International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 06, 2020
ISSN: 1475-7192

The Effect of Forest Management PEC, FSC, ISO 38200:2018 on Wood Industries Competitiveness: Evidence from Indonesia

[*1]Agus Purwanto, [2]Masduki Asbari, [3]Freddy Ong, [4]Mirza Prameswari, [5]Priyono Budi Santoso, [6]Leo Hutagalung, [7]Otto Berman Sihite, [8]Virza Primahendra

ABSTRACT--- *Sustainable business is the dream of every organization and industries. In order to sustain, the organization and industries needs to perform well and able to competition with others. Pioneer industry such as wood are also aims for the same thing. There are three crucial industries that contribute in sustaining the world's wood industries, and they are Forest Stewardship Council (FSC), Program for the Endorsement of Forest Certification (PEFC) and ISO 38200:2018. The purpose of this research was to determine the effect of Forest Management of FSC Chain of Custody, PEFC Sustainable Forest Management and ISO 38200:2018 Chain of Custody of wood and wood-based products towards the business competitiveness of wood industries in Indonesia. This research was conducted among several wood processing companies or industries that uses wood as main raw material in Indonesia. The respondents are 372 employees of wood industries as top management, manager and staff that have plan or have implement FSC, PEFC and ISO 38200:2018. The background of the research is because of inadequate in research data on PEFC, FSC and ISO 38200:2018 which implemented particularly in wood Industries in Indonesia. The data collection was carried out by using electronic questionnaire which distributed to 372 employees in the wood industries starting August 2019 until November 2019. The collected data was analyzed using Structural Equation Model (SEM) and Linear Structural Model (LISREL) version 8.70. The results of the analysis showed that implementation FSC Chain of Custody, PEFC Sustainable Forest Management and ISO 38200:2018 Chain of Custody of Wood and Wood-based are significantly and positively affect the business competitiveness like increase improvement in the customer satisfaction index, increase sales growth and market share. This research is high in novelty value as it proposes a model for FSC, PEFC, ISO 38200 and business competitiveness of wood industries in Indonesia.*This research *could be adapted and adopted by other countries or in other regions.Furthermore, this research can open the pathway for the top management of wood industry or other industry alike to increase the business competitiveness and performance.*

Keywords--- *business competitiveness, forest management system, FSC, ISO 38200, PEFC*

[1]* *Universitas Pelita Harapan, Indonesia, Corresponding author Email : agozpor@gmail.com*
[2] *Universitas Pelita Harapan, Indonesia*
[3] *Universitas Pelita Harapan, Indonesia*
[4] *Universitas Pelita Harapan, Indonesia*
[5] *Universitas Pelita Harapan, Indonesia*
[6] *Universitas Pelita Harapan, Indonesia*
[7] *Universitas Pelita Harapan, Indonesia*
[8] *Universitas Pelita Harapan, Indonesia*

Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020

I. INTRODUCTION

More than 30% of the world surface is covered with forests, the forested area which spread all over the world could provide food, medicine and fuel for billions of people according to World Wildlife Fund.The total of Indonesia land area is 187.7 million hectares , and 93.9 million hectarses of them coveredin forested land.Out of 187.7 million hectares in Indonesia the 85.85 million hectares of them is still forested (45.7%) and 34.54 million hectares of them is non-forested land (18.4%). According to Lahtinen et al. (2019) Indonesia's deforestation in 2016-2017 was 0.48 million hectares (inside and outside the forest area), which is a very large deforestation about of 0.66 million, and because of reforestation about 0.18 million hectares has been restored. According Ofoegbu et al. (2019) the rate of deforestation rate in 2011 until 2017 is the result of the calculation of net deforestation already consider reforestation activities. While the pervious calculations period is still using deforestation gross. According to Chia et al(2016) that in 2014-2015 periode,aproximately 30% of forested area is reduced by the deforestation and land fires. According to Panjaitan et al. (2019) the purpose of monitoring forest resources is to reduce deforestation, restore and rehabilitate degraded forests, management the sustainable 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 forestbecomes very important because of the decreasing in forest areas by 6% and the increasing of 17% global carbon dioxide emissions (Baccini et al., 2012). More counter measure is needed to reduce forest loss and maintain oxygen stocks (Brown, 2013; Sills, et al., 2014; Lee et al., 2018). Because of the high degradation forest in many places the amount of forest has been (Sloan and Sayer, 2015). Sarah et al.(2016) also said that forest certification can affect these programs in many ways, using their competencies it could either enhance or restrict non-state certification schemes and FSC was temporarily useful to the forestry sector (Hasan et al, 2019).

