

THE EFFECT OF EMPLOYEE NUMBER AND COMPETENCE ON WORKPLACE EFFECTIVENESS, WITH EDUCATION AS A MODERATING VARIABLE FOR EMPLOYEES IN THE TRADE AND CUSTOMER MANAGEMENT DIVISION, AND IN FINANCE, COMMUNICATION, AND GENERAL AFFAIRS AT PT PLN (PERSERO) MAIN DISTRIBUTION UNIT IN NORTH SUMATRA

Yasmir Lukman¹⁾, Kiki Farida Ferine²⁾, Sri Rahayu³⁾

¹⁾Master of Management Student, Universitas Pembangunan Panca Budi

^{2),3)}Master of Management, Universitas Pembangunan Panca Budi

E-mail: yasmir.lukman82@gmail.com

Correspondence author: kikifaridaferinesyarif@ymail.com

srirahayu@dosen.pancabudi.ac.id

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Abstract

This study aims to analyze the influence of the number of employees and competency on the effectiveness of work results with education as a moderating variable on employees in the Commerce and Customer Management Division and the Finance, Communication and General Division at PT PLN (Persero) North Sumatra Main Distribution Unit. The research problem stems from the importance of the effectiveness of work results in supporting the sustainability of company operations, especially in the electricity distribution sector which demands efficiency, service quality, and accuracy of employee performance. This type of research is quantitative research using a survey method. The population in this study were all employees in the studied field with a sample of 94 respondents determined through saturated sampling techniques. The research instrument was a questionnaire with a Likert scale. Data were analyzed using Partial Least Square (SmartPLS 3.0). The results of the study indicate that: (1) the number of employees has a positive and significant effect on the effectiveness of work results; (2) competency has a positive and significant effect on the effectiveness of work results; (3) education is unable to moderate the relationship between the number of employees and the effectiveness of work results; and (4) education is unable to moderate the relationship between competency and the effectiveness of work results. The R-square value of 0.693 indicates that 69.3% of the variation in work effectiveness can be explained by the number of employees and their competencies, while the remainder is influenced by factors outside the research model. This finding emphasizes the importance of proportionally increasing the number of employees and developing employee competencies in improving work effectiveness. However, the role of education as a moderating variable has not been proven significant in this study.

Keywords: *number of workers, competence, education, effectiveness of work results, PT PLN (Persero).*

Background

In the era of globalization and increasingly fierce industrial competition, the effectiveness of work results is a key factor in determining the success of an organization, including state-owned enterprises such as PT PLN (Persero). As a company that plays a vital role in providing electricity to the public, employee effectiveness is a crucial aspect in ensuring smooth operations and customer service. Therefore, factors that influence work results effectiveness, such as the number of employees and employee competencies, require further attention. According to data from PT PLN (Persero) North Sumatra Main Distribution Unit (PLN UID Sumut), the number of employees in the Commerce and Customer Management divisions, as well as in Finance, Communications, and General Affairs, continues to experience dynamics influenced by recruitment policies and workforce efficiency. In 2023, the number of employees in both divisions increased by 5%, while work results effectiveness has not shown a significant increase. This raises questions about the extent to which the number of employees and employee competencies contribute to work results effectiveness in the company environment. Several previous studies have discussed the influence of the workforce and competencies on work results effectiveness in various industrial sectors. For example, research by Robbins and

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Judge (2019) found that an adequate workforce and appropriate competencies positively impact work effectiveness. Furthermore, research by Dessler (2020) highlighted the importance of employee competency in improving organizational productivity and performance. Research by Wibowo (2021) showed that work effectiveness can be influenced by various factors, including education as a moderating variable that can strengthen or weaken the relationship between employee competency and work effectiveness. Furthermore, a study by Ghozali (2022) found that increasing the workforce does not always translate to work effectiveness if it is not accompanied by increased competency and adequate training.

