
The Influence of Competence and Work Environment on the Performance of Firefighters at the Bogor District Fire Department

M Aditya Setiawan¹, M. Azis Firdaus², Hannisa Rahmaniar Hasnin³

^{1,2,3} University of Ibn Khaldun Bogor

*Email : Adityasetiawan1172@gmail.com

Abstract

This study aims to analyse the effect of competence and work environment on the performance of firefighters at the Bogor District Fire Service. This research was carried out at Mako Cibinong, Bogor Regency Fire Department. This research was conducted from February 2023 to July 2023. Data collection used observation, questionnaires and interviews. The sample of this research is 32 people. Data analysis techniques include Descriptive Statistics, Validity, and Reliability Tests. Classical Assumption Test, Multiple Linear Regression Test, and Analysis of the Coefficient of Determination. The study's results explained the value of $t_{count} 2.808 > t_{table} 1.708$ that the influence of competence significantly affects the performance of firefighters at the Bogor district fire service. The work environment with a t_{count} of $2.808 > t_{table}$ of 1.708 significantly affects the performance of firefighters at the Bogor Regency fire department. The effect of competence and work environment with a value of α ($0.003 < 0.05$) and test results and $f_{count} 7.332 > f_{table} 3.54$. has a significant effect simultaneously on the performance of firefighters at the Bogor District Fire Service.

Keyword: Competence, Work Environment, Performance, Fire Fighting

Introduction

Fires in industrial estates can lead to business stoppages and investment losses that result in job termination.

According to data from the U.S. Fire Administration, the number of fire cases in the United States from 2011-2013 has continually increased. In 2011 there were 449,900 cases; in 2012, there were 466,800 cases; and in 2013 there were 474,000 cases. The number of fire deaths in 2011 was 2,530 people; in 2012, it was 2,450 people, and in 2013 was 2,820 people. [1]. According to geospatial data from the National Disaster Management Agency (BNPB), there were 983 residential fires in Indonesia from 2011 to mid-2015 and 81 forest and land fires. [2].

Based on the initial data, the number of fire cases in 2008 was 125. Cases in 2009, there was an increase in the number of fire cases, namely 162 cases, then in 2010, there was a decrease in the number of fire cases, namely 121 cases, then there was an increase in fire cases in 2011, namely 135 cases. Finally, in 2012 the number of fire cases increased to 150, with 693 cases of building fire disasters from 2008 to 2012.

Researchers made direct observations at the Fire Department in providing socialisation to the community about fire fighting, conducting simulations of fire fighting and rescuing victims, providing socialisation to managers and employees about the dangers of fire in multi-storey buildings, introducing fire extinguishers to kindergarten students, invited by the Fire Department, and forming technical guidance and counselling for Voluntary Fire Assistance (BALAKAR). However, there still needs to be more socialisation and counselling from the Fire Department to other communities about the dangers of fire. The standard indicator has an essential meaning because it tells when a goal can be completed; therefore, the standards used must follow what is needed so that the objectives can be carried out correctly.

1 In field research, researchers saw that the operational hours of personnel were 24 hours divided into two shifts day and night, which aimed to be on guard in the event of a fire; fire trucks were constrained by the distance to the location of the fire incident due to road access that was difficult to reach, such as the existence of gates that made it difficult for fire trucks to enter the alley/street. The lack of awareness of other road users when the fire truck is heading to the location of the fire thus hinders, hinders the smoothness of getting to the location of the fire and the congestion that occurs on the highway. The crowd of residents who saw the fire made it difficult for members to extinguish the fire that occurred, as for other difficulties that occur in the

presence of a type of object and building that burns require a long time to extinguish. as well as the extinguishing tools used are less efficient. Moreover, the extinguishing tools used are less effective in supporting firefighting. With the existing fire fighting equipment, the fire fighting service is quite tricky in extinguishing efforts; the existence can see this of extinguishers and security equipment, the number still needs to be improved, and some need to be effectively used. However, extinguishers and security equipment follow existing standards.

The indicators of tools or facilities are resources that can be used to help complete goals successfully. Therefore, all tools or facilities must be complete and suitable so that personnel and employees can carry out their duties properly so that the objectives of the Fire Service can be realised. Researchers saw that water sources made the fire department quite troublesome and constrained. If there is a large fire, the amount of water volume used is even more significant, as seen from the author's data. City hydrants have as many as 36 suitable units, as many as 26 damaged units as many as ten units. Pump engines as many as four units damaged as many as three units, suitable for as much as 1 unit. Fire wells, as many as three units are suitable, and none are damaged. If the fire truck runs out of water in the fire fighting stage, it can use alternative water sources such as rivers, ponds, residents' wells and others. The existing fire station needs to be increased with the size of Bogor Regency, seeing that the existing tools and facilities are pretty good, equipped with one fire truck unit and five personnel at the fire fighting post.

