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The Effect Of Training And Work Ability On Sustainable Performance Through Motivation: A Study At The National Disaster Management Agency

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Abstract

Sustainable employee performance has become a strategic issue for disaster management institutions. However, the 2024 performance achievements of the National Disaster Management Agency (BNPB) remained below target, while employees' education and training (training) and work ability were in the sufficient category. This study aims to analyze the effect of education and training and work ability on sustainable performance, both directly and through motivation as an intervening variable, at BNPB. This study employed a quantitative approach with a descriptive-verificative method. Data were collected through questionnaires distributed to 72 BNPB employee respondents, determined using the Slovin formula with a purposive sampling technique. The data were analyzed using Structural Equation Modeling (SEM) based on Partial Least Square with the assistance of SmartPLS 3.0 software. The results show that education and training have a positive effect on sustainable performance, with a coefficient value of 0.073 and a p-value of 0.000. Work ability has a positive effect on sustainable performance, with a coefficient value of 0.153 and a p-value of 0.000. Education and training have a positive effect on motivation, with a coefficient value of 0.794 and a p-value of 0.000. Work ability has a positive effect on motivation, with a coefficient value of 0.554 and a p-value of 0.000. Motivation has a positive effect on sustainable performance, with a coefficient value of 0.432 and a p-value of 0.000. Motivation is also proven to mediate the effect of education and training on sustainable performance, with a coefficient value of 0.032 and a p-value of 0.000, as well as to mediate the effect of work ability on sustainable performance, with a coefficient value of 0.343 and a p-value of 0.002. A Goodness of Fit (GoF) value of 0.768 indicates that the research model has a high level of fit. These

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findings contribute to the development of human resource management literature, particularly in understanding the role of motivation as a mediator in the relationship between training and work ability and sustainable performance. The findings are also expected to serve as a reference for BNPB in designing more effective human resource development policies.

Keywords: Education and Training, Work Ability, Motivation, Sustainable Performance

INTRODUCTION

Indonesia is an archipelagic country geographically situated between three major world tectonic plates, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate, making its territory prone to volcanic activity and earthquakes. Throughout early 2026, 217 natural disaster events were recorded, with floods being the most dominant type of disaster (127 events), followed by extreme weather (52 events), landslides (18 events), and forest and land fires (17 events), confirming that hydrometeorological disaster risk remains a major threat across many regions of Indonesia (Mawarni & Ardira, 2020). The Government established the National Disaster Management Agency (BNPB) as a non-departmental institution responsible for organizing disaster management, as regulated under Article 10 of Law of the Republic of Indonesia Number 24 of 2007.

Education and training refer to human resource development activities aimed at improving employees' knowledge and skills (Handoko, 2021; Pramudyo, 2017; Rachmawati, 2019). Work ability encompasses the intellectual and physical capabilities required to carry out tasks (Robbins & Judge, 2021), comprising the dimensions of knowledge, experience, skill, and work capacity (Gibson, 2018). Motivation is an internal drive that leads individuals to carry out activities with sincerity, enthusiasm, and strong commitment, thereby producing optimal output (Afandi, 2019; Hasibuan, 2021), while sustainable performance is an organization's achievement in conducting activities that provide social benefits and reduce negative environmental impacts (Naciti, 2019; Chaudhuri & Jayaram, 2019; Paulraj et al., 2017).

However, BNPB's 2024 performance achievements show that several indicators have not yet reached their targets, including the regional disaster resilience index, which was only realized at 0.54 against a target of 0.78, and the response time rate, which only reached 30% against a target of 60%. A pre-survey of 30 respondents indicated that

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employees' work motivation was in the high category (mean = 3.73), yet the organization's sustainable performance remained suboptimal, indicating a gap between high motivation and comparatively low performance achievement. A further pre-survey showed that education and training (mean = 3.20) and work ability (mean = 2.83) were in the sufficient category, making them areas that require attention.

Previous studies show mixed findings regarding the relationships among these variables. Sinaga and Sitinjak (2021) as well as Refi and Amin (2025) found that education and training have a positive and significant effect on employee performance, whereas Angka and Sutina (2023) found the opposite result in the context of civil servants (ASN). Similarly, Arianty (2023) and Efendi et al. (2024) found a significant effect of work ability on performance, in contrast to the findings of Futri et al. (2022) and Widyandari et al. (2022). Sulistiyowati and Agustina (2021) showed that work motivation can act as an intervening variable in the relationship between training and performance.

These inconsistencies in prior research findings (research gap), combined with the phenomena observed in the field (phenomenon gap), form the basis for this study to analyze the effect of education and training and work ability on sustainable performance, both directly and through motivation as an intervening variable, at the National Disaster Management Agency.

METHOD

This study employed a causal quantitative approach with a descriptive-verificative method (Sugiyono, 2021) to test hypotheses regarding the effect of independent variables, a mediating variable, and a dependent variable. The research was conducted at the National Disaster Management Agency (BNPB), with the target population comprising all 251 BNPB employees. The sampling technique employed was non-probability sampling using purposive sampling (Sekaran & Bougie, 2021). The sample size was determined using the Slovin formula with a 10% precision level, resulting in a sample of 72 respondents.

