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Influencing factors of performance of agricultural cooperatives in the Vietnamese Mekong Delta

Tri Minh Pham

Faculty of Economics and Law, Tra Vinh University, Vietnam

Abstract

The study identifies the influencing factors of the performance of agricultural cooperatives (ACs) in the Mekong Delta (MD) of Vietnam. The study used a disproportionate stratified sampling method, with 308 valid samples collected from the Department of Agriculture and Rural Development in the districts and the Management Boards of ACs in 9 provinces in MD. Performance of AC is measured against five indicators, namely return on sales (ROS), return on assets (ROA), return on equity (ROE), responsiveness to cooperative members' needs, and generation of jobs. Multivariate regression method was used for data analysis. The estimated results identified four factors that are positively correlated with cooperatives' performance (namely management competency; contributed capital; membership size; and members' participation) while indicating interaction between independent variables (management competency and contributed capital; management competency and membership size) in the relationship to performance of cooperatives. The study findings showed that the degree of influence of management competency on performance of cooperatives in fruit tree farming is always higher compared with those in rice farming. In addition, a number of recommendations are proposed to help the ACs' management boards make appropriate improvements to the support policy and performance evaluation indicators of the cooperatives. Cooperatives should also innovate in the use and optimization of resources.

Keywords: performance, management competency, measurement, multivariate regression

1 Introduction

In many countries around the world, cooperatives have been playing an important role in socio-economic development and have long been considered an effective operating model, which provides opportunities for linkage, cooperation, and sustainability in production and business activities for households and enterprises (Singh *et al*., 2021). Agricultural cooperatives (AC) have become the cornerstone of the linkage between smallholder farmers and markets, and an effective way to improve farmers' income as these cooperatives contribute to increased bargaining power, production scales, increased added value for agricultural products, and expanding markets (Deng *et al*., 2021; Oliveira Junior & Wander, 2021).

In Vietnam, cooperatives have constantly strived to overcome difficulties and challenges to contribute to the socio-economic development of the country. However, not many cooperatives functioned effectively despite the fact that numerous support policies were promulgated in this area, mainly due to limited internal competency, small scale, weak competitiveness, and uncertain benefits for the members (Bao, 2011). ACs in the Vietnamese Mekong Delta (MD) are also not an exception to that. There are many researchers who have made personal comments and opinions related to the performance of cooperatives, but there are no empirical studies to fully verify this issue. Meanwhile, most of the foreign studies addressed the relationship between the management competency and performance of cooperatives (Mahazril *et al*., 2012; Thuvachote & Phetphong, 2014; Pavão & Rossetto, 2015), other studies revealed factors influencing the performance of cooperatives (Walt, 2005; Amini & Ramezani, 2008; Banaszal, 2008; Kakhaki *et al*., 2009; Unal *et al*., 2009; Gholifar & Baniasadi, 2013). The limitation of these studies is that they have not provided a robust measurement scale of management competency in the empirical verification of the relationship between management

* Corresponding author – minhtri0101@gmail.com

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competency and performance of ACs or identified the influencing factors on the performance of cooperatives. Thus, the current study focused on investigating the influencing factors on the performance of cooperatives, providing a closer, more accurate and effective assessment of the issue before any recommendation to improve the performance and efficient use of resources of cooperatives can be put forward.

1.1 Agricultural Cooperatives concept

In the context of the study, ACs are defined as collective economic organisations founded, operated, and co-owned by farmers or farmer households for their needs and common interests (Vienney, 1980; ICA, 1995; O'Sullivan & Shelfrin, 2003). AC members voluntarily contribute capital, the means to promote the collective strength of each member participating in the cooperative, help each other effectively implement agricultural production and business activities, and improve material and spiritual life (Vienney, 1980; ICA, 1995). Overall, ACs do contribute to the country's socio-economic development.

