(RESEARCH ARTICLE)

The mediating effect of environmental management accounting on hospital environmental performance: Analyzing hazardous waste processing in public hospitals of Manokwari Regency

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Abstract

This study aims to investigate the relationship between Leadership Transformation Style, organizational commitment, and the environmental performance of hospitals in managing hazardous waste. The study uses Structural Equation Modeling with a Partial Least Square approach (SEM-PLS) to analyze the data. The study focuses on the Civil Servants, Honorary Employees, and Contracted Health Workers at the Government General Hospital in Manokwari Regency as the research subjects. The dimensions of Transformation Leadership Variable are measured using 4 dimensions consisting of 37 indicators, while the dimensions of Organizational Commitment Variables are measured by 3 dimensions with 16 indicators. The measurement of Environmental Performance Variables consists of 13 indicators. Hypothesis tests I and II demonstrate a positive correlation between transformational leadership and Hospital Environmental Performance, with path coefficients of 0.364 and p-values of 0.009 (<0.05). Additionally, the study shows that there is a significant relationship between organizational commitment and the environmental performance of hospitals, with a path coefficient of 0.483 and a p-value less than 0.05. Both hypothesis tests I and II confirmed the positive association between transformational leadership and Hospital Environmental Performance with path coefficients of 0.364 and p-values of 0.009 (<0.05). The study evaluates the PLS Predict test of the Structural Equation Modeling with Partial Least Square method (SEM-PLS) and suggests that the PLS model has medium predictive power.

Keywords: Leadership Transformation style; Organizational commitment; Hazardous waste; Environmental performance; Partial Least Square; PLS-Predict

1. Introduction

Environmental pollution occurs when human activities release living organisms, substances, energy, or other elements into the environment that degrade the quality of the environment to a level that impairs its intended function.(1) Indonesia is confronting environmental challenges resulting from its new industrial boom and requires effective strategies to oversee, remedy, and control contaminated areas, for example, the flow of tailings from PT Freeport Indonesia, which flows down the Ajkwa and Mimika Rivers in Papua. To restore a ravaged ecological system that spans 43,500 hectares, funding of 7.5 billion US dollars is required (Sulistyani, R. 2007, p. 23). Hospitals are healthcare institutions for communities. They are always influenced by scientific and technological developments as well as the community's socio-economic conditions. Providing health services is the primary function of hospitals, which makes them a meeting place for people of diverse age groups, social strata, and interests. If hospitals do not manage their environmental sanitation conditions effectively, the interaction between community groups can lead to the spread of

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diseases and health problems. Health service activities in hospitals typically generate waste that may contain infectious germs and hazardous waste in solid, liquid, or gas form. In Indonesia, hazardous waste is called hazardous and toxic waste or "*limbah B3*".

The distribution of hazardous waste production in Indonesia according to data from the Directorate of Performance Assessment of Hazardous and Non-Hazardous Waste Management - Ministry of Environment and Forestry as of June 2021 is 70.45 tons per day, and there are 112 waste management permits. Hazardous waste management in Indonesia is governed by Government Regulation No. 101 of 2014 Regarding Hazardous Waste Management. The results of the West Papua Health Service publication showed that during the Covid-19 pandemic in March and April 2020, there were 8.2 tons of Covid-19 hazardous waste that was not disposed of properly. The main problem is that there is no incinerator in West Papua, so it is still being disposed of by burning.

