Performance Factors in Aloe Vera's Value Chain as a Green Product

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***Abstract* - Market mechanism of agricultural products which is currently applied is based on green economy. Green economy is also[1] run in a farm of Aloe Vera in Pontianak, Indonesia. This study aims to analyze performance factors of Aloe Vera's value chain as a green product. Value chain is analyzed using SEM analysis (Structural Equation Modelling). This research employs multi-stage sampling method and the samples include farmers, traders, consumers, and policy makers (110 respondents). The results showed that coefficient value was positive, indicating that if there is an increase of attention in value chain, farm performance will improve. Activities of value chain's actors will improve performance as it is related to farming's input-output management, synergy, and value chain's integrity. Both indicators are important to ensure value chain's actors can work to achieve farming performance. Quality performance was examined in terms of diversification and improvement of farming efficiency, increase in added value, increase in farm profitability, and improvement of marketing efficiency. This study contributes to the latest literature by examining the management of the value chain of Aloe Vera farming which is an icon local commodity in Pontianak which is the center of Aloe Vera production in Indonesia.**

Keywords: *Aloe vera, green products, SEM, value chain.*

1. Introduction

ASEAN-China Free Trade Agreement (ACFTA) was enacted on January 1st, 2010. However, its impact is already visible. For example, fruits imported from China have been available at the local market at a cheap price. On the one hand, ACFTA can be a market opportunity to increase people's income. On the other hand, it can be a threat to Indonesian society as well. In order to turn ACFTA into a big opportunity for Indonesia, surely Indonesian agricultural products' quality must be improved (competitiveness) and its production must be efficient, especially for superior products which are uniquely produced in Indonesia [34]. In addition to quality improvement, customer-oriented marketing efficiency at various levels (e.g., local, regional and international) cannot be neglected [33]; [36]. Therefore, to win the competition in ACFTA, the agricultural sector has to develop its superior commodities.

Commodities that must be developed in the era of global competition are those with unique qualities and future prospects. Aloe vera is one of Indonesia's main commodities in domestic, regional, and international market. It is a free-chemical and environmentally-friendly product; hence, it can be claimed as a green product and leading commodity. Its production center is located in Pontianak, West Kalimantan. More than 23 countries, as recorded by WHO, use Aloe vera as a raw material for medicine. Moreover, having so much worth, Aloe vera is relatively low-maintenance, which makes it more attractive to be studied and researched scientifically [34].

2. Literature Review

One study worth to be examined is Aloe vera agribusiness' value chain. The idea of value chain is quite intuitive. The term refers to a series of activities required to produce something (product or service), starting from its conceptual stage and then followed by several stages of production, delivery to the final consumer, and disposal after use [20]; [5]. The value chain is formed when all the producers/actors within the chain of production work in a way that maximizes value creation along the chain.

Some concepts of value chain in academic perspective are related to each other. Three streams of primary research in the literature of value chain are divided into: (i) filiere approach [6]; [31]; (ii) conceptual framework described by reference [28]; [23]; and (iii) global approach proposed by reference [19]; [10; [13]; [11]; [12]; [35].

The concept of filiere 1988 includes an empirical perspective of a firm to map the flow of commodities and to identify the producers and their various activities. Rational in filiere approach is broadly similar to the concept of value chain described previously. However filiere mainly focused on the issues on technical natures of physical and quantitative relationship's contents, which are summarized in a flow chart of commodities and a map of relationship's transformation.

Within reference [28]; [23], the value chain provide tools forcompanies to determine the source of their competitive advantage (both current and potential sources). In particular, he argued that sources of competitive advantage cannot be merely detected by examining the company as a whole, or by distinguishing major activities which directly contribute to the added-value of completed product or service, or by examining its supporting activities which bring about indirect effects on the final value of a product.

Furthermore, reference [20]; [5] also posited their own value chain concepts. First, an analysis of value chain systematically maps actors participating in production, distribution, marketing, and sales of a product. Second, analysis of value chain can play a major role in identifying the distribution of benefits to the producers within the value chain. Third, value chain analysis can be used to assess the role of improvement (upgrading) within itself. Fourth, value chain analysis underlines the role of governance within itself, both internally and externally. Therefore, this study aims to analyze the performance factors of Aloe Vera's value chain as a green product in Pontianak, West Kalimantan.

3. Methodology

This research used explanatory method to retrieve data from the sample and questionnaire as data collection tools. Once the data were obtained, the results were presented in explanatory style and the data were analyzed to test the hypotheses [4]. The samples were determined through multi-stages sampling techniques, because they consisted of several groups, namely farmers, merchants, consumers, and policy makers [8].

