

Value Chain and Customer Value Analysis of Organic Food Supply Chain

Ratih Ardia Sari*, Sylvie Indah Kartika Sari, Angga Akbar Fanani, Qomariyatus Sholihah

Industrial Engineering Department, Faculty of Engineering, Universitas Brawijaya, Malang, Indonesia

**Corresponding author. Email: rath.ardia@ub.ac.id*

ABSTRACT

Organic food consumption, nowadays, has increased rapidly because of environmental sustainability, nutrition, and health issues concern. Considering organic product as value-added product; it provides an opportunity to understand the value creation, where each party in supply chain played their role. This study investigated how value created at organic product along supply chain and identified customer behavior though analyzed the motivations, beliefs, and attitudes behind the customer purchased decision on organic product. This study focused on organic catfish supply chain. Value Chain Analysis (VCA) was conducted to map supply chain parties, understand the market and identify value, and challenges for improving supply chain performance. Moreover, quantitative analysis carried out based on survey to understand customers' behavior. This study found that organic catfish supply chain actors in Malang, Indonesia, involved fish seed and feed supplier, organic catfish farmer, processed food business, wholesaler, and retailer. These actors performed their activities at input supply, farming, and marketing function level. The result of survey illustrated that customer motivation toward purchasing organic food was mainly based on their belief about its benefit such as healthy and environmental friendly. In addition, the survey showed that availability of organic product influence customer purchased decision, which is become important point for supply chain to manage customer demand.

Keywords: *Customer behavior, organic food, sustainable, value*

1. INTRODUCTION

Currently, organic food products become popular and shifting community lifestyle. People began to realize that unnatural chemicals such as fertilizers, pesticides, chemical feed, and growth hormones can adversely affect human health and the environment. It is widely recognized that food consumption patterns have been following changes over the past few years due to concern about environmental sustainability, development, nutritional aspects, and health problems. This changes lead sustainability concepts become popular especially in supply chain. Sustainable supply chain management concept tried to manage information, capital flows, materials and coordination among supply chain actors while taking goals from

sustainable development dimensions which are derived from stakeholders and customer requirement [1].

Organic product which are considered as value added product in food and markets, especially in the context of developing countries, provide opportunities to understand value creations in promising markets where all parties in the supply chain played their role. Value Chain Analysis (VCA) is essential to map product flow, information flow, management, and control of the value chain to improve supply chain performance. This analysis has been widely implemented for identifying the main business process in supply chain [2]. Previous study show that VCA provides framework to analyze actor and their relationship, identify competitive advantages and

bottleneck in value chain [3] as well as identify improvement both in quality and product design to enable actor across supply chain enhance value of product [4].

VCA is conducted through several steps, mapping the actors involved, understanding the market, mapping the flow, and identifying opportunities and challenges [5]. Mapping the parties and understanding the market is the primary step to determine how parties across supply chain interact throughout the process. To create value in the supply chain, it is important to understand the value obtained by customers on products or services.

Organics products are widely cultivated, not only organics vegetables and fruits, but also organic catfish. Organic catfish cultivation used environmentally techniques by utilizing positive microorganisms' arrangements in ponds and natural habitat of catfish. This cultivation is considered more profitable, environmental friendly and save approximately 50-70% costs from seed to harvest [6]. Furthermore, fish consumption need In Indonesia, currently, has relatively high due to the consistent promotion by government and high nutrition on fish. However, the availability of sea fish depends on the season, so the selling price of marine fish products relatively high. Therefore one alternative to meet the needs of fish consumption are organic freshwater fish. Moreover organic catfish farming is one of the alternative business for community to obtain food adequacy at the community level that consider not only about productivity and economic, but also how the health effects and how it affect the environment. Furthermore organic catfish cultivation is very profitable and promising. The wastewater from cattish farming can be functioned as natural fertilizer for plants or vegetables that can improve economic, and environment sustainability. In addition, organic catfish product has lower cholesterol levels, healthier safer chewier texture compared to non-organic catfish. Therefore, this study will focus on organic catfish supply chain.