1.1. Research Gap

This study is based on theoretical and empirical findings from previous studies on the Role of Environmental Accounting and hazardous Waste. One of the limiting factors is weak legal sanctions in the country. Research has found a negative relationship between mandatory environmental disclosure legal sanctions and regulatory deviations carried out by companies.(2) Firstly, Environmental management is the main factor that affects the implementation of environmental accounting. Secondly, the Statement of accounting standards, and thirdly, the size of the organization have no significant impact on the implementation of environmental accounting.(3) Company size does not significantly affect the company's social and environmental disclosure (4) Organizational size and environmental management do not affect the implementation of environmental accounting.(5) (6) Define transformational leadership as a leadership approach that centers on the impact leaders or supervisors have on their subordinates. Subordinates exhibit trust, pride, loyalty, and respect towards their superiors and are motivated to surpass expectations. To achieve transformational leadership, subjective evaluations should be avoided unless explicitly identified as such. Additionally, leaders must establish their credibility by articulating a lucid and succinct vision for the organization. The main responsibility of a transformational leader is to serve as both a catalyst and overseer of change. It is important to always explain technical terms when first used to ensure understanding. The results of research by (7) that the Transformational Leadership Style has no significant effect on employee performance. This is due to the lack of vision and personality, lack of inspiring subordinates and the leader's inability to instill motivation in employees, Runtuwene, et al 2022(7), the results of this study are different from Gani (2020)(8). The research findings are that transformational leadership has a direct effect on environmental performance through green creativity (He et al., 2022). (9) Found that transformational leadership has a direct effect on hospital environmental performance. (10) The International Federation of Accountants definition of Environmental Management Accounting (EMA) is "the management of environmental and economic performance through the development and implementation of an accounting system that deals with the environment and its practices appropriately." EMA encompasses LCC, full cost accounting, benefit assessment, and strategic planning for environmental management. EMA is a technique that prioritizes efficiency and effectiveness in resource utilization and is a component of a wider management control system (Rustika, 2011)(11). Environmental management accounting is a tool that connects two key pillars of sustainable development, the economic (profit) and environmental (planet) pillars, and serves as a reference point for business decision-making (Cahyandito, 2009: 3)(12) Environmental Performance According to ISO 14031 (2013), environmental performance is defined as the measurable results obtained from environmental management activities carried out by the company. Environmental performance is also defined as the harmful environmental impacts one of the limiting factors is the weak legal sanctions in place in the country; research has found that there is a negative relationship between legal sanctions for mandatory environmental disclosure and corporate non-compliance. (2) First, environmental management is the factor that most affects the implementation of environmental accounting, second, the statement of accounting standards, third, the size of the organization does not affect the implementation of environmental accounting. (3) Company size does not have a significant impact on Corporate Social and Environmental Disclosure (4). The adoption of environmental accounting is not influenced by either organizational size or environmental management, but rather by the statement of accounting standards. Concerning the storage stage, the majority of organizations have complied with the regulations under Permenlu RI No. 56 of 2015, with some exceptions , (14). Rachmawati (2009) discovered that organizational commitment, work motivation, and leadership style significantly impact performance. Handayani (2010) found that the implementation of environmental accounting is primarily influenced by environmental management, with no discernible impact from accounting standard statements or organizational size.

1.1.1. Research Question

The study examines three research questions: First, does the transformational leadership style have a direct effect on the environmental performance of hospitals? Secondly, does the transformational leadership style have a significant and positive effect on EMA? Finally, does EMA have a favorable and significant impact on the environmental

performance of hospitals? Fourth, does EMA significantly and positively impact the mediation of transformational leadership style and environmental performance in hospitals? Fifth, does EMA have a sizable effect size in mediation as a mediator variable?

2. Material and methods

2.1. Research Design

This research is hypothesis testing, will be analyzed a quantitative approach of correlation inferential statistics. The subject of the research is the civil servants, honorary workers and health contract workers of the Government General Hospital in Manokwari Regency. The total population was 786 and by using stratified random sampling 100 samples were obtained. The data used in this study are primary data obtained by distributing questionnaires through google form and field surveys. The exogenous variable in this study is transformational leadership, the mediating variable is environmental management accounting costs and the endogenous variability is hospital environmental performance. The constructs in this study refer to a reflective measurement model whose items are measured on a ten-point Likert-type scale. The dimensions of the transformational leadership variable are measured with 4 dimensions of 37 indicators, environmental management accounting costs are measured with 4 dimensions of 12 indicators, and environmental performance is measured with 13 indicators