Research by Mangkunegara (2020) also revealed that high employee competency can increase work effectiveness, but without adequate education, competency improvement cannot be optimized. Another study by Sutrisno (2021) reinforces this finding by showing that relevant education can strengthen the relationship between employee competency and work effectiveness. Furthermore, research by Handoko (2022) and Siagian (2023) emphasizes the importance of effective human resource management in improving employee work effectiveness. A study by Sedarmayanti (2023) also shows that the effect of workforce size on work effectiveness can be moderated by employee education levels. Research by Nawawi (2024) reveals that education can be a factor that strengthens the relationship between employee competency and work effectiveness in the public sector. Referring to previous research, this research is important to conduct to provide theoretical and practical contributions. Theoretically, this research can add insight into the field of human resource management, particularly regarding the relationship between workforce size, competency, education, and work effectiveness. Practically, the results of this study are expected to provide recommendations for the management of PLN UID North Sumatra in increasing the effectiveness of employee work results through more optimal human resource management strategies.

Identification of problems

PLN UID North Sumatra is currently facing the challenge of improving organizational performance in the era of technology 4.0, requiring sufficient Human Resources (HR) to fill workforce positions and the competency of the HR itself to carry out every existing business process. PLN UID North Sumatra itself aims to achieve organizational performance of 110% of the set target, but has never achieved as expected. Several factors are causing this:

1. The number of workers is not evenly distributed across several sub-fields and units, this causes employee work productivity not to be achieved.
2. HR competencies do not meet the requirements for certain positions, so they do not support the achievement of organizational performance values.
3. Many human resources have educational backgrounds that are different from their current job positions, so it takes time to adjust to the job.

Formulation of the problem

Based on the background that has been described, the problem formulation in this research is as follows:

1. Does the number of workers have a positive and significant effect on the effectiveness of employee work results at PLN UID North Sumatra?
2. Does competence have a positive and significant influence on the effectiveness of employee work results at PLN UID North Sumatra?
3. Does education have a positive and significant effect on the number of workers and the effectiveness of work results at PLN UID North Sumatra?
4. Does the number of workers have a positive and significant effect on the effectiveness of work results moderated by employee education at PLN UID North Sumatra?
5. Does competence have a positive and significant effect on the effectiveness of work results moderated by employee education at PLN UID North Sumatra?

Research purposes

The objectives of this research are:

1. To test and analyze the influence of the number of workers on the effectiveness of employee work results at PLN UID North Sumatra.
2. To test and analyze the influence of competence on the effectiveness of employee work results at PLN UID North Sumatra.

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3. To test and analyze the influence of education on the effectiveness of employee work results at PLN UID North Sumatra.
4. To test and analyze the influence of the number of workers on the effectiveness of work results moderated by employee education at PLN UID North Sumatra.
5. To test and analyze the influence of competence on the effectiveness of work results moderated by employee education at PLN UID North Sumatra.

Benefits of research

1. Theoretical Benefits

1. This research contributes to the development of knowledge in the field of human resource management and organizational behavior, particularly regarding the influence of the number of workers and competence on the effectiveness of employee work results.
2. By including the education variable as a moderating variable, this study also provides a new perspective in understanding the factors that influence the effectiveness of employee work results in the context of electrical service sector organizations.
3. The results of this study can be a reference for other researchers who wish to study similar topics in the future.

2. Practical Benefits

1. Practically, the results of this study are expected to provide input and recommendations for the management of PLN UID North Sumatra in improving the effectiveness of employee work results.
2. This research can be a basis for designing more effective human resource development strategies, forming a positive organizational culture, and creating programs to increase the effectiveness of employee work results that are targeted and sustainable.

Thus, the organization is expected to be able to increase productivity, service quality, and overall target achievement.

LITERATURE REVIEW

Effectiveness of Work Results

According to Hasibuan (2017), work effectiveness is a condition that shows the level of success of management activities in achieving goals including quantity of work, quality of work and timeliness in completing work.

Indicators of work effectiveness

According to Hasibuan (2017) it is as follows:

- a. Predetermined time standards: The effective process of achieving goals is inextricably linked to how long a person can complete a task. The success or failure of a job depends largely on how it is completed.
- b. The results of the work achieved means that the work must be carried out within the planned time, so that the results of the work are in accordance with expectations, both in terms of the quality and quantity of the work that has been carried out.

