Impact of Programme for Endorsement of Forest Certification (PEFC) on Business Competitiveness : Evidence From East Java

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ABSTRACT

The purpose of this research is to analyze and determine the effect of the application of programme for the endorsement of forest certification (PEFC) on business competitiveness for wood industries. This research was conducted in several companies that use wood in East Java Indonesia with 200 employee respondents of 14 wood companies which have plans to implement PEFC. The background of this research is due to inadequate research on the benefits of PEFC in timber companies in East Java Province Indonesia. Data collection was carried out by distributing questionnaires from Desember 2019 until Januari 2020 and analyzing the data using Structural Equation Model (SEM) and Linear Structural Model (LISREL) software version 8.70. The result of analysis show that the application of PEFC significantly affected business competitiveness such as increasing customer satisfaction index, increasing sales, increasing productivity and increasing company reputation. The Novelty of this research is a new model of PEFC in East Java and this research could be used as a reference for further research in Indonesia and other region in the world.

Keywords : Chain of Custody, Competitiveness, PEFC

I. INTRODUCTION

A new standard for supporting responsible use of timber and timber products has just been published PEFC Chain of custody of timber and timber-based products.Deforestation and forest degradation are ravaging our planet, This standard for tracing timber and timber products back to its sources and will help to provide this information .PEFC, Chain of custody of timber and timber-based products contain the requirements for a chain of custody of timber and timber-based products that allows users to trace the origininality of timber and timber products

every step along the supply chain (Iso.org, 2019). The purpose of monitoring forest resources is to reduce unplanned deforestation, restore and rehabilitate degraded forests, sustainable management of forests, and evaluate the function of carbon sequestration by forests, forested lands and trees outside the forest to moderate the global climate (Fujita, 2010). Protecting tropical forests is becoming increasingly urgent because of the decline in forest areas by 6% and 17% global carbon dioxide emissions (Baccini et al., 2012). more is needed about ways to reduce forest loss and maintain oxygen stocks (Brown, 2013; Sills, et al., 2014; Lee et al., 2018). Most of the forest

becomes deforestation and high forest degradation (Sloan and Sayer, 2015). Deforestation contributes greatly to increasing global greenhouse gas emissions and resulting in climate change (Harris et al., 2012). many people who live in or near these forests are highly dependent on forest resources and their livelihoods are threatened by deforestation (Sunderlin et al., 2005). There have been many companies that have certified forest and in 2019 companies in Indonesia have already certified as many as 580 certified (FSC.org,2019). many companies that are forest certified and in 2019 companies in indonesia including East Java Province Indonesia which have been certified , the main purpose of implementing PEFC is to fulfill government regulations and also requests from customers, there are several objectives to be achieved namely increase business Competitiveness such as customer satisfaction index, increase sales, increase productivity and safety and employee satisfaction.

The purpose of this study was to determine the effect of the implementation of PEFC on business competitiveness. The urgency of this study is the first because there has not been any study on the effect of new standard PEFC specifically on timber industries in East Java Province and as input for the owners of timber-based companies to implement PEFC . The novelty of this research is the first study that analyzes the effect of new standard PEFC implementation on business competitiveness of timber industries in East Java Province Indonesia.

II. RESEARCH METHODS

Data analysis of this research using the Structural Equation Model (SEM) using a Linear Structural Model (LISREL) version 8.70. William and Gavin (2004) using LISREL to test the relationship between the latent variables and indicators - indicators. Construct validity and reliability of the indicators in this study conducted by Confirmatory Factor Analysis (CFA). Testing the validity and reliability of

the instrument was performed using confirmatory factor analysis to obtain valid and reliable data. Second-order confirmatory factor analysis (2nd Order CFA) is a measurement model consists of two levels. The first level of analysis performed on the latent constructs all aspects of the indicators and the analysis is done of latent constructs to construct its aspects. Through the CFA not only be done testing the validity of a construct (Construct Validity) but also reliability testing constructs (Construct Reliability). The construct has good reliability is if the value of Construct Reliability (CR) $\geq$ 0.70 and variance extracted values $\geq$ 0.50.

Data This study is based on questionnaires distributed in 200 respondents from 14 timber industries companies that have plan to implement PEFC Management System in East Java Province. Based on the previous studies and the purpose of writing this study, it created a research model as follows:
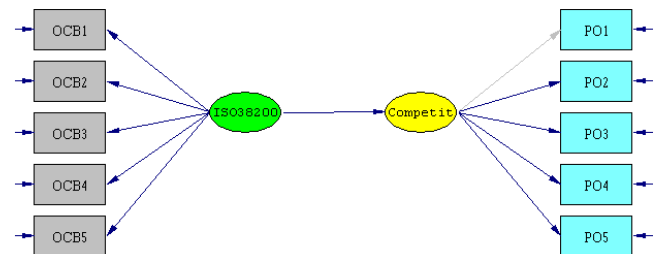

Figure 1. Model of Research

Note : The figure 1 is derived from the output of the Lisrel program (authors, 2019)

Based on the above research model made the following hypotheses:

1. Ho : There is a no significant and positive relationship between the implementation of PEFC (PEFC) to the Business Competitiveness (OP).