Deforestation is the main cost of global green house gas emissions which resulted drastic in climate change (Harris et al., 2012). There are many people who live near these forests and they are highly dependent on resources which they got from the forest, to make it worst their livelihoods are threatened by deforestation (Sunderlin et al., 2005). Newsom & Hewitt (2005) examined and found out that most of the certified companies were need to increased the training of their workers, most of the industries increase the safety of their worker by 82%, and increase their working wages as much as 64%. According to Hirschberger (2005) 183 out of 12 Russian forest companies which are certified covering a total area of more than 3.5 million ha found that the results of having forest certification strengthen work rights for forest company workers. According Wang et al. (2017) many certified regional forest companies increase the protection of the workers right which resulted in the reduction of postponement salary. The workers understand that certification is an important thing for them to protect their right to work in the forest company. According Gabriel et al. (2018) the Forest Stewardship Council (FSC) the most important standards is to improve the sustainability of the forest governance. In 2018, FSC certified a total forest area of 195 Mega hectares across 80 countries in the world.

According Hanafi et al. (2019) in 2019 many companies have been certified including companies in Indonesia, According to Council (2019) 580 of the companies in Indonesia have been certified. The main purpose of implementing FSC, PEFC and ISO 38200:2018 is to fulfill government regulations and also to fulfill customers request, there are several objectives that needs to be achieved such as the improvement of business performance and competitiveness like customer satisfaction index, sales increase, increase productivity, safety and employee

Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020

satisfaction. The purpose of this study was to determine the effect of forest management FSC Chain of Custody, PEFC Sustainable Forest Management and ISO 38200 Chain of custody of wood and wood-based products to business performance for wood industries in Indonesia. The important part this study is because there has not been any study on the influence from implementing FSC, PEFC and ISO 38200. The purpose of this research is to determine the effect of forest management FSC Chain of Custody, PEFC Sustainable Forest Management and ISO 38200:2018 Chain of Custody of Wood and Wood-based products to business competitiveness for wood industries in Indonesia. The novelty of this research is the first study that analyzes the effect of FSC, PEFC and ISO 38200:2018 in Indonesia.

II. METHODS

This research used quantitative methods and data processing using Structural Equation Model LISREL software, data collection using online electronic questionnaires distributed to 372 employees like managers, employees and staff in several wood industries in Indonesia, data collection techniques using simple random sampling and snowball sampling. Based on the previous literature and discussion, the research questions as well as the research objectives, the following research framework is developed as following figure :

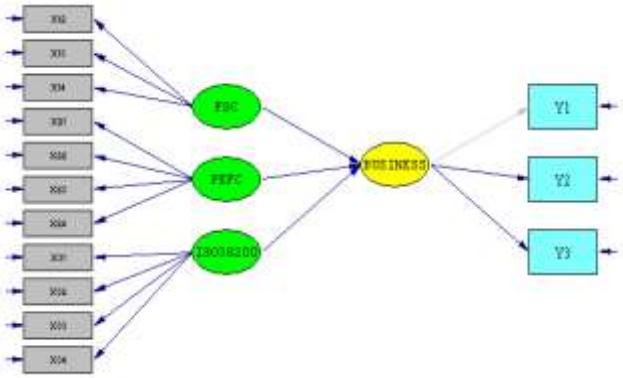

Figure 1: Conceptual Framework of Research

There are several research hypotheses that have been listed out in order to ensure the practicability of this research. The research hypothesis is as follow:

H1: There is a postive and significant relationship between the implementation of FSC to wood industries competitiveness.

H2: There is a positive and significant relationship between the implementation of PEFC to wood industries competitiveness.

H3: There is a postive and significant relationship between the implementation of ISO 38200:2018 to wood industries competitiveness.

The indicators for each independent variables FSC, PEFC, ISO38200:2018 and the dependent variables of competitiveness are determined based on references from previous studiesin the following table :

Table 1: Indicator of Variables

Variable	Indicators	References
FSC (X.1)	Sysyem of Management (X1.2)	FSC.org (2019) Council (2019) Santoso et al.(2019), Purwanto et al.(2019)
	Material Handling & Sourcing (X1.3)	
	Control of Volume (X1.4)	
PEFC (X.2)	Leadership of Leaders (X2.1)	PEFC.org (2019) Santoso et al.(2019) Enescu (2019) Purwanto et al.(2019)
	Supprt & Planning (X2.2)	
	Evaluation of Performance (X2.3)	
	Improvement (X2.4)	
ISO 38200 (X.3)	Requirement of Organizational (X3.1)	ISO.org (2019) Santoso et al.(2019) Purwanto et al.(2019)
	Assesment of risk (X3.2)	
	Methodes of CoC (X3.3)	
	Information of Output (X3.4)	Santoso et al.(2019) Purwanto et al.(2019)
Business Competitiveness (Y)	Satisfaction of Customer (Y.1)	
	Increasement of Sales (Y.2)	
	Productivity (Y3)	

The main indicators used were independent variable FSC (X1) system of management (X12), Material handling and sourcing (X13), control of volume (X14) (Council,2019) and the main indicators of variable PEFC (X2) are leadership of leaders (X21), planning & support (X22), evaluation of performance (X23), and improvement (X24). According to Bhawsar et al (2019) and (Enescu,2019) stated that the main indicators of ISO 38200 (X3) are organizational requirement (X31), assessment of risk (X32), methods of CoC (X33) and information of output (X34) (Council,2019). The main indicators of dependent variables of Business Competitiveness (Y) are satisfaction of customers (Y1), increasement of sales (Y2) and productivity (Y3).