2.2. Data Analysis Techniques

The technique used in this study is multiple linear regression analysis, specifically SEM-PLS. The PLS-SEM (Partial Least Squares-Structural Equation Modeling) technique used in this study focuses on the interaction between prediction and theory testing. As it is a variance-based SEM analysis that aims to test model theory, several measures were employed to declare the proposed model acceptable such as R Square, SRMR, and PLS Predict. It is essential to validate the results (15) Partial least squares (PLS) is a variance-based structural equation modeling analysis method designed to test model theories that emphasize prediction studies. As a result, various measures such as R Squared, Standardized Root Mean Square Residual (SRMR), and PLS Predict have been developed to establish the proposed model's acceptability.(16), The evaluation methods employed include the Goodness of Fit Index (GoF Index)(17), To overcome the data solution, outliers need to be removed, and bootstrapping needs to be performed. (18) . SEM-PLS is used as an alternative in this study because it possesses full statistical power and does not require certain assumptions such as normally distributed data. The measurement model used in this study comprises of both reflective and formative measurements of the variables of leadership, transformation, and organizational commitment, with the latter being evaluated by the significance of outer weight(19) The reflective measurement model is evaluated based on a loading factor of ≥ 0.70, average variance extracted (AVE) of ≥ 0.50, Heterotrait Monotrait Ratio (HTMT) below 0.90, as well as formel and lacker criterion to assess for discriminant validity. The formative measurement model is evaluated based on the significance of outer weight, with no multicollinearity between measurement items observed from the outer VIF > 5.(20)

3. Results

3.1. Outer Model Test

The results test of the first stage outer model found that of the 37 indicators of transformational leadership variable, there were 3 loading factor values < 70, so they were removed from the model, the results of testing the first stage model found that the composite reliability value> 0.8 (0.8>0.7) and the average variance extracted AVE value> 0.5 and the Cronbach's alpha value was dominated by a value> 0.8 So it can be concluded that the evaluation of the reflective measurement model in the first stage has been met.
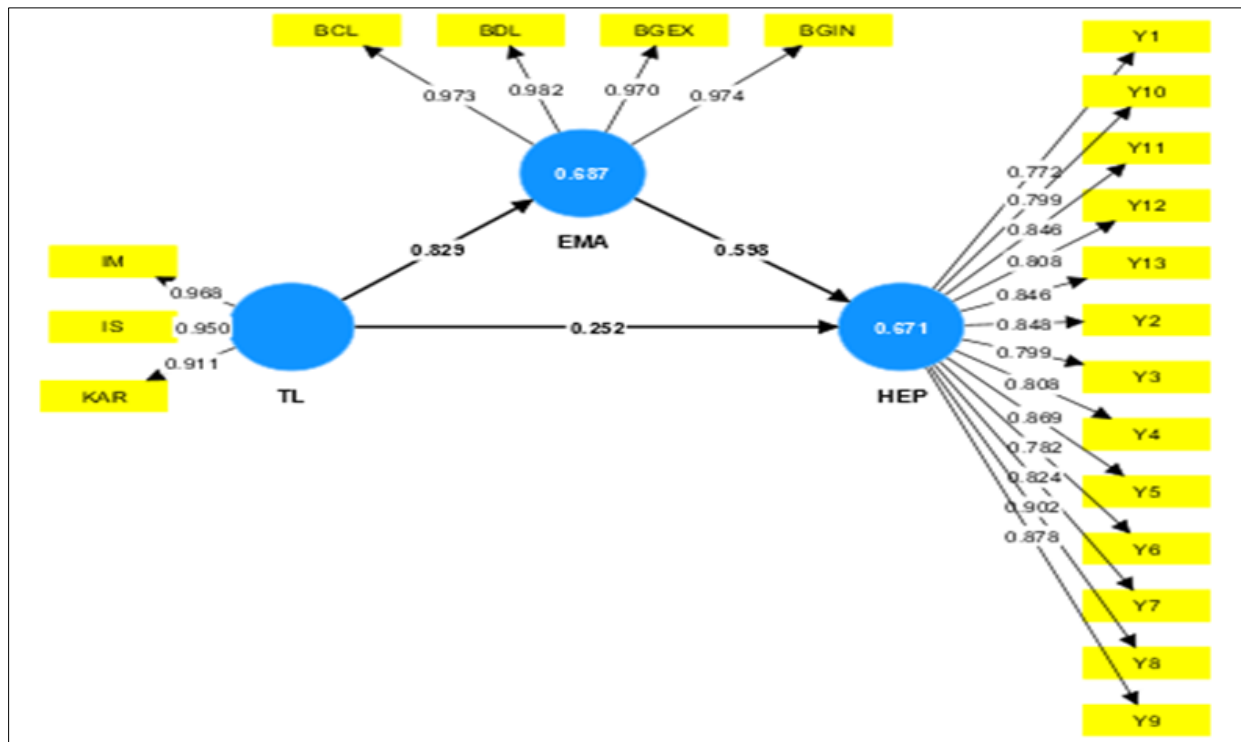
Figure 1 Test Results: Outer Model

