A study on the promotion performance evaluation of organic produce markets in China

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Abstract

Consumers have changed the produce consumption patterns to diversification and refinement and particularly concerned about the healthfulness and safety of produce that sustainable agricultural development. So, the ecological agriculture, and organic agriculture are flourishing in recent years. Delphi Method and Data Envelopment Analysis are applied to the empirical analysis of 12 DMUs, which are enterprises with 2016 organic agriculture authentication in Fujian Province, with the public data. The results are concluded as following. One DMU presents strong-form efficient promotion performance, revealing the relatively better promotion performance efficiency. Six DMUs show margin inefficient promotion performance that the relative promotion performance efficiency could be more easily enhanced. Five DMUs appear obvious inefficient promotion performance. Slack Variable Analysis is further utilized for discussing the improvement direction for organic produce enterprises which invest in too many inputs. According to the conclusions, suggestions are proposed to enhance the promotion of organic produce so that the agricultural production aims to not pollute environments, not destroy the ecology, and provide consumers with healthy and safe produce.

Keywords: Organic agriculture. Produce. Promotion performance. Performance evaluation.

1. Introduction

The worsening ecological environment in the world has greatly impacted the living environment of human beings in past years. With the enhancing living standard, Taiwan highly depends on synthetic materials of chemical fertilizers and synthetic pesticides and promotes the production efficiency with large agricultural machinery and the cultivation of single crops. It eases up the food pressure caused by population growth but affects the natural ecosystems in the earth.

The overuse of natural resources resulting in the exhaustion has caused negative effects on the earth environment (including water, soil, and air). The energy crisis has countries be aware of the limit of the earth resources, the serious pollution of environment, and the damage of ecological environment, and the degrading agricultural productivity. How to maintain the environmental quality and living standard and ensure the sustainable living space for descendants is gradually emphasized in the world. Moreover, consumers have changed the produce consumption patterns to diversification and refinement and concerned about the healthfulness and safety of produce that the sustainable agriculture, ecological agriculture, or organic agriculture is flourishing in past years.

The emergence of health idea therefore has organic produce boom in past years. The higher consumers' satisfaction and loyalty have them be glad to recommend organic food to others, purchase products of certain brands, businesses, and authentication, have longer periods eating the products, and appear higher consumption on organic vegetables.

In this case, healthfulness and safety becomes the key opportunities to expand organic food markets (Stallman, 2011). Produce prices and quality would change with time and locations; the characteristics of easy spoilage and not being easily preserved become the factors in the produce sales. In comparison with other industries, the production costs for organic agriculture are higher and the profits in the entire supply chain, from market distribution to consumers, are easily exploited by mediate traders (Kola et al., 2014).

Organic agriculture comparatively does not pollute the environment or destroy the ecology and could provide consumers with healthy and safe produce. When the national income is enhanced and the living standard is promoted, consumers have gradually stressed on food safety so that organic agriculture is getting important.

2. Literature Review

2.1. Organic produce

Lindic et al. (2012) pointed out the primary goal of organic agriculture as keeping the health of ecological communities where soil, plants, animals, and human beings depend on each other and having production and life achieve harmony. Dentoni et al. (2012) regarded agriculture as the important economic activity of human beings that advanced countries would actively promote organic farming to maintain the sustainability of agricultural management.

Organic agriculture is an overall production management system, which enhances and reinfores the health of agroecosystem, including biodiversity, biosphere, and soil biological activity. Shobayashi et al. (2011) mentioned that an organic production system was based on the specific production standard aiming to implement the socially, ecologically, and economically sustainable optimal agroecosystem.

Organic agriculture stresses on enhancing and reinforcing the health of agroecosystem, containing the comprehensive production management system of biodiversification, biosphere, and soil biological activity. Aertsens et al. (2011) applied sustainable management to consider regional conditions and local conditions.

The implementation of such a goal required the application of agricultural, biological, and physical approaches, rather than achieving all specific functions of the system with synthetic materials. Pauli (2015) pointed out the effects of organic agriculture on ecological environment.

I. To reduce pollution on environments: Belletti et al. (2014) indicated that replacing pesticides with natural enemies and microorganism or physical methods of bagging, trapping plates, and bug zappers were utilized for the disease prevention and the cultivation of disease resistant species in organic cultivation. In regard to the use of fertilizers, organic fertilizers are used for replacing chemical fertilizers. Such a cultivation method could avoid pesticide accumulation or eutrophication of lakes, rivers, and reservoirs.

II. To recycle agricultural waste and reuse renewable resources: Sidali & Scaramuzzi (2012) proposed that it would result in environmental pollution when agricultural and animal waste, such as crop residue, husk, and animal excrements, was not properly processed. When fully fermenting such agricultural waste to become organic fertilizers for farms, it would effectively process such agricultural waste,

improve the soil property, provide nitrogenous, phosphate, and potash fertilizers required for crop growth, as well as largely reduce the use of chemical fertilizers.