1.2 Viewpoints on the performance and performance measurement scale of cooperatives

The term "performance" is widely and loosely used across a range of bodies of knowledge in the literature, including strategy, operations management, and innovation. As commented by Lebas (1995), very few researchers agree on performance that really means: it can mean anything comes from productivity, strength, resistance, return on investment or plenty of other definitions do not specify the meaning of the term fully. In general terms, performance can be defined as follows:

- The execution or fulfilment (of a duty);
- A person's achievement under a test condition;
- The return of an investment, especially in stocks and shares. (Thompson, 1995).

In using words such as 'fulfilment' and 'achievement', the definition alludes to some sort of attainment or reaching of a standard in the output to a process. They suggest that a wide range of things may perform, including processes, actors or products.

In production and business activities, the creation of products and services is always associated with people's daily live. Business and production are favourable when the products created are bought by the market. To achieve such a result, production entities (individuals, households, businesses) must be able to do business. The overarching long-term goal of the entities is to do business effectively and maximize profits. The changing business environment requires each entity to have appropriate business strategies or resilience. Business is an art that requires quick calculation and acknowledging the problem at a strategic level. The efficiency of production and business activities is always associated with business activities, which can be considered from many different angles (Giao, 1997).

Performance is difficult to measure in the case of cooperatives, which generally aim to pay their members the best price for the products received (Kyriakopoulos *et al*., 2004). Some researchers argued that the performance of a cooperative aims to improve its product quality, productivity, technical efficiency, provision of services, and logistics performance for sustainable profits. According to Sexton & Iskow (1993), there are two empirical measures on the performance of cooperatives, i.e. economic efficiency or financial indicators. Many efforts have been undertaken to evaluate the performance of cooperatives but there is no single one-fits-all method of assessment (Epstein, 2001). Yet, financial indicators are often used to assess the performance of cooperatives as they are easy to understand and measurable using data available in financial reports. Traditional financial indicators used to measure include return on assets (ROA), return on equity (ROE), liquidity, etc. (Huang *et al*., 2015). Cooperatives are autonomous economic organisations, established and developed out of the needs of the household economy. A cooperative usually engages in either of the two main fields of operation: services and sector-specific business. That means that the performance of the cooperatives is not only comprised of business performance but also involves social performance. According to Pavão & Rossetto (2015), the performance of cooperatives is classified into economic-financial and social-environmental performance categories. Thus, the performance of the cooperative should be viewed from both the perspective of business performance (profitable business to members) and social performance (contributing to the local socio-economic development).

1.3 Performance measurement scale of agricultural cooperatives

Every cooperative, regardless of the field of operation, should be measured for performance no matter whether they are profit-oriented or not. Previous studies indicated that the performance measurement of the cooperative helps make appropriate decisions in line with its future orientations and assists the cooperative in strategic planning, management, and continual improvement. Therefore, to visualize the contribution of cooperatives to socio-economic development, it is necessary to offer some measures for the assessment of the performance of cooperatives (Aini *et al*., 2012). Glob-

ally, there have been many studies on the performance of cooperatives for which, depending on research contexts and categories of cooperatives, researchers utilized different performance measurement criteria. Among these, the study of Pavão & Rossetto (2015) on cooperatives in Brazil showed that the performance of ACs is measured not only by the economic-financial indicators but also environmental-social performance indicators. In the same line, Singh *et al.* (2021) reported that previous researchers accepted the use of financial and non-financial indicators to measure the performance of cooperatives.

Some prominent studies on the performance of cooperatives include Zivkovic & Hudson (2015) who applied two financial indicators to measure the performance of cooperatives, namely: return on investment (ROI); return on equity (ROE). Similarly, Thuvachote & Phetphong (2014) also used financial indicators to measure the performance of cooperatives in Thailand: return on assets (ROA) and ROE. In Vietnam, Socodevi (2005) proposed important indicators to measure the performance of cooperatives: return on sales (ROS); ROA; ROE, among others. Besides, the Vietnam Law on Cooperatives of 2012 also specifies two important social indicators to measure social performance: responsiveness to cooperative members' needs, and generation of jobs. In general, social performance indicators require large-scale surveys which involve substantial time and selection of representative cooperatives. Therefore, it is necessary to select indicators in alignment with the field of operation. Thus, the performance indicators of ACs are based on two main indicators: financial performance and social performance (Pavão & Rossetto, 2015; Singh *et al.*, 2021). In this case, financial performance is measured against three indicators: ROS, ROA, ROE, and social performance is measured against two indicators: responsiveness to cooperative members' needs, and generation of jobs. The calculation of financial performance measurement indicators is presented in Table 1.