The test results in Figure 1, when the loading factor value of all dimensions exceeds 0.70, it can be said that all measurement items are valid and feasible as a test tool. The next step to strengthen the validity is to look at the results of the composite reliability and AVE can be viewed in Table 1.

Table 1 Construct Reliability Test

Dimension	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
EMA	0.983	0.983	0.987	0.950
HEP	0.962	0.964	0.966	0.689
TL	0.938	0.942	0.961	0.890

From the test results, it can be seen that the Cronbach alpha value > 0.7 and the composite reliability > 0.7, so all variables are declared reliable (21). In the AVE column, all values are> 0.5, so from the overall test conducted, it can be concluded that the validity test and the reflective reliability test have been met.

Table 2 Fornell -Lacker

Dimension	Environmental Management Accounting (EMA)	Hospital Environmental Performance (HEP)	Transformation Leadership (TL)
EMA	0.975		
HEP	0.807	0.830	
TL	0.829	0.748	0.944

The results of the Fornell and Lacker tests show that the variables EMA, HEP, TL each have an AVE root greater than the correlation, these results indicate that the discriminant validity of the variables Transformation Leadership (TL) and Environmental Management Accounting (EMA) has been met. The results of the discriminant validity test at the measurement dimension level Can be viewed in Table 3, are met if each item measurement dimension has a high

correlation with the variable it measures, and the results of the discriminant validity test with HTMT are acceptable if the HTMT value of each pair of variables is less than 0.90.

Table 3 Heterotrait-monotrait ratio (HTMT)

Dimension	Heterotrait-monotrait ratio (HTMT)
HEP <-> EMA	0.824
TL <-> EMA	0.862
TL <-> HEP	0.783

3.2. Model Feasibility Test

Before hypothesis testing is carried out, a multicollinearity test is carried out by looking at the inner VIF value, the acquisition of the inner VIF value in this study is < 5, so free from multicollinearity symptoms, this result strengthens the results of parameter estimation in SEM PLS is robust or unbiased, can be viewed in Table 4.

Table 4 Result of Inner Model Test

Dimension	VIF
EMA -> HEP	3.190
TL -> EMA	1.000
TL -> HEP	3.195

The test results found that first, Transformation Leadership (TL) has a positive and significant effect on Hospital Environmental Performance (HEP) conclusion Hypothesis 1 is accepted, second Transformation Leadership (TL) variable has a positive and significant effect on Environmental Management Accounting (EMA) conclusion Hypothesis 2 is accepted, third Environmental Management Accounting (EMA) variable has a positive and significant effect on Hospital Environmental Performance (HEP) conclusion Hypothesis 3 is accepted, can be viewed in Table 5;

