

Benefit analysis of the implementation of Environmental Management System (EMS) ISO 14001:2015 in a tyres industry

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ABSTRACT

Environmental management has an important role in PT. Elang Perdana Tyres Industry (PT. EPTI). The company has been implementing a standard of ISO 14001:2015 to implement its environmental management. Environmental Management System (EMS) ISO 14001:2015 implemented consistently and effectively, provides several benefits that can enhance environmental performance in the company. The objectives of this research are 1) to identify the benefits of the implementation of EMS ISO 14001:2015, and 2) to analyze the relationship between the benefits of the implementation of EMS ISO 14001:2015 and the environmental performance of EMS. Primary data was collected from field observations, interviews with respondents, and questionnaire survey. Secondary data was obtained from company profile, and organizational structure, as well as documents of ISO 14001:2015. This research explained that the benefits of the implementation of the Environmental Management System (EMS) ISO 14001:2015 are enhancing company reputation, enhancing customer satisfaction, enhancing employee motivation, and reducing production costs. The main benefit for the company, based on the questionnaire result of 100 respondents that determined from Slovin formula, is enhancing company reputation (93 respondents). Besides, this research also explains that the implementation of EMS ISO 14001:2015 has strong relationship with the environmental performance EMS ISO 14001:2015 (coefficient of regression 0,717). Therefore, the benefits of the implementation of the Environmental Management System (EMS) ISO 14001:2015 are enhancing company reputation, enhancing customer satisfaction, enhancing employee motivation, and decreasing production costs have a strong relationship with environmental performance EMS ISO 14001:2015 in PT. EPTI. Benefit analysis of the implementation of EMS ISO 14001:2015 is needed to inform the company about the importance of benefits that can be obtained for improving the implementation of EMS ISO 14001:2015. The benefits obtained by the company will attract and motivate the company to improve the performance of EMS ISO 14001:2015. Even these benefits will further motivate continuous improvement that has an impact on effective environmental management in reducing negative environmental impacts and supporting sustainable development as a whole.

ABSTRAK

Pengelolaan lingkungan mempunyai peranan penting di PT. Elang Perdana Tyres Industry (PT. EPTI). Perusahaan telah menerapkan standar ISO 14001:2015 untuk menerapkan pengelolaan lingkungannya. Sistem Manajemen Lingkungan (EMS) ISO 14001:2015 yang diterapkan secara konsisten dan efektif, memberikan beberapa manfaat yang dapat meningkatkan kinerja lingkungan di perusahaan. Tujuan penelitian ini adalah 1) mengidentifikasi manfaat penerapan EMS ISO 14001:2015, dan 2) menganalisis hubungan manfaat penerapan EMS ISO 14001:2015 dengan kinerja lingkungan EMS. Data primer dikumpulkan dari observasi lapangan, wawancara terhadap responden, dan survei kuesioner. Data sekunder diperoleh dari profil perusahaan, dan struktur organisasi, serta dokumen ISO 14001:2015. Penelitian ini menjelaskan bahwa manfaat penerapan Sistem Manajemen Lingkungan (EMS) ISO 14001:2015 adalah meningkatkan reputasi perusahaan, meningkatkan kepuasan pelanggan, meningkatkan motivasi karyawan, dan mengurangi biaya produksi. Manfaat utama bagi perusahaan berdasarkan hasil kuesioner terhadap 100 responden yang ditentukan dari rumus Slovin adalah meningkatkan reputasi perusahaan (93 responden). Selain itu penelitian ini juga menjelaskan bahwa penerapan EMS ISO 14001:2015 mempunyai hubungan yang kuat dengan kinerja lingkungan EMS ISO 14001:2015 (koefisien regresi 0,717). Oleh karena itu, manfaat penerapan Sistem Manajemen Lingkungan (EMS) ISO 14001:2015 adalah meningkatkan reputasi perusahaan, meningkatkan kepuasan pelanggan, meningkatkan motivasi karyawan, dan menurunkan biaya produksi mempunyai hubungan yang kuat dengan kinerja lingkungan EMS ISO 14001:2015 di PT. EPTI. Analisis manfaat penerapan EMS ISO 14001:2015 diperlukan untuk memberikan informasi kepada perusahaan mengenai pentingnya manfaat yang dapat diperoleh untuk perbaikan penerapan EMS ISO 14001:2015. Manfaat yang diperoleh perusahaan akan menarik dan memotivasi perusahaan untuk meningkatkan kinerja EMS ISO 14001:2015. Bahkan manfaat-manfaat tersebut akan semakin memotivasi perbaikan berkelanjutan yang berdampak pada pengelolaan lingkungan hidup yang efektif dalam mengurangi dampak negatif terhadap lingkungan dan mendukung pembangunan berkelanjutan secara keseluruhan.