Factors that influence work effectiveness

According to Hasibuan (2017) the factors that influence work effectiveness

1. Number of Workers– The availability of the required number of employees will facilitate the division of tasks, so that work can be completed more quickly and effectively.
2. Competence– The level of ability, skills, knowledge and work attitude of employees determines the quality of work results.
3. Work motivation– Internal and external motivations that influence employee enthusiasm and seriousness in working.
4. Work Discipline– Compliance with regulations, rules and operational standards applicable within the organization.
5. education and training– The level of formal education and training that employees undergo can improve their knowledge and work skills.
6. Leadership– The style and ability of a leader in directing, supervising, and motivating employees has a big influence on work effectiveness.

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7. Work environment– A comfortable and supportive atmosphere, facilities and working conditions will increase employee productivity.
8. Employee Welfare– Providing adequate compensation, benefits and facilities will make employees more enthusiastic about working.

Expenditures are in accordance with the plan. Budgeting must be in accordance with the previous plan to avoid any misappropriation of funds. Each expenditure is listed in a structured and clear manner so that it is clear how much money is needed to carry out the work.

According to Hasibuan (2017), factors influencing employee performance effectiveness include motivation, job satisfaction, work discipline, and compensation systems. Additionally, factors such as ability, work environment, and leadership also play a significant role.

Number of Workers

According to the Central Statistics Agency (2021), the number of workers is defined as the number of working-age residents who are working or looking for work.

Labor Force Number Indicator

According to BPS (2021) is:

1. Labor Force Participation Rate (LFPR)
The percentage of the workforce to the working age population shows how much of the working age population is active in economic activities, both working and looking for work.
2. Open Unemployment Rate (OPR)
The percentage of the number of unemployed to the workforce shows how many of the workforce are unemployed and looking for work.

Factors that influence the number of workers

According to the Central Statistics Agency (BPS) in 2021, it includes:

- a. number of working age population,
- b. labor force participation rate,
- c. unemployment rate,
- d. level of education,
- e. wage levels, and
- f. economic growth.

Competence

According to Wibowo (2017), competence is all forms of attitudes, motives, skills, knowledge, behavior or other personal characteristics that are important for carrying out work so that they can differentiate between average performance and superior performance.

Competency Indicators

According to Wibowo (2017) it is as follows:

1. Knowledge:
It is information a person possesses in a particular field, which is essential for carrying out their duties and responsibilities. Good knowledge can increase efficiency and effectiveness at work.
2. Skills:
It is the ability to perform a specific task or job well and to the maximum. This skill encompasses both technical skills and the ability to adapt to various situations.
3. Attitude:
Reflects a person's behavioral patterns in carrying out their duties and responsibilities, including their attitude toward work, coworkers, and the company. A positive and professional attitude is essential to creating a conducive and productive work environment.

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Factors that influence competence

According to Wibowo (2017), this includes beliefs and values, skills, experience, personality characteristics, motivation, emotional issues, intellectual abilities, and organizational culture.

Education

According to Hendrayani (2020), education is an effort carried out by a person or group of people to become adults or reach a level of potential in humans that needs to be addressed or responded to.

Education level indicators

According to Hendrayani (2020), it includes:

- a. The formal education dimension with indicators of the last education completed by each worker, including elementary school, middle school, high school and college.
- b. The dimensions of informal education with indicators of attitudes and personality formed by family and environment.

Factors that influence education

According to Hendrayani (2020),

- a. Higher levels of education are generally associated with increased knowledge, skills, and broader insights, which in turn can improve performance.
- b. Work experience also plays an important role in developing individual skills and increasing effectiveness in work.

Conceptual Framework

The following is a conceptual framework that illustrates the relationship between the number of workers, competence, education (as a moderating variable), and the effectiveness of work results.

