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THE INFLUENCE of GREEN SUPPLY CHAIN MANAGEMENT(GSCM) TOWARD ECONOMIC PERFORMANCE on AGRIBUSINESS APPLES

Dwi Susilowati[1,2], M.Muslich Mustadjab[3], Budi Setiawan[3], Mintarti Rahayu[4]

[1]Agribusiness Department Islamic University of Malang,
[2] Environmental Science and Technology Graduate Program University of Brawijaya,
[3]Agribusiness Department, University of Brawijaya,
[4] Management Department University of Brawijaya,
INDONESIA.

[1] pddst@yahoo.co.id

ABSTRACT

The purposes of this research are to determine: 1. The influence of green supply chain management (GSCM) practices of apple farmers towards the economic performance on apples agribusiness, 2.The influence of government support and green market towards GSCM practices of apple farmers on apples agribusiness. The research was conducted in Batu city East Java Indonesia. Batu City has an image as an apples city. Apples agribusiness in Batu commonly is small and medium businesses. Respondents of this research were 129 people of apple farmers with random sampling. The data were retrieved through interviews using questionnaires. The data analysis was used analysis of Generalized Structured Component Analysis (GSCA). It is a SEM analysis method based on variance component. The results of this research showed that the GSCM practices of apple farmers positively influenced significantly to the economic performance. It means that if the GSCM practices increase then the economic performance will increase. The indicators of economic performance increasing were showed by the increasing of income and sales of healthy, safe and free chemicals apples. The indicators of GSCM practices are showed by the using of natural fertilizer and pesticide. The GSCM practices are influenced by government support and green market. The government support for the GSCM practice is showed by farmer's coordination leads by the government officer, funding policy, information given to the farmers, technical assistance aids and infrastructure support. The indicators of green market were showed by the improvement of purchase, consument trust, satisfaction and demand of healthy, safe and free of chemicals apples. From this research it can be suggested to the government to increase its support toward apple farmers to apply the GSCM practices. Besides that the apple farmers of the farmer must increases their attention to green market demand.

Keywords: Agribusiness, Green Supply Chain Management, Economic performance, Green Market

INTRODUCTION

Batu City has an image as an apples city, but lately the productivity of apples has declined from 29.70 kg /tree in 2006 to 15.00 kg /tree in 2012[1]. It is caused by the decreasing of nutrients and organic matter in soil, the increasing of chemical residues (pesticides), ecosystem destruction (deforestation), the increasing of temperature and the decreasing of fertilizer inputs (Sitompul, 2007). Nowadags consumers want to buy healthy, safe and free chemicals apples, so they also need a continuous availability of the apples. Apple farmers must meet the demands of consumers. The apple agribusiness must be sustainable and compete.

[1] Agriculture and Forestry Agency, Batu city,2012

According to Janaina and Nathalie (2007) to meet the needs of good quality and safe product for consumption, the developing countries can use the Supply Chain Management (SCM) approaches that are environmentally friendly. It is called the Green Supply Chain Management (GSCM) (Hutchison, 1998). Most the research about the GSCM is performed on industrial companies. The research of GSCM is not performed in detail yet on apple agribusiness.

Zhu and Sarkis (2007) states that the company condition influences the practice of GSCM. Apples agribusiness in Batu city largely is small and medium businesses. Therefore this research is important to do on apple agribusiness. The statement of the problems in this research is: 1. does the practice of GSCM influence toward the economic performance on apple agribusiness? , 2. Does the government support and green market influences the practice of GSCM on apple agribusiness?. The purpose of this study is to determine: 1. the influence green supply chain management (GSCM) practices of apple farmers towards the economic performance on apples agribusiness, 2. The influence of government support and green market towards GSCM practices of apple farmers on apple agribusiness.