2. H1 : There is a significant and positive relationship between the implementation of

PEFC (PEFC) to the Business Competitiveness (OP).

Based on the hypothesis of the indicator - an indicator of the variables used in this study are indicators of Dependent Variables X (Implementation of PEFC), namely management system (PEFC1), Documentation (PEFC2), material and products records(PEFC3), Sales (PEFC 4), Risk Assesment (PEFC 5) (Santoso et al,2019), Indicators of Dependent Variables Business Competitiveness (OP), namely as increase customer satisfaction index (OP1) , increase sales (OP2) , increase productivity (OP3) , safety (OP4) and employee satisfaction (OP5).

Table 1. Profile of Respondents

Job Title	Man	Woman	Total
Top Management	16	6	22
Senior Manager	25	16	41
Manager	24	13	37
Staff	61	39	89
Total	126	74	200

Note : The respondent profile table is derived from a summary of the questionnaire returned (authors, 2019)

The distribution of questionnaire data from Desember 2019 until Januari 2020 data on companies that implemented the PEFC were obtained from pefc.org

III.RESULTS AND DISCUSSION

The first step is to create a syntax program on Lisrell software after that the program is run to get the loading factor of PEFC variable (PEFC) and Business Competitiveness Variable (OP) and to determine the t value of each variable. The data analysis by Structural Equation Model (SEM) using a Software Linear Structural Model (LISREL) version 8.70 of

Joreskog and Sorbom (2008), and the results of analusis are in the following figure.:
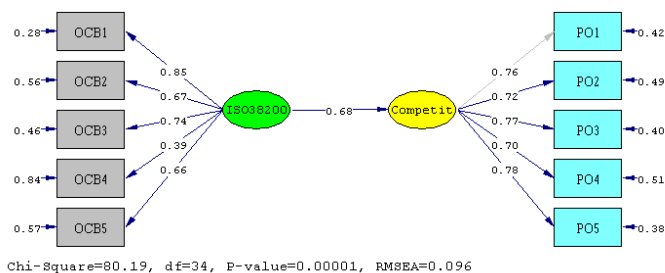

Chi-Square=80.19, df=34, P-value=0.00001, RMSEA=0.096

Figure 2. Loading factor Value Indicator
Note : The figure comes from the output of the Lisrel program processing (authors, 2019)

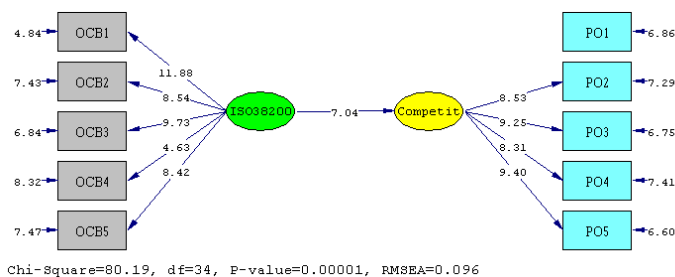Chi-Square=80.19, df=34, P-value=0.00001, RMSEA=0.096

Figure 3. t-Value Indicator
Note : The figure comes from the output of the Lisrel program processing (authors, 2019)

Based on figure 2 and figure 3 is concluded that no error variance negative value, and the value of the indicator CoC FSC above the loading factor of 0.5 (> 0.5) and for value loading factor <0.5 will be issued. The entire value of t which to test the significance of the value of the loading factor of greater than 1.96 (> 1.96). It is that all valid and significant indicator. Then the results of the output lisrell of each indicator and loading factor are summarized in the table for analysis of validity and reliability ummary of the results of the analysis can be seen in the following table:

Table 2. Results of 2nd Order Analysis Indicators CFA Construct Validity

Variable	Indicator	Loading Factor	*T-Value*	Remark
PEFC	PEFC	0.85	11.88	Valid &

(PEFC)	1			Significant
	PEFC 2	0.67	8.54	Valid & Significant
	PEFC 3	0.74	9.73	Valid & Significant
	PEFC 4	0.89	4.63	Valid & Significant
	PEFC 5	0.66	8.42	Valid & Significant
Busines s Compet itivenes s (OP)	OP1	0.76		
	OP2	0.72	8.93	Valid & Significant
	OP3	0.77	9.25	Valid & Significant
	OP4	0.70	8.31	Valid & Significant
	OP5	0.78	9.25	Valid & Significant

Note The table comes from the output of the Lisrel program processing (authors, 2019)

Based on the above test results showed that the value of the loading factor is obtained entirely above 0.5 (> 0.5), and all the t value obtained is more significant than 1.96 (> 1.96). A summary of the results of the above analyses can be seen in Table 3.