This research was conducted to map flow of value in the supply chain of organic catfish product using Value Chain Analysis and then tried to understand the market by identifying costumer behavior toward

purchasing organic food products. Market behavior identification conducted by identifying the motivation, beliefs, attitudes behind the customer decision to purchase organic food. The objective of this research were mapping the organic catfish supply chain value, and identifying customer behavior behind customer decision to purchase organic food. This study provides new insights into the organic catfish supply chain value chain and alternative strategies for improve business performance through understanding value and market behavior.

2. MATERIALS AND METHODS

This study investigated value chain throughout a case study at organics catfish supply chain in Malang, East Java, Indonesia. Data collected through observation, literature review, interviews, and discussion with supply chain actors, especially to organic catfish farmer group, wholesaler and customer. Semi structured interviews were conducted to map the organics catfish supply chain and to have better understanding about role of actors in supply chain, and identified how each actors in the supply chain interact with each other to meet customer desired value.

Organic catfish in Malang is widely cultivated in Malang area, moreover in some urban village developed "organic catfish village" pilot project such as Polowijen and Balearjosari. There are several farmer groups in that village and become a national fish cultivation pilot such as Mina Barokah farmer group and Sumber Lancar farmer group [7]. The observed organic catfish supply chain focused on those farmer groups. Value chain analyses were conducted to map product and information flow; supply chain actor and their roles; relationship mapping and identification of opportunities and challenges at organic supply chain in Malang.

Furthermore, market behavior observed thought quantitative analysis to understand and identify customer behavior in buying organic food product. Identification of market behavior were performed through semi-structured questionnaires on purchasing behavior. Questionnaires were design in different scales. The survey began with social demographic

questions and closed ended survey question that asked participant to measure the frequency of consumption of organic product. In addition, respondents were asked to answer using a five-point Likert scale ranging from strongly agree to strongly disagree to find out about attitudes; customer belief in organics foods; perception of purchase barriers and intention to purchase of organic food. This semi structured questionnaires were modified from Viera et al. [8].

Data collected carried out online through goggle form because of pandemic and community activity restricted. This online questionnaire distributed to organic catfish customer or household in Malang, Indonesian based on group farmer information. From this customer, the form distributed to other participant. This study used nonprobability sampling to get the participant with snow ball sampling. Total 141 respondents have been collected.

Reliability test was calculated using Cronbach's alpha. Descriptive statistics were used to analysis data collected from respondent.

3. RESULTS AND DISCUSSION

3.1. Value Chain Analysis

Organic catfish supply chain actors include fish seed and feed provider, organics catfish farmer,

processed organic catfish food business, wholesaler, retailer and customer. The identified consumers encompass household, restaurant and other business such as freshwater fishing business or processed food business. The retailer involved are online or offline shop and pedlars who travelled good for sell to surrounding household area. Value chain analysis in organic catfish supply chain in Malang, East Java, Indonesia was illustrated in Figure 1 which shows some function, activities, and actor involved in organic catfish supply chain. The function levels consist of input supply level, farming, and processing, marketing and consuming level. Each actor at each level performed some activities to produce value added at organic catfish product.

Organic catfish farming starts from purchasing catfish seed and feed at suppliers and preparation in ponds which have regulated water condition in. Organic catfish farmers performed cultivation by growing and fattening organics catfish until the size and age of fish appropriate for harvest. Hereafter, this fresh catfish could distribute to wholesaler, food processors business, retailers, or directly to the end customer. This fresh product has limited durability which speed of delivery or transportation became important factor.