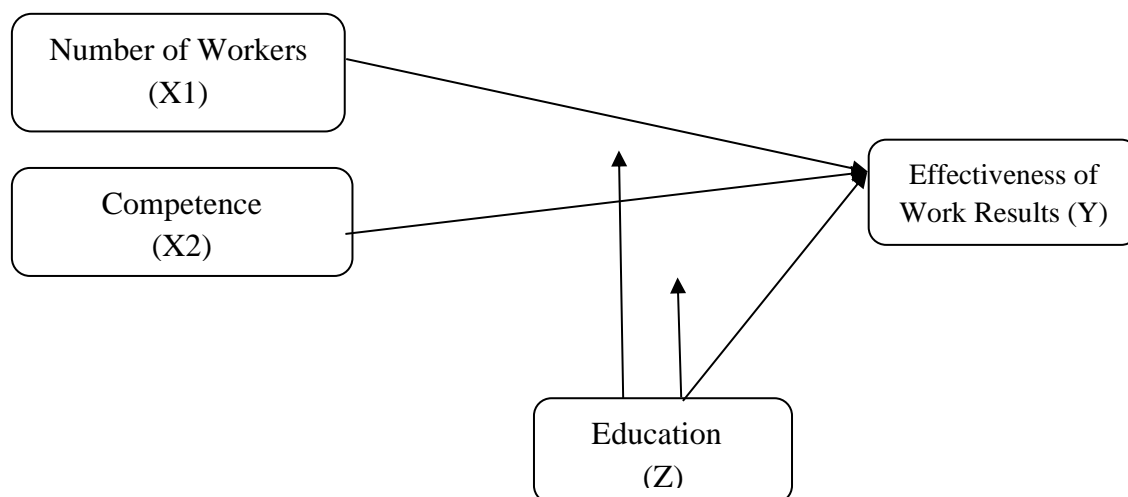


Figure 1. Conceptual Framework

Hypothesis:

- 1. The number of workers has a positive and significant effect on the effectiveness of employee work results at PLN UID North Sumatra.
- 2. Competence has a positive and significant influence on the effectiveness of employee work results at PLN UID North Sumatra.
- 3. Education has a positive and significant influence on the effectiveness of employee work results at PLN UID North Sumatra.

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4. The number of workers has a positive and significant effect on the effectiveness of work results moderated by education at PLN UID North Sumatra.
5. Competence has a positive and significant effect on the effectiveness of work results moderated by education at PLN UID North Sumatra.

Research methods

Types of research

The type of research used is quantitative research. According to Sugiyono (2016), quantitative data is a research method based on positivity (concrete data). Research data consists of numbers that will be measured using statistics as a calculation test tool, related to the problem being studied to produce a conclusion.

Time and Location of Research

This research was conducted in August 2025 for 1 month at PLN UID North Sumatra Jalan KL Yos Sudarso No. 284 Medan.

Data source

The research data sources used by researchers are primary data sources, primary data sources are those from which researchers obtain data directly. Sugiyono (2016) states that primary data sources are data sources that directly provide data to data collectors or researchers.

- a. Primary Data: Collected through a questionnaire distributed to PLN UID North Sumatra employees.
- b. Secondary Data: Derived from company reports, academic literature, and previous research.

Research Population and Sample

a. Population

Population is a generalization area consisting of objects/subjects that have certain qualities and characteristics that are applied by researchers to be studied and drawn conclusions (Sugiyono, 2016). The population used in this study was all employees in the Commerce and Customer Management Division and the Finance, Communication and General Division of PLN UID North Sumatra, totaling 94 employees.

b. Sample

According to Sugiyono (2016), a research sample is part of the number and characteristics of the population. Sampling for this research was carried out using a saturated sampling technique (census). namely sampling by taking the entire population as much as 94 employees of PLN UID North Sumatra.

Data collection technique

The data collection technique used is a questionnaire. Researchers will distribute questionnaires to sample respondents. According to Sugiyono (2016), a questionnaire is a data collection technique carried out by providing a set of written questions or statements to respondents to answer.

Operational Definition of Variables

According to Sugiyono (2016), a variable is an attribute, characteristic, or value of a person, object, or activity that has a certain variation in activity determined by the researcher to be studied and conclusions drawn. In this study, there are two types of variables: independent variables, dependent variables, and moderating variables.