III. SAMPLE DATA AND ANALYSIS PROCEDURE

This research used Structural Equation Model (SEM) using a Linear Structural Model (LISREL) software version 8.70 to analyze the data which has been collected. William and Gavin (2004) has test the relationship between the latent variables and indicators – indicators and the construct has good reliability using LISREL method is suitable if the value of construct reliability (CR) ≥ 0.70 or greater than 0.70 and variance extracted values ≥ 0.50 or greater than 0.50. Data of this research was based on questionnaires which has been distributed to 372 respondents of employees like managers, staff and supervisor from 20 of wood industries employee in Indonesia that have implemented FSC Chain of Custody,PEFC Sustainable Forest Management and ISO 38200:2018 Chain of custody of Wood and Wood-based products management. This research was conducted in several wood industries which

processing wood or use wood as main material in Indonesia and 372 respondents was found among 20 wood industries.The respondents which has been collected were employee of Wood industries top management, manager and staffthat have planor have implemented FSC, PEFC and ISO 38200. This research used quantitative methods and data processing using Structural Equation Model LISREL software, data collection using online electronic questionnaires distributed to managers, employees and staff of Wood industries in Indonesia, data collection techniques using simple random and snowball sampling.

Table 2: Profile of Respondents

District	Man			Woman			Total
	Top Management	Manager	Staff	Top Management	Manager	Staff	
Banten	9	20	25	7	9	13	83
West Java	12	21	21	6	12	11	83
DKI Jakarta	11	17	22	7	7	7	71
Central Java	6	16	21	5	6	10	64
DIY Jogja	4	9	10	4	5	8	40
East Java	3	5	10	3	4	6	31
Total	45	88	109	32	43	55	**372**

Based on Table 2 above the total of respondents are 372 employees and all of respondent were evenly distributed from 6 provinces in Indonesia, namely Banten, DKI Jakarta, West Indonesia, Central Indonesia, DIY Jogjakarta and East Indonesia. Respondent consist of male and female from wood industries employees with several position as top management supervisors and staffs. The most respondents were form Banten and West Java as 83 respondents.

IV. RESULTS AND DISCUSSION

This research was started by creating a syntax program on Lisrel software to obtain the loading factor of independent variable FSC (X1) namely system of management (X12), material handling & sourcing (X13), control of material volume (X14) (Council,2019). The main indicators of independent variable PEFC (X2) are leadership of leader (X21), planning and support (X22), evaluation of performance (X23) and improvement (X24) (Enescu,2019). The main indicators of independent variable ISO 38200:2018 (X3) are requirement of organization (X31), assessment of risk (X32), methodes of Chain of Custody Control (X33), information of output (X34) (Council,2019). The main indicators of dependent variables of business competitiveness (Y) are satisfaction of customers (Y1), inreasement of sales (Y2), operation of productivity (Y3). The data analysis was conducting by Structural Equation Model (SEM) using a Linear Structural Model (LISREL) software version 8.70 of Joreskog and Sorbom (2008), and the results of analyzing data show in the following figure.

```
OBSERVED VARIABLES X11 X12      X13     X14     X21     X22
        X23 X24         X31     X32     X33     X34     Y1      Y2      Y3
        Y4

RAW DATA FROM FILE PAPER.PSF
SAMPLE SIZE = 372
LATENT VARIABLES FSC PEFC ISO38200 BUSINESS
RELATIONSHIPS
X12     X13     X14             = FSC
X21     X22     X23     X24     = PEFC
X31     X32     X33     X34     = ISO38200
Y1      Y2      Y3               = BUSINESS
BUSINESS = PEFC FSC ISO38200PATH DIAGRAMEND OF PROBLEM
```

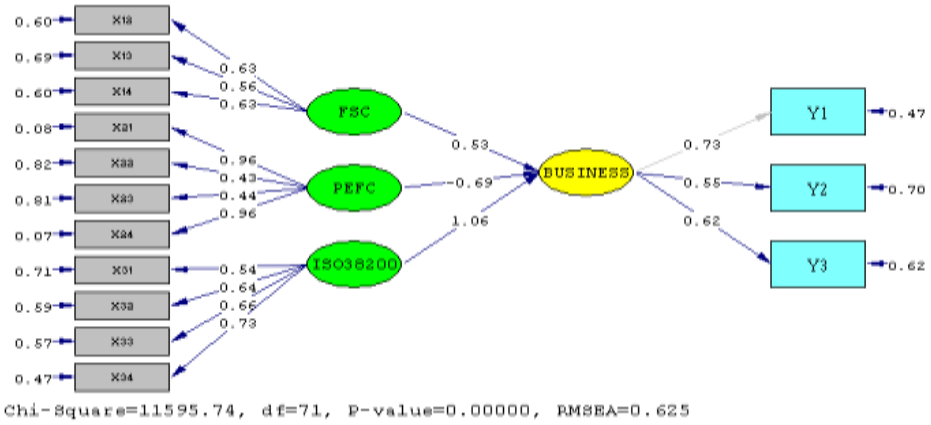

Figure 3: Loading factor Value Indicator

value for all of indicators and the value of loading factor for all of independent variables FSC, PEFC and dependent variables ISO 38200 were greater than 0.5 (> 0.5) and value of the loading factor of greater than 1.96 (> 1.96) so all of indicators area were valid and significant.