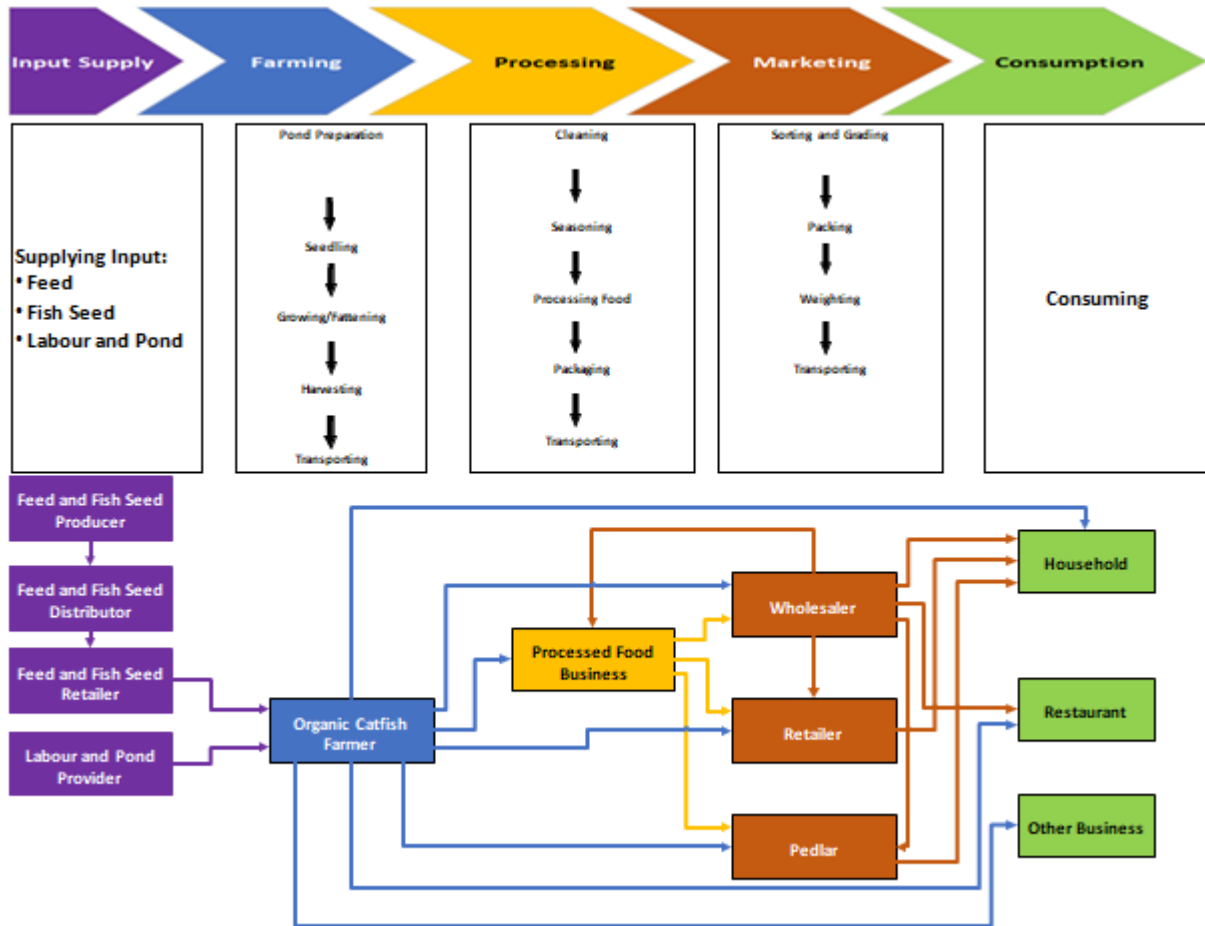


Figure 1. Value chain analysis of organic catfish supply chain in Malang, East Java Indonesia

Besides fresh organic catfish product, this supply chain provided processed organic product which ready to cook; heat, or eat. This product need specific type of packaging to extent product durability and maintain product quality for the next stage in the supply chain.

Cleaned organic catfish product and filled catfish are included at ready to cook product, while seasoned organic catfish is ready to heat product. Processed food business performed some activities to process fresh catfish become another packaged processed product that ready to eat such as shredded catfish, catfish meatball, and baby catfish crispy an fish skin crispy

Several types of organic catfish product, both fresh and processed food are delivered to costumer through marketing channel from farming or production point to consumption point. Group farmer could deliver their product directly to consumer or thought immediate actor such as wholesaler, retailer, and pedlar. In general, there are

six main distribution channel which indicate how organic product reach end customer. These are identified market channel in this study:

- a. Channel 1 : Organic Catfish Farmers - Customer
- b. Channel 2 : Organic Catfish Farmers – Wholesaler - Customer
- c. Channel 3 : Organic Catfish Farmers – Retailer - Customer
- d. Channel 4 : Organic Catfish Farmers – Wholesaler – Retailer/ Pedlar - Customer
- e. Channel 5 : Organic Catfish Farmers – Processed Food Business – Wholesaler - Customer
- f. Channel 6 : Organic Catfish Farmers – Processed Food Business – Retailer/ Pedlar - Customer

3.2. Market Behavior Survey

Market behavior identification was carried out through semi-structured questionnaires on purchasing behavior. The questions were divided into several parts. The first part was related to respondent's social demographics. Most of the respondents were woman, matching with the research target as decision-makers in household related to foodstuffs consumed by their families. Demographics profile respondents represent the prevalence of woman approximately 95% in the sample. It was also depicts that respondent have high education level, which more than 98% have completed their senior high school. Approximately 56% of the household live with the family and most of respondent aged at 18-29 years old and 30-39 years old at 54% and 31% respectively. Most of household have medium average monthly income, since more than 86% household have income less than five million Indonesian Rupiah monthly.

The following part of questioner were related to question about respondent frequency to buy organic product; subjective knowledge, behavior beliefs, perceived barrier to buy organic product, attitude toward purchasing organic product, and intention to purchase organic product. This question used five point Likert scale and the collected data was reliability tested to convince data validity. Furthermore, the collected data was calculated by mean and standard deviation to analyze customer buying behaviors. Mean standard deviation and

Cronbach's alpha (α) of the reliability test showed in Table 1.

The result of calculated data from questionnaires depicts that frequency associated with purchasing organic product of respondents was relatively low. Mostly, 44% of respondent purchase it "few time in a year", followed by 30% purchase it "several time a month" and only 5% of respondent buys it "every week". Most of respondents are seldom to purchase organic product because of availability and the price. This is quite reasonable considering the average monthly income of household was relatively medium according demographic profile.

Behavior belief of respondents measured to illustrate the consumer belief or not about organic product beneficial though nine question referred to the absence of harmful chemical, not really organics; expensiveness, environmental-friendly, tastier, more natural, fresher, healthier, more attractive compared to non-organic product. All response was measured by means and the result obtained was presented in Table 1. The second largest means value at belief of organic product was found in question item "healthier" with the value of 4.38, following by "environmental-friendly" at 4.31 means value. This highest value denotes that respondents believe that the main motivation to purchase and consume organic food is because the organic products are indeed better for health and environment than non-organic product. This result is consistent with previous studies [9].

Table 1. Questionnaire result for customer behavior in Malang, East Java Indonesia

Question Item	Means	Standard Deviation	Question Item	Means	Standard Deviation
A. Subjective Knowledge	$\alpha = 0.938$		D. Behavior Belief	$\alpha = 0.834$	
Knowledgeable about organic product	2.98	1.01	Free of harmful chemicals	3.92	1.09
Know about organic food compared to other people	2.69	0.98	Environmental friendly	4.31	0.75
Really know about organic products	2.80	1.04	Healthier	4.38	0.69
B. Purchase Barriers	$\alpha = 0.797$		Tastier	3.72	1.00
Easy to find organic product	2.91	1.14	Fresher	4.05	0.95
Easier to purchase	2.46	1.05	Attractive	3.63	1.02
Food safety	3.62	0.87	Expensive	4.30	0.84
Availability of organic product	2.85	1.08	Natural	4.26	0.78
Easy to distinguish organic products	3.09	1.07	Not really organic	3.44	0.90
C. Purchasing Attitudes	$\alpha = 0.937$		E. Intention to buy	$\alpha = 0.851$	
Feel happy	3.88	0.92	Intention to buy	3.66	0.89
Feel good	3.86	0.88	Will buy	3.56	0.98
Beneficial	4.03	0.85	F. Subjective Norm		
Wise	3.79	0.96	Most of people who I value would buy organic food	3.42	0.98
Feel like better person	3.93	0.87			
Contribution to something better	3.97	0.88			
Doing right thing	3.79	0.95			