Table 5 Hypothesis Testing-Path Coefficient

Hypothesis	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	
TL -> HEP	0.252	0.252	0.102	2.466	0.014	Significant
TL -> EMA	0.829	0.828	0.031	26.589	0.000	Significant
EMA -> HEP	0.598	0.601	0.088	6.787	0.000	Significant

n the confident interval output, it is known that the magnitude of the effect of Transformation Leadership (TL) on Hospital Environmental Performance (HEP) and Environmental Management Accounting (EMA) and EMA on HEP in a 95% confidence interval at the lowest confident interval level of 2.5%, if there is treatment or effort to increase each variable by hospital management, it will increase the value of each variable with the lowest increase value is 0.44% (TL -> HEP) and the highest is 0.88% (TL-> EMA) can be viewed in Table 6;

Table 6 Confident Interval-Path Coefficient

	Original sample (O)	Sample mean (M)	Confident Interval		f-Square
			2.5%	97.5%	
TL -> HEP	0.252	0.252	0.043	0.442	0.341
TL -> EMA	0.829	0.828	0.762	0.885	0.061
EMA -> HEP	0.598	0.601	0.43	0.776	2.195

3.3. Mediation test

The result is Environmental Management Accounting significantly mediates the effect of Transformation Leadership on Hospital Environmental Performance with a mediation path coefficient of (0.496) and significant with t statistics (6.298> 1.96), p-value 0.00 <0.05 with 95% Confidence intervals, EMA variable mediates the effect of TL on HEP by 0.352 to 0.660, can be viewed in Table7:

Table 7 Specific indirect effect

Hypothesis 5	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Confidence intervals	
						2.5%	97.5%
TL -> EMA -> HEP	0.496	0.498	0.079	6.298	0.000	0.352	0.660

The result is that Environmental Management Accounting (EMA) significantly mediates the effect of Transformation Leadership (TL) on Hospital Environmental Performance (HEP) with a mediation path coefficient of (0.496) and significant with t-statistic (6.298> 1.96), p-value 0.00 <0.05 with 95% confidence intervals, the EMA variable mediates the effect of TL on HEP by 0.352 to 0.660.

3.3.1. Effect Size Mediation Test

The mediation effect can be calculated from the square of the path coefficient of (22) where the mediating variable is environmental management accounting. Following (22), the formula is as follows. Effect Size Mediation Upsilon Statistic

$$(v) = \beta^2_{MX} \beta^2_{YM.X.}$$

Where:
$\beta 2 MX$ is the path coefficient of the effect of X on M
$\beta 2 YM.X$ is the path coefficient of the effect of M on Y

Table 8 Effect Size Mediation Test

	Statistic Upsilon (v)	Description
TL -> EMA -> HEP	$(0,829)^2$ x $(0,598)^2$ = 0,246	**High Effect**

The interpretation of the statistical value of the mediation effect of Upsilon (v) refers to the recommendation of Cohen in (23), (24) Namely 0.175 (high mediation effect), 0.075 (medium mediation effect) and 0.01 (low mediation effect). Based on the above calculations, the Statistics Upsilon value (v) = 0.246, this finding proves that the role of environmental management accounting in mediating the indirect effect of transformational leadership on hospital environmental performance at the structural level is high.

Table 9 Compilation of AVE, R-Square, Gof Index & SRMR

	Average variance extracted (AVE)	R-Square	AVE x R-Square	GoF	SRMR
EMA	0.950	0.687	0.653	0.808	0.071
HEP	0.689	0.671	0.463	0.680	
Average	**0.820**	**0.679**	**0.558**	**0.744**	

The magnitude of the effect of TL on EMA is 68.7% and the effect of TL on HEP is 67.9%, in Hair et al (2021) including moderate influence. The SRMR value is 0.071 <0.10, referring to Karin Schermelleh et al (2003), it is still acceptable, indicating an acceptable model fit, this proves that empirical data can explain the influence between variables in the model. The GoF index value is an overall evaluation of the measurement model and the structural model. The calculation results show that the GoF model value is 0.744, including the high GoF category, which means that the empirical data can explain the measurement model, this proves that the measurement model has a high level of fit.

