Performance evaluation of basic-level farmers' associations introducing customer relationship management

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Ridong Hu
PhD in Engineering
Institute : Institute of Quantitative Economics, Huaqiao University
Address: No.668 Jimei Avenue, Xiamen, 361021 Fujian, China
E-mail: **j_rdhu@hqu.edu.cn**

Mingyu Lin
Institute :School of Economics and Finance, Huaqiao University
Address: No. 269 Chenghua North Rd. Quanzhou, 362021 Fujian, China

Chich-Jen Shieh
PhD in Economics
Institute :Institute of Quantitative Economics, Huaqiao University
Address: No.668 Jimei Avenue, Xiamen, 361021 Fujian, China
E-mail: **charleshieh@ hqu.edu.cn**
(Corresponding author)

Abstract

Supply and marketing businesses have been the important economic business of basic-level farmers' associations. However, following the changes of societies and markets, current basic-level farmers' associationsare facing strict challenges and operation transformation on the supply and marketing businesses. It is necessary to introduce new business management models into the operation so as to enhance the overall business performance. The operation of supply and marketing businesses therefore should be established based on good customer relationship by better understanding customer needs, analyzing the need information, providing appropriate services and products, and actively concerning about customers' after-sale responses to adjust and improve farmers' associations' services and products. To combine expert opinions, reduce input costs, and avoid fuzziness in the interview process, Modified Delphi Method is utilized for screening input and output factors. Basic-level farmers' associations in Yunlin County, which is named the agricultural capital, is studied. The research results are summarized as followings. One DMU in the basic-level farmers' associations shows strong efficiency, revealing the better relative efficiency. Three DMUs, with marginal inefficiency, present the relative efficiency between 0.9 and 1, revealing the relative efficiency being easily enhanced. Six DMUs, with obvious inefficiency, appear the efficiency lower than 0.9. The DEA evaluation results reveal that many basic-level farmers' associations in Yunlin County do not achieve the scale efficiency. In this case, the input for basic-level Farmers' associations' introduction of customer relationship management, in Yunlin County, should be re-considered and re-adjusted in order to enhance the competitiveness. Finally, suggestions based on the results are proposed, expecting to analyze farmers' relevant information and understand current situations and dilemmas of local agriculture production and marketing by the introduction of customer relationship management to provide farmers' associations with opportunities and directions for future

transformation.

Keywords: Farmers' Association. Customer relationship management. Performance evaluation.

1. Introduction

The structure of farmers' associations in Taiwan is divided into economic business and expenditure business. Economic business is the major source of farmers' associations' business funds, including credit and supply & marketing businesses. Expenditure business, on the other hand, refers to engaging in farmer education and insurance with the surplusallocatedfrom economic business, containing promotion and insurance businesses. Farmers' associations aim to serve farmers that the operating earnings of the supply and marketing businesses have been ignored for long.

Besides, they are not operated with corporation management and, under the trend of economic and trade liberalization, the government changes the protection policy to open the concessionary business of farmers' associations step by step that the competition from cooperative markets and agricultural enterprises results in unstable income of the supply and marketing businesses. The credit businesses therefore become the primary capital to support the operation of farmers' associations. Along with the government' promotion of financial liberalization, numerous private banks are established in past years.

Moreover, farmers' associations appear problems from internal management to external supervision due to the deficient system that the financial structure of the credit businessesis worsened and the surplus shortage in credit businesses influences the overall operation of farmers' associations. For this reason, farmers' associations gradually focus on the supply and marketing businesses which have been ignored for long. The supply and marketing businesses of farmers' associations in Taiwan cover co-marketing and supply(pesticide, fertilizer distribution, and agricultural products), establishment of agricultural product brands and expansion of the marketing channels, agricultural product processing, and supermarket management.

The service offered in the supply and marketing businesses aims at farmers'needs and the supplied agricultural production materials are the necessities for agricultural production. The served objects of the supermarket businesses are expanded to general consumers. As a result, the types of customers contacted and the varieties of products supplied in the supply and marketing businesses are more diversified than other departments in farmers' associations. The needs for customer relationship management are therefore higher than other departments.