Table 1. Operational Definition of Variables

Variables	Operational Definition	Indicator
Effectiveness of Work Results (Y)	According to Hasibuan (2017), work effectiveness is a condition that shows the level of success of management activities in achieving goals including quantity of work, quality of work and timeliness in completing work.	According to Hasibuan (2017), work effectiveness indicators are as follows: a. Predetermined time standards. b. The results of the work achieved.
Number of Workers (X₁)	According to BPS (2021), the number of workers is defined as the number of working-age residents who are working or looking for work.	According to BPS (2021) there are 2 indicators of the number of workers, namely 1. Labor Force Participation Rate (LFPR). 2. Open Unemployment Rate (OPR).
Competence (X₂)	According to Wibowo (2017), competence is all forms of attitudes, motives, skills, knowledge, behavior or other personal characteristics that are important for carrying out work so that they can differentiate between average performance and superior performance.	According to Wibowo (2017) there are 3 competency indicators as follows: 1. Knowledge 2. Skills 3. Attitude
Education (Z)	According to Hendrayani (2020), education is an effort carried out by a person or group of people to become adults or reach a level of potential in humans that needs to be addressed or responded to.	Education level indicators according to Hendrayani (2020) include: a. Dimensions of formal education. b. Dimensions of informal education.

Data Analysis Model

This study uses Moderated Regression Analysis (MRA) to examine the direct relationship and moderating effect of education on the relationship between workforce size and competency with work effectiveness. Moderated Regression Analysis (MRA) or interaction testing is a specific application of multiple linear regression where the regression equation contains an interaction element (the multiplication of two or more independent variables). This test is conducted to see the significance of the individual influence of the independent variables in the model on the dependent variable. By conducting this test, the statistical values of each independent variable are obtained. One way to test regression with moderating variables is by using interaction testing. The Moderated Regression Analysis (MRA) interaction test is an application of multiple linear regression where the equation contains an interaction element (the multiplication of two or more independent variables). Moderated Regression Analysis uses an analytical approach that maintains sample integrity and provides a basis for controlling the influence of moderator variables. This method is carried out by adding a multiplication variable between the independent variable and the moderating variable. Moderated Regression Analysis (MRA) is a specialized form of multiple linear regression analysis where the regression equation contains an interaction element (the multiplication of two or more independent variables). In

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this study, moderated regression analysis was performed by comparing regression equations to determine the type of moderator variable as follows:

$$Y = a_1 + b_1X_1 + b_4Z + b_5X_1Z + e_1$$

$$Y = a_2 + b_2X_2 + b_3Z + b_6X_2Z + e_1$$

RESULTS AND DISCUSSION

By conducting initial testing of the questionnaire instrument, the accuracy and reliability of the variable and indicator data collected for this study were confirmed. The test results revealed four variables in the model to be used in the study, as listed below:

Outer model

Outer model testing is conducted through several stages. First, convergent validity, which aims to determine the extent to which indicators measuring the same construct have a high correlation. This test is generally assessed by the loading factor value, which should be greater than 0.7, and the Average Variance Extracted (AVE) value, which should exceed 0.5. Second, discriminant validity, which tests whether different constructs are truly empirically separate. Discriminant validity is usually evaluated using the Fornell-Larcker Criterion or HTMT (Heterotrait-Monotrait Ratio) with a value below 0.90. Third, construct reliability testing is conducted to assess the internal consistency of indicators in measuring latent variables. Construct reliability is assessed using Composite Reliability (CR), with an ideal value above 0.7 and Cronbach's Alpha, which is also recommended to be greater than 0.7.

Convergent Validity

Convergent validity is a test used in the outer model to determine the extent to which indicators within a construct consistently measure the same latent variable. This means that convergent validity tests whether indicators that should be correlated actually have a high correlation. See the following figure:

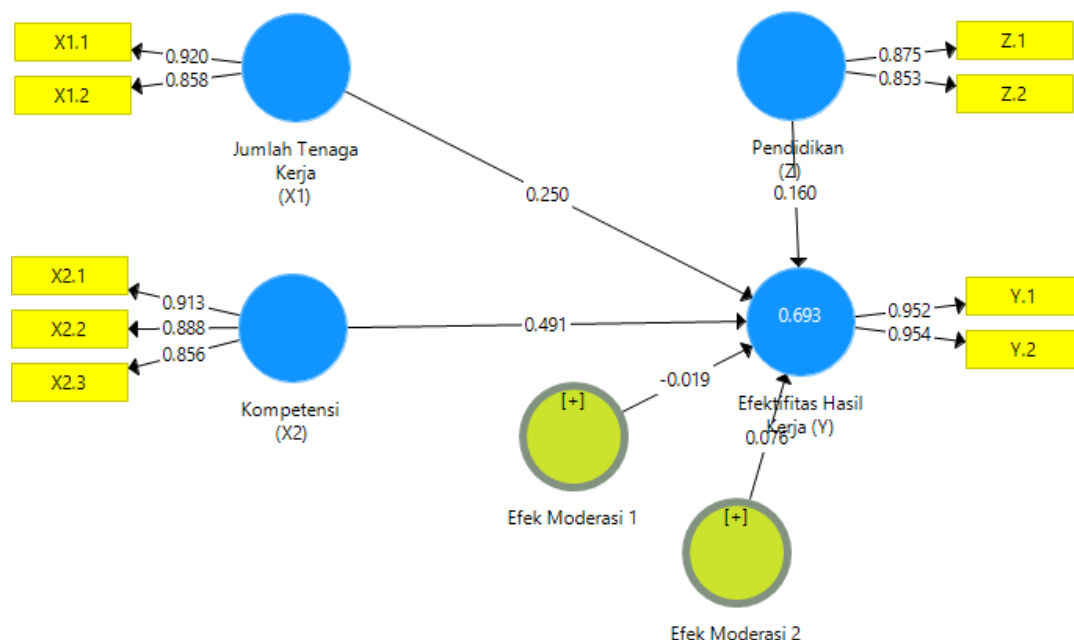


Figure 2. Research Model in SmartPLS

The Smart PLS output for loading factor gives the results in the following table: Outer Loadings In this study there is an equation and the equation consists of two equations.

$$Y = b_1X_1 + b_2Z + b_3X_1Z + e_1$$

$$Y = 0.250 + 0.160 - 0.019 + e_1$$

$$Y = b_2X_2 + b_3Z + b_4X_2Z + e_2$$

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$$Y = 0.491 + 0.160 + 0.076 + e2$$

Table 2. Outer Loadings/Cross Loading

	Educatio n_(Z)_	Moderati on Effect 1	Moderati on Effect 2	Effectivene ss of Work Results (Y)	Number of Workers_(X1) _	Competen ce_(X2)_
Number of Workers_(X1)_ * Education_(Z)_		1,011				
Competence (X2)_ * Education_(Z)_			0.861			
X1.1					0.920	
X1.2					0.858	
X2.1						0.913
X2.2						0.888
X2.3						0.856
Y.1				0.952		
Y.2				0.954		
Z.1	0.875					
Z.2	0.853					

Source: Smart PLS 3,3,3

The results of the convergent validity test indicate that all indicators in the research variables have loading factor values above 0.7. This means that each indicator used is declared valid because it is able to reflect the construct it measures. The Number of Workers variable (X1) is proven valid with two strong indicators, as is the Competence variable (X2) which has three indicators with high loading values. Furthermore, the Work Result Effectiveness variable (Y) shows very high consistency with two indicators that have loading factors above 0.95. The Education variable (Z) as a moderating variable also meets convergent validity with valid indicators. In addition, the moderation test between the number of workers and education and competence with education shows adequate loading values so that the interaction is declared valid. Thus, all constructs in this study have met the criteria of convergent validity, so it can be concluded that the research instrument is suitable for use in the next stage of analysis.

Discriminant Validity

Discriminant validity is a test used to ensure that each construct in a research model is truly distinct from the other constructs. This means that the indicators used to measure one latent variable should not have a higher correlation with another construct than with itself. Thus, discriminant validity provides assurance that each latent variable has unique characteristics and that there is no overlap in its measurements. In PLS-SEM, discriminant validity is typically tested using two main approaches. First, through criteria, the data is as follows:

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Table 2. Discriminant Validity

	Education (Z)	Moderation Effect 1	Moderation Effect 2	Effectiveness of Work Results (Y)	Number of Workers (X1)	Competence (X2)
Number of Workers (X1) * Education (Z)	-0.278	1,000	0.763	-0.152	-0.273	-0.141
Competence (X2) * Education (Z)	-0.170	0.763	1,000	-0.071	-0.166	-0.108
X1.1	0.672	-0.265	-0.098	0.764	0.920	0.818
X1.2	0.596	-0.216	-0.215	0.582	0.858	0.644
X2.1	0.657	-0.061	-0.045	0.741	0.749	0.913
X2.2	0.523	-0.184	-0.170	0.686	0.779	0.888
X2.3	0.668	-0.135	-0.076	0.711	0.682	0.856
Y.1	0.617	-0.126	-0.028	0.952	0.734	0.763
Y.2	0.670	-0.163	-0.107	0.954	0.728	0.773
Z.1	0.875	-0.189	-0.116	0.605	0.661	0.693
Z.2	0.853	-0.296	-0.180	0.561	0.573	0.506