Using these estimates as input, the blindfold procedure predicts the deleted data points for all variables. The smaller the difference between the predicted and original values, the higher the Q^2 value, indicating greater predictive accuracy. As a guideline, the Q^2 value for a given endogenous construct should be greater than zero to indicate the predictive accuracy of the structural model for that construct. Q^2 values greater than 0.0.25, and 0.50 illustrate the small, medium, and large predictive relevance of the PLS model (17), can be viewed in Table10;

Table 10 Q^2 Value

Predictor	SSO	SSE	Q^2 (=1-SSE/SSO)
EMA (Z)	400.000	140.667	0.648
HEP (Y)	1300.000	709.364	
TL (X)	300.000	300.000	

Based on the processing results, it is known that Q^2 value EMA = 0.648, this indicates that the model built has a relevant predictive power, which means that any changes in the hospital's environmental performance can be predicted by the variables Transformation Leadership (TL) and Environmental Management Accounting (EMA) as mediating variables.

3.4. PLS Predict

Partial Least Squares (PLS) is an analytical technique used for prediction purposes. To assess the predictive performance of a proposed PLS model, it is necessary to develop a measure of the goodness of fit of the model. The PLS Predict algorithm serves as a validation tool to test the strength of PLS prediction models. The PLS model's predictive power can be determined by comparing its RMSE or MAE values to those of a linear regression model. If the PLS-SEM analysis produces a higher predictive error in terms of RMSE or MAE for all indicators when compared to the linear regression model, it indicates that the model lacks predictive power. If the majority of dependent construct indicators in PLS-SEM analysis produce higher prediction errors compared to LM benchmarks, it indicates that the model has low predictive power. If a minority (or equal number) of indicators in the PLS-SEM analysis produce higher prediction errors compared to the LM benchmark, it indicates moderate predictive power. If none of the indicators in the PLS-SEM analysis have a higher RMSE or MAE value compared to the LM benchmark, the model has high predictive power" (17), can be viewed in Table 11 ;

Table 11 PLS Predict

Measurement Item	PLS		LM	
	RMSE	MAE	RMSE	MAE
BCL	**0.617**	**0.487**	0.643	0.490
BDL	**0.553**	**0.428**	0.578	0.436
BGEX	**0.643**	**0.509**	0.659	0.522
BGIN	**0.585**	**0.464**	0.599	0.466
Y1	**1.294**	**0.960**	1.298	0.974
Y2	**1.264**	**0.903**	1.320	0.954
Y3	1.420	1.033	**1.360**	**0.999**
Y4	1.576	**0.898**	**1.516**	0.925
Y5	**1.799**	**1.061**	1.803	1.117
Y6	1.071	**0.716**	**1.069**	0.766
Y7	1.686	**0.944**	**1.678**	1.039
Y8	**1.232**	**0.974**	1.286	1.001
Y9	**1.331**	**0.940**	1.413	0.984

Measurement Item	PLS		LM	
	RMSE	MAE	RMSE	MAE
Y10	**1.402**	**0.980**	1.465	1.001
Y11	**1.449**	**1.075**	1.471	1.106
Y12	**1.306**	**0.996**	1.375	1.031
Y13	**1.264**	**1.019**	1.292	1.046
Totally	13	16	4	1
	29		5	
	34			

Based on the processing results of 34 observations of the RMSE and MAE values for the PLS model with RMSE and MAE there are 29 items higher than the liner regression LM model, which is 5 items, this shows that the proposed PLS model has a high predictive power, which means that any changes in the variation of exogenous variables can predict the strength of changes in endogenous variables.