Table 1: *Indicators to measure the financial performance of Agricultural Cooperatives.*

Indicator	*Measure*	*Unit*
Return on sales (ROS)	$\text{ROS} = 100 \times \frac{\text{Net Income}}{\text{Net Sales}}$	%
Return on assets (ROA)	$\text{ROA} = 100 \times \frac{\text{Net Income}}{\text{Total Assets}}$	%
Return on equity (ROE)	$\text{ROE} = 100 \times \frac{\text{Net Income}}{\text{Shareholders Equity}}$	%

Source: Socodevi, 2005; Thuvachote & Phetphong, 2014; Pavão & Rossetto, 2015

1.4 Overview of influencing factors on the performance of cooperatives

The success of cooperatives depends on many factors, in which the three key success factors are organisation (management professionalization), finance (risk management), and operations (transaction cost management) (Oliveira Junior & Wander, 2021). Many previous studies showed that the success or failure of cooperatives is mainly influenced by internal factors, the most important of which is the human resources of the cooperatives (Kakhaki *et al.*, 2009; Unal *et al.*, 2009; Gholifar & Baniasadi, 2013; Oliveira Junior & Wander, 2021). However, for an overall view, the performance of cooperatives can be dependent on different factors, including internal and external factors. Some internal factors are also included in the survey, namely:

Management competency: In cooperative activities, the manager always plays an important role, influencing the orientation of the cooperative, from initiating, promoting, and protecting policies (Fulton, 2001). Competent managers will encourage members to make decisions based on the values of cooperative, which can control internal and external conflicts for sustainable operation. The Cooperative Management Board has a very important role and is directly related to the performance of the cooperative. This group becomes an important force determining the success or failure of a management system, the effectiveness of socio-economic activities. In cooperatives, they are the people who are directly involved in the process of setting goals, directions, solutions for building and developing cooperatives, who have also the ability to make the optimal plan to use with the effectiveness of the resources of the cooperative, because they have the knowledge and practical experience to be able to choose the best options and strategies. Cooperative managers are aware of the critical issues and processes needed to implement strategies that help attain a competitive advantage and improve an organisation's performance (Singh *et al.*, 2021). On the other hand, they are the ones who guide the implementation of the State policies on cooperatives, helping members understand and be aware of the guidelines, policies, and the Law on Cooperatives, which are the bridge between the State and members. Therefore, improving the competency of the Cooperative Management Board will help this group effectively manage, operate, plan and produce services. Today, the requirements for managers are increasing due to the growing production, the fierce competition in the market. Forcing them to come up with many options and choosing optimal plans becomes more difficult. The impact of management decisions on cooperatives is both profound and effective or has serious consequences, requiring high management responsibilities and the science of management

decisions. Therefore, the competency of the manager is very important to bring cooperative's performance. The more frequent involvement of managers in strategic planning, meetings, and high level of job satisfaction positively affect the profitability of cooperatives (Zivkovic & Hudson, 2015). Market-oriented, the cooperatives are always in high demand for quality managers. A manager who understands the tasks and functions to be performed has a personality, has a sense of responsibility, and has built good relationships with other members will be a valuable asset. That's an important factor to be cooperatives' performance (Thuvachote & Phetphong, 2014). Pavão & Rossetto (2015) studied the relationship between management competency and cooperative performance in 26 subcommittees and 01 inter-committee in Brazil. Testing results show a positive relationship between management competency and cooperative performance.