In Indonesia, 63% of fires are caused by electrical short-circuits in densely populated areas, 10% from oil lamps and candles, 5% from cigarettes, 1% from stoves, and others. The denser the population, the easier fires to break out. The increasing trend of residential fires is related to denser populations, drier weather, poverty, limited hydrants, and land use. Fire management in Indonesia still faces many obstacles. The performance and authority of firefighting institutions (IPK) still need to be optimal regarding human resources (HR), equipment and supporting facilities. It includes the lack of firefighting posts, which affects response time and the weight of attacks. In addition to extinguishing fires, firefighters are also in charge of rescue and disaster management, including rescue in landslides, evacuation of animals in danger, evacuation of drifting people, evacuation of wasp nests, and other natural disasters. Meanwhile, the demand for rescue actions against fires and other urban disasters is increasing often with the increase in disaster events. Not all regions have local regulations (Perda) on technical prevention and control of fire hazards.

A fire protection system is a system that is studied to reduce the unwanted impact of destructive fires, so; buildings must be built following the applicable building standard requirements so that it matches the fire protection equipment that will be used in the building. Fire protection systems consist of active and passive protection systems and are accompanied by fire management. [3].

Human resource management is a science or a way to manage the relationship and role of resources (labour) owned by individuals efficiently and effectively. It can be used optimally so that (goals) with the company, employees, and employees. [4]. Furthermore, human resource management is planning, organising, implementing and supervising the workforce's procurement, development, rewarding, maintenance and separation to achieve organisational goals. [5]. The work environment exists in the environment of workers that can affect them in carrying out tasks, such as temperature, humidity, ventilation, lighting, noise, cleanliness of the workplace and whether or not the work equipment is adequate. [6]. Performance is the willingness of a person or group to carry out activities or perfect them according to their responsibilities with the results as expected. Performance is significant and must be considered by management. [7].

Research conducted by Gracia [8] simultaneously shows that the variables of workability, work experience and work environment affect employee performance, which means that an increase in workability, work experience and work environment will affect the increase in employee performance of the Sidrap Regency Pamong Praja Police and Damkar Unit by 88.8%. Other research by Ekhsan [9] shows that work motivation and discipline positively and significantly affect employee performance. Furthermore, research conducted by Gautama [10] shows that the relationship or influence between knowledge variables and performance is significant. So the author suspects that knowledge has a positive and significant effect on the performance of firefighters in Klaten Regency.

This study aimed to analyse the effect of competence and work environment on the performance of firefighters at the Bogor Regency Fire Service.

Research Methods

The method used in this research is a descriptive research method with a quantitative approach. The data collection method used is observation, questionnaires and interviews with respondents. The population in this study was to determine the effect of competence and work environment on members of the Bogor Regency fire department as many as 32 people as well as the sample of the study. Data analysis techniques were used through descriptive statistical tests, validity tests, reliability tests, classical assumption tests, multiple linear regression tests, coefficient of determination analyses, t-tests, and f-tests. The independent variables used in this study are competence and work environment. The dependent variable in this study is employee performance. The place of implementation of this research was conducted at Mako Cibinong Fire Department of Bogor Regency from February 2023 to July 2023.

Results

Multiple Regression Analysis

In this study, the complete analysis of multiple regression analysis using the help of the SPSS version 26.0 program can be seen in the following table.

Table 1: Multiple Regression Analysis

Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.570	6.199		2.350	.026
	Competence	.368	.198	.388	1.860	.073
	Work Environment	.195	.155	.262	1.257	.219

a. Dependent Variable: Performance

Source: SPSS processed data, 2021

Based on the table above, the regression equation obtained is $Y = 14.570 + 0.368 X_1 + 0.195 X_2$. From this equation, it can be concluded that:

1. The constant value of 14,750 is the state when the variable Performance of Firefighters (Y) has not been influenced by the variables Competence (X_1) and Work Environment (X_2). If the independent variable does not exist, the variable Performance of Firefighters does not change.
2. The regression coefficient value of workload (X_1) is 0.368, indicating that if the constant is fixed and there is no change in the Work Environment variable (X_2), then every 1 unit change in the Competency Variable will result in a change in the Performance of Firefighters (Y) by 0.195 *points*.
3. The coefficient value of Work Environment (X_2) of 0.195 indicates that if the constant is fixed and there is no change in the Competence variable (X_1), then every 1 unit change in the Work Environment variable (X_2) will result in a change in the Performance of Firefighters (Y) by 0.195 *points*.