Primary data were collected directly from respondents through a questionnaire structured using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to measure respondents' perceptions, complemented by interviews (Sujarweni, 2018). Secondary data were obtained from BNPB performance reports, literature, and scientific journals to provide theoretical and empirical context.

The independent variables in this study are education and training (X1) and work ability (X2); the intervening variable is motivation (M); while the dependent variable is

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sustainable performance (Y) (Zulganef, 2018; Sugiyono, 2019). The measurement of all indicators refers to the theory of education and training, the theory of work ability, the theory of motivation, and the theory of sustainable performance.

Data analysis was conducted using Structural Equation Modeling (SEM) based on Partial Least Square (PLS-SEM) with the assistance of SmartPLS version 3.0 (Ghozali & Latan, 2020). The analysis stages included evaluation of the measurement model (outer model) through convergent validity and reliability testing, evaluation of the structural model (inner model) through R-Square and Q-Square values, and hypothesis testing through a bootstrapping procedure. The model's fit with the empirical data was assessed using the criteria presented in Table 1. Hypothesis testing was carried out by evaluating the T-statistic and P-value, accepting a hypothesis if the T-statistic ≥ 1.994 and the p-value < 0.05.

Table 1. Model Evaluation Criteria (PLS-SEM)

Evaluation Criteria	Cut-off Value
Outer Loading (Convergent Validity)	≥ 0.5
Cronbach's Alpha	≥ 0.7
Composite Reliability (CR)	≥ 0.7
R-Square	Strong: > 0.67; Moderate: 0.33 to 0.67; Weak: < 0.19
Q^2 Predict	> 0
Goodness of Fit (GoF)	> 0.36 (large/high category)

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RESULTS AND DISCUSSIONS

A. Descriptive Statistics

The number of respondents used in this study was 72 people, meeting the minimum sample size required. Respondents were dominated by males at 93.06%, while females accounted for 6.94%. Based on age, respondents were dominated by the 25–35-year age group (54.17%), followed by those under 25 years old (27.78%) and those over 35 years old (18.06%), indicating that the majority were within the productive age range. Based on education level, respondents were dominated by Diploma III (D3) graduates (44.44%), followed by Diploma I (D1) (27.78%), Bachelor's degree (S1) (15.28%), and others (12.50%).

Table 2. Descriptive Statistics of Research Variables

Variable	Mean Score	Category
Education and Training (X1)	3.53	Good
Work Ability (X2)	3.34	Fairly Good
Motivation (M)	3.46	Good
Sustainable Performance (Y)	3.47	Good

B. Validity and Reliability Test

Validity and reliability testing in this study was conducted using SmartPLS 3.0. The convergent validity test results (outer loading) show that all 32 indicators across the four variables (10 training indicators, 8 work ability indicators, 8 motivation indicators, and 6 sustainable performance indicators) had values above 0.5, and were therefore declared valid, as presented in Table 3.

Table 3. Convergent Validity Test Results (Outer Loading)

Variable	Number of Indicators	Outer Loading Range	Conclusion
Training (X1)	10	0.720 – 0.899	Valid
Work Ability (X2)	8	0.542 – 0.927	Valid
Motivation (M)	8	0.733 – 0.899	Valid
Sustainable Performance (Y)	6	0.731 – 0.928	Valid

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The reliability test results show that all variables had Cronbach's Alpha and Composite Reliability values above 0.7, and were therefore declared reliable, as presented in Table 4.

Table 4. Reliability Test Results

Variable	Cronbach's Alpha	Composite Reliability	Conclusion
Training (X1)	0.949	0.953	Reliable
Work Ability (X2)	0.904	0.927	Reliable
Motivation (M)	0.945	0.949	Reliable
Sustainable Performance (Y)	0.921	0.927	Reliable

C. Structural Model Suitability (Goodness-of-Fit)

Structural model testing was carried out to determine the overall fit of the research model. An R-Square value of 0.822 for the motivation variable indicates that training and work ability jointly explain 82.2% of the variance in motivation, while an R-Square value of 0.895 for the sustainable performance variable indicates that the exogenous variables explain 89.5% of its variance. Both values are classified as strong. Q^2 predict values above zero for both variables (0.814 and 0.817) indicate that the model has good predictive relevance. A Goodness of Fit (GoF) value of 0.768 falls into the large/high category, indicating that the structural model used in this study has a good level of fit (goodness of fit).