Membership size: Activities of cooperatives depend greatly on the "patronage" of the members through the use of inputs and outputs of cooperatives. Members' participation in cooperatives reflects the business volume of cooperatives. A Larger membership size may lead to more business volume and reduce input and transportation costs. A large number of members is an important driving force in business strategy planning, supporting delivery of large business volume and thereby achieving different scales of success (Banaszak, 2008; Sebhatu *et al*., 2021). Nyoro and Ngugi's (2007) study with milk and coffee cooperatives in central Kenya showed that cooperatives having a larger number of members and providing services to members in bulk quantity will perform more efficiently. Sebhatu *et al*. (2021) also show that membership size has a positive relationship with the performance of ACs. However, the research findings of Zivkovic & Hudson (2015) with 148 cooperatives in Texas suggested that the size of cooperatives is negatively correlated with economic performance.

Members' participation: Empirical studies show that the successes of cooperatives are influenced by the participation of members and their commitments. The participation of members can include their participation in meetings, support to the Board of Directors, participation in recruitment, sponsoring activities... (Bhuyan, 2007). Participation of members is an important indicator in developing farmers' understanding and appreciation of cooperatives (Gray *et al*., 1998). Mahazril *et al*. (2012) studied factors affecting the performance of cooperatives in Malaysia through strategic planning and participation of members. The analysis results indicate that the strategic planning and participation of the members are positively correlated with the performance of cooperatives, but also suggesting a weak correlation between variables.

Contributed capital of members: Capital is a prerequisite and important factor affecting the business performance of the cooperatives. The scale expansion of cooperatives includes up-scaling of members' participation and their capital contribution. With more members, a cooperative would be able to increase its capital contrition, deliver its plans more effectively to address the common needs of its members, provide its services and products to its members more effectively while the market demands on the cooperative will be greater. Capital is an input factor that plays a decisive role in the business performance of the cooperative. A financially strong cooperative can not only maintain its production and business activities, but also find ways to invest in modern equipment and technologies to reduce costs, improve its benefits and reputation, and stay in control of its inputs (Sebhatu *et al*., 2021). Thus, a capital contribution is a very important factor affecting the performance of cooperatives (Arayest, 2011). A survey of the causes of the failure of cooperatives' business performance in Africa showed that a lack of capital is one of the most important factors that led to the failure of operation of cooperatives (Walt, 2005). A number of other internal factors may also affect the performance of cooperatives such as product type and quality, competitive strategy, risk management that can affect cooperatives' performance. Besides, external factors can also affect the competitiveness and sustainable development of cooperatives, including factors such as external support, government policies, legal frameworks, and market factors, among others.

Kachule (2004)'s literature review reported that the key drivers of the failure of cooperatives include the weak management competency and limited financial resources, especially low capital contribution to cover the cost of training and retraining for knowledge on cooperative management and leadership, resulting in poor financial supervision and control and misappropriation of the funds of cooperatives. Therefore, cooperatives need to consider in improving their management through training programs and more effective use of their funds (Suyanto, 2012). Moreover, many conflicts can arise within a cooperative; the principles of cooperation are also challenged by heterogeneity in the cooperative in terms of membership size, cultural background, and technology. It affects the members' satisfaction with the cooperative (Hovelaque *et al*., 2009). To solve this problem, the Management Board of a cooperative should adopt new approaches for heterogeneous and non-participating members. Therefore, the management must be competent and flexible in dealing with the member heterogeneity in terms of membership size, cultural background, and technology (Abdelrahman & Smith, 2007). Thus, for each cooperative,

management competency is always correlated with the capital and membership size of the cooperative. These correlations, if properly addressed, will promote the effective operation of the cooperative.

2 Materials and methods

2.1 *Actual situation of agricultural cooperatives in the Mekong Delta*

According to the 2019 report of the cooperative development agency under the Ministry of Planning and Investment, MD region has a natural area of about 3.96 million ha, accounting for 12 % of the country's area, of which the agricultural land area is about 3.21 million ha, accounting for 77 % of the total land area of the region, with a population of over 17.7 million people, accounting for nearly 20 % of the national population. MD always affirms the leading role of the nation in agricultural and aquaculture production. Annually, this region produces over 60 % of national rice production, 70 % of fruit production, 52 % of aquatic production, contributing more than 90 % of the country's rice export, contributing positively to the national food security and export earnings, creating jobs for rural residents. This is a dynamic and developed economic region with many creative economic development models. Especially, cooperatives have been formed to produce goods, linking rice production, fruit trees, and aquaculture in some localities, has brought value and high efficiency. The ACs have well promoted their role of supporting and linking members in raising capital, expanding production scale, creating jobs, increasing income for members and employees.