III. To develop good cropping systems: Kola et al. (2014) indicated that continuous cropping used in general cultivation would absorb similar nutrients that certain nutrients in the soil would be rapidly lost. Eventually, the use of chemical fertilizers was increased as large amount of chemical fertilizers were used for supplementing nutrients. Organic cultivation, with rotation, intercropping, or green manure rotation with legume, could improve the physio-chemical structure of soil and reduce pests.

VI. To improve air quality: Janssen & Hamm (2012) stated that the large use of chemical nitrogenous fertilizers would generate nitrous oxide (N2O) to destroy the ozone layer of stratosphere in the air so that the ultraviolet directly went through the atmosphere to the ground to endanger the creatures in the earth. Reducing or not using chemical fertilizers could assist in reducing the generation of N2O.

V. To prevent soil erosion: Stallman (2011) mentioned that organic agriculture focused on mixed cropping, intercropping, and rotation that the soil coverage was complete to avoid direct rainfall. Besides, the use of organic matters for enhancing soil permeability and water holding capacity could effectively prevent soil erosion.

2.2. Organic produce market promotion

The major sales channels of organic produce contain organic stores, organic counters in supermarkets, regular home delivery, farms, and organic restaurants. Campbell et al. (2015) mentioned that there were businesses introducing multilevel marketing into organic produce markets, which was an emerging home delivery worthy of observation.

Sidali & Scaramuzzi (2012) indicated that the emergence of e-commerce and home delivery would have network marketing be emphasized in the future as organic consumers presented similar characteristics with network users, with higher incomes, higher educational background, and preference for convenience, that the convenience of online orders and

payment and home delivery would attract network users.

Francesco (2014) argued that the distribution channels and pricing of organic vegetables were different from traditional produce. Organic produce was popular by organic farmers as it was directly sold without going through the third party (zero-order channel), the direct-marketing prices of organic vegetables were about one-third higher than those with indirect sales, and the net income was higher than it with indirect sales. Among direct sales channels, regular home delivery revealed the most sales quantity and was the most popular in farms.

Brand et al. (2011) indicated that, in the marketing of organic produce, regular home delivery customers presented the highest loyalty, the market grew stably, and the property of lifelong consumption revealed great meanings on the business opportunities for businesses. Consequently, it was necessary to reinforce the service and contact with customers. E-commerce could be utilized for expanding home delivery markets and offering the convenience to select products in the future in the future so as to enhance consumer satisfaction and long-term consumption.

Anson & Pavithran (2014) mentioned that the sales amount in supermarkets was large and grew rapidly, but the low prices of general vegetables in winter would affect the sales of organic produce. Most people in charge of general supermarkets do not understand organic produce, but simply consider it as a kind of produce, and even mix up general, hydroponic, or GAP (Good Agricultural Practice) produce. Merriam (2014) proposed that organic produce suppliers should often communicate and contact with the persons in charge and provide proper packages, discrimination, posters, boards, or instruction sheets to highlight and discriminate organic produce.

Processed or healthy food is the major profit-making products for organic stores that applying organic produce to attract customers is emphasized. Pino et al. (2012) stated that there were lots of organic stores established, but a lot of them shut down because of bad management; organic stores were suggested to develop home delivery services to increase the profits by thoroughly using refrigeration equipment and reducing costs for depletion.

2.3. Performance measurement

Leng (2014) advocated that channel performance should be measured with multi-dimensional variables. Sorenson et al. (2011) evaluated dealer performance from the aspect of

suppliers and proposed four models of rational system, behavior system, internal procedure, and open system. In the research on the relationship among corporate strategies, performance, and production capacity, Chepng'enoKoske & Muturi (2015) proposed to measure with pre-tax market share, returns on assets, and growth rate.

Vijay (2015) evaluated channel performance from the aspect of strategy management and suggested to cover financial performance and customer satisfaction. Nirmala & Dewi (2011) proposed the criteria for manufacturers evaluating dealer performance as sales quota achievement rate, average stocks, customer delivery service time, handling of damage and lost goods, cooperation in promotion and training programs, and dealers' customer service. Most of them were measured with quantitative financial indicators of profitability and growth rate.

Performance could be measured with single or multiple dimensions. Mohr and Rijswijk & Frewer (2012) regarded performance as the measurement with multiple dimensions, including efficacy, fairness, productivity, and profitability. Uetake (2013) measured performance with (1) retailers' perception of supplier performance, e.g. profitability of suppliers' products, national advertisement, product quality, and ordering process and (2) retailers' financial performance.