Based on this survey, respondent in Malang believe that organic food are healthier, better for environment, more natural, fresher and free of harmful chemical, even though more expensive, lack of taste and less attractive than non-organic product. The lowest mean in the item “Not really organic” at 3.44 indicates that consumers are not sure about organic products currently available are really organic, which is related to the organic product certification process. This certification is needed as a differentiator between organic and non-

organic products and ensures that the product is authentically organic. Based on previous research [10], generally consumers had strong beliefs in certified product along food chain and certification organization, but the levels of trust between countries were different. In addition, based survey related to customer behavior in purchasing food [11], it depicts that more than 50% of participant agree that there are significant different between certified organics product and uncertified ones. Moreover the level of trust for certified of organic

product higher than product without certificates, which lead customer to be willing to pay higher prices for certified ones.

Most of the respondents felt that they had not much knowledge about organic products. From the questionnaires about subjective knowledge, the means was value only at 2.69 – 2.98 from five point Likert scale. It indicated that there is an opportunity for organic product business to transfer knowledge related to organic products to the community. Moreover, the respondent perceived that it was difficult to find and purchase organic products (means value = 2.46). This difficulty was also supported by the low of organic product availability. Overall, respondent had perceived barriers when buying organic food so they preferred to consume non-organic products that are already available in nearby places.

Considering the consumer attitude toward organic product, respondents revealed favorable attitudes toward organic food. This is indicated by the means value of all item in attitude construct greater than 3.7 in a five-point scale. Overall respondent agreed that most of customer felt more beneficial, give more contribution to something better, better person, happier, wiser when consuming organic product.

Participant answered at buying intention construct, indicating that customer had high intention to purchase organic product. Moreover, the same result was also presented in subjective norm. Respondent agree that most people who their value would purchase organic product. This situation shows that organic products have a selling value for consumers in the market.

4. CONCLUSION

This study had identified organic catfish supply chain thought value chain analysis to mapping the actor involved across supply chain. The analysis limited in Malang area, East Java Indonesia with local and regional distribution. Actors involved in the food supply chain played their role both individually or business and effective coordination between parties had not yet been established. Organic catfish product prices are still following and compete with non-organic prices. Organic catfish supply chain actors include fish seed and feed supplier, organic catfish farmer, processed food business, wholesaler, retailer and customer (households, restaurant and other business). Value chain analysis conducted at input supply level, farming, and processing, marketing and consuming

level. Each actor at each level performed some activities to create value added at the organic product.

The research has also shown that consumers believe that organic products are healthier and more environmental friendly compared to non-organic products. It give implication that the motivation of consumers to purchase and consume organic products are because of healthy and environmentally friendly reason. However, consumers have not believed that the products on the market are originally organic that related to organic product certification process. Nevertheless, from value chain analysis, the most of actors involved in the supply chain are micro, small and medium enterprises which usually have limitations, so this certification process needs more attention. Therefore, there is an opportunity for organic food supply chain to collaborate with government, private industry and certification bodies to increase trust in organic food and recognition of organic certification.

The main consumer's perceived barriers to obtain and purchase organic products were the availability of organic products, the ease of getting organic products, and the lack of customer knowledge on how to distinguish organic and non-organic products. Respondents agree that by consuming organic products, they felt morally more beneficial, more contributing, better person, happier, and wiser than non-organic. It shows that organic products have a high selling value in the upcoming market. Consumers have high intention and desire to buy organic products. It shows that organic products have value as a product competency which has selling value for consumers.

Based on low purchasing organic product frequency of respondents, organic catfish actor in the supply chain requires a new strategy related to several outcomes resulting from this research such as the availability of the organic product; the ease of purchasing the organic product, the belief which ensure the product is truly organic, the effectiveness in the farming and distribution process, and the determination of affordable price of organic product. Strategy which could apply to improve customer trust about organic product is communicated and practices Corporate Social Responsibility. Based on past research [12], corporate capability and corporate social responsibility image influence customer trusts which encourage customer willingness to buy organic product and co-developing behavior.