Keywords: *benefits analysis, company reputation, environmental management system, environmental performance, ISO 14001:2015*

INTRODUCTION

Population growth, industrial development, and technological progress can appear environmental problems are more complex (Widiyono, 2022). Decreasing of natural resources excessively with addition of chemical containment in economic activities can also impact resources environmental alteration. It is because economic activities can generate waste beside their product (Ramadan et al., 2015). Waste management is not effective yet can decrease environmental quality like pollution and material damage related the environment aspects. All parties such as government, environmentalists, researchers, and companies, increasingly have concern with global environmental issues because the environmental quality alteration from pollution (Utomo, et al., 2021). There are many advanced and innovative programs involved the Indonesian government agencies, NGOs, industrial and consulting firms, and several universities across the archipelago in co-producing of pioneering approaches to national environmental management that related with environmental management support systems, enhancing environmental law capabilities, improving compliance with environmental regulations standards and requirements (Monk, 2020). Besides that, various scientific disciplines from many countries must create networks and collaborations in further research in efforts to find solutions to environmental problems (Priatna & Monk, 2021).

Decreasing of environmental quality will obtain decreasing natural resources quality that can impact limitation of availability natural resources that can explore by company to meet community needed. Increasing of company awareness will enhance the environmental management and prevention pollution. (Haholongan, 2016) had research to explain that the company attempt to enhance awareness of environmental management of their employee with the important of environmental preservation. It is because the company need to enhance company reputation, equal with environmental aspect compliances. Enhancement of company reputation will give positive response from the customer so demand of product will be increase.

Environmental Management System (EMS) must be implemented effectively in order to reduce negative impact of environmental damage. Corrective action needed order that to take the EMS action did not comply yet with ISO 14001:2015, so that environmental damage will be managed more effectively (Kojra et al., 2020). Implementation of ISO 14001:2015 will obtain many benefits to the company by reducing environmental pollution, enhancing environmental performance, enhancing regulation compliances, reducing environmental risk, and as marketing tools to enhance company reputation (Kamalia et al., 2020). It is make

positive value to the company and can obtain company motivation to enhance environmental performance in order to increase company profit (Sari & Kamalia, 2019). Therefore, benefit analysis of implementation is needed to find out the benefits of EMS implementation to increase environmental performance. The objectives of this research are 1) Identifying benefits from the implementation of EMS ISO 14001:2015 in PT. Elang Perdana Tyres Industry (PT. EPTI), 2) To analysis the relationship between benefits of implementation of EMS ISO 14001:2015 and the environmental performance of EMS ISO 14001:2015.

METHODS

Research Location

The research was conducted in PT. Elang Perdana Tyres Industry (PT. EPTI), Sukahati Village, Branta Mulia Industrial Estate, Bogor Regency. PT. EPTI is a foreign investment company from Dubai. This company was operated since 1997 with their product are radial tyres, bias tyres and bias belted tyres with various brand according the order from customers. Their own brand, Accelera and Forceum, is exported to 90 countries worldwide. The location of PT. Elang Perdana Tyres Industry location can be seen in Figure 1.



(Source: Google Map, 2023)

Figure 1. Location of PT. Elang Perdana Tyres Industry in Bogor Regency (Source: Google Map, 2023)

Data Sources

This research using quantitative descriptive method. Data used in this research consist of primary data and secondary data.

Primary data

Primary data that is collected is obtained from field observations, interview the respondents and distribute the questionnaire. The respondents that are interviewed consist of personnel HSE Department (Manager, Supervisor and Administration staff) that manage EMS ISO 14001:2015 in this company. Questionnaire of benefits EMS ISO 14001:2015 was distributing to 100 respondents that are consist of various level of employee.

Secondary data

Secondary data that are collected obtained from company profile, organizational structure, waste management data and ISO 14001 documents. These secondary data were used to find out implementation of EMS ISO 14001:2015 that obtain benefits in company.