CONTEXT AND REVIEW OF LITERATURE

Thomas and Griffin, 1996 states that the *supply chain* (SC) is a physical network of companies that are engaged in managing raw materials, the manufacture goods, and informing the flow of materials to suppliers, and deliver it to end users. S*upply chain management (SCM)* is a method, a tool or an approach management. Williamson et al. (2004) defines that supply chain management (SCM) is management organizations which are interrelated and integrated both consumers with suppliers in a process for producing value products and services for consumers. Green Supply Chain Management (GSCM) is the key to ensure that all factors or the elements in the supply chain to pay attention on environment or it doesn't cause harmful impacts to the environment (Hutchison, 1998). The environmental impacts can be occurred at all stages production. Therefore, the GSCM is emerged as a new pattern which is important for companies to achieve profitability and market share objectives by lowering risk and environmental impact while improving the ecological efficiency (van Hock and Erasmus, 2000). Implementation of environment-friendly supply chain not only considers the processes that occur in the company, but it also happens outside the company. The majority of companies are still focused on its activities within the company. It is purchasing, in-bound logistics, and production (Rao, P. and D. Holt, 2005).

Zhu and Sarkis, 2007 states in his research that the pressure regulation (government) and customer demands are affect the implementation of the practice Green Supply Chain Management (GSCM). According Chien and Shih, 2007 the role of government, suppliers and customers are the drive to the implementation of the GSCM practice. Rao and Holt, 2005 states that the environment-friendly can be contribute to competitiveness and economic performance of an organization or company. However, according to Harry Bremmers, Derk-Jan Haverkamp, Anna Sabidussi and Onno Omta, 2007 that small firms are less interested to implement sustainable than large companies. Based on the above explanations it was hypothesized that: 1. the GSCM practices has a positive effect on economic performance, 2. the government support has a positive influence on GSCM practice in apple agribusiness, 3. the green market has a positive influence on GSCM practice in apple agribusiness.

METHODOLOGY

This study used the descriptive quantitative methodology. The research was conducted in Batu city East Java Indonesia. Apples agribusiness in Batu commonly is small and medium businesses. Respondents of

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this research were the apple farmers with random sampling. The sample quantity was determined by using the formula presented by parel 1973:

$$n = \frac{NZ^2\sigma^2}{Nd^2 + Z^2\sigma^2}$$

Explanation: n = sample, N = total population, Z = table value z on distribution normal, σ2 = diversity of the population, d = tolerable Error of estimation.

From the calculation, the quantity samples were taken 129 person of 675 person population. The data were used primary data. The primary data were obtained through observation and interviews. The data analysis was used Generalized Structured Component Analysis (GSCA). It is a SEM analysis method based on variance component. According to Tenenhaus, 2008 the GSCA can be used for the calculation of the score. GSCA can be used on structural models that involve variables with the reflective or formative indicators. Hwang, 2009 stated that the GSCA is allow to occurr multi-colonierity, which it is occurred a strong correlation between the exogenous variables. The complex models which are analysis the relationship between variables measures modeling the GSCA structural equation is: a. designing a structural model, b. designing the measurement model, c. constructs the path diagram, d. conversion path diagram to the system of equations, e. estimate, f. evaluation of goodness of fit. Based on the description above it can be presented the construction path in figure 1 as follows:

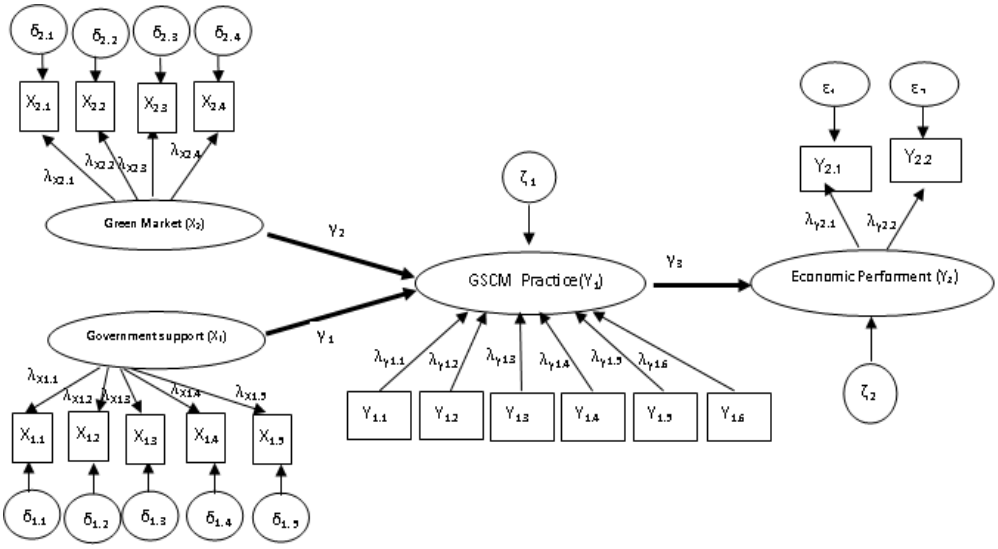

Figure 1. Construction the path diagram GSCM on agribusiness apple

Based at the path diagram GSCM is converted to following equations:

1. Specification of the relationship between latent variables with their indicators:

The exogenous latent variables Govermenment Support/X_1 (reflective)

Coordination ($X_{1.1}$) $= \lambda_{X1.1} X_1 + \delta_{1.1}$
Fund ($X_{1.2}$) $= \lambda_{X1.2} X_1 + \delta_{1.2}$
Information ($X_{1.3}$) $= \lambda_{X1.3} X_1 + \delta_{1.3}$
Technical assistance ($X_{1.4}$) $= \lambda_{X1.4} X_1 + \delta_{1.4}$
Infrastructure ($X_{1.5}$) $= \lambda_{X1.5} X_1 + \delta_{1.5}$

The exogenous latent variables Green Market/X_2 (reflective)

Purchase ($X_{2.1}$) $= \lambda_{X2.1} X_2 + \delta_{2.1}$

Trust ($X_{2.2}$) $= \lambda_{X2.2} X_2 + \delta_{2.2}$

Satisfaction ($X_{2.3}$) $= \lambda_{X2.3} X_2 + \delta_{2.3}$

Request ($X_{2.4}$) $= \lambda_{X2.4} X_2 + \delta_{2.4}$

The endogenous latent variables GSCM appel farmers/Y1 (formative)

$Y_1 = \lambda Y_{1.1}$fertilizer $(Y_{1.1}) + \lambda Y_{1.2}$pesticides $(Y_{1.2}) + \lambda Y_{1.3}$fund $(Y_{1.3}) + \lambda\ Y_{1.4}$knowledge $(Y_{1.4}) + \lambda Y_{1.5}$resources $(Y_{1.5}) + \lambda Y_{1.6}$harvest and post-harvest $(Y_{1.6}) + \zeta_1$

The endogenous latent variables Economic Performance/Y2 (reflective)

Income ($Y_{2.1}$) $= \lambda_{Y2.1} Y_2 + \varepsilon_1$

Sales ($Y_{2.2}$) $= \lambda_{Y2.2} Y_2 + \varepsilon_2$

2. Specification of the relationship between latent variables (structural model):

Structure model of the GSCM apple agribusiness in Batu city is:

GSCM Practice/Y_1 $= \gamma_1$ Government Support(X_1) + ζ_1

GSCM Practice /Y_1 $= \gamma_2$ Green Market(X_2) + ζ_1

Economic Performance /Y_2 $= \gamma_3$ GSCM Practice (Y_1) + ζ_2

The symbols of λx and λy are loading matrix that describes such a simple regression coefficients linking between the latent variables with its indicator. Symbol δ, ζ and ε are the residual measurement error or noise. Symbol γ is the path coefficients linking among the latent variable. Feasibility test model was done using measures of fit. Goodness of fit is a combination measure between measurements and models struktral. Nilai FIT models ranging from 0-1, larger the FIT value then more large the proportion of variant variables that can explain the phenomenon of the green apple agribusiness. The statistical test used in this research was the t statistic or t test.

RESULTS

Characteristics of Respondents

Total respondents are 129 apple farmers. The data showed that 20, 16 % of them are elementary graduated, 46,51% are junior high school graduated, 21,71% are high school graduated, 11,62% are diploma and university graduated. The most respondents are Junior high school graduated; it means that most of the respondents did not have a high education level.