Hypothesis Test Results

T-test

The following is the t-test formula: $R^2 =$ Multiple Correlation Coefficient $K =$ some independent variables $n =$ Number of samples If $t_{count} > t_{tabel}$ or $sig < 0.05$ then H_0 is accepted $H_0: \beta, \beta_{12} > 0$ indicates that there is an influence between the Competency load and the work environment on the Performance of Fire Fighters at the Bogor Regency Fire Service.

Table 2: Partial T-Test Results
X₁ to Y

Model		Unstandardise Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.198	6.837		2.808	.009
	Competence X1	.560	.156	.549	3.594	.001

a. Dependent Variable: Y Performance

Source: SPSS processed data, 2021

1. The results of the t-test (partial) X_1 against Y show that the significance value of the effect of Competence

(X_1) on the performance of firefighters (Y) is $0.009 < 0.05$ and the value of $t_{count} 2.808 > t_{tabel} 1.708$, then H_0 is rejected and H_{a1} accepted. Competence (X_1) significantly affects the Performance of Firefighters (Y).

Table 3: Partial T-Test Results
X₂ to Y

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	25.774	5.418		4.757	.000
	Work Environment X1	.414	.125	.519	3.325	.002

a. Dependent Variable: Y Performance

Source: SPSS processed data, 2021

2. The results of the t-test (partial) X_2 against Y show that the significance value of the effect of the Work Environment (X_2) on the Performance of Firefighters (Y) is $0.002 < 0.05$ and the t_{count} value is $3.325 > 1.708$, then H_0 is rejected, and H_{A2} is accepted. It means that the Work Environment (X_2) significantly affects the Performance of Fire Fighters at the Bogor Regency Fire Service.

F test

The following is a table of simultaneous F Test results.

Table 4: Simultaneous F Test Results

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	143.362	2	71.681	7.332	.003 ^b
	Residuals	283.513	29	9.776		
	Total	426.875	31			

a. Dependent Variable: Y Performance

b. Predictors: (Constant), Work Environment X1, Competence X1 Source: SPSS processed data, 2021

Following the table above, it can be seen that the significance value for the influence of Competence (X_1) and Work Environment (X_2) is $0.003 < 0.05$ and $f_{count} 7.332 > f_{tabel} 3.54$. It proves that H_{03} is rejected and H_{a3} is accepted. It means that there is an effect of Competence (X_1) and Work Environment (X_2) simultaneously on the Performance of Firefighters (Y).

Coefficient of Determination Analysis

The following are the results of the tests carried out, shown in Table 5 below.

Table 5: Determination Coefficient Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate
1	.580 ^a	.336	.290	3.12671

a. Predictors: (Constant), Work Environment, Competence
Source: SPSS processed data, 2021

Based on the testing of Table 5, it can be seen where $R = 0.580$, explaining that in the variable Influence of Competence (X_1) and Work Environment (X_2), there is a powerful and unidirectional or positive correlation to changes in the variable Performance of Firefighters (Y) by the results obtained, namely: $R = 0.580$ it can be concluded that the independent variable (X) has a solid correlation with the dependent variable (Y). It means that any change (increase) in the variable *Influence of Competence* and *Work Environment* causes an increase in the Performance of Firefighters.

R square value (r^2) = 0.336. This value indicates that the variable Influence of Competence (X_1) and the variable Work Environment (X_2) has a contribution to the variable Performance of Firefighters at the Bogor Regency Fire Service (Y) by 36.3% and the remaining 64.7% is influenced by other factors outside this discussion.

The Effect of Competence on the Performance of Fire Fighters at the Bogor Regency Fire Service

Following the problems that exist in the Bogor Regency Fire Service, especially problems in terms of employee performance, it is necessary to conduct research using the variables of the influence of competence and work environment on the performance of firefighters in the Bogor Regency Fire Service. From these variables, it is found that the effect of competence on the performance of firefighters shows that the competency variable significantly affects the performance of firefighters in the Bogor Regency fire service. Based on the results of the partial t-test, it can be seen that the Competency Variable (X_1) on the performance of members of the Bogor Regency fire department shows a tcount value of $2.808 > t_{tabel} 1.708$. Thus the second hypothesis is proven because the value of $t_{count} > t_{tabel}$. Then the results of this study are in line with previous research conducted by Amin [11] shows that the competency variable significantly affects the performance of employees of the regional secretariat of the Sidrap district with an accuracy of 95.3%.