3.1 Model evaluation

At this research stage, model accuracy was evaluated through several stages of goodness of fit. Model's conformity examination is illustrated in Table 1.

3.2 Model interpretation

After compatibility test, we still could modify the developed model ifsome requirements were not met. Hypotheses are temporary answers to explain research issues and can lead or direct future research.

Table 1. Goodness of Fit

Goodness of Fit Indeks	Cut Of Value	Compatibility level Acceptable
X2- chi square	<df with α= 0,05	x^2 /df > 5
RMSEA	≤ 0,08	RMSEA ≤ 0,08 (good fit) RMSEA < 0,05 (close fit)
GFI	≥ 0,95	0,80 ≤ GFI ≤0,9 (marginal fit)
AGFI	≥ 0,95	0,80 ≤ AGFI ≤0,9 (marginal fit)
CMIN/DF	≤ 2,00	-
TLI	≥ 0,95	-
CFI	≥ 0,95	CFI > 0,9 (marginal fit) CFI ≥ 0,95 (good fit)

4. Results and Discussion

4.1 Validity and Reliability Test

Overall, all questionnaire items recorded value of more than (and equal to 0.3); hence, it can be concluded that all items were valid. According to reference [30]; [24], if correlation coefficient is more than the value of Pearson correlation in statistics table, then the questionnaire's instrument or item is significantly correlated to the final score and declared valid. However, if the correlation coefficient is less than the value of Pearson correlation in statistics table, then the questionnaire's item or instrument is not significantly correlated to the total score and declared invalid.

Reliability test showed that all variables achieved 0.6 score, indicating that all variables were reliable. According to reference [30]; [24], Cronbach's Alpha method is suitable for scale or range kind of values. Reliability test itself generally uses certain limits, like 0.6. Less than 0.6 scores of reliability 0.6 is unfavorable; while above 0.7 is acceptable and 0.8 is good.

4.2 Analysis of Structural Equation Modeling (SEM)

After confirmatory factor analysis and every indicator in the model fit, theStructural Equation Model (SEM) was conducted next. The processed results are displayed in Figure 1, proving that the model fits the research data.

SEM model's analysis results indicated that X^2 value was 98.601 and *p* was equal to 0.432 (Figure 1). These results support the null hypothesis that SEM has a good match (Ho). P-value is very substantial (p values> 0.05), supporting the proposition that the overall model fit the data.

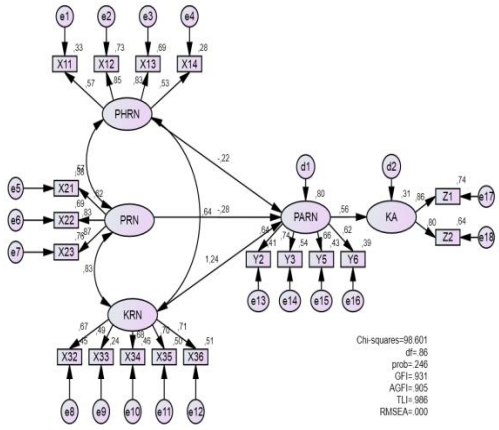

Figure 1. The Results of SEM Tests for Aloe Vera Agribusiness (At the Farm)

Table 2. Results' Summary of Measurement Model Analysis for Aloe Vera Agribusiness

			Estimate	S.E.	C.R.	P	Label
PARN	<---	PRN	-,279	,271	-1,032	,302	par_17
PARN	<---	PHRN	-,210	,147	-1,432	,152	par_19
PARN	<---	KRN	1,124	,331	3,395	***	par_20
KA	<---	PARN	,791	,206	3,840	***	par_18
X11	<---	PHRN	1,000				
X12	<---	PHRN	1,274	,211	6,026	***	par_1
X13	<---	PHRN	1,398	,236	5,914	***	par_2
X14	<---	PHRN	,780	,172	4,538	***	par_3
X21	<---	PRN	1,000				
X22	<---	PRN	1,481	,224	6,605	***	par_4
X23	<---	PRN	1,523	,223	6,819	***	par_5
X32	<---	KRN	1,000				
X33	<---	KRN	,791	,166	4,757	***	par_6
X34	<---	KRN	,909	,147	6,184	***	par_7
X35	<---	KRN	1,060	,168	6,299	***	par_8
X36	<---	KRN	,880	,140	6,296	***	par_9
Y2	<---	PARN	1,000				
Y3	<---	PARN	1,169	,189	6,189	***	par_10
Y5	<---	PARN	,909	,176	5,163	***	par_11
Y6	<---	PARN	1,001	,209	4,781	***	par_12
Z1	<---	KA	1,000				
Z2	<---	KA	,903	,165	5,489	***	par_13