Source: Smart PLS 3,3,3

The results of the discriminant validity test using the Fornell-Larcker Criterion approach show that each construct has a higher indicator correlation value with its own construct compared to other constructs. The variables Number of Workers (X1), Competence (X2), Work Result Effectiveness (Y), and Education (Z) are proven to have unique and non-overlapping indicators. Similarly, the moderating variables formed from the interaction between the number of workers and education and competence and education show discriminant valid results. Thus, it can be concluded that all constructs in this research model have met discriminant validity, so that each latent variable can be clearly distinguished and there is no multicollinearity between constructs. Composite Reliability (CR) is used to assess construct reliability or the internal consistency of indicators in measuring latent variables. CR is considered superior to Cronbach's Alpha because it takes into account the weighting (loading) of each indicator, while Cronbach's Alpha assumes all indicators have the same contribution.

Table 3. Construct Reliability and Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Education (Z)	0.662	0.855	0.747
Moderation Effect 1	1,000	1,000	1,000
Moderation Effect 2	1,000	1,000	1,000
Effectiveness of Work Results (Y)	0.899	0.952	0.909
Number of Workers (X1)	0.742	0.884	0.792
Competence (X2)	0.862	0.916	0.784

Source: Smart PLS 3,3,3

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The results of reliability and convergent validity testing indicate that all research constructs meet the required criteria. The Cronbach's Alpha value for all variables is above 0.6, indicating good internal consistency in the research instrument. Furthermore, the Composite Reliability (CR) value for all constructs is also greater than 0.70, thus concluding that all variables have high reliability. In terms of convergent validity, all variables have an Average Variance Extracted (AVE) value above 0.50, with most even above 0.70. This indicates that most of the indicator variance can be explained by the latent construct it measures. The Work Result Effectiveness (Y) variable has the highest AVE value, namely 0.909, indicating that the indicator used is very strong in representing the construct. Meanwhile, the moderating variables also show perfect results with reliability and AVE values of 1,000. Thus, all constructs in this study can be declared valid and reliable, so that the research instrument is suitable for use in testing the structural model (inner model) in the next stage.

Inner Model Analysis

To ensure the baseline model is accurate and robust, an internal model evaluation is performed. The completed audit phase is one of the indicators taken into account when evaluating the baseline model.

Coefficient of Determination (R2)

By using the SmartPLS 3.0 program to process the data, here's how to determine the R Square value:

Table 4. R Square Results

	R Square	Adjusted R Square
Effectiveness of Work Results (Y)	0.693	0.676

Source: Smart PLS 3,3,3

Based on the results of the inner model test, an R-Square (R²) value of 0.693 was obtained for the variable Work Result Effectiveness (Y). This means that the independent variables consisting of the Number of Workers (X1) and Competence (X2) with the moderating role of Education (Z) are able to explain 69.3% of the variation in employee work result effectiveness. Meanwhile, the remaining 30.7% is influenced by other factors not included in this research model.

Hypothesis Testing

The hypothesis analysis in this study was conducted using the bootstrapping method in the SmartPLS application. The results of the hypothesis testing are seen from the path coefficient values (original sample), T-Statistics values, and P-Values. A relationship between variables can be declared significant if it has a T-Statistics value > 1.96 at a significance level of 5% (two-tailed) or P-Values < 0.05. Thus, the results of this hypothesis test will indicate whether the independent and moderating variables in this study have a significant effect on the dependent variable or not.