The data showed that 31, 78% of respondent are 25-49 years old, 58.14% are 41-55 years old, 10.08% are 56-70 years old. The majority of respondents are aged between 41-55 years,it means that most of the respondents are in the productive age.The data showed that 52.71% of respondents use less than 0.5 hectare of their field for apple farm, 32.56% use 0,5-1.0 hectare of their field for apple farm, 14.73% are use 0.5 and above hectare of their field for apple farm. It means that most of the respondents have a narrow land area to apple farm.

Respondents averagely have 5 labours. The data showed that 71% of respondents get Rp.15,000,000 a year as their income from apple farm, 19% get Rp.15,000,000 – Rp.30,000,000 a year as their income from apple farm, 14.73% get Rp. 30,000,000 and above a year as their income from apple farm. It means that the majority of respondents still have a low income.

Relationship between Latent Variables with Their Indicators

Government Support Variable

The government support variable is a support of government that given to apple farmers in Batu city. The government support variable is explained by five indicators. They are

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coordination, funding, information, technical assistance and infrastructure. The analysis results of the government support variable and their indicators showed in Table 1.

Table 1. The analysis results of the government support variable and their indicators

Alpha =0.877				
Indicator	*Mean*	*Coefficient*	*SE*	*CR*
Coordination	3.28	0.846	0.023	37.46*
Funding	2.87	0.803	0.030	27.0*
Information	*3.47*	*0.860*	*0.025*	*33.77**
Technical Asistance	3.08	0.757	0.029	25.98*
Infrastructure	2.81	0.833	0.024	35.36*

CR* = significant at .05 level

The alpha value is 0.877, it means that the government support variable has a good internal reliability consistency because it is more than 0,6. Information has the greatest **Mean** value (3,47) comparing with the other indicators. The Mean value of the five indicators averagely still below 3,5. All of them are significant in 95 % confidence level. Therefore the five indicators of the government support needs to improve so that the practice of GSCM on apple farmers can be better. Information indicator has the greatest coefficient value (0,860) comparing with the other indicators. It is significant in the 95% confidence level.

Green Market Variable

The green market variable is a response of the healthy and safe apple consumers. The green market variable is described by four indicators. They are purchase, trust, satisfaction and demand. The analysis results of the green market variable and their indicators showed in Table 2.

Table 2. The analysis results of the green market variable and their indicators

Alpha = 0.908				
Indicator	*Mean*	*Coefficient*	*SE*	*CR*
Purchase	3.05	0.834	0.038	22.12*
Trust	2.95	0.914	0.020	46.37*
Satisfaction	2.95	0.912	0.020	45.34*
Demand	2.98	0.883	0.031	28.54*

CR* = significant at .05 level

The alpha value is 0.908, it means that the green market variable has a good internal reliability consistency because it is more than 0,6. Purchase indicator has the greatest **Mean** value (3,05) comparing with the other indicators. The Mean value of the four indicators

averagely still below 3,5. All of them significant in the 95% confidence level. Therefore the four indicators of the green market needs to improved so that the practice of GSCM on apple farmers can be better. Trust indicator has the greatest coefficient value (0,914) comparing with the other indicators. It is significant in the 95% confidence level.

Green Supply Chain Mangement (GSCM) Variable

The GSCM practice variable is an apple farming that to heed environment. The GSCM practice at farmer apple is described by six indicators. They are fertilizers, pesticides, fund, knowledge, resources, harvest and post-harvest. The analysis results of the GSCM practice variable and their indicators showed in Table 3.

Table 3. The analysis results of the GSCM variable and their indicators

Alpha = 0.890				
Indicator	*Mean*	*Coefficient*	*SE*	*CR*
Fertilizers	3.19	0.245	0.072	3.42*
Pesticides	2.80	0.364	0.132	2.76*
Fund	2.90	0.137	0.090	1.52
Knowledge	3.52	0.232	0.128	1.82
Resources	3.47	0.216	0.125	1.73
Harvest And Post-Harvest	3.04	0.009	0.067	0.14

CR* = significant at .05 level

The alpha value is 0.890, it means that the GSCM variable has a good internal reliability consistency because it is more than 0,6. From six indicators of GSCM at apple farmers only two indicators are significant in 95% confidence level. The two significant indicators are fertilizer and pesticides. The fertilizer indicator has the greater Mean value (3,19) than the mean value of pesticides indicator(2,80). The Mean values of both indicators averagely remain below 3.5 significant in 95% confidence level. Therefore the using of natural fertilizers and chemical-free pesticides needs to improve so that the practice GSCM on apple farmers can be better. The pesticides indicator has the greater coefficient value (0,364) comparing with the ferlilizer indicator (0,245). It is significant in 95% confidence level.