Table 3. Analysis For the 2nd Order CFA PEFC Construct Validity

Variable	Var iabl e	Loadi ng Factor	*T-Value*	Remark
PEFC (PEFC)	PEF C	0.68	7.04	Valid & Significan t

Note : Table comes from the output of the Lisrel program processing (authors, 2019)

These results can be concluded that PEFC (PEFC) has valid and significant. Results of validity are also reinforced by the value of Chi-Square (r) that generates a value of 100.44. The next step to calculate the value Construct Reliability (CR) and

Variance Value entrance (VR), Construct reliability is a measure of the internal consistency of indicators that show the formation of a variable degree in the variable formed. Extracted variance is a measure of how much of the variance of the indicators were removed by the variable created. Two approaches can be made to assess the reliability of the measurement model is test construct reliability and variance extracted for each latent variables (Hair et al. 2010). the next step is to summarize the value of construct reliability and variance extracted from the loading factor value of each variable in the following table

Table 4. Results of 2nd Order Analysis Construct Reliability.

Indicato r	*Loadin g Factor*	*Loadin g Factor2*	*1-Loadin g Factor2*	*CR*	VE
PEFC1	0.85	0.240	0.640		
PEFC2	0.67	0.423	0.578		
PEFC3	0.74	0.347	0.603	0.7 9	0.58
PEFC4	0.89	0.332	0.616		
PEFC5	0.66	0.223	0.750		
OP1	0.76	0.223	0.730		
OP2	0.72	0.234	0.662		
OP3	0.77	0.234	0.658	0.7 8	0.58
OP4	0.70	0.345	0.645		
OP5	0.78	0.310	0.657		

Note : Table comes from the output of the Lisrel program processing (authors, 2019)

Based on the calculation formula CR construct reliability was obtained results and indicators VE for PEFC (PEFC) of 0.75 (CR) ≥ 0.70 and 0:55 (VE) ≥ 0.50. and concluded that the variable CoC FSC (X) has good reliability and value constructs have good reliability. Businnes Competitiveness Indicators (OP) of 0.74 (CR) ≥ 0.70 and 0:52 (VE) ≥ 0.50. and concluded that the Business Competitiveness has good reliability and value constructs have good

reliability. Therefore, based on the results of the analysis of the reliability calculation can be concluded that the reliability of the whole is a good indicator and conclude that the research meets the requirements of all phases of testing. The next step is to carry out the Analysis of Goodness of Fit (GOF), GOF data obtained from the results of the software execution

Analysis *Goodness of Fit (GOF)*

Test the suitability of the model in the overall model fit about the analysis of statistical GOF value generated by the program lisrel, for the relevance of the model (model fit) are good enough and for its model fit the criteria as shown in Table 5.

Table 5. *Goodness of Fit*

Indeks Fit	Value	Value Standard	Remark
Chi-Square	80.19	>0.5	Good
Root Mean Square Error of Approximation (RMSEA)	0.03	<0.08	Good
Normed Fit Index (NFI)	0.92	>0.90	Good
Non-Normed Fit Index (NNFI)	0.91	>0.90	Good
Comparative Fit Index (CFI)	0.91	>0.90	Good
Incremental Fit Index (IFI)	0.91	>0.90	Good

Note : Table comes from the output of the Lisrel program processing (authors, 2019)

Based on the results of the analysis above can be seen that all fit indices stated that the model fit. These results indicate that the variable is declared valid and reliable so that it can be concluded that the overall model is still a good match. Model equation

(Structural Equations) linear from 8.70 LISREL software obtained as follows:

Competitiveness = 0.68*ISO38200, Errorvar.= 0.53 ,
R^2 = 0.67 (0.097)   (0.12)
                7.04   4.57

Figure 4. Structural Equations

Note : The figure comes from the output of the Lisrel program processing (authors, 2019)

Based on the results from all the above analysis, it can be seen that the implementation of PEFC (PEFC) is a positive and significant effect on Business Competitiveness with t value equal to 7.04 The goodness of fit models is produced pretty good with chi-square value of 80.19. For the virtue of fit criteria, the other also already qualified as needed. Rated R Square of 0.67 means the Implementation of PEFC have affect the business Competitiveness by 67% while other factors influence 33%.   So summarized and obtained the following regression equation OP (Business Competitiveness) = 0.68 x PEFC Implementation + Error