This study has limited in identifying and surveying organic catfish in a city used convenience sample. Future research could be conducted in other cities which have difference background and culture. Moreover, future studies may develop technical and operational strategies for practical implementation in organization to overcome the obstacle faced by actors across the supply chain.

AUTHORS' CONTRIBUTIONS

Ratih Ardia Sari designed, performed the study and wrote the manuscript. Sylvie Indah Kartika Sari and Angga Akbar Fanani performed the study and analysed the data. Qomariyatus Sholihah designed and revised the manuscripts.

ACKNOWLEDGMENTS

This study was supported by Faculty of Engineering, Universitas Brawijaya. The author would like to thanks to group farmer; wholesaler, retailer and customer of organic catfish in Malang for their support in this research.

REFERENCES

- [1] S. Seuring, M. Müller, From a literature review to a conceptual framework for sustainable supply chain management, *Journal of Cleaner Production* 16 (15) (2008) 1699-1710. DOI: <https://doi.org/10.1016/j.jclepro.2008.04.020>
- [2] F. S. Wiryawan, Marimin, T. Djatna, Value chain and sustainability analysis of fresh-cut vegetable: A case study at SSS Co., *Journal of Cleaner Production*, (2020). DOI: <https://doi.org/10.1016/j.jclepro.2020.121039>
- [3] A. Ayele, T. Erchafo, A. Bashe, S. Tesfayohannes, Value chain analysis of wheat in Duna district, Hadiya zone, Southern Ethiopia, *Heliyon* (2021) e07597. DOI: <https://doi.org/10.1016/j.heliyon.2021.e07597>
- [4] R. M. Rosales, R. Pomeroy, I. J. Calabio, M. Batong, K. Cedo, N. Escara, V. F. A. Gulayan, M. Narvadezi, M. Sarahadil, Value chain analysis and small-scale fisheries management, *Marine Policy* (2017) 11–21. DOI: <https://doi.org/10.1016/j.marpol.2017.05.023>
- [5] J. Howieson, M. Lawley, K. Hastings, Value chain analysis: an iterative and relational approach for agri-food chains, *Supply Chain Management: An International Journal*, (2016) 352-362. DOI: <https://doi.org/10.1108/SCM-06-2015-0220>
- [6] Agromedia. [Online]. Available: <https://agromedia.net/10-keunggulan-budi-dayalele-organik-yang-agromate-harus-ketahui-2/>. [Accessed 20 07 2021].
- [7] Pemerintah Kota Malang, 25 January 2017. [Online]. Available: <https://malangkota.go.id/2017/01/25/budi-dayalele-sumber-lancar-jadi-percontohan-nasional/>.
- [8] L. M. Vieira, M. D. D. Barcellos, A. Hoppe, S. B. d. Silva, An analysis of value in an organic food supply chain, *British Food Journal* 115(10) (2013) 1454-1472. DOI: <https://doi.org/10.1108/BFJ-06-2011-0160>
- [9] R. Yadav, Altruistic or egoistic: Which value promotes organic food consumption among young consumers? A study in the context of a developing nation, *Journal of Retailing and Consumer Services* 33 (C) (2016) 92–97. DOI: <https://doi.org/10.1016/j.jretconser.2016.08.008>
- [10] B. Murphy, M. Martini, A. Fedi, B. L. Loera, C. T. Elliott, M. Dean, Consumer trust in organic food and organic certifications in four European countries, *Food Control* 133 (2022) 1-8. DOI: <https://doi.org/10.1016/j.foodcont.2021.108484>
- [11] M. Lang, A. C. Rodrigues, A comparison of organic-certified versus non-certified natural foods: Perceptions and motives and their influence on purchase behaviors, *Appetite*, 168 (2022) 1-7. DOI: <https://doi.org/10.1016/j.appet.2021.105698>
- [12] W. Yu, X. Han, L. Ding, M. He, Organic food corporate image and customer co-developing behavior: The mediating role of consumer trust and purchase intention, *Journal of Retailing and Consumer Services* 59 (2021) 102377. DOI: <https://doi.org/10.1016/j.jretconser.2020.102377>