Source: Primary Data Analysis, 2018

Notes:
PHRN = Availability of the value chain, PRN = Practice of the value chain
KA = Performance of Agribusiness
KRN = Competence of value chain
PARN = Increased activity of the value chain

Path coefficient values for each factor or value chain management's supporting components in SEM model are displayed in Figure 1 and the results of regression analyses are displayed on Table 4. Thus, each factor's level of influence or each component of value chain management which improve its activities is formulated in a structural equation as follows:

$$PARN = -0{,}210^{ns} PHRN - 0{,}279PRN + 1{,}124^{**}KRN \quad (1)$$

On the structural Equation (1), it appears that there are two factors or supporting components of value chain management scorenegative values. It indicates that if there is an increase against PHRN or PRN, then PARN will decrease. On the other hand, factors or value chain management's components which support KRN showed positive values. It signals that if there is an increase of KRN,PARN will increase as well. Path coefficient's values for PARN and KA relationship are formulated in a structural equation as follows:

$$KIA = 0{,}791^{**}PARN \quad (2)$$

Coefficientvalue in Equation (2) indicates a positive value. It means that if there is an increase in PARN, it will increase KA, as well. Activities of value chain's producers should boost agribusiness performance, because it is related to the management of input-output, as well as synergy and integrity of the value chain. Both indicators are important, because producers involved are expected to work satisfactorily to achieveof agribusiness' performance measured by efficiency improvement, profit improvement, and marketing efficiency in Aloe vera agribusiness.

Table 2 shows a summary of measurement model's result in the value chain management of Aloe vera products, as well as some increased activities of value chain's producers and farming performance. The five variables in this research, namely PRN, PHRN, KRN, PARN and KA, were considered valid based on their significant statistical parameters. Factor loading of each indicator was more than (and equal) to 0.5 and considered acceptable in the research. A significance test of the dimensions extracted as latent variables is derived from standardized loading factor of each dimension. Each indicator or dimension, which is formed latent variables, showed a good result, because the value of critical ratio was more than (and equal to) 2.00 and all probability values for each indicator were less than 0.05. Thus,all indicators were strong in the measurement model.

The value of standardized regression showed that an increase in independent variable, there will be an increase in coefficient value of dependent variable. Critical ratio equals to t-test's value, which signals that all indicators recorded significant effects when they were compared to t-values. The analysis' results showed that such concern does not affect value chain (PARN), as CR value was less than 2.00 and p-value was more than 0.05. Indicators forming value chain's latent variables needto be addressed, because it affects PARN. Low PHRN was caused by lack of trust among value chain's producers, lack of cooperation, lack of information system, lack of ability to manage value chain's inventory, lack of interest among suppliers and customers, and far distance between suppliers and customers and production sites.

4.3 Hypotheses Testing

The results of hypothesis testing showed that H2 and H4-H7 were accepted, because CR values were significantly more than 2.00 ($p < 0.05$). While H1 and H3 were rejected, because CR values were less than 2.00 ($p < 0.05$). Hypothesis testing's results are displayed in Table 3.

H2-H4 recorded CR value respectively 3.383 and 3.925. There are some reciprocal relationships between value chain practices, value chain attractiveness, and value chain competence. There is also positive contribution of each value chain's component in PARN and KA. The third construct is exogenous policy variable, which is related to the implementation of Aloe Vera's value chain principles. The alignment of the value chain's principles for the development of Aloe Vera agribusiness and sustainability is absolutely necessary.

Table 3. Hypothesis Testing for Structural Model MVC of Aloe vera Agribusiness

			Esti-mate	S.E.	C.R.	P	Ha	Explana-tion
PARN	<--	PHRN	-,210	,147	-1,432	,302	H1	Rejected
PARN	<--	KRN	1,124	,331	3,395	***	H2	Accepted
PARN	<--	PRN	-,279	,271	-1.032	,302	H3	Rejected
KA	<--	PARN	,791	,206	3,840	***	H4	Accepted
KRN	<-->	PHRN	,177	,048	3,663	***	H5	Accepted
KRN	<-->	PRN	,220	,052	4,203	***	H6	Accepted
PHRN	<-->	PRN	,144	,042	3,415	***	H7	Accepted

Source: Primary Data Analysis, 2018

Notes:
PHRN = Availability of the value chain, PRN = Practice of the value chain
KA = Performance of Agribusiness
KRN = Competence of value chain
PARN = Increased activity of the value chain
Ha = Hypotheses

H1 and H3 were rejected, as indicated by their respective CR value of -1.432 and -1.032. The results signal that attractiveness and practice do not affect value chain (PARN). The focus of value chain lies in the smooth flow of products from farmers to traders and from traders to consumers. The biggest challenge in terms of product availability is to appropriately and timely regulate the quality and quantity. Due to the swift use of capital goods purchased by consumers, the faster the product moves, the better. Farmers' task is to ensure the availability of value chain in order to generate value chain itself for consumers. In the financial context, the focus of value chain is a smooth cash flow. Hence, failure or delay in selling the products will fall on the farmers. On the other hand, in case of information, the focus of value chain management is the smooth flow of communication. Error in or lack of provision of information may adversely affect the smooth flow of financial products.