DISCUSSION

Based on the results of data analysis concluded that the independent PEFC variable is valid and significant and has a positive and significant influence on the dependent variable business competitiveness meaning that the application of PEFC has a positive effect on the competitiveness of the Wood industry in java. These results are consistent with previous research studies conducted by Purwanto et al. (2019) state that forest management influence significant and positive to business competitiveness. Santoso et al. (2019) state that forest management FSC influence significant and positive to business competitiveness. This study contributes to the research into the benefits of *FSC Chain of Custody*, PEFC Sustainable Forest

Management *and ISO 38200* Chain of custody of Wood and Wood-based products certification, the limitation of this study is that it does not discuss about financial competitiveness indicators, so in the future research, the indicators of financial competitiveness can be measured over a certain period of time. Other than that, a comparison of the financial competitiveness of FSC Chain of Custody*,* PEFC Sustainable Forest Management *and ISO 38200* Chain of custody of Wood and Wood-based products Certificate holders can be made. *FSC* Chain of Custody*,* PEFC Sustainable Forest Management *and ISO 38200* Chain of custody of Wood and Wood-based products certification applies to all organizations that trade, process or produce Wood and forest products. The benefits of implementing *FSC* Chain of Custody , PEFC Sustainable Forest Management *and ISO 38200* Chain of custody of Wood and Wood-based products certification namely maintaining customers are the main benefits of certification, increasing new customers, increase in exports, increase company image, profit and increase, commitment to environmental responsibility which enhance the company's image, promote, sustainable use of forest resources, improve communication with customers, prevent illegal logging, and improve management efficiency. The results of the study show that *FSC* Chain of Custody*,* PEFC Sustainable Forest Management *and ISO 38200* Chain of custody of Wood and Wood-based products certification is a prerequisite for competitiveness and competitiveness for companies. One of the benefits of this research is to convince the owners of timber and processing companies to get *FSC* Chain of Custody*,* PEFC Sustainable Forest Management *and ISO 38200* Chain of custody of Wood and Wood-based products certified because the benefits of its application have been tested and also as a form of compliance with laws and regulations so as to enhance the good image of the company.

IV. CONCLUSION

Based on the analysis of the results of research can be concluded that the implementation of the PEFC has a positive and significant impact on influenced business competitiveness such as increase customer satisfaction index, increase sales, increase productivity and safety and employee satisfaction so that it will increase the company's profit The research object not only in Banten province but could also be extended to other provinces. The results of this study of implementation of the ISO 38200 management system has an influence on business competitiveness so that companies that have not implemented it are recommended to immediately implement it, this study reinforces the results of previous studies.

This study contributes to the research into the benefits of PEFC certification, The limitation of this study is that it does not discuss financial Competitiveness indicators, so in future research financial Competitiveness can be measured over a certain period of time. Other than that,a comparison of the financial Competitiveness of PEFC Certificate holders can be made. PEFC certification applies to all organizations that trade, process or produce timber and forest products. The benefits of implementing PEFC certification namely maintaining customers are the main benefits of certification, increasing new customers, increase in exports, increase company image, profit and increase, commitment to environmental responsibility which enhance the company's image, promote, sustainable use of forest resources, improve communication with customers, prevent illegal logging, and improve management efficiency.

The results of the study show that PEFC certification is a prerequisite for competitiveness for companies. One of the benefits of this research is to convince the owners of timber and processing companies to get PEFC certified because the benefits of its application have been tested and also as a form of compliance

with laws and regulations so as to enhance the good image of the company.

V. LIMITATION

This study has several limitations, the sample not representative of the target population, the number of samples that are not much due to limited time and cost, the object of this study is only industry companies in East Java Province even though more other companies have implemented in othes Provincies. This study has limited time and the number of respondents only 164 employees have not convinced to generalize the results of this study. Software used for data analysis is Lisrel and a lot of people did not yet familiar with this software. This study didn`t not discuss about financial indicators so it`s cannot be known the real financial benefits of applying PEFC, for the following research to discuss financial indocators by comparing the financial condition of PEFC certified and uncertified companies. This research only examines the paper industry even though many companies are implementing PEFC such as timber distributors, timber factories and others. For further research it is advisable to examine companies throughout the chain from timber to end users.

VI. ACKNOWLEDGEMENTS

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Cite this Article

Agus Purwanto, Mirza Prameswari Saefuddin, Samuel Tanasjah Setiawan, "Impact of Programme for Endorsement of Forest Certification (PEFC) on Business Competitiveness : Evidence From East ", Shodhshauryam, International Scientific Refereed Research Journal (SHISRRJ), ISSN : 2581-6306, Volume 3 Issue 1, pp. 42-51, January-February 2020. URL : http://shisrrj.com/SHISRRJ203110