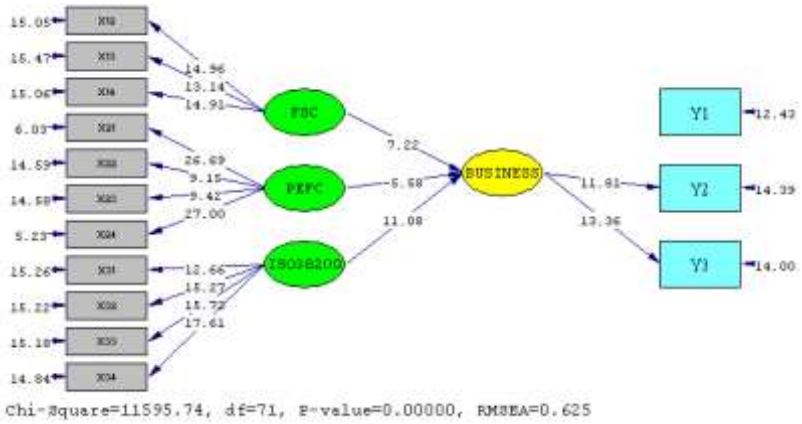

Figure 4: t-Value Indicator

Based on figure 4 there is no error variance negative value for t value all of indicators and the t value of loading factor for all of independent variables FSC, PEFC and independent variables ISO 38200 were greater than 0.5 (> 0.5) and t value of the loading factor was greater than 1.96 (> 1.96) so all of indicators were valid and significant.

Table 3: Results of 2nd Order Analysis of Indicators

Variables	Indicators	Factor of Loading	*T-Value*	Remark
FSC (X1)	System of Management FSC (X1.2)	0.63	14.96	Significant
	Handling & Sourcing of Materials (X1.3)	0.56	13.14	Significant
	Control of Volume FSC (X1.4)	0.63	14.91	Significant
PEFC (X2)	Leadership of Leaders (X2.1)	0.96	26.69	Significant
	Support & Planning PEFC (X2.2)	0.43	9.15	Significant
	Evaluation of Performance PEFC (X2.3)	0.49	9.42	Significant
	Improvement of Process PEFC (X2.4)	0.95	27.10	Significant
ISO 38200 (X3)	Requirement of Organization (X3.1)	0.54	12.66	Significant
	Assesment of Risk (X3.2)	0.64	15.27	Significant
	Methods of CoC Control (X3.3)	0.66	15.71	Significant
	Information of Output (X3.4)	0.73	17.61	Significant
Competitiveness (Y)	Satisfaction of Customers (Y1)	0.73	14.43	Significant
	Increasement of Sales (Y2)	0.55	14.39	Significant
	Process Productivity (Y3)	0.62	14.10	Significant

The overall of loading factor were valid and significant.The independent variable FSC (X1) consist of system of management (X12), handling and sourcing materials (X13), control of volume (X14) (Council,2019). The main indicators of independent variable PEFC (X2) are leadership of leaders (X21), support and planning PEFC (X22), evaluation of performance PEFC (X23) and process improvement (X24).(Enescu,2019). The main indicators of independent variables ISO 38200:2018 (X3) are requirement of organization (X31), Assesment of risk (X32), methodes of Chain of Custody Control (X33), information of output (X34) (Council,2019). The main indicators of dependent variables of business vompetitiveness (Y) are satisfaction of customers (Y1), increasement of sales (Y2), process of productivity (Y3).These results can be concluded that independent variables of FSC Chain of Custody, independent variables of PEFC Sustainable Forest Management and independent variables of ISO 38200:2018 Chain of custody of wood and wood-based products has valid and significant. The result of dependent variables of business competitiveness were also valid and significant. The results of validity test are also reinforced by the value of Chi-Square (r) that generates a value of 11595.74. The next step is to calculate the value of Construct Reliability (CR) and Value of Variance Entrance (VR) that explained in the following table 4.

