirical attention. Future research can build on this foundation to propose more holistic frameworks that integrate micro-level HRD practices with macro-level development outcomes across diverse institutional contexts.

In addition, the findings highlight a critical gap in HRD research as it pertains to sustainability: the need to reconceptualize human capital not merely as an economic input, but as a transformative force capable of driving inclusive development outcomes. This perspective, informed by Sen's Capability Approach (1999), provides a normative foundation for future research that seeks to understand how workforce development programs can be designed with explicit regard for human agency and sustainable development.

Practical Implications. From a policy and management perspective, the findings underscore the need for agricultural extension institutions and government agencies to shift their focus from the quantity of training delivery to the quality and competency outcomes of training programs. Sustainable Skills Training must be strategically aligned with both organizational performance goals and the national SDG agenda. Programs should be designed using competency frameworks, include continuous monitoring of learning outcomes, and be regularly evaluated for their contribution to decent work indicators.

Moreover, institutions such as BPP must develop an integrated learning ecosystem that continuously assesses, monitors, and strengthens the competence of extension workers. This system should be adaptive, data-driven, and explicitly oriented toward sustainable development outcomes. Investment in human resource development, when structured to produce measurable competency gains, represents one of the most effective pathways toward the realization of Decent Work and Economic Growth as envisioned in the 2030 SDGs Agenda.

REFERENCES

- Anderson, J.R., & Smith, K. (2022). The Impact of Continuous Skill Training on Agricultural Extension Workers' Performance. *International Journal of Agricultural Extension*, 10(2), 123–138.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173.
- Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press.
- Chen, L., & Kumar, P. (2022). Competency Development and Decent Work in Agricultural Extension Services. *International Journal of Rural Development*, 8(3), 234–249.
- Garavan, T. N., Costine, P., & Heraty, N. (1999). *Training and development in Ireland: Context, policy and practice*. Oak Tree Press.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2017). *Multivariate Data Analysis*. (8th ed.). Pearson.
- Johnson, R., & Williams, P. (2022). Measuring the Effectiveness of Sustainable Skill Development in Agricultural Extension. *Journal of Agricultural Education and Extension*, 28(4), 378–393.
- Kusuma, H., & Wijaya, A. (2022). Evaluasi Program Pelatihan dan Dampaknya terhadap Kinerja Penyuluh di BPP. *Jurnal Manajemen Agribisnis*, 11(1), 78–92.
- Martinez, C., & Rodriguez, S. (2023). Agricultural Extension Training Programs and SDGs Achievement: A Global Perspective. *World Development*, 158, 105–120.
- Nugroho, R., & Sulistyowati, L. (2023). Efektivitas Program Pelatihan Berkelanjutan dalam Meningkatkan Kompetensi Penyuluh Pertanian. *Jurnal Administrasi Publik*, 7(1), 45–57.

- Pratiwi, S., & Rahman, A. (2022). Implementasi SDGs Nomor 8 dalam Pengembangan SDM Sektor Pertanian. *Jurnal Kebijakan Pembangunan*, 17(2), 167–182.
- Sadono, D., Sumardjo, & Gani, D. S. (2021). Pengaruh Pelatihan terhadap Kompetensi dan Kinerja Penyuluh Pertanian di Provinsi Jawa Barat. *Journal of Agricultural Extension*, 17(1), 97–108.
- Sekaran, U., & Bougie, R. (2023). *Research Methods for Business: A Skill Building Approach*. John Wiley & Sons.
- Sen, A. (2020). *Development as Freedom: A Gender Perspective*. Oxford University Press.
- Senge, P. M. (1990). *The Fifth Discipline: The Art & Practice of The Learning Organization*. Doubleday.
- Shuen, D. J. T. G. P. A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509–533.
- Sugiyono. (2023). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Teece, D. J. (2018). Dynamic capabilities and entrepreneurial management in large organizations: Toward a theory of the (entrepreneurial) firm. *European Economic Review*, 108, 202–219.
- Wibowo, A., & Haryanto, T. (2022). Analisis Kompetensi SDM dan Pencapaian Target SDGs di Sektor Pertanian: Studi Kasus di Kabupaten Sleman. *Jurnal Ekonomi Pertanian Dan Agribisnis*, 6(2), 1224–1238.
- Wilson, M., & Thompson, R. (2023). Sustainable Development Goals Achievement through Human Resource Development in Agriculture. *Journal of Sustainable Development*, 16(1), 45–60.