Farmers' associations in Taiwan present the advantage of local service that the supply and marketing business operation should be established based on good customer relationship by more understanding customer needs, analyzing the need information, providing appropriate services and products, and actively concerning about customers' after-sale responses to adjust and improve the provided services and products. It could dig out new customers, prevent existing customers from loss, and enhance the loyalty and profits. Besides, it could understand current situations and dilemmas of local agriculture production and marketing and provide opportunities and directions for farmers' associations' future transformation by analyzing farmers' relevant information. In this case, the performance evaluation of farmers' associations introducingcustomer relationship management is discussed in this study.

2. Literature Review

2.1. Customer relationship management

Yazdanparast et al. (2016) pointed out the focus on customer relationship management (CRM) since 1999. The product manufacturing and marketing in the past development of agriculture, forestry, fishing, animal husbandry, and manufacturing were product-oriented; nevertheless, the emergence of service and consumerism gradually changed it into customer-oriented. Čeněk et al. (2016) emphasized that customer relationship management, with the assistance of information technology, integrated corporate functions, customer interactive channels, and advanced database technology to search for customer needs and further enhance customer loyalty and satisfaction.

Jones et al. (2015) regarded customer relationship management as a tactic that enterprises increased new customers and prevented existing customers from loss, promotedcustomer loyalty, and enhancedcustomers' profit contribution through meaningful communication and understanding as well as influence on customer behaviors, covering all activities which could change casual customers to loyal customers by satisfying or exceeding the needs to appear repurchase behavior. Griffiths& McLean (2015) defined customer relationship management as continuous relationship marketing, stressed on helping enterprises look for valuable customers for further segmentation, provided different products and channels for the satisfaction, and maintained favorable relationship with customers to further enhance the contribution for the enterprises making profits.

Aichner & Jacob (2014) pointed out customer relationship management as business model and strategy application; enterprises grasped customer information by actively deepening the relationship with customers and utilized such customer information for distinct strategy application in order to satisfy different customer needs. Lee, T., Shia& Huh (2016) referred customer relationship as enterprises establishing long-term, mutually satisfactory, and mutually trusted partnership with high commitment, through the combination of economy, technology, information, and society, with the customers. Good customer relationship could be performed by customer satisfaction, customer retention rate, customer turnover, customer loyalty, and customer value.

Harrigan & Miles (2014) pointed out customer relationship management as business model and strategy application;enterprises grasped customer information through actively deepening the relationship with customers and utilized such customer information for making distinct strategy application to satisfy various customer needs.

Dootson et al. (2016) regarded customer relationship management as a tactic for enterprises increasing new customers, preventing existing customers from loss, promoting customer loyalty, and enhancing customers' profit contribution through meaningful communication to understand and influence customer behaviors, including all activities which could change casual customers into loyal customers by satisfying or exceeding the needs to appear repurchase behavior.

Polláka & Dorčákb (2016) described customer relationship management as understanding customer needs, providing best individualized service, satisfying customer needs, and creating satisfactory value and interactive relationship. Enterpriseshad to stress on the interaction and service with customers, constantly enhance the service quality for customers with various innovative products and services, regard customer relationship management as the goal of the sustained-yield management, and establish long-term and close relationship with customers to shape the long-term win-win. It has been a concerned issue in past years.

2.2. Performance meaning and measurement

Jone et al. (2014) pointed out performance as the outcomes of business activity, which contained the creation of operating revenue, the control of costs and expenses, and the presentation of profit outcomes. Durkin et al. (2014) defined organizational performance as "the attainment of a specifically desired end". In other words, performance was the consistency between actual output and desired output of an organization.