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

Indicators	*Factor of Loading*	*Factor2 of Loading*	*1-Loading Factor2*	*CR*	VE
System of management FSC (X1.2)	0.63	0.40	0.60	0.91	0.81
Handling & Soucing of Material FSC (X1.3)	0.56	0.31	0.69		
Control of volume FSC (X1.4)	0.63	0.40	0.60		
Leadership of leaders FSC (X2.1)	0.96	0.92	0.08		
Support & planning PEFC (X2.2)	0.43	0.18	0.82		
Evaluation of performance PEFC (X2.3)	0.49	0.24	0.76		
Improvement of process PEFC (X2.4)	0.95	0.90	0.10		
Requirement of organization 38200 (X3.1)	0.54	0.29	0.71		
Assesment of risk ISO 38200 (X3.2)	0.64	0.41	0.59		
Methods of CoC ISO 38200 (X3.3)	0.66	0.44	0.56		
Information of output ISO 38200 (X3.4)	0.73	0.53	0.47		
Satisfaction of customer (Y1)	0.73	0.53	0.47		
Increasement of sales (Y2)	0.55	0.30	0.70		
Productivity of process (Y3)	0.62	0.38	0.62		

The calculation of formula CR construct reliability obtained results and indicators of value 0.91 (CR) ≥ 0.70 or greater than 0.70 and 0.81 (VE) ≥ 0.50 or greater than 0.50 and concluded that the all of indicators have good reliability and value constructs had good reliability. Therefore, based on the results of the analysis of the reliability test can be concluded that the reliability of the whole indicators were good indicator and conclude that the research meets the requirements.The next step was to carry out the analysis of Goodness of Fit (GOF), GOF data obtained from the results of the software execution.

Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020

V. ANALYSIS GOODNESS OF FIT (GOF)

The Lisrel program was used to test the goodness and suitability of the model in the overall model using the analysis of statistical GOF value to obtain the relevance of the model (model fit) and the results was fairly good and for its model fit the criteria as shown in following Table 5.

Tabel 5: Goodness of Fit

Index of Fit	Value	Standard	Remark
Chi-Square	11595.72	> 0.5	***Good***
Root Mean Square Error of Approximation	0.04	< 0.08	***Good***
Fit Index of Normed	0.96	> 0.90	***Good***
Fit Index of Non Normed	0.94	> 0.90	***Good***
Fit Index of Comparative	0.95	> 0.90	***Good***
Fit Index of Incremental	0.96	> 0.90	***Good***
Fit Index of Relative	0.94	> 0.90	***Good***
Fit Index Goodness	0.92	> 0.90	***Good***

The results of the analysis indicated that all indicators were fit and the overall model was still a good match.Based on data analysis the model equation (Structural Equations) linear ouput from 8.70 LISREL software obtained as follows:

BUSINESS = 0.53*FSC + 0.69*PEFC + 1.06*ISO38200,
Errorvar.= 0.37 , R^2 = 0.89
(0.078) (0.13) (0.10) (0.064)
7.08 5.48 10.87 5.74

Figure 4 : Structural Equations

All of the above analysis showed that that the forest management Forest Stewardship Concil , PEFC and ISO38200:2018 have a positive and significant effect on wood industries competitiveness with t value equal to 7.08. The goodness of fit models resulted farily good with chi-square value of 11595.74. For the virtue of value R Square of 0.89 means the Implementation of independent variables FSC, independent variables of PEFC and independent variables of ISO 38200 have affected positive and significant on the dependent variable Wood industries competitiveness by 89 % and the other factors influence only 11%. So it can be summarized and obtained the following regression equation WoodIndustries Performance) = 0.53*FSC + 0.69*PEFC + 1.06*ISO38200 + Errorvar.

The implementation of the FSC Chain of Custody,PEFC Sustainable Forest Management and ISO 38200:2018n Chain of custody of Wood and Wood-based products had positive and significant impact on wood industries competitiveness such as raise the index of customer satisfaction, raise the productivity and sales and that it will

increase the company's profit.The results of this study stated that the implementation of FSC Chain of Custody , PEFC Sustainable Forest Management and ISO 38200:2018 Chain of custody of Wood and Wood-based products management system had an influence on the company's business competitiveness so that wood industries companies that have not been implemented it are recommended to immediately implement FSC Chain of Custody , PEFC Sustainable Forest Management and ISO 38200 Chain of custody of Wood and Wood-based products, this study reinforces the results of previous studies.

H^1: There is a positive and significant relationship between the implementation of FSC to wood industries competitiveness.

The results of data analysis concluded that the independent FSC variable is valid and significant and has a positive and great influence based on variable business competitiveness which means that the application of FSC has a positive effect on the competitiveness of the eood industries in Indonesia. These research resulted almost the same with the previous research studies conducted by Yanti et al. (2018) that there are some ecologic benefits of using the Forest Stewardship Council (FSC) management for the community which makes the community avoid the threats of flood, providing sufficient water availability, providing good air quality, maintaing and preserve flora and fauna. The economic benefit from using FSC was the availability of sufficient irrigation for agriculture and plantations, provide economic benefits to the community, improve community participation in forest management, create jobs and maintain local knowledge and institutions. The benefit of using Forest Stewardship Council in forest management which conducted by Wei et al (2016) has been prove high benefit by implement forest management. According to Narayan et al. (2017) in the market request of the certified wood is increasing rather than non-certified one, it's because of the use of the FSC forest management by the certified wood industries. The benefits of forest management certification for farmer was reduced and had a negative effect unless if the cost could be spread over to a large number of farmers the benefit of certified wood production is greater. It would interest them if the income of the farmer is increased just by having certified logs. According to Purwanto et al (2019) and Santoso et al (2019) the implementation of the Forest Stewardship Coucil resulted a huge and positive impact on the business competitiveness performance of wood industries such as increase customer satisfaction index, increase sales, increase productivity and safety and employee satisfactions which resulted in improvement of the company's profit. Accoding Santoso et al. (2019) also had a similar research in using the FSC forest management increases the business competitiveness performance of wood industries such as customer satisfaction index,sales, productivity,safety and employee satisfactions which resulted increase the company income.

