



Multinomial Logistic Regression Analysis of Employee Performance in Certification Service Companies

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ABSTRACT

This research was conducted at a service company engaged in the certification sector. The ability to handle a problem related to certification is the main requirement in determining the quality of services provided by the company. This study uses the Multinomial Logistic Regression Method which aims to find out the general description and the factors that affect employee performance in carrying out their daily work. This study uses primary data collected through online survey sheets for North Jakarta branch employees. The results of the study show that the factors that influence employee performance in certification service companies are the competence of the workforce in the form of Bachelor's degree educational background and work experience. For 6 years and employee training, while other factors have no significant effect.

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INTRODUCTION

Changes in economic conditions as one of the effects of globalization that are currently occurring have resulted in high competition and competition in various companies and have led to the obligation to improve the performance of the company's human resources. The success of an organization cannot be separated from the personal qualities of those working in it. The role of human resource management in organizations is not only administrative but also focuses more on how to improve human resource capabilities so that they become innovative and innovative [1-3].

Development of human resources is carried out through various methods, 2 of which are very important are through learning, upgrading nursery and increasing experience activities. Learning and training for employee training can be obtained through official, informal or non-formal means. Formal nursery training is usually obtained based on employee learning frameworks and also provided by the industry. Competence in the body is raised through mandatory and sincere training activities [4-6].

Industries or certification facilitating bodies are required to carry out evaluations of bodies or industries that are part of their obligations in a fair and consistent manner. In terms of duties and functions, the company must first be able to resolve internal problems in the form of employee performance as actors that lead to certification results for parties outside the company. This fact is a consequence of an organization requiring human resources who have special abilities and expertise in accordance with the vision and goals of the agency [7].

Efforts to develop human resources to improve skills through competence and training in nurseries in the certification service facilitator industry are often carried out in developed countries, but are rarely carried out in developing countries, including in Indonesia. Based on the existence of this research gap, the researchers carried out the research points above. This research was attempted on companies engaged in the certification service provider sector in North Jakarta, DKI Jakarta, with the title Multinomial Logistic Regression Analysis of Employee Performance in Certification Service Companies.

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EXPERIMENTAL METHOD

The research used is descriptive evaluative which means a research procedure that assesses a fair situation or what exists in a condition that is the object of research [8]. The variable relationships that are the focus of the research consist of competency independent variables (X1), training independent variables (X2) and employee performance dependent variables (Y1) as shown in **Figure 1**.

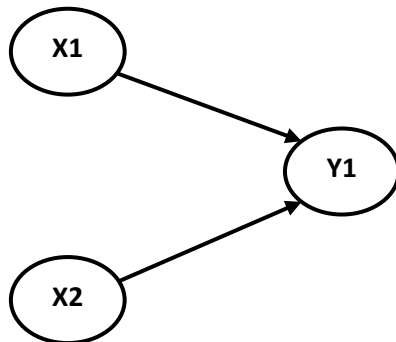


Figure 1. Relationship between variables

Competence is defined as the insight, expertise, and actions of a professional in carrying out a profession [9]. Competence is defined as the attitude of a person who includes knowledge, skills, style, numbers and self-design so that they work more efficiently, win and succeed than others. Markers in competence include trainee encouragement, nursery upgrading character, self-actualization plans, increased knowledge and skills.

Based on Afsan et al, (2012) ability is a specific income obligation that can be measured based on standards of accuracy, overall, pay and dexterity. Ability can also be interpreted as a clear attitude shown by each person as a result of activities obtained by employees according to their position and responsibilities in the industry [10].

According to Dessler, (2017) it is claimed that the factors that influence the ability of a person to carry out activities are their expertise, encouragement, support received, the presence of the profession they are in, and their bond with the agency. The markers used are in the form of quantity, quality, duration accuracy, independence, and usability. Nursery training is a method used to improve the skills, expertise and knowledge of employees by providing the latest data so that they can carry out their work in an efficient manner [11].

Based on various perspectives, nursery education can be defined as a series of legal and consistent learning activities within an organization that aims to improve employee skills [12]. Some of

the markers used in a nursery training include: required modules, the procedures used, the expertise of the nursery training instructor, training tools or principles, nursery training participants, and training assessments.

Multinomial logistic regression is an expansion of binary (2 types) logistic regression if the dependent elastic has more than 2 types [13]. Equipment regression is a solution that can be used to analyze various research problems and aims to find patterns of association between a set of predictor elastics and a categorical or qualitative type of reaction elastic simultaneously. The main objective of equipment regression analysis is to calculate the probability of occurrence or non-event occurrence based on the existing predictor values and to classify research subjects based on the probability threshold. According to Pamungkas, (2007) a form of regression in the usual way can be claimed in a mathematical way such as the meeting below:

$$Y_i = \beta_0 + \beta_i X_i + \varepsilon_i$$

Where,

Y_i : the value of the dependent variable on the i -observation

β_0 and β_i : regression coefficient parameters

X_i : the constant value of the independent variable in the i -observation

ε_i : random errors, $\varepsilon_i \sim N(0, \sigma^2)$ which are not correlated.

$i : 1, 2, 3, \dots, n$

The analysis steps attempted in this research cover several levels, which can be seen as follows:

- a. Carrying out the normality test (Kolmogorov Smirnov)
- b. Linearity test
- c. Multicollinearity test
- d. Heteroscedasticity test
- e. Doing a multinomial logistic model test
- f. Draw a conclusion

RESULTS AND DISCUSSION

Based on the results of distributing the questionnaires tried in this research, the character of the respondents can be recognized as shown in **Table 1**. Respondents had various educational backgrounds with details of SMK/SMA graduates as much as 8.57%; D3 is 5.71% and S1 is 85.71%. When viewed from the company's educational background, it can be categorized as good because it has the most undergraduate educational background compared to other levels of education. Most of the respondents based on gender found that employees with male genitalia accounted for a percentage of

69.44% and female employees with as much as 30.56%. The ratio of the number of male employees is higher because adjustments to the company's operational activities are mostly carried out in the field (site).