The Effect of Work Environment on the Performance of Fire Fighters at the Bogor Regency Fire Department

A pleasant work environment in the sense of comfortable workplace conditions, the existence of a Member PPPK programme, and good working relationships will encourage a member's performance to be better so that the goals of the Bogor Regency Fire Department can be achieved and the Bogor Regency Fire Department's targets can continue to be improved. Based on the results of partial hypothesis testing, it can be seen that the tcount value is $2.808 > t_{tabel} 1.708$. Thus, the second hypothesis is proven because the tcount value $> t_{tabel}$. Thus, H_{o2} is rejected, and H_{a2} is accepted, and it can be concluded that the work environment significantly affects the performance of firefighters at the Bogor Regency Fire Service. It is by the statement in Sedamaryanti's research [12] found that the work environment has a positive effect on member performance.

The Influence of Competence and Work Environment on the Performance of Fire Fighters at the Bogor Regency Fire Department

Based on the results of the regression analysis is $Y = 14.570 + 0.368 X_1 + 0.195 X_2$ and simultaneous hypothesis testing, it can be seen that the probability value of the variable The influence of competence and work environment is greater than the α value ($0.003 < 0.05$) and the test results and $f_{count} 7.332 > f_{tabel} 3.54$. Thus the third hypothesis is proven H_{o3} rejected and H_{a3} accepted. It can be concluded that the influence of competence and work environment has a significant effect on the performance of firefighters at the Bogor Regency Fire Department. It means that the variation in the performance value of members of the Bogor Regency Fire Service by 62.4% is determined by the influence of competence and work environment factors. This study's results align with previous research conducted by Gracia [8]. Motivation and work environment influence employee performance at PT Triview Geospatial Mandiri South Jakarta. Forkamma Journal Vol 2 No. 2 in 2019. Simultaneously, it shows that the variables of workability, work experience and work environment affect employee performance, which means that an increase in workability, work experience and work environment will affect the increase in employee performance of the Sidrap Regency Pamong Praja Police and Damkar Unit by 88.8%.

Conclusions

Based on the results of the research analysis, the conclusions are obtained, namely, 1) the effect of competence has a significant effect on the performance of firefighters in the Bogor Regency Fire Department, 2) the work environment has a significant effect on the performance of firefighters in the Bogor Regency Fire Department, and 3) Competence and Work Environment have a significant effect simultaneously on the performance of firefighters in the Bogor Regency Fire Department. The recommendations given based on the above conclusions are, 1) the agency must be able to maintain and improve the competence of firefighters currently possessed by members of the Bogor Regency fire department, 2) the agency should improve and improve the work

environment of firefighters so that it can make it easier for members to carry out their duties, and 3) run response time, add facilities and the needs of firefighters so that the target of Firefighter Member Performance is achieved.

Reference

- [1] U.S. Fire Administration. Fire in the United States 2006-2015. 2017. [2] Badan Nasional Penanggulangan Bencana (BNPB). Data geospasial.
- [3] P, Dulbert B, Komalasari D. Evaluasi sistem proteksi kebakaran perusahaan. Bandung: PT Alumni; 2015. [4] Ricardianto P. Human capital management. Bogor: In Media; 2018.
- [5] Mangkunegara AAAP. Manajemen sumber daya manusia perusahaan. Bandung: PT. Remaja Rosdakarya; 2018.
- [6] Isyandi B. Manajemen sumber daya manusia dalam perspektif global. Pekanbaru: UNRI Press; 2017.
- [7] P. Manajemen Sumber Daya Manusia (Teori, Konsep dan Indikator). Riau: Zanafa Publishing; 2018.
- [8] Gracia BA. Pengaruh motivasi dan lingkungan kerja terhadap kinerja karyawan pada PT. Triview Geospatial Mandiri Jakarta Selatan. JIMF (Jurnal Ilm Manaj Forkamma). 2019;2(2):31–48.
- [9] Ekhsan M. Pengaruh motivasi dan disiplin kerja terhadap kinerja karyawan. Optim J Ekon dan Kewirausahaan. 2019;13(1):1–13.
- [10] Gautama GC. Pengaruh pengalaman, kemampuan, pengalaman kerja terhadap kinerja karyawan pada Indonesia Miki Industries [Unpublished bachelor's thesis]. Universitas Muhammadiyah Surakarta; 2021.
- [11] Amin NM. Pengaruh kompetensi terhadap kinerja pegawai di Sekretariat Daerah Kabupaten Sidenreng Rappang [Unpublished bachelor's thesis]. Universitas Hasanuddin; 2015.
- [12] Sedarmayanti. Sumber daya manusia dan produktivitas kerja. Jakarta: Mandar Maju; 2014.