Research Method

This research consists of five step of activities, there are documentation studies, arrange research instrumentation, collecting data, data analysis, and deciding relationship between benefits of the implementation of EMS ISO 14001:2015 and environmental performance EMS ISO 14001:2015. The steps of activities can be followed in Figure 2.

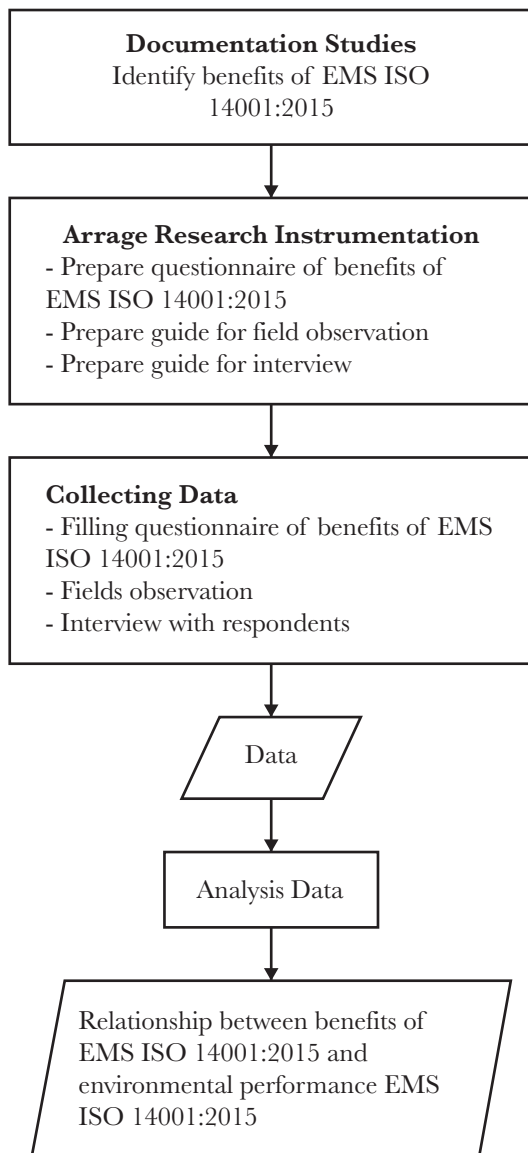


Figure 2. Flow chart of the research.

The first step of this research (documentation studies) started with identifying the benefits of implementation EMS ISO 1400:2015. Thus, identification of benefits

from implementation EMS ISO 14001:2015 consists of enhancing company reputation, enhancing customer satisfaction, enhancing employees motivation, and reducing production cost. The second step of this research was arrangement questionnaire as research instrument. This questionnaire contains about benefits of implementation EMS ISO 14001:2015. Besides that, researcher also arranged observation and interview guidance. All these instrument claims to obtain information about benefits of implementation EMS ISO 14001:2015. Third step was collected the data from the instruments. The respondents of this research are employees of the company in PT. EPTI. Data that was collected had been managed and analyze to get information about benefits of implementation EMS ISO 14001:2015. The last step was describing the output of benefits from implementation EMS ISO 14001:2015 from questionnaire, and analyzed the relationship between benefits of the implementation EMS ISO14001;2015 and environmental performance of EMS ISO 14001:2015.

Sampling Method

This research method is descriptive quantitative with sampling method using questionnaire as the main instrument. Respondents are employee of PT. EPTI. The total number of employee of this company is 2.000 employees, consist of operator that working in three shifts. This research using simple random sampling that each of population unit has same probability to be choosen. Researcher decided the number of sample using Slovin formula (Paramita, 2009).

$$n = \frac{N}{1 + Ne^2}$$

Note:

n= Amount of sample

N= Population

Ne= Degree of accuracy sampling method maximum 10%

based on this formula, the number of samples:

$$\begin{aligned}
 n &= \frac{2000}{1 + 2000 \times (10\%)^2} \\
 &= 92,2 \sim 100 \text{ samples}
 \end{aligned}$$

RESULTS AND DISCUSSION

Identify Benefits from the Implementation of EMS ISO 14001:2015

PT. Elang Perdana Tyres Industry has ISO 14001:2015 certification that explain environmental management for implementing Environmental Management System (EMS). EMS need consistent attempt to comply the standard. Company claims of

board of director and internal audit program can obtain EMS implementation effectively (Erwin, 2021). Motivation from board of director can perhaps increase employee competencies in environmental aspects, energy efficiency program, and hazardous waste management. This attempt can obtain contribution to EMS implementation to achieve goal of environmental performance. These environmental performances can obtain benefits to the company, like reducing production cost, enhance company reputation, enhance employee motivation and enhance customer satisfaction (Abrori et al., 2018). According to questionnaire data from 100 respondents, explain many benefits from the implementation of EMS ISO 14001:2015 in this company (Table 1).