However, the setting of "desired objectives" became an argument among scholars of organization theory. Alqahtani & Saba (2013) regarded efficacy as the achievement of the pursuit of organizational goals, while efficiency stressed on the relationship between inputs and outputs and sought for the minimization of resource costs. Vernuccio (2014) mentioned that efficiency was emphasized by management levels because of limited organizational resources. Efficiency referred to a manager producing more outputs with certain inputs or producing certain outputs with fewer inputs. Efficacy referred to amanager achieving the objectives set by the organization. Accordingly, efficiency focused on the use of means, while efficacy pursued the measurement of ends.

Ou Yang et al. (2013) considered that financial performance and marketing performance were often used for the business performance in general companies, return on investment, return on sales, pre-tax income, sales volume, and sales growth rate were used for financial performance, and market share was used for marketing. Choudhury & Harrigan (2014) proposed to judge organizational performance with finance, corporate, and organization: (a) Financial performance was the common indicator in research as well as a definite measure, e.g. sales growth rate and return on sales. (b) Corporateperformance was also included for analyzing other non-financial indicators, such as market share and product quality. (c) Organizational efficacy, with the general definition of achieving organizational goals, contained above two and the satisfaction of various interested parties with the goals.

Rodriguez et al. (2015) discovered the positive and significant effects of experience in the investment in China, investment scale, and company size of parent companies in Taiwan on the performance. Enterprises with higher investment experience and scale of the parent companies would show better business performance; and, no absolute correlation between investment location and performance. In this case, a manager had to consider the achievement of organizational goals as well as pay attention to outcomes.

Guerreiro et al. (2015) proposed the establishment of performance evaluation systems and emphasized that the outcome announcement would change the entire organization even though there was no reward. They believed that what was measure would be properly done, the success or failure would not be known without measurement results, not knowing what success was would not be able to reward, not rewarding success might reward failure, not knowing what success was would not acquire experiences, not understanding failure would not be able to see visions of things by experiences, and the proof of performance could win the public support (Shokohyar et al., 2016).

3. Research Design

3.1. Input/output screening

To combine expert opinions, reduce input costs, and avoid fuzziness in the interview process, Modified Delphi Method is utilized in this study for screening input and output factors. Based on special considerations in some part of the research, brainstorming open-ended questionnaire is omitted. A structural questionnaire is directly developed, after referring to large amount of literatures and making modifications, for the first run questionnaire survey.

It is regarded as Modified Delphi Method. The structural questionnaire is directly used for the first run survey to save time; besides, the structural questionnaire could have the experts immediately focus on the research subject and omit the guess of open-ended questionnaire. Total 30 copies of questionnaire are distributed, and 22 valid copies are retrieved, with the retrieval rate 73%.

"Agricultural capital" has been the slogan of Yunlin County Government. In addition to helping farmers, it is moving toward specialization and elaboration. Agricultural output in Yunlin County is ranked the top in Taiwan, the agricultural population is about 9.82% of farmers (more than 0.3 million people) in Taiwan, and the supply lines spread the entire island. Basic-level farmers' associations in Yunlin County are therefore selected as the research objects in this study. The variable data used in this study are public statistical data.

3.2. Definition of variables:

Input variables:

(a) Input amount: Budget input for practicing customer relationship management.
(b) Input labor: Labor input for communicating with customers and interactive service.

Output variables:
(a) Number of people: Number of old customers maintained.
(b) Operating performance: Operating income acquired in a period.

3.3. Efficiency evaluation analysis

From the aspect of economics, Guo & Chan-Olmsted (2015) indicated that an operating unit with fewer inputs but more outputs revealed the better "performance". "Efficiency" could be used for measuring such performance. With the comparison of inputs and outputs, efficiency was defined as efficiency＝weighted sum of output/weighted sum of input. The maximum output function of different input composition was called "production function". The maximum output acquired from inputs was generally smaller than the output of production function. For this reason, production function was the largest frontier of various outputs that it was called "production frontier". Trainor et al. (2014) explained the geometric meaning of efficiency that envelope was utilized for reflecting all inputs and outputs of the evaluated decision-making unit to the space to evaluate the relative efficiency of the organization, to find out the efficiency envelope which could envelope all observed data, to form the efficiency frontier, and to calculate the distance between the observed value of individual decision-making unit and the efficiency envelope so as to calculate the relative efficiency level.