Table 5. Structural Model Goodness-of-Fit

Indicator	Cut-off Value	Calculation Result	Conclusion
R-Square – Motivation (M)	≥ 0.67 (Strong)	0.822	Goodness of Fit
R-Square – Sustainable Performance (Y)	≥ 0.67 (Strong)	0.895	Goodness of Fit
Q^2 Predict – Motivation (M)	> 0	0.814	Goodness of Fit
Q^2 Predict – Sustainable Performance (Y)	> 0	0.817	Goodness of Fit

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Goodness of Fit (GoF)	> 0.36 (Large)	0.768	Goodness of Fit

D. Hypothesis Testing

Hypothesis testing determines the effect of the independent variables on the dependent variable. A hypothesis is declared accepted if the T-statistic value ≥ 1.994 and the P-value < 0.05.

Table 6. Hypothesis Testing Results

Variable	Path Coefficient	T-Statistic	P Value	Conclusion
Training (X1) → Sustainable Performance (Y)	0.073	9.535	0.000	Significant
Work Ability (X2) → Sustainable Performance (Y)	0.153	4.358	0.000	Significant
Training (X1) → Motivation (M)	0.794	8.663	0.000	Significant
Work Ability (X2) → Motivation (M)	0.554	6.238	0.000	Significant
Motivation (M) → Sustainable Performance (Y)	0.432	3.782	0.000	Significant
Training (X1) → Motivation (M) → Performance (Y)	0.032	3.782	0.000	Significant
Work Ability (X2) → Motivation (M) → Performance (Y)	0.343	3.123	0.002	Significant

DISCUSSIONS

a. The Effect of Training on Sustainable Performance

The training variable shows a positive effect on sustainable performance, indicated by an estimate value of 0.073 and a p-value of 0.000 < 0.05. Employees who receive adequate training tend to produce higher-quality work. This finding is consistent with Elisa et al. (2022), who showed that work-related competencies have a significant effect on performance.

b. The Effect of Work Ability on Sustainable Performance

The work ability variable shows a positive effect on sustainable performance, with an estimate value of 0.153 and a p-value of 0.000 < 0.05. Employees with good work

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ability (encompassing adequate knowledge, experience, and skill) tend to produce higher-quality and more consistent work outcomes. This finding supports Dewa (2023), who showed that work ability has a positive effect on employee performance.

c. The Effect of Training on Motivation

The training variable shows a positive effect on motivation, with an estimate value of 0.794 and a p-value of 0.000 < 0.05. This is the highest estimate value among all direct relationships in the model, making training the most dominant factor in driving employee motivation. Relevant training programs enhance employees' self-confidence and psychological drive to perform better.

d. The Effect of Work Ability on Motivation

The work ability variable shows a positive effect on motivation, with an estimate value of 0.554 and a p-value of 0.000 < 0.05. Referring to Victor Vroom's expectancy theory, employees with high work ability believe that their efforts will yield optimal outcomes, thereby driving higher work motivation.

e. The Effect of Motivation on Sustainable Performance

The motivation variable shows a positive effect on sustainable performance, with an estimate value of 0.432 and a p-value of 0.000 < 0.05. Employees with high work motivation, whether in terms of physical needs, sense of security, social needs, or recognition for achievement, tend to produce more consistent and sustainable performance.

f. The Mediating Role of Motivation in the Relationship between Training and Sustainable Performance

The path analysis results show that motivation acts as a mediator in the relationship between training and sustainable performance, with an estimate value of 0.032 and a p-value of 0.000 < 0.05. This finding indicates that training does not automatically improve sustainable performance directly, but rather requires motivation as a psychological link.

g. The Mediating Role of Motivation in the Relationship between Work Ability and Sustainable Performance

The path analysis results show that motivation acts as a mediator in the relationship between work ability and sustainable performance, with an estimate value of 0.343 and a p-value of 0.002 < 0.05. Training and work ability provide the "tools and materials," while motivation serves as the "driving energy" that converts this potential into consistent and sustainable performance.

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CONCLUSION

Education and training have a positive effect on the sustainable performance of BNPB employees. The better the implementation of training in terms of material relevance, instructor quality, and relevance to task requirements, the higher the resulting sustainable performance. However, the coefficient of the direct effect of training on sustainable performance is relatively small compared to its effect on motivation, indicating that the impact of training on performance is largely channeled through the prior strengthening of work motivation.

Work ability also has a positive effect on sustainable performance. Employees with adequate knowledge, experience, and skills produce better-quality work. As with training, the effect of work ability on motivation is far greater than its direct effect on performance, indicating that employee competence needs to be accompanied by motivational drive in order to have an optimal impact on the organization's sustainable performance.

Motivation has a positive effect on sustainable performance and is proven to mediate the effect of both training and work ability on sustainable performance. This finding represents the study's main contribution: motivation is not merely a supporting variable but a psychological link that determines whether investment in training and work ability development is genuinely converted into the organization's sustainable performance. A Goodness of Fit value of 0.768 confirms that this research model has a high level of fit with the empirical field data.

Based on these findings, BNPB is advised to conduct training on a regular basis with content tailored to the actual needs of disaster management, to improve employees' work ability through disaster management competencies and rapid decision-making skills, and to specifically strengthen programs that drive employee work motivation, such as recognition of achievement and welfare guarantees, given its central role as a mediator toward sustainable performance.

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