Table 1. Benefits of Implementation EMS ISO 14001:2015

Benefits of Implementation EMS ISO 14001:2015	N of Respondents
Company reputation	93
Customer satisfaction	82
Employee motivation	72
Reduce production cost	78

Respondent's perception shows that the most benefits from the implementation EMS ISO 14001:2015 is enhancing company reputation (93 respondents), while the lowest benefits of implementation EMS ISO 14001:2015 in this company is enhancing employee motivation (72 respondents) (Tabel 1). Questionnaire data analysis on the benefits of implementation EMS ISO 14001:2015 can be seen in Figure 3.

Figure 3 explains that most respondents understand and know that the implementation of EMS ISO 14001:2015 will benefit the company. They had awareness that benefits of implementation EMS ISO

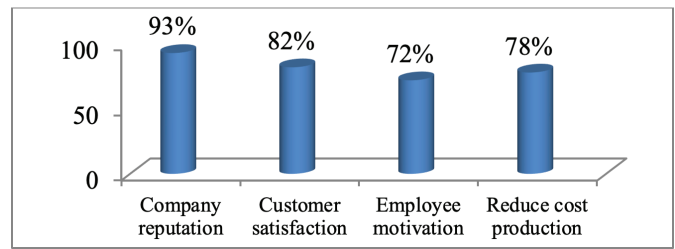


Figure 3. Questionnaire data analyses on the benefits of implementation EMS ISO 14001:2015.

14001:2015 is enhance company reputation. Besides, they also aware benefits implementation EMS ISO 14001:2015 consist of enhance customer satisfaction, enhance employee motivation and reduce production cost. Therefore, it is important to analyse of environmental performance implementation EMS ISO 14001:2015 in PT. EPTI.

Relationship between Benefits of Implementation and Environmental Performance of EMS ISO 14001:2015

Questionnaire data about the benefits of implementation of EMS ISO 14001:2015 had statistical test with instrumentation tests, linear regression tests, feasibility model tests, and classic assumption test. This kind of test is conducted to help in deciding feasible or not feasible data to use in further analysis.

Validity test

A validity test about the benefits of implementation EMS ISO 14001:2015 is conducted using Pearson Correlation (in SPSS software) with a significance level of 5%. This test useful to decide whether the data feasible or not feasible to use. The result of the validity test can be seen in Table 2.

Table 2. Result of validity test on benefits of The implementation of EMS ISO 140012:015

		Company reputation	Customer satisfaction	Employee motivation	Reduce cost production	Environmental performance
Company reputation	Pearson Correlation	1	.998**	.999**	.998**	.283**
	Sig. (2-tailed)		0,000	0,000	0,000	0,004
	N	101	101	101	101	100
Customer satisfaction	Pearson Correlation	.998**	1	.997**	.998**	.397**
	Sig. (2-tailed)	0,000		0,000	0,000	0,000
	N	101	101	101	101	100
Employee motivation	Pearson Correlation	.999**	.997**	1	.998**	.616**
	Sig. (2-tailed)	0,000	0,000		0,000	0,000
	N	101	101	101	101	100
Reduce cost production	Pearson Correlation	.998**	.998**	.998**	1	.587**
	Sig. (2-tailed)	0,000	0,000	0,000	0,000	0,000
	N	101	101	101	101	100
Environmental performance	Pearson Correlation	.283**	.397**	.616**	.587**	1
	Sig. (2-tailed)	0,000	0,000	0,000	0,000	
	N	100	100	100	100	100

Besides, the researcher also had validity test using OLS with criteria test, if R count > R table, data is valid, if R count < R table, data is not valid (Matondang, 2009). Validity test results can be seen in Table 3.

Table 3. Validity test results using OLS.

	Company reputation	Customer satisfaction	Employee motivation	Reduce cost production
R Count	0,286	0,400	0,619	0,590
R Table	0,1966	0,1966	0,1966	0,1966
	V	V	V	V

Note: V= Valid

Results of the validity test based on Pearson Correlation and OLS explain that dependent variables of the benefits of implementation EMS SML ISO 14001:2015 are valid. Result of validity test using Pearson Correlation explain that the significance value < 5% even result of validity test using OLS explains that R count > R table, data is valid.