H^2: There is a positive and significant relationship between the implementation of PEFC to wood industries competitiveness.

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 which means that the application of PEFC has a positive effect on the competitiveness of the Wood industry in Indonesia. These results are consistent with previous research studies conducted by Santoso et al.(2019) who also implemented the PEFC and resulted in positive and significant impact on business competitiveness performance of Wood industries such as

increase customer satisfaction index, sales, productivity, safety and employee satisfactions which resulted increase the company income. According to Cubbage et al. (2010) some individuals from ten firms in Argentina and Chile which has received Forest Stewardship Council (FSC) forest management certification was interviewed to determine the management, environmental, social, and economic impacts of certification. The Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification schemes (PEFC), or the Sustainable Green Ecosystem Council (SGEC) The determined three benefit dimensions which perceived level of benefits gained from a chain of custody certification were (1) business performance, (2) customer relations, and (3) environmental communication. The highest rating in benefit was environmental communication, followed by customer relations, then business performance. Business performance was rated significantly lower than the other two dimensions. The large eood companies (≥ 300 employees) received a very large benefits from certification. According to Polisar.et al. (2017) Forest Stewardship Council (FSC) and PEFC intended to regulate wood extraction to maintain the ecological environment of forests which require the evidence of biodiversity and ecosystem conservation in a forest management which could maintain the animals' populations.

H^3: There is a positive and significant relationship between the implementation of ISO 38200:2018 to wood industries competitiveness.

Based on the results of data analysis concluded that the independent variable of ISO 38200:2018 is valid and significant and has a positive and significant influence on the dependent variable business competitiveness meaning that the application of ISO 38200:2018 has a positive effect on the competitiveness of the wood industries in Indonesia. These results are consistent with previous research studies conducted by Purwanto et al. (2019) said that forest management greatly affect and positive to business performance. Santoso et al. (2019) also said that FSC forest management had positive impact to business performance and also improved it. Thisresearch study contribute by researchinginto the benefits of FSC Chain of Custody, PEFC Sustainable Forest Management and ISO 38200:2018n Chain of custody of wood and wood-based products certification, the limitation of this study was that it does not discuss about financial indicators, so in the future research, to find the indicator of the financial performance could be measured over a certain period of time. A comparison of the financial performance of FSC Chain of Custody, PEFC Sustainable Forest Management and ISO 38200:2018 Chain of custody of wood and wood-based products certificate holders can be created. 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 andforest 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 are maintaining customers (which is the main benefit of using forest management), increasing new customers, increase in exports, increase company image, increased in profit, 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 the management's 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 performance and competitiveness for companies. The other benefits of this research is to convince the owners of wood and processing companies to get FSC Chain of Custody,PEFC Sustainable Forest

Management and ISO 38200:2018 Chain of custody of wood and wood-based products certified, because of this research the benefits inimplementing this method have been tested and also as a form of compliance with laws and regulations enhanced the good image of the company.

VI. CONCLUSION

Based on the results of this reasearch, it showed that FSC Chain of Custody , PEFC Sustainable Forest Management and ISO 38200 Chain of custody of wood and wood-based products certification is a requirement for the wood industries which increased the performance and competitiveness of the company business. One of the benefits of this research is to convince the owners of wood and processing companies to get FSC Chain of Custody , PEFC Sustainable Forest Management and ISO 38200:2018 Chain of custody of wood and wood-based products certified because of this research the benefits in implementing this method have been tested and also as a form of compliance with laws and regulations enhanced the good image of the company.

This research has several limitations namely the sample was not representative of the target population, the number of samples was not inadequate, the object of this research was only focused only wood industrial companies in Indonesia, even though there are other companies that have implemented the above variables in other countries. Furthermore, the limited time of the study and the few number of respondents that was only 372 respondents and it make the finding was restricted and not generalize. This study only depends on the three variables which consisted of FSC, PEFC and ISO 38200 but in reality, the financial indicators are also is a crucial in determining organizational performance and competitiveness. Therefore, it is interesting for future researchers to include the financial indicators to identify the real financial benefits of applying FSC Chain of Custody , PEFC Sustainable Forest Management and ISO 38200 :2018 Chain of custody of Wood and Wood-based products. The future research also adopts those financial indicators by comparing the financial condition of FSC Chain of Custody,PEFC Sustainable Forest Management and ISO 38200 :2018 Chain of custody of Wood and Wood-based products in various certified and uncertified companies through a comparative study. The research findings could also guide other researchers in other region in in the process of extending the analyses to other country. Instead, this research could be extended to enrich the existing literatures of the similar discipline context. Other than that, this study only observed theWood industries even though many companies are implementing FSC Chain of Custody,PEFC Sustainable Forest Management and ISO 38200 chain of custody of wood and wood-based products such as wood distributors, wood factories and others. Finally, it is also highly recommended for future research to examine similar relationship of variables of the chain from wood to end users.