Table 5. Hypothesis Results

	Original Sample (O)	T Statistics (O/STDEV I)	P Values	Results
Education (Z) -> Effectiveness of Work Results (Y)	0.160	2,129	0.017	Accepted
Moderation Effect 1 -> Effectiveness of Work Results (Y)	-0.019	0.207	0.418	Rejected
Moderation Effect 2 -> Effectiveness of Work Results (Y)	0.076	0.706	0.240	Rejected
Number of Workers (X1) -> Effectiveness of Work Results (Y)	0.250	2,136	0.017	Accepted
Competence (X2) -> Effectiveness of Work Results (Y)	0.491	4,120	0,000	Accepted

Source: Smart PLS 3,3,3

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Based on the results of data processing using the bootstrapping method in SmartPLS, a summary of the hypothesis test results is obtained as follows:

1. Education (Z) → Work Result Effectiveness (Y) The results show a coefficient of 0.160 with a T-statistic of 2.129 > 1.96 and a p-value of 0.017 < 0.05. This means the hypothesis is accepted. This proves that education has a positive and significant effect on the effectiveness of work results. The higher an employee's education level, the more effective the work results achieved.
2. Moderation Effect 1 (Number of Workforce*Education) → Effectiveness of Work Results (Y) The coefficient value is -0.019 with a T-statistic of 0.207 < 1.96 and a p-value of 0.418 > 0.05. This means the hypothesis is rejected. In other words, education is unable to moderate the effect of workforce size on work effectiveness. The workforce size has a more dominant direct influence than differences in education levels.
3. Moderation Effect 2 (Competence*Education) → Effectiveness of Work Results (Y) The coefficient value is 0.076 with a T-statistic of 0.706 < 1.96 and a p-value of 0.240 > 0.05. This means the hypothesis is rejected. This indicates that education neither strengthens nor weakens the influence of competence on the effectiveness of work results.
4. Number of Workers (X1) → Effectiveness of Work Results (Y) The coefficient value is 0.250 with a T-statistic of 2.136 > 1.96 and a p-value of 0.017 < 0.05. This means that the hypothesis is accepted. The number of workers has a positive and significant effect on the effectiveness of work results. The more adequate the number of workers, the more effective the work results achieved by the organization.
5. Competence (X2) → Effectiveness of Work Results (Y) The coefficient value is 0.491 with a T-statistic of 4.120 > 1.96 and a p-value of 0.000 < 0.05. This means the hypothesis is accepted. Competence has the greatest influence on work effectiveness compared to other variables. The higher the competency an employee possesses, the higher the work effectiveness.

Conclusion

Based on the results of research on the Influence of the Number of Workers and Competence on the Effectiveness of Work Results with Education as a Moderating Variable on PT PLN (Persero) Employees, the following conclusions can be drawn:

1. The number of workers has a positive and significant effect on the effectiveness of work results. This shows that the more appropriate the number of available workers is according to operational needs, the higher the effectiveness of employee work results.
2. Competence has a positive and significant effect on the effectiveness of work results. This means that the higher an employee's competency (knowledge, skills, and abilities), the more effective their work results will be. This variable even has the most dominant influence compared to other variables.
3. Education has a positive and significant effect on the effectiveness of work results. This indicates that the higher the employee's education level, the greater their contribution to increasing work effectiveness.
4. The moderating effect of education on the relationship between the number of workers and the effectiveness of work results is rejected. This means that education is not able to strengthen or weaken the influence of the number of workers on the effectiveness of work results.
5. The moderating effect of education on the relationship between competence and work effectiveness is rejected. This means that education does not act as a variable that strengthens or weakens the influence of competence on the effectiveness of work results.

Suggestion

After obtaining the results of the hypothesis and explaining them and drawing conclusions, the researcher will make the following suggestions:

1. For the management of PT PLN (Persero) It is recommended to plan the workforce more precisely according to operational needs. With an appropriate workforce, the workload will be distributed proportionally, thus achieving optimal work effectiveness.
2. Improving employee competency Competence needs to be prioritized through training, workshops, and certifications tailored to the field of work. This is crucial because competence has been proven to significantly impact the effectiveness of work results.

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3. Employee education should still be considered, for example by encouraging employees to continue their formal and non-formal education. Although education did not act as a moderating variable in this study, it still has a direct positive effect on the effectiveness of work results.
4. Human Resource Management It is best to develop a career development program that is in line with the educational background, so that the theoretical knowledge obtained by employees can be applied directly in the work.
5. For further research, it is recommended to add other variables such as work motivation, organizational culture, job satisfaction, or leadership style, which may provide a more comprehensive picture of the effectiveness of work results.

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