Line regression

Linear regression was used to determine the relationship between the benefits of implementation of EMS ISO 14010:2015 and the environmental performance of EMS ISO 14001:2015. Determination coefficient used to measure how much influences both variables. The value of R2 closer to 0 explains that the limitation of capability independent variable to describe dependent variable. The value of R2 closer to 1 explains that the independent variable obtain almost all information that needed to predict dependent variable. Coefficient variable using adjusted R-Square because amount of independent variable more than 1. Coefficient value of determination can be seen in Table 4.

Table 4. Linear regression of the benefits of Implementation EMS ISO 14001:2015.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.853	.728	.717	0.06840	.728	63.566	4	95	0.000	2.090

Based on Table 4, adjusted R-Square 0,717 explains that the influences proportion independent variable benefits of implementation EMS ISO 14001:2015 towards dependent variable environmental performance EMS ISO 14001:2015 is 71.7%. This result describe that

Table 5. T-test of the benefits of implementation EMS ISO 14001:2015

Model	Unstandardized Coefficients		Standardized Coefficient	t	Sig.	95.0% Confidence Interval for B		Correlations		
	B	Std. Error	Beta			Lower Bound	Upper	Zero-order	Partial	Part
	1 (Constant)	0,369	0,034				10,923	0,000	0,302	0,436
Company reputation	0,098	0,098	0,195	3,329	0,001	0,039	0,156	0,283	0,323	0,178
Customer satisfaction	0,143	0,018	0,429	7,801	0,000	0,106	0,179	0,039	0,625	0,417
Employee motivation	0,131	0,018	0,46	7,258	0,000	0,095	0,167	0,616	0,597	0,388
Reduce cost production	0,115	0,018	0,373	6,251	0,000	0,079	0,152	0,587	0,54	0,34

independent variable benefits of implementation EMS ISO 14001:2015 have strong influences to predict dependent variable environmental performance EMS ISO 14001:2015, however, 28.3% is influenced by other variables beyond of analysis. According to the coefficient range in the research conducted by Pratomo and Astuti (2015), relationship between independent variable benefits of implementation EMS ISO 14001:2015 towards dependent variable environmental performance EMS ISO 14001:2015 is strong. It is describe that independent variable benefits of implementation EMS ISO 14001:2015 contribution have strong influences simultaneously towards dependent variable environmental performance EMS ISO 14001:2015.

Test of feasibility model

Two test of feasibility model conducted in this research are as follows:

1. Significance test of individual parameter T-test

T-test in linear regression is used to estimate regression model accurately to describe trend of independent variable to influence dependent variable. Parameter is estimated in linear regression are constant and slope. The test results can be seen in Table 5.

The probability value in the T-test is smaller than alpha (error level) 0,05 so independent variable benefits of implementation EMS ISO 14001:2015 have strong influences towards dependent variable environmental performance EMS ISO 14001:2015.

2. Statistic F-test

Statistic F-test is a primary step to identified regression model to decide feasible or not feasible to explain influences between independent variable towards dependent variable. Statistic F test follow F distribution with same criterions with One Way ANOVA. Probability value F count smaller that alpha (error level) 0,05 so regression model is feasible. However, F probability value bigger than alpha (error level) 0,05 so regression model is not feasible. The testing result is explained in Table 6.

The probability F value in the table is 0,001 smaller than significance level 0,05 so it is explain that regression model is feasible to describe relationship between independent variable benefits

of implementation EMS ISO 14001:2015 that have strong influences towards dependent variable environmental performance EMS ISO 14001:2015. Dewi (2018) explain that independent variable benefits of implementation EMS ISO 14001:2015 have together influences towards dependent variable environmental performance EMS ISO 14001:2015.

Table 6. Result of statistic F-test of benefits of implementation EMS ISO 14001:2015.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,190	4	0,297	63,566	<,001 ^b
	Residual	0,444	95	0,005		
	total	1,634	99			

Classic assumption test

Classic assumption test in this research are as follows:

Normality test

The normality test is residue data formed by the regression model. There are some distribution points near with diagonal line so it was explained that data have normal distribution. The distribution of points in the Normal P-P Plot explains that near with diagonal line so reside data have normal distribution.

Normality test was also conducted using Kolmogorov-Smirnov (Table 7).