Moreover, test on H5 received CR value of 3.663 (more than > 2.00; p <0.05), indicating the effect of competencies on value chain (PARN). Consumers can influence farmers to provide input on product's design they expect, so that agribusiness can adapt and modify the product, then create cooperation among value chain's actors. According to reference [17]; [1], consumers is one of essential motivations for companies to address the changes, so that they seek to provide higher quality products and pay more attention to environment as a form of social responsibility to the environment and society. Companies must collaborate with other interest groups, such as traders, suppliers, and consumers. It is in accordance with the opinion of reference [3]; [26] who stated that collaboration in value chain helps management to identify and evaluate the differences of options, which may be devoted to specific environmental challenges. This is also supported by reference [29]; [16] who stated that such choice is frequently associated with improvements in performance, particularly in productivity and quality.

A key to success in improving quality and enhancing competitive position in business environment is by developing competitive agribusiness value chain in all aspects. Value chain's competence illustrates organizational, managerial, technical, and strategist skills of agribusiness companies. Adequate competence of value chain allows agribusiness to reliably respond to market demand anytime, anywhere, and in any variation. Key competencies can be developed by matching value chain's competencies to customer requirements, training, increasing continuity, implementing the best practices of operational and distribution, and allocating resources according to future design of value chain. These focus potentially create benefits for agribusiness performance in the long-term. These results are consistent with previous research by reference [38]; [18]; [15]; [7]; [22]; [27].

Furthermore, H6 test recorded CR value of 4.203 (more than 2.00; p > 0.05), indicating that practice influences value chain PARN. Practice forms value chains, which include customersand suppliers to perform integration and services. Such practices aim to enhance the integration of value chain activities, to deliver products timely to customers, to contactend users to get feedback, to listen to the signals of market demand, to classify customers based on their needs, and to participate in decision-making among suppliers. Dissemination of information within value chain determine consumers' needs; while communication efforts between value chain's actors indicate an attempt to communicate consumers' strategic needs and illustrate use of technology. Through the development of collaboration between partners in the value chain, market demands can be realized, and the final products can be brought closer to the market. Various activities can be carried out between actors within the value chain so that the chain processes run smoothly.

Finally, H7 testrecorded CR value of 3.415 (more than 2.00; p <0.05), indicating that PARN affects farm performance. Several dimensions which form PARN are integrity, synergy, and increase of input-output in agribusiness management. These results are consistent with studies conducted by reference [37]; [2]. Value chain's integration is closely related to the company performance and mediated by customer service. Similar studies conducted by reference [9]; [21] who foundstrong relationship in the integration between suppliers and customers for a company with improved performance. It showsthat the integration between suppliers and customers is essential to improve the company's overall performance. Value chain management is needed to achieve competitive advantage, because it provides various opportunities to reduce costs and improve service to consumers and achieveconsumer satisfaction. Value chain's integration is developed on the basis of two decisions which affect economic activity and agribusiness framework. They then form production process and attract consumers who support the mobilization of information process. Some objectives must be achieved to implement integrated value chain which reduces inventory and costs, increase product value, increase resources, accelerate time to market, and retain customers.

5. Conclusions

The inputs of Aloe Vera's value chain are natural resources, human, financial, and information resources. Value chain actors plan, implement, and control inputs to create various forms, including raw materials, auxiliary materials, and other materials. While the output of value chain is a ready-made goods. Inputs and outputs must be regulated by value chain's actors so that each actor will gain profit. Farmers need to cooperate with actors who need both input and output, so that product distribution is ensured.

Our key findings are summarized as follows. Increased activity within value chain (PARN) is important, because its actors must consider every aspect of the chain's support to create mutually beneficial relationships. Farmers are sometimes neglected in the implementation of business management and business activity, causing current and long-term chain activities to fail because they are not well-coordinated. Aloe vera agribusiness prioritizes management aspect in business development to achieve good performance. By doing so, Aloe Vera agribusiness performance can improve its efficiency, profitability, and marketing performance. This study contributes to the latest literature by examining the management of the value chain of Aloe Vera farming which is an icon local commodity in Pontianak which is the center of Aloe Vera production in Indonesia.

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