Data Envelopment Analysis (DEA) is used in this study for evaluating efficiency. Unlike traditional regression analysis which simply seeks the average path through a series of data points, it envelopes various sample data and attempts to find out the relationship and presents the advantages required for a favorable efficiency evaluation model. It applies the technique of linear planning, considers factors which could be used for measuring the performance of evaluated units, and compares the performance among units with similar features.

Hu et al. (2015) mentioned that Farrell, in 1957, first replaced the common "default function" with "non-default production function" to estimate efficiency and applied the skills of mathematical planning to calculate the production function frontier, i.e. efficiency

production function. Farrell proposed two contents covered in efficiency. One was technical efficiency (TE), reflecting the maximum output under preset inputs. The other was allocative efficiency (AE), or price efficiency (PE), which reflected the use of input with the optimal proportion under preset input prices. Accordingly, under the assumption of constant returns to scale and constant input price, Farrell first divided overall efficiency into technical efficiency, related to real inputs and outputs, and allocative efficiency, related to the optimal factors. The product of the two was the total economic efficiency. Farrell applied the following hypotheses. I. Production boundary was composed of most efficient evaluated units, and inefficient units were placed below the boundary (i.e. rear right of boundary). II. Production boundary showed convex points, and the slope of each point was negative. III. Outputs and inputs presented the relationship of constant returns to scale.

4. Empirical analysis of basic-level Farmers' associations' performance on the introduction of customer relationship management

4.1 Analysis of basic-level Farmers' associations' performance on the introduction of customer relationship management

By substituting input/output indicators for CCR model and BCC model, the overall production efficiency and pure technical efficiency of basic-level farmers' associations introducing customer relationship management could be calculated. The two are further divided to acquire the returns to scale of basic-level farmers' associations introducing customer relationship management. Overall production efficiency, pure technical efficiency, scale efficiency, and returns to scale are organized in Table 1.

From Table 1, Gukeng Farmers' Association, with the overall efficiency=1, is relatively the most efficient basic-level farmers' association, while the rest basic-level farmers' associations introducing customer relationship management show low overall production efficiency. Especially, Yuanchang Farmers' Association appears the lowest overall efficiency that it is relatively the most inefficient basic-level farmers' association. That is, in addition to the DMU with the relative overall production efficiency=1, the rest 9 DMUs are relatively inefficient basic-level farmers' associations, possibly because they could not effectively apply inputs or do not achieve the optimal production scale. It requires further analyses.

Table 1: Relative efficiency of basic-level farmers' associations' introduction of customer relationship management

various supply and marketingbasic-level Farmers' Association in Yunlin County	overall efficiency	technical efficiency	scale efficiency
Erlun Farmers' Association	0.96	0.96	0.97
Dapi Farmers' Association	0.86	0.86	0.86
Gukeng Farmers' Association	1.00	1.00	1.00
Tuku Farmers' Association	0.81	0.80	0.81
Shuilin Farmers' Association	0.76	0.75	0.76
Sihhu Farmers' Association	0.84	0.84	0.83
Yuanchang Farmers' Association	0.72	0.70	0.74
Taihsi Farmers' Association	0.91	0.92	0.90
Dongshih Farmers' Association	0.89	0.88	0.89
Baozhong Farmers' Association	0.94	0.94	0.94

4.2. Slack Variable Analysis

Regarding the analysis of returns to scale, Table 2, Gukeng Farmers' Association, with constant returns to scale, reveals the customer relationship management efficiency reaching the optimal. Other basic-level farmers' associations present increasing returns to scale, showing that the scale could be expanded to enhance marginal returns and further promote the efficiency.

In terms of Slack Variable Analysis, the improvement for basic-level farmers' associations introducing customer relationship management is shown in Table 2. Basic-level farmers' associations could achieve efficient operation by increasing inputs to the items with few inputs. Besides, the input resources for Gukeng Farmers' Association'efficiency have reached the optimal use.