Janssen & Hamm (2012) regarded performance measurement indicators as (1) dealers' sales performance, (2) manufacturer satisfaction with dealers' financial performance, (3) manufacturer satisfaction with the growth creation, (4) manufacturer satisfaction with dealers' capability, (5) manufacturer satisfaction with dealers' obedience to distribution policies (i.e. contracts), (6) manufacturer satisfaction with dealers' changes with markets, and (7) dealers' support performance.

3. Research indicator and Object

3.1 Establishment of research indicator

By summing up the evaluation indicators for organic produce performance proposed by above researchers, Delphi Method is utilized in this study for drawing up the evaluation indicators for organic produce promotion performance in this study. Delphi Method, also named expert judgment, is a group decision-making approach presenting both qualitative and quantitative characteristics and is interdisciplinary and future oriented. Aiming at certain issues with short data or unknown situations in the research process, a commonly acceptable answer is acquired through several runs of anonymous questionnaire survey of experts for

votes and feedback till the least differences among experts' opinions.

The so-called "experts", according to literatures, should present the following conditions (Zagata, 2012). (1) Presenting interests in commonly participating in Delphi Method survey. (2) Presenting rich information for sharing. (3) The knowledge and technology in special fields are approved. (4) Presenting specialty, including practical experiences and theoretical studies, on the subject-related field. (5) Agreeing with the research result containing the special information possessed. Zagata (2012) further indicated that an expert should present knowledge standard, reliability, and accuracy and show deeper understanding about the industry so that the expert judgment was closer to the fact than ordinary people. The value of Delphi Method is based on such answers.

I. Establishment of evaluation indicator

The evaluation indicators in this study are established according to Delphi Method. The variables are defined as below.

(1) Input variable:

a) Finance: including personnel cost, medical supply costs, pension, board expenses, overtime pay, and welfare.

b) Production: containing number of engaged manpower, cropping area.

(2) Output variable:

a) Customer: covering organic produce market share and organic produce growth rate.

b) Profitability: The gross sales of organic produce are regarded as the performance of an enterprise. The operating revenue accumulated in 2016 is used as the output variable.

II. Research method and object

Both Delphi Method and Data Envelopment Analysis are utilized in this study for the empirical analysis of 12 organic agriculture enterprises (DMUs) authenticated by Fujian Province in 2016. The public data in the yearly statistics reports are used for selecting the input/output performance indicators in order to provide organic produce enterprises with reference for improvement.

4. Results

4.1 Analysis of organic produce promotion performance

By substituting various input/output indicators for CCR model and BCC model, the total production efficiency and the pure technical efficiency of organic produce enterprises are calculated. They are further divided by each other to calculate the returns to scale of organic produce enterprises. The total production efficiency, pure technical efficiency, and scale efficiency are organized in Table 1.

From Table 1, Chaoda Modern Agriculture (Holdings) Limited, with the total production efficiency 1, is a relatively efficient sector, while the rest organic produce enterprises reveal low total production efficiency; especially, Pinghe Yuantian Fruit and Vegetables Professional Cooperative appears the lowest total efficiency that it is relatively the most inefficient traditional Chinese hospital. In other words, 11 DMUs, except the one with the total production efficiency 1, are relatively inefficient organic produce enterprises. It is possibly because they could not effectively apply inputs or they do not reach the optimal production scale. It requires further analyses.

Table 1: Relative efficiency of organic produce enterprises

Organic produce enterprise	Total efficiency	Technical efficiency	Scale efficiency
Chaoda Modern Agriculture (Holdings) Limited	1.00	1.00	1.00
Fujian Ha Longfeng Tea Co., Ltd.	0.96	0.94	0.95
Paulownia Tea Co., Ltd.	0.95	0.95	0.95
Siamen Qingyunling Ecological Agriculture Co., Ltd.	0.90	0.90	0.89
Fujian Xianzhi Building Biological Technology Co., Ltd.	0.86	0.85	0.87
Anxi County Taoyuan Organic Tea Field Co., Ltd.	0.91	0.92	0.90
Pinghe Yuantian Fruit and Vegetables Professional Cooperative	0.81	0.80	0.81
Anxi County, Fujian Province, Hong Tea factory	0.88	0.89	0.88
Fujian Jingtai Tea Co., Ltd.	0.93	0.92	0.94
Fujian Jintian educated youth farm Limited	0.83	0.82	0.83
Laozhiquing Group Co., Ltd.	0.95	0.94	0.95

Fujian Shenghe Food Co., Ltd.	0.86	0.87	0.86

4.2. Slack variable analysis

According to Table 2, two organic produce enterprises present constant returns to scale, with the input/output achieve the optimal; 6 organic produce enterprises show decreasing returns to scale that reducing the scale might enhance the marginal returns and improve the promotion performance; and, the rest 4 organic produce enterprises present increasing returns to scale, showing that they could expand the scale to increase the marginal returns and further enhance the promotion performance.