Table 7. Results of normality test of the benefits of the implementation EMS ISO 14001:2015.

N		100
Normal	Mean	0,0000000
Parameters ^{a,b}	Std. Deviation	0,06700429
Most	Absolute	0,104
Extreme	Positive	0,095
Differences	Negative	-0,104
Test Statistic		0,104
Asymp. Sig. (2-tailed) ^c		0,009
Monte Carlo	Sig.	0,008
Sig. (2-tailed) ^d	99%	Lower Bound
	Confidence Interval	
		Upper Bound

According to the normality test, it can be explained that a significance value 0,009 comply normality standard <0,05. Therefore, the dependent variable of benefits EMS ISO 14001:2015 have normal distribution.

The result of the statistical analysis of coefficient regression explains that influences of independent variable benefits of EMS ISO 14001:2015 have strong

influences towards dependent variable environmental performance SML ISO 14001:2015 in PT. EPTI. Based on observation and interview to HSE Department personnel, so strong influences contribution of independent variable benefits EMS ISO 14001:2015 towards environmental performance of EMS ISO 14001:2015 caused by:

1. Several employees aware that benefits of implementation EMS ISO 14001:2015. It is explained in the result of questionnaire. There are mostly of employee agree with implementation of EMS ISO 14001:2015 because it can obtain the most important benefits to enhance company reputation. Besides that, employee also aware that other benefits of implementation EMS ISO 14001:2015 are enhancing customer satisfaction, enhancing employee motivation and reducing production cost.

2. PT. EPTI has ISO 14001:2015 certification to prove that they had efforts to manage the environment of the EMS in the company. Environmental performance in this company is 71,35% with middle level. It was described that compliance of standard requirements ISO 14001:2015 supporting with awareness of benefits implementation ISO 14001:2015 that can enhance environmental performance in company.

Contribution of strong influence benefits implementation EMS ISO 14001:2015 towards environmental performance of EMS ISO 14001:2015 based on previous research are:

1. Enhancement of company reputation through EMS implementation has a strong relationship support environmental performance to sustainable company (Rusko et al., 2014). Thus, the benefits of implementation EMS ISO 14001:2015 to enhance environmental performance EMS ISO 14001:2015 and company reputation through EMS implementation is strong relationship to support sustainable development of company.

2. Most of the companies declared that enhancement of customer satisfaction strong influences in environmental performance in sustainable development (Erwin, 2021).

3. Most of the companies declared that enhancement of customer satisfaction strong influences in environmental performance in sustainable development (Khair et al., 2020).

4. Environmental condition support to implement EMS ISO 14001:2015 can enhance employee motivation. Enhancement of employee motivation

can enhance management commitment so the employee will do their exercise optimally and responsibly. Their optimal efforts can support to achieve the company goals and implementation of EMS ISO 14001:2015 (Zulfikar et al., 2019).

Jamaludin (2007) explains that the implementation of EMS ISO 14001:2015 to enhance company reputation and customer satisfaction will decide efforts of product management in market. This aspect depends on trust and customer acceptance, experience and company's knowledge. Khair, et al (2020) explain that enhancement of economic poverty and cost efficiency can achieve by implementation of environment and working environmental integrity that can enhance employee motivation. Company that understands benefits implementation EMS ISO 14001:2015 has 2 (two) reasons in their implementation are reduce natural resources and expand their market or make their new market. Therefore, relationship between EMS ISO 14001:2015 to enhance company reputation, enhance customer satisfaction, enhance employee motivation and reduce production cost have strong influences towards environmental performance EMS ISO 14001:2015 in PT. EPTI can be accept based on previous research had been done.

CONCLUSION

Most of the respondents' perception explained that the benefits of implementation of EMS ISO 14001:2015 are enhancing the company's reputation (93 respondent). The lowest amount of respondent perception describes the benefits of implementation of EMS ISO 14001:2015 are enhancing employee motivation in company (72 respondent).

The benefits of implementation of Environmental Management System (EMS) ISO 14001:2015 have strong relationships with the environmental performance of EMS ISO 14001:2015 which is indicated by regression coefficient 0,717.

Relationship between the benefits of implementation of EMS ISO 14001:2015 in enhancing company reputation, enhancing customer satisfaction, enhancing employee motivation, and reducing production cost have a strong impact on the environmental performance of EMS ISO 14001:2015 in PT. Elang Perdana Tyres Industry (PT. EPTI).

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