Table 2: Improvable degree of basic-level farmers' associations' introduction of customer relationship management

decision-making unit (DMU)	improvable input		improvable output		returns to scale
	amount	labor	number of people	Operating performance	
Erlun Farmers' Association	1	1	0	0	IRS
Dapi Farmers' Association	1	3	2	1	IRS
Gukeng Farmers' Association	0	0	0	0	CRS
Tuku Farmers' Association	1	0	3	2	IRS
Shuilin Farmers' Association	3	3	0	1	IRS
Sihhu Farmers' Association	0	2	2	2	IRS
Yuanchang Farmers' Association	4	3	3	0	IRS
Taihsi Farmers' Association	0	3	0	2	IRS
Dongshih Farmers' Association	2	0	2	0	IRS
Baozhong Farmers' Association	2	1	0	1	IRS

Data source: Self-organized in this study.

5. Conclusions

The efficiency acquired with DEA and the information of variables are classified in Table 2. One DMU (10% of all DMUs) presents strong efficiency, with the efficiency=1, showing the better relative efficiency. Three DMUs (30% of all DMUs), with marginal inefficiency, show the relative efficiency between 0.9 and 1, revealing that the relative efficiency could be more easily enhanced. Six DMUs (60% of all DMUs), with obvious inefficiency, appear the efficiency lower than 0.9, among which Yuanchang Farmers' Association receives the lowest efficiency=0.72. The DEA analysis results show high proportion of basic-level farmers' associations in Yunlin County not achieving the scale efficiency that the inputs for introducing customer relationship management to basic-level

farmers' associations should be re-considered and re-adjusted to enhance the competitiveness.

Apparently, Gukeng Farmers' Association presents critical status in agricultural supply and marketing, particularly the production and sales of produce. In regard to produce sales, Gukeng Farmers' Association is the major group to deal with produce co-marketing. The remarkable benefit to concentrate produce for sales is to enhance the supply and marketingefficiency and reduce distribution costs. Furthermore, farmers' associations conductingagricultural product exhibitions could promote the fame of the agricultural products in the town and enhance the market acceptance. Farmers' associations also provide agriculture production and marketing groups with lots of marketing information for farmers understanding the market needs and supply of produce. It therefore could help farmers timely regulate the supply and demand of produce output. Employees in farmers' associations, by understanding customer needs and consumer behaviors as well as the supply and marketing businesses, could provide products and services conforming to customer needs and enhance the profits by systematic procedures and good customer relationship.

6. Recommendations

According to above conclusions, suggestions for basic-level farmers' associations are proposed as followings.

I. Managers of farmers' associations should think of the importance of introducing customer relationship management to the supply and marketing businesses and evaluate the effect of customer relationship management on the overall businesses. The organization of a farmers' association contains four departments, which independently execute finance, insurance, promotion, and supply & marketing tasks. However, the contacted customers are about the same that the integration of customer information in the departments could comprehensively understand customer needs and consumer behaviors to further set up the customer relationship management strategies better conforming to customer demands. It would create larger benefits for the farmers' association.

II. Basic-level farmers' associations should actively exchange and cooperate with industry, academia, and research units, provide on-job training related to customer relationship management, and reinforce employees' cognition of customer relationship management and acceptance of customer relationship management strategies so as to present complete and sufficient professional knowledge and skills for the effective promotion of customer relationship management. Knowledge management model could also be introduced to promote the performance of the organization and the employees of basic-level farmers' associations through the systematic knowledge acquisition, creation, sharing, transfer, application, and learning.

III. Farmers' associations have undertaken the co-marketing of pigs, fruits, vegetables, and flowers to earn the fee, which has been the primary economic source of farmers' associations. Nonetheless, the market competition results in decreasing co-marketing through farmers' associations. It becomes the essential strategies to reinforce the link with farmers and strive for farmers' trust by promoting the businesses. Farmers concern the most about auction prices. Staff in farmers' associations should keep close contact with markets to enhance the relationship with customers, grasp the market supply and demand, and provide farmers with real-time information for the market allocation to enhance farmers' benefits.

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