FACTORS THAT INFLUENCE THE PRODUCTIVITY OF PALM OIL HARVESTING LABOR AT PTPN IV PABATU PLANTATION

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ABSTRACT

Labor productivity is a critical factor in determining operational efficiency in the oil palm plantation sector. This study aims to analyze the influence of age, work experience, and wages on the productivity of harvest workers at PTPN IV Pabatu Plantation Unit. A quantitative approach was employed using multiple linear regression. A sample of 80 respondents was selected from the population of permanent harvest workers through random sampling. The results indicate that, simultaneously, the three independent variables significantly affect labor productivity. Partially, age and wages have a significant influence, while work experience does not. Wages were found to be the most dominant factor in enhancing productivity. These findings suggest the need for fair wage policies and performance-based incentive systems to improve harvesting efficiency in plantation operations.
Keywords: productivity, labor, oil palm, wages, age

INTRODUCTION

Oil palm (Elaeis guineensis Jacq.), one of the leading commodities in the plantation sector, plays a vital role in supporting the national economy, both through its contribution to foreign exchange earnings and in creating job opportunities for the wider community. The rapid development of the palm oil industry requires optimal workforce management to achieve more effective and sustainable results, particularly for harvesters, who are the spearhead of the production process in the field. The productivity of harvesting workers significantly determines the operational efficiency of plantations and the quality of the resulting harvest.

Despite technological advancements, the oil palm harvesting process still relies heavily on human labor due to geographic conditions, equipment investment costs, and limited adaptability of mechanical technology. In practice, harvester productivity can be influenced by various factors, including age and length of service, as well as the level of wages received. Being too young or too old can affect physical strength and work endurance, while work experience can determine the accuracy of harvesting techniques, and wages are a direct motivator for harvester enthusiasm and work discipline.

PTPN IV Pabatu Plantation Unit, as a strategic business unit in the palm oil plantation sector, faces monthly productivity fluctuations influenced by various labor factors. To improve harvester productivity, an empirical understanding of the extent to which workers' demographic and economic characteristics influence their performance is necessary. Internal data indicates that unstable harvest output has the potential to impact production targets.

Previous research (Afifah and Lubis, 2016; Bindrianes, 2017) indicates that labor productivity in the plantation sector is significantly influenced by several key variables, such as age, work experience, and wage levels. However, the influence of each variable can vary depending on the local context and characteristics of the company. Therefore, this study is urgent because it aims to identify the most influential elements within the context of PTPN IV Pabatu Plantation Unit.

This study aimed to explore the extent to which age, work experience, and wage levels influence the productivity of oil palm harvesters at PTPN IV Pabatu Plantation Unit, Serdang Bedagai Regency. The findings of this study are expected to provide valuable input for company management in making decisions or formulating policies related to improving work efficiency and maintaining the continuity of the production process.

RESEARCH METHOD

This study adopted a quantitative approach to examine the extent to which age, work experience, and wage level influence the productivity of oil palm harvesters at PTPN IV, Pabatu Plantation Unit, located in Serdang Bedagai Regency. The data analysis process utilized multiple linear regression, interpreted using SPSS version 25.0 software. Primary data was obtained by distributing questionnaires to predetermined respondents, accompanied by in-person interviews at the research location.

The subjects in this study were permanent daily workers assigned to the harvesting department, spread across seven departments. The sample was determined using proportional random sampling, calculated using the Slovin formula with a margin of error of 10%. Based on this approach, 80 respondents were selected from a total population of 248 workers. The regression analysis model used in this study is formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Prior to hypothesis testing, classical assumptions were tested to assess whether the regression model was suitable for further analysis. Data normality was checked through visual interpretation using histograms and normal curves in P-P plots. Meanwhile, to identify potential multicollinearity between independent variables, analysis was conducted using tolerance values and variance inflation factors (VIF), and heteroscedasticity testing was performed using residual scatterplots. Furthermore, hypothesis testing was conducted by simultaneously examining the effect of the three independent variables on productivity using the F-test. To determine the extent to which each independent variable exerts an individual influence, a t-test was used. Furthermore, to assess the extent to which the independent variables explain changes or variations in the dependent variable, the adjusted coefficient of determination (Adjusted R^2) was tested. This methodology is designed to provide an empirical overview of the dominant variables influencing the performance of oil palm harvesters at the study site, with the hope of providing a basis for company policy recommendations.

RESULTS AND DISCUSSION

Classical Assumption Test Results

The regression model was first tested using the classical assumption test to ensure the model's adequacy in explaining the relationships between variables. The results of the normality test using the histogram and normal P–P plot approaches showed a residual distribution resembling a bell-shaped normal curve, although statistically the Asymp. Sig. value of 0.049 was slightly below the 0.05 significance level. This indicates

that the distribution is not completely normal, but remains acceptable due to the visual distribution tending to be normal and the sample size being quite large (n = 80).
The results of the multicollinearity analysis showed that all independent variables had a Tolerance value above 0.1 and a VIF below 10. This leads to the conclusion that there is no strong correlation between the independent variables in the regression model used. Meanwhile, based on the results of the heteroscedasticity test, the distribution of residual points appears random and scattered without showing a consistent pattern. Thus, it can be concluded that the regression model used is free from heteroscedasticity issues.