REFERENCES

1. Baccini et al .(2012). Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. Nature Clim Change2, 182–185 (2012). https://doi.org/10.1038/nclimate1354
2. Brown, H.C, Lassoie, J.P., (2010). Institutional choice and local legitimacy in community-based forest management: lessons from Cameroon. Environ Conserv 37, 261–269. :

3. Brown, M.I.(2013). Redeeming REDD: Policies, Incentives and Social Feasibility For Avoided Deforestation. Earthscan, London.https://doi.org/10.4324/9780203123652
4. Bhawsar, P. and Chattopadhyay, U. (2018), "Evaluation of industry cluster competitiveness: a quantitative approach", Benchmarking: An International Journal, Vol. 25 No. 7, pp. 2318-2343. -02-2017-0022
5. Chia, E., Tiani, A., Sonwa, D., Perez-Teran, A. and Tchatchou, B. (2016), "Securing well-being with the advent of climate hazards: Case of forest-dependent communities in a landscape in the Congo Basin", International Journal of Climate Change Strategies and Management, Vol. 8 No. 2, pp. 175-193.
6. Cubbage,F.,Diaz,D.,Yapura,P.(2010). Impacts of forest management certification in Argentina and ChileForest Policy and Economics 12 (7), 497-504.https://doi.org/10.1016/j.forpol.2010.06.004
7. Council, F. S. (2019). FSC international standard. FSC Principles and Criteria for Forest. FSC Stewardship. FSC-STD-01-001 (version 4-0) EN
8. Enescu, C. M., Apăfăian, A., Hălălișan, A. F., & Puicea, D. R. E. (2019). Current profile of PEFC Chain of Custody certified companies in Romania. Scientific Woods Series Management, Economic Engineering in Agriculture and Rural Development, 19(1), 189-192.
9. Eerikäinen, K. and Venho, M. (2018), "Deriving market prices for forestland properties from comparables", Property Management, Vol. 36 No. 4, pp. 423-445. https://doi.org/10.1108/PM-07-2017-0043
10. Fujita, K. and Shaw, R. (2010), "Chapter 7 Forest management as an adaptation option in mountain areas of Japan", Shaw, R., Pulhin, J. and Jacqueline Pereira, J. (Ed.) Climate Change Adaptation and Disaster Risk Reduction: An Asian Perspective (Community, Environment and Disaster Risk Management, Vol. 5), Emerald Group Publishing Limited, Bingley, pp. 127-145.
11. Gabriel C.R., Alberto.F.L., Antônio. G.J.(2018). Non-conformities to the Forest Stewardship Council (FSC) standards: Empirical evidence and implications for policy-making in Brazil.Journal of Forest Policy and Economics.88(2018).59-69.
12. Gadzama, N. and Ayuba, H. (2016), "On major environmental problem of desertification in Northern Nigeria with sustainable efforts to managing it", World Journal of Science, Technology and Sustainable Development, Vol. 13 No. 1, pp. 18-30.
13. Hanafi, M., Wibisono, D., Mangkusubroto, K., Siallagan, M. and Badriyah, M. (2019), "Designing smelter industry investment competitiveness policy in Indonesia through system dynamics model", Journal of Science and Technology Policy Management, Vol. 10 No. 3, pp. 617-641.
14. Harris, N.L., Brown, S., Hagen, S.C., Saatchi, S.S., Petrova, S., (2012). Baseline map of carbon emissions from deforestation in tropical regions. Science 336, 1573–1576.DOI:
15. Hasan, S., Zhang, Y., Chu, X. and Teng, Y. (2019), "The role of big data in China's sustainable forest management", Forestry Economics Review, Vol. 1 No. 1, pp. 96-105. -0013
16. Hirschberger, Peter (2005): The Effects of FSC-certification in Latvia: an analysis of CARs. WWF Forest Programme.29 p.
17. Ismail, I., Sohail, M., Gilani, H., Ali, A., Hussain, K., Hussain, K., Karky, B., Qamer, F., Qazi, W., Ning, W. and Kotru, R. (2018), "Forest inventory and analysis in Gilgit-Baltistan: A contribution towards developing a forest inventory for all Pakistan", International Journal of Climate Change Strategies and Management, Vol. 10 No. 4, pp. 616-631.