Regarding Slack Variable Analysis, the improvement directions for organic produce enterprises with too many inputs are shown in Table 2. Aiming at units with too many inputs, such organic produce enterprises could achieve efficient management by reducing inputs. Another 2 organic produce enterprises present the optimal efficiency that the input resources have reached the optimal use.

Table 2: Improvements for organic produce enterprises

Decision-making unit (DMU)	Improved input		Improved output		Returns to scale
	Finance	Production	Customer	Profitability	
Chaoda Modern Agriculture (Holdings) Limited	0	0	0	0	CRS
Fujian Ha Longfeng Tea Co., Ltd.	0	-1	2	0	DRS
Paulownia Tea Co., Ltd.	0	0	0	0	CRS
Siamen Qingyunling Ecological Agriculture Co., Ltd.	0	2	0	4	IRS
Fujian Xianzhi Building Biological Technology Co., Ltd.	-1	-1	2	2	DRS
Anxi County Taoyuan Organic Tea Field Co., Ltd.	3	2	3	1	IRS
Pinghe Yuantian Fruit and Vegetables Professional Cooperative	-1	0	0	1	DRS
Anxi County, Fujian	0	2	0	2	IRS

Province, Hong Tea factory					
Fujian Jingtai Tea Co., Ltd.	-1	-1	3	0	DRS
Fujian Jintian educated youth farm Limited	0	-1	0	2	DRS
Laozhiquing Group Co., Ltd.	-2	0	1	1	DRS
Fujian Shenghe Food Co., Ltd.	1	1	2	1	IRS

Data source: organized in this study.

5. Conclusion

DMUs are classified into strong-form efficiency, margin efficiency, margin inefficiency, and obvious inefficiency, where strong-form efficiency shows the efficiency 1 and the slack variable 0, implying the extremely larger strength than inefficient DMUs. Unless there are major changes in inputs and output, such units should keep the efficiency. Margin efficiency shows the efficiency 1, but at least 1 slack variable not being 0. Such units would reduce the efficiency below 1 when increasing inputs or decreasing outputs. Margin inefficiency reveals the efficiency lower than 1, but higher than 0.9, and could be easily increased up to 1. The efficiency below 0.9 is regarded as obvious inefficiency. Such units would be hard to become efficient in short period. When a unit appears the efficiency below 0.75, it would maintain the inefficient condition unless there are major changes in input/output.

The efficiency and variable message acquired with DEA are classified in Table 1. One DMU (about 8% of all DMUs) shows strong-form efficiency (=1) on the promotion performance, revealing the better promotion performance efficiency; six DMUs (about 50% of all DMUs) show the promotion performance between 0.9 and 1, as margin inefficiency, revealing that the promotion performance efficiency of such organic produce enterprises could be more easily enhanced; and, five DMUs (about 42% of all DMUs) present the promotion performance efficiency below 0.9, as obvious inefficiency, where Pinghe Yuantian Fruit and Vegetables Professional Cooperative appears the lowest promotion performance efficiency 0.72. The DEA results reveal the moderate proportion of organic produce enterprises reaching the scale efficiency. The inputs need to be considered and adjusted in order to enhance the competitiveness.

6. Recommendations

Based on the research conclusions, suggestions for promoting organic produce are proposed in this study.

- Most farms produce and market the products or cooperate with constant manufacturers for the cultivation and delivery. Nevertheless, the effect of climate has the produce yield and control become difficult that the stock cannot be predicted as in manufacturing industry. Currently, they would sell through e-commerce websites. In this case, it is not necessary to focus the planning on online shopping, but to start from the setup of simple websites, aiming to reinforce the brand image and exchange information, e.g. introduction of company, online product catalogue, news announcement platform, online enquiry, message board, discussions, and email. They could enhance the planning of e-commerce websites, such as online shopping, stock system, and members, which require more human resource management, according to the farm size to expand the e-commerce territory step by step.
- In terms of enhancing market penetration, organic produce enterprises could reinforce the physical and virtual channels, actively expand direct marketing like home delivery, group buying, and activity gift market, and promote the brand awareness and designation through advertisement, exhibition promotion, cause-related marketing, and provision of ecological experience.
- Regarding the product development and diversification, organic crops are cultivated with rotation and high-value organic crops and contracted with farmers for farming and produce purchase to increase the product items and quantity. Although the market of organic possessed products is promising, there are still niche markets domestically. The internal channels of a company and the cooperation and development with midstream and downstream businesses could reduce the production risks. Besides, enlarging the production scale and enhancing the benefits aim to increase the cropping areas for organic crops, enhance the production skills, and reduce the production costs.

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