Table 1. Classical Assumption Test Results

Type of The Test	Indicator	Value	Description
Normality	Asymp. Sig (K-S Test)	0,049	The data is visually close to normal.
Multicolinearity	VIF (Age / Experience / Wage)	1,704 / 1,707 / 1,008	No multicollinearity occurs.
Heteroscedasticity	Scatterplot of Dot Patterns	Spread randomly	No heteroscedasticity occurs.

Multiple Linear Regression Test Results
This study used a multiple linear regression approach to evaluate the simultaneous influence of the independent variables—age, length of work experience, and wage level—on the focus of the study's variables, namely, labor productivity. The results showed that these three independent variables simultaneously exerted a significant influence on labor productivity, as indicated by the calculated F-value of 19.031 with a significance level of 0.000. This result indicates that the regression model applied in this study can be declared statistically valid.
The Adjusted R^2 value of 0.406 indicates that the model can explain approximately 40.6% of the variation in labor productivity. The remaining 59.4% is attributed to the influence of other variables outside the research model, such as work environment conditions, harvesting equipment, or internal labor motivation.

Table 2. F Test Results and Coefficient of Determination

Statistical	Value	Description
F-Count	19,031	> FTable (2,79), significant
Significant (p-value)	0,000	< 0,05, signifikan
Adjusted R^2	0,406	Model Explained 40,6% variable Y

Partial Effect Test Results (t-Test)
Partially, the effect of each variable was tested using a t-test. The analysis results indicated that age and wage level had a significant impact on labor productivity, while work experience did not show a significant effect in the analyzed model. Age had a significance value of 0.042 with a positive coefficient, indicating that as age increases within the productive range, productivity tends to increase. This aligns with the theory that productive age provides greater resilience and work efficiency.
Work experience showed a p-value of 0.583, well above 0.05, indicating that this factor did not contribute significantly to productivity. This may be due to the homogeneity of

experience among respondents or a fixed employment system that reduces the variation in the impact of experience.

The wage variable showed the most significant result with a p-value of 0.000, making it the most dominant factor. Increased wages have been shown to provide a strong motivational boost to harvest labor performance.

Table 3. Result of T Test

Variable	Coefisien (B)	t-count	Sig. (P-value)	Description
Ages (X_1)	0,741	2,067	0,042	Significant
Work Experience (X_2)	0,393	0,551	0,583	Not Significant
Wage (X_3)	1.922E-5	6,934	0,000	Very Significant

Interpretation of Findings and Practical Implications

The analysis of this study reveals that of the three variables analyzed, wages play the strongest role in determining the productivity of oil palm harvesters at PTPN IV's Pabatu Plantation Unit. This is indicated by a very low significance value and a positive coefficient. Practically, this finding confirms that an adequate wage system, including performance-based incentives and premiums, can be an effective instrument for encouraging increased labor productivity. Workers tend to demonstrate higher performance when they receive rewards commensurate with their workload and harvest results.

In addition to wages, age was also found to have a significant effect on productivity. This suggests that workers within the productive age range tend to have the physical abilities, discipline, and job stability that support harvest performance. Conversely, workers who are too young or too old may face limitations in terms of endurance and accuracy in the field. Therefore, human resource management strategies in plantation companies should consider employee selection and placement policies based on an optimal age range, as well as encourage workforce regeneration through training and recruitment of productive-age workers.

Meanwhile, work experience did not significantly influence productivity. These findings can be interpreted as indicating that the work experience of harvest workers at the research site is relatively homogeneous, or that the company's work system is standardized, reducing the variation in the impact of experience on work output. Therefore, the company needs to review the effectiveness of its training programs, field supervision, and the development of experienced workers to ensure they remain relevant and contribute significantly to productivity gains.

Overall, the results of this study provide important input for company managers to prioritize policies to improve workforce welfare, particularly through transparent and fair wage and incentive systems. Furthermore, it is necessary to develop a workforce age management program to maintain productivity, as well as evaluate the effectiveness of work experience as a predictor of performance.

CONCLUSION

The main focus of this study was to evaluate the extent to which age, work experience, and wage levels influence the productivity of oil palm harvesters at PTPN IV's Pabatu Plantation Unit. Based on data processing using multiple linear regression, it was found that these three independent variables collectively exert a significant influence on productivity. However, when viewed separately, only age and wages were shown to have a significant impact on worker performance, while work experience showed no significant

effect.

Wage was the most dominant variable in increasing productivity, demonstrating the importance of a fair and performance-based compensation system in encouraging motivation and work efficiency. Age also had a significant influence, indicating the need for workforce management that considers the balance of productive ages in the field. Conversely, work experience was not a strong predictor of harvest performance, necessitating an evaluation of existing training and development systems.

The findings of this study have practical implications for human resource management within the plantation sector, enabling companies to formulate productivity-boosting policies through more targeted and measurable wage management, work age structures, and workforce development programs.

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