18. Kathuria, V. (2019), "Structural change and technical efficiency: a study of Indian pulp and Wood industry", Indian Growth and Development Review, Vol. ahead-of-print No. ahead-of-print.
19. Lähtinen, K. and Myllyviita, T. (2015), "Cultural sustainability in reference to the global reporting initiative (GRI) guidelines: Case forest bioenergy production in North Karelia, Finland", Journal of Cultural Heritage Management and Sustainable Development, Vol. 5 No. 3, pp. 290-318.
20. Lee, Donna Lynette; Llopis, Pablo; Waterworth, Robert Michael; Roberts, Geoff; Pearson, Timothy R.H.. (2018). Approaches to REDD : nesting lessons learned from country experiences : Main report (English). Washington, D.C. : World Bank Group.
21. Lewis, R.A., Davis, S.R.(2015). Forest certification, institutional capacity, and learning: ananalysis of the impacts of the Malaysian Wood Certification Scheme. For. Pol. Econ.52, 18–26.
22. Ma, N., Li, C. and Zuo, Y. (2019), "Research on forest insurance policy simulation in China", Forestry Economics Review, Vol. 1 No. 1, pp. 82-95.
23. Managi, S., Wang, J. and Zhang, L. (2019), "Research progress on monitoring and assessment of forestry area for improving forest management in China", Forestry Economics Review, Vol. 1 No. 1, pp. 57-70.
24. Michal,J. Brezina,D., Safarik,D.(2019).Analysis of Socioeconomic Impacts of the FSC and PEFC Certification Systems on Business Entities and Consumers.Sustainability 11 (15).
25. Newsom, Deanna and Hewitt, Daphne (2005): The Global Impacts of SmartWood Certification. Final Report ofthe TREES Program for the Rainforest Alliance. http://www.rainforestalliance.org/programs/forestry/perspectives/documents/sw_impacts.pdf
26. Narayan.M, Hoang. L.S.,Geoff. C, Hung.(2017).The financial benefits of forest certification: Case studies of acacia growers and a furniture company in Central Vietnam.Land Use Policy.69(2017).56-63
27. Ofoegbu, C., Chirwa, P., Francis, J. and Babalola, F. (2017), "Assessing vulnerability of rural communities to climate change: A review of implications for forest-based livelihoods in South Africa", International Journal of Climate Change Strategies and Management, Vol. 9 No. 03, pp. 374-386.
28. Owari,T.(2008).Market Benefits of Chain of Custody Certification. Forest Resource Management and Mathematical Modeling. FORMATH .7(2).
29. Panjaitan, R., Sumartono, S., Sarwono, S. and Saleh, C. (2019), "The role of central government and local government and the moderating effect of good governance on forest fire policy in Indonesia", Benchmarking: An International Journal, Vol. 26 No. 1, pp. 147-159.
30. Pinto, L.F.G., McDermott, C.L., (2013). Equity and forest certification – a case study in Brazil. For. Pol. Econ. 30, 23–29.
31. Polisar,J.(2017). Using certified wood extraction to benefit jaguar and ecosystem conservation.Ambio 46 (5), 588-603.
32. Purwanto, A., Asbari, M., & Santoso, P.(2019). Can ISO 38200:2018 Wood and Wood Based Product Chain of Custody Increase Businesss Competitiveness of Wood Industries in West Indonesia ?. Jurnal Hutan dan Masyarakat. 8 (2).113-125.
33. Purwanto, A . (2019). Effect of Implementation ISO 38200:2018 Chain of Wood Products Custody Toward Wood Industries Business Competitiveness In Pati Central Indonesia Indonesia, International Journal of Scientific Research in Science and Technology(IJSRST), 6 (6).261-268. doi :

34. Purwanto, A., Sihite, B.O.,Yanthy, E., Hutagalung, L. (2019). Influence of Forest Management System FSC, PEFC and ISO 38200:2018 Toward Business Performance at Wood and Wood Industries in Sumatera Indonesia, Saudi Journal of Business and Management Studies, 4(12). 892-897. DOI:
35. Sarah. L, BurnsabPablo. F, Yapurab.L. G.(2016).State actors and international forest certification policy: Coalitions behind FSC and PEFC in federal Argentina.52(2016).23-29.
36. Santoso, P, Purwanto, A., & Asbari, M.(2019). Influence of Implementation Chain of Custody Forest Management System FSC-STD-40-004 V3-0 to Business Performance of Wood Industriesia in Banten Indonesia, International Journal of Management and Humanities (IJMH), 4(4), 32-36. DOI:
37. Sloan, S., Sayer, J.A., (2015). Forest Resources Assessment of 2015 shows positive globaltrends but forest loss and degradation persist in poor tropical countries. For. Ecol.Manage. 352, 134–145.
38. Yanti, R., Syahza, A., Hidir, A. and Suwondo, S. (2018), "The communication model of forest management based on environmental awareness", Management of Environmental Quality, Vol. 29 No. 6, pp. 1093-1109.
39. Yowhan. S.(2020) .Determining economically viable forest management option with consideration of ecosystem services in Korea: A strategy after successful national forestation.Ecosystem Services.41(2020).
40. Wang, S., Lee, W. and Son, Y. (2017), "An assessment of climate change impacts and adaptation in South Asian agriculture", International Journal of Climate Change Strategies and Management, Vol. 9 No. 4, pp. 517-534.
41. Wei, J. and He, H. (2016), "Incentive contract or tenure reform? Understanding the transition of forest resources management in China", China Agricultural Economic Review, Vol. 8 No. 1, pp. 112-128.

Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020