3.5. Robustness Check- Measurement of Non-Linear Relationships

To assess the nonlinear relationship of the quadratic effects between each pair of constructs, a two-step approach with standardization was used. This analysis was conducted to check whether the evidence provided in terms of the robustness of linear effects can be viewed in Table 12;

Table 12 Robustness Check- Measuring Non-Linear Relationships

Quadratic Effect (QE)	Path Coefficient	P values	Description
EMA -> HEP	0.576	0.000	
TL -> EMA	0.836	0.000	
TL -> HEP	0.277	0.005	
QE (EMA) -> HEP	**-0.031**	**0.563**	**Linearity fulfilled**

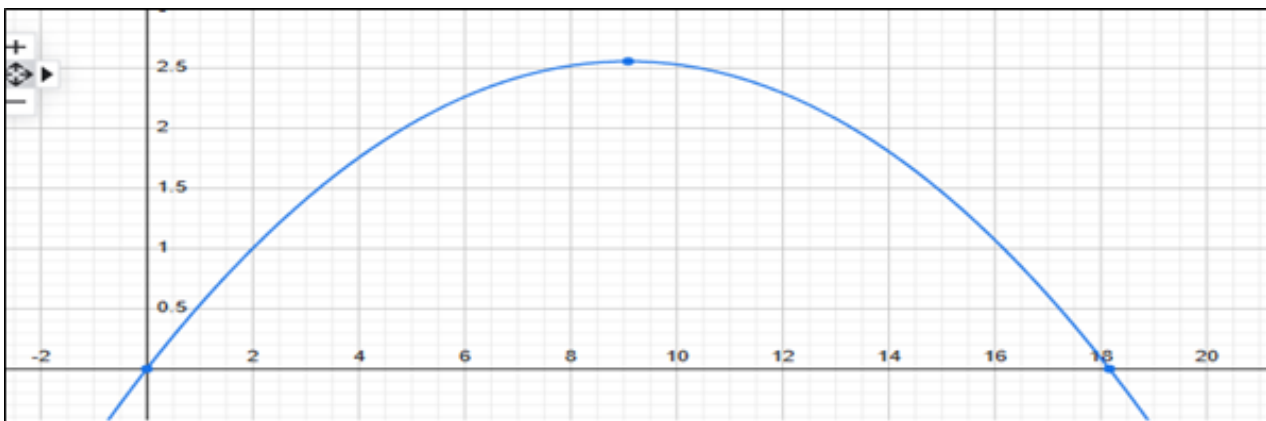Quadratic Effect value is $Y = -0.031x^2 + 0.563x$ When displayed, it looks like Figure 2:

Figure 2 Linier Curve

Referring to the measure of non-linear effects by(25), the results are, line item QE EMA→HEP, the resulting P-value is -0.331 greater than the 0.05 significance level. The results accept the null hypothesis that TL and HEP do not have a significant non-linear quadratic effect on the line item QE TL→HEP, and it is concluded that the non-linear, quadratic

effect of QE EMA→HEP on HEP is not significant. These results prove that transformation leadership, environmental management accounting and hospital environmental performance have a linear relationship in this research dataset.

4. Discussion

The test results of the first hypothesis "The better the practice of transformational leadership with its individual influence, inspirational motivation, intellectual stimulation and individual consideration has a positive impact on the environmental performance of the hospital" is accepted, this indicates that any change in transformational leadership style will improve the environmental performance of the hospital with a confidence interval of 97.5% the effect of transformational leadership in improving the environmental performance of the hospital lies between 0.043% to 0.0442%., and partially the transformation leadership style in improving hospital environmental performance at a high structural level (f-square = 0.341). This result is consistent with previous studies that used the transformational leadership variable as an exogenous variable. Rijal (2016) (26), Gullece et al 2016 (27), Imran, M. K. et al., (2016)(28), Khan et al., (2018) (29) Muis (2021)(30) Di He et al 2022 (31), Parves et al 2022(32),(9) This result is consistent with(2022) Runtunewe el al ((7) who found that transformational leadership style has no significant effect on employee performance. Research proves that leaders who are charismatic, as motivators, are able to motivate and improve employees' thinking skills (intellectual of stimuli) by providing appropriate challenges so that employees or staff can develop their intellectual skills, are able to accept and take into account the consideration of employees or staff in hospital policies, Their role is achieved in the realization of hospital institutions to create a sustainable environment that is measurable through compliance with regulations stated in PROPER (Company Performance Rating Assessment Program in Environmental Management and According to Regulation of the Minister of Health of the Republic of Indonesia Number 7 of 2019 concerning Hospital Environmental Health Implementation of Waste and Radiation Safety.