Table 1. Respondent characteristics

Criteria	Categories	Frequency <i>n</i> = 36	Percentage
Educations	Undergraduate	30	85.71%
	Diploma	2	5.71%
	Senior High School	3	8.57%
Sex	Female	11	30.56%
	Male	25	69.44%
Age	20-25 years old	11	20.00%
	26-30 years old	8	14.55%
	> 30 years old	36	65.45%
Working Period	< 2 Years	13	36.11%
	2 - 4 Years	4	11.11%
	4 - 6 Years	2	5.56%
	> 6 Years	17	47.22%

Most of the respondents are in the range above 30 years of 65.45% with the most work experience of more than 6 years of 47.22%. This number can reflect that companies engaged in certification services already have sufficiently good qualifications in terms of experts who will carry out certification in accordance with consumer demands. **Table 2** it can be seen that the variables X1 and X2 have Asymp Sig significance (2-tailed) of 0.089 and 0.034 or > 0.03 as a result it can be concluded that the data is distributed (normal). **Table 3** presented that the reliability test results yield a value of 0.741 (Cronbach's Alpha > 0.6) and it can be stated that the data is reliable.

Table 2. Normality test with Kolmogorov Smirnov Method

One-Sample Kolmogorov-Smirnov Test					
		X1	X2	Y1	
N		36	36	36	
Normal Parameters ^{a,b}	Mean	4,3650	4,2131	1,89	
	Std. Deviation	,44924	,54471	,319	
Most Extreme Differences	Absolute	,136	,152	,525	
	Positive	,136	,152	,364	
	Negative	-,116	-,129	-,525	
Test Statistic		,136	,152	,525	
Asymp. Sig. (2-tailed)		,089 ^c	,034 ^c	,000 ^c	
Monte Carlo Sig. (2-tailed)	Sig.	,467 ^d	,333 ^d	,000 ^d	
	97% Confidence Interval	Lower Bound	,456	,323	,000
		Upper Bound	,478	,343	,000

a. Test distribution is Normal.
 b. Calculated from data.
 c. Lilliefors Significance Correction.
 d. Based on 10000 sampled tables with starting seed 1314643744.

Table 3. Reliability test

Reliability Statistics	
Cronbach's Alpha	N of Items
0.741	3

Table 4. Multicollinearity test

Independent Variables	Collinearity Statistics	
	Tolerances	VIF
X1	0.391	2.557
X2	0.391	2.557

Table 4 it can be seen that the VIF values of the independent variables X1 and X2 are 2.557 with a tolerance of 0.391. Tolerances values above 0.1 and VIF values below 10 mean that multicollinearity does not occur. **Figure 2**, can see the scatterplot between the variables, the points spread randomly above or below the value of 0 (zero). As a result, it can be stated that there is no heterodasticity.

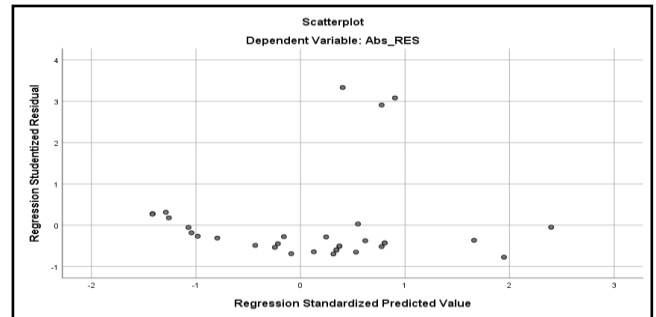


Figure 1. Scatterplot between variables

Table 4. Model Prediction Ability

Observed	Predicted		Percent Correct
	1	2	
1	1	3	25.00%
2	1	31	96.90%
Overall Percentage	5.6%	94.4%	88.90%

Table 4 it can be seen that the overall predictive ability of the model is 88.90%. This value is obtained after simulating the calculation of the multinomial logistic regression model using the SPSS 26 statistical application.

Table 5. Multinomial Logistic Regression Model with SPSS 26

Parameter Estimates									
Y1 ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	97% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
1	Intercept	8,527	6,686	1,626	1	,202			
	X1	,344	1,745	,039	1	,844	1,411	,032	62,182
	X2	-3,054	1,617	3,567	1	,059	,047	,001	1,576

a. The reference category is 2.

Based on the data in **Table 5**, multinomial logistic regression equation can be made as can be seen in the equation below:

$$L_n \left(\frac{P(\text{dominant})}{P(\text{unrelated})} \right) = 8,527 + 0,344X_1 - 3,054X_2 \quad (2)$$

Through the results of this analysis it is also shown that training (X2) has no significant effect. This can be seen from the interpretation of the X2 model which refers to the $\text{Exp}(\beta)$ value or the odds ratio value given in Table 6 of 0.047. Meanwhile, the competency variable (X1) shows an $\text{Exp}(\beta)$ value or an odds ratio value of 1.411 which is an indication that employee performance at the company can be improved through hiring employees who have competence in the form of undergraduate educational background and work experience over 6 years.

CONCLUSION

Based on the presentation of the research results, it can be concluded that the factors that influence employee performance at certification service companies are the competence of the workforce in the form of an undergraduate educational background and work experience of more than 6 years and employee training, on the other hand, other aspects do not affect it in a significant way. The results of this analysis create a logit form that proves the relationship between the three variables.

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