Economic Performance Variable

The Economic performance variable is described by two indicators.They are income and sales. The analysis results of the Economic performance variable and their indicators showed in Table 4.

Table 4. The analysis results of the Economic performance variable and their indicators

Alpha = 0.819				
Indicator	*Mean*	*Coefficient*	*SE*	*CR*
Income	3.06	0.920	0.018	50.74*
Sales	2.95	0.922	0.022	42.04*

CR* = significant at .05 level

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The alpha values is 0,819, it means that the economic performance variable has a good internal reliability consistency because it is more than 0,6. The income indicator has the greater **Mean** value (3,06) than the mean value of sales indicator (2,95). The Mean value of the two indicators averagely still below 3,5 significant in the 95% confidence level. Therefore the two indicators of the economic performance variable needs to improved so that the practice of GSCM on apple farmers can be better. The sales indicator has the greater coefficient value (0.922) than the coefficient value of income indicator (0,920). It is significant in the 95% confidence level.

Relationship among Latent Variables

The analysis results showed that the FIT value is 0.624, it means that 62.4% of the model can be explained by the government support, green market, Green Supply Chain Management (GSCM) of apple farmers and economic performance variables and 36.6% of the model can be explained by the other variables. The relationship among the latent variables showed in table 5.

Table 5. The relationship among latent variables

Variable	*Koefficien*	*SE*	*CR*
Government support->GSCM at apple farmer	0.729	0.073	10.02*
Green market-> GSCM at apple farmer	0.209	0.078	2.67*
GSCM at apple farmer ->economic performance	0.600	0.053	11.42*

CR* = significant at .05 level

Relations between Government Support with GSCM practices at Apple Farmers

The relationship between the government support with GSCM practice on apple farmer is showed in Table 2 obtained the following equation:

GSCM at apple farmers = 0.729 government support*+ 0.073

The Government support variable has a positive relationship to the GSCM practice on apple farmers, it is significant at 95% confidence level. Therefore the support of the government can be said affect the GSCM practice on apple farmers. The role of government is very important in the implementation of GSCM practices and quality standards environment that should be run by businesses to maintain a healthy environment.

Relationship between Green market with the GSCM practice at apple farmers

The relationship between the green market with the GSCM on apple farmers is showed in Table 5 obtained the following equation:

GSCM manufacturer = 0.209* green market+ 0.78

The Green market variable has a positive relationship to the GSCM practice on apple farmers, it is significant at 95% confidence level. Therefore the green market can be said affect the GSCM practice on apple farmers.

Relationships between GSCM Practices at apple farmers with Economic Performance

The relationship between GSCM practices on apple farmers with economic performance showed in Table 5 obtained the following equation:

Economic performance = 0.600* GSCM + 0.053

The GSCM practices on apple farmers has a positive relationship to the economic performance, it is significant at the 95% confidence level. Therefore the GSCM practice can be said affect to the economic performance in agribusiness apples.

The GSCA analysis results showed in figure as follows:

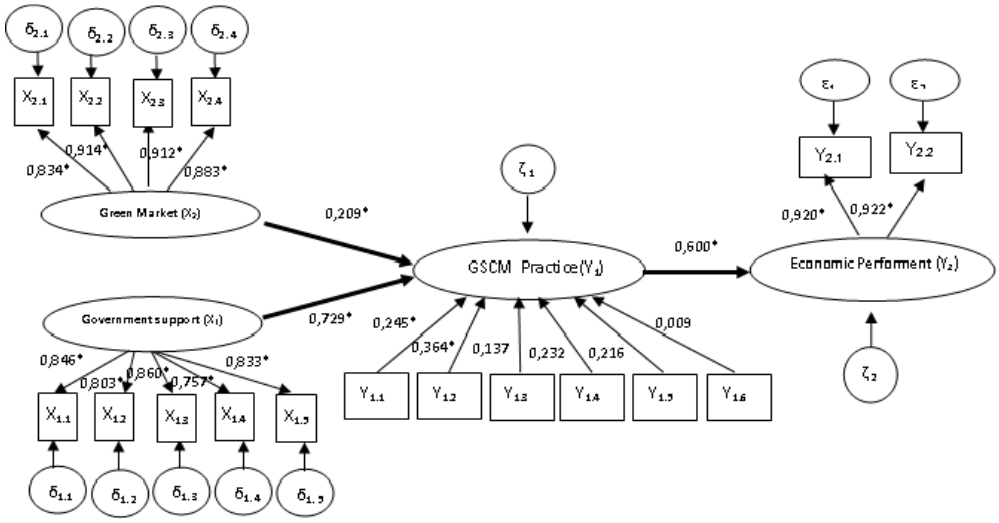

Figure 2. The GSCA Analysis Results

DISCUSSION

The GSCM practice on apple farmers has a positive influence to economic performance in apple agribusiness. It means that if a GSCM practices is improved then the economic performance will increases. This results are consistent with the results of research that conducted by Rao and Holt, 2005 that the GSCM practices can affect the economic performance of an organization or company. The GSCM practice improvement can be done by increasing the significant indicator variables (fertilizers and pesticides). The using of natural fertilizers/organic must be improved so it can reduce the using of chemistry fertilizers in green apple production. The using of organic fertilizer can increase the fertility of the soil in a long time. The using of natural pesticides should be improved too, to increase the GSCM practices on apple farmers. The using of pesticides is directly affected to the quality of apples product. Because most of the farmers have less than 0,5 hectare for apple farm, so it is impossible for them to expand their apple farm. The only way to increase their production is by sustainable apple farming process. The sustainable production process is a process that does not use chemicals as a factor of apple production so that the product becomes healthy and safe. Consumers have a highly demand of free pesticides apple. The improvement of economic performance is indicated by the increasing of revenue and sales. Comparing with revenue, sales have more influence to support economic performance. It is because with the increase of sales will increase the revenue of the farmers, with the assumption that the price apple in a stable condition.

The government support has a positive influence to the GSCM practices on apple farmers.It means that the larger of government support given to the apple farmers the practices GSCM will increase. The results are consistent with the results of research that conducted by Lee (2008), Zhu and Sarkis (2007), Chien and Shih (2007), and Ilsuk Kim and Hokey Min (2011). The increase of government support is indicated by: 1. the frequency of coordination about GSCM practices to apple farmers, 2. the increasing quantity of policies related to

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convenience for apple farmers to access funds to support GSCM practice, 3. more often information about GSCM practices given to apple farmers, 4. the increasing of technical assistance related to GSCM practice, 5.the full of provided infrastructure by the government to support the GSCM practices. The most important indicator to describe the government is information. Because it is a factor that can connect the activity of government to the farmers. All of the government programs can't be known by the farmers without information. Complete and regular information given from government to the farmers can increase the knowledge of the framers about the GSCM practice. It will support the farmers to apply GSCM practice in their farms.

The green market has a positive influence toward the GSCM practice; it means that the greater response given by the green apple consumers will increase the GSCM practices on apple farmers. The result is consistent with the results of research conducted by Zhu and Sarkis, 2007, Chien and Shih, 2007, Darnall et al., 2008, Su-Yol Lee, 2008, Riccardo Vecchio,2010. The increase of consumer response indicated with the increasing purchases, trust, satisfaction and demand of green apples. The confidence is the best indicator to describe the green market variable. The confidence of consumer about the safe and healthy apple is important because the increasing of consumer's confidence will increase the purchase, satisfaction and demand of healthy and safe apples.

CONCLUSION

The conclusions of this study are as follows : 1. the GSCM practices has a positive effect on economic performance, 2. the government support has a positive influence on the GSCM practice in apple agribusiness, 3. the green market has a positive influence on the GSCM practice in apple agribusiness.

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