The **second** hypothesis, it has been confirmed that the greater utilization of Transformational Leadership practices, such as individual influence, inspirational motivation, intellectual stimulation, and individual consideration, has a beneficial effect on the costs of Environmental Management Accounting. This research indicates that the expansion of EMA as a management tool for regulating hospital environmental expenses is contingent on the Transformational Leadership approach. The study suggests that utilizing EMA can be significantly influenced by the Transformational Leadership Style. The impact ranges from 76.2% to 88.5% in the 97.5% confidence interval. The value of f^2=0.3341 supports these findings, indicating that the Transformational Leadership style has a substantial effect on the structural level of environmental performance improvement. The **third** hypothesis test, it is accepted that "EMA, as a management tool, has a positive impact on the environmental performance of hospitals." This suggests that changes in EMA expenses, including costs related to environmental impacts, damage prevention, internal failures, and external environmental factors, can enhance hospital environmental performance. According to a 97.5% confidence interval, the utilization of EMA as a management tool can improve hospital environmental performance by 76.2% to 88.5%. With a calculated f^2 value of 0.061, it is evident that EMA has a limited impact on hospital environmental performance at the structural level. The research demonstrates that EMA is a crucial management tool for Hospital Institutions to establish a sustainable environment. This can be measured through compliance with regulations stipulated in PROPER (Company Performance Rating Assessment Program in Environmental Management) and the Regulation of the Minister of Health of the Republic of Indonesia, No. 7 of 2019. This regulation pertains to Hospital Environmental Health and the Implementation of Waste and Radiation Safety. When first mentioned, technical terms in this regulation will be explained for clarity. The **fourth** hypothesis test, "EMA has a positive and significant effect in mediating leadership transformation with hospital environmental performance." This study demonstrates that hospital management can enhance hospital environmental performance by implementing policies and can also utilize EMA for evaluating the overall efficiency of environmental costs. The **five** hypothesis test, EMA have a high mediation effect size value so that they have good mediation capabilities. Furthermore, our analysis reveals that EMA serves as a mediator with a significant mediating effect, linking Leadership Transformation to Hospital Environmental Performance. Our findings indicate a high mediation size effect.

5. Conclusion

The study concludes that practicing Transformational Leadership with the use of individual influence, inspirational motivation, intellectual stimulation, and individual consideration has a positive effect on hospital environmental performance. Furthermore, it suggests that changes in the Transformational Leadership style can lead to improvements in hospital environmental performance. Secondly, the more proficient the practice of Transformational Leadership is, the more it positively affects Environmental Management Accounting Costs. Furthermore, any changes in the Transformational Leadership Style will result in increased functionality of EMA as a management tool in controlling hospital environmental costs. Thirdly, Using EMA as a management tool has a positive impact on hospital environmental performance. Further, any change in EMA Cost can improve such performance. This finding indicates that hospital

management can utilize EMA as a tool to calculate the overall efficiency of environmental costs in order to enhance hospital environmental performance. Fourthly, EMA significantly mediates the effect of Transformational Leadership on Hospital Environmental Performance. This finding supports the idea that EMA serves as a mediating variable between Transformational Leadership and Hospital Environmental Performance. The five EMAs possess a strong mediation effect size value, indicating significant mediation capabilities.

Recommendation

For future research, it is recommended that a 5-point Likert scale be used and the sample size be clearly stated. Additionally, the robustness test procedure should be fully implemented to evaluate the durability of the model, following the guidelines set forth by Hair et al. (2019).

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest regarding the publication of this paper

Statement of informed consent

Informed consent was obtained from all individual participants included in the study

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