According to 2019 statistics of Vietnam Cooperative Alliance, the country had 26,618 cooperatives, attracting over 7,252,416 participants, including 15,495 ACs. In MD, there are 2,887 cooperatives in many different fields, typically the agricultural field (1,776 cooperatives), the transportation field (187 cooperatives), the construction field (140 cooperatives), the industrial field (120 cooperatives), and others. The average revenue of an AC reached 1.38 billion VND[1]/ year, gaining an average profit of 266.44 million VND/ year. Cooperative services provided to members include (1) Input service (Supply of plant varieties, production, and supply of rice seeds, fertilizers, and pesticides, etc.); (2) Output services (product consumption for farmers and members); (3) Other services (rice drying, motorized transport, dredging, internal credit, rice seed production). Cooperative classification results show that cooperatives classified as rather or good with positive tendency over each year, by 2019, accounting for 69.8 %. Revenue and profit increased over the years, reaching an average of 23.86 %/ year. Remuneration of managers of cooperatives reaches an average of 1,500,000 VND/ month/ person ($ 64.7/ month/ person) or more. The average cooperatives are stable ones without losses, and the remuneration of the management of the cooperatives reaches an average of 1,000,000 VND/ month/ person ($ 43.1/ month/ person). The cooperatives classified as weak are usually those in a state of moderate operation, very low business profits, and the remuneration of cooperative managers reaches an average of VND 500,000 per month ($ 21.57/ month/ person).

2.2 *Research sample*

To ensure a sufficient number of samples in order to estimate the research model. The study selected 350 ACs from 38 districts in 09 provinces[2] in MD[3] .Two questionnaires are pre-designed to collect data on the operation information of the AC and the competency of the AC management board. Questionnaires about the operation information of ACs were directly distributed at 350 ACs. The competency of the AC Management Board was measured by one self-assessment questionnaire of the AC Management Board, one questionnaire for the manager of the Department of Agriculture and Rural Development in the district where the AC is selected.

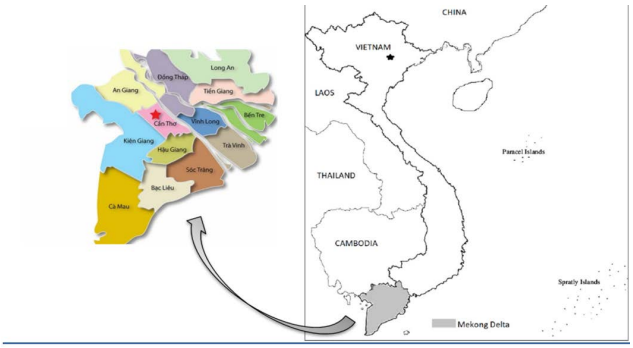

Fig. 1: *Study area in MD of Vietnam.*

2.3 *Research method*

The study used a disproportionate stratified sampling method, with the initial population divided into district/town administrative units. This sampling method presents more advantages compared with non-probability sampling methodology, with higher representativeness and coverage of the

[1]VND is Vietnam's currency (Vietnamese Dong) and one million VND = 43.14 US $ in 2019

[2]Hau Giang, Can Tho, Soc Trang, Tra Vinh, Kien Giang, Vinh Long, An Giang, Dong Thap, Tien Giang

[3]MD is the southernmost region of Vietnam (Fig. 1)

Table 2: *The proposed dependent and independent variables.*

Var.	*Definition*	*Source*	*Expectation*
1. Dependent variable in the model			
Y	Performance of ACs	Socodevi, 2005; Thuvachote & Phetphong, 2014; Pavão & Rossetto, 2015; Law on Cooperatives in 2012	
2. Independent variables, interaction variables and dummy variables in the model			
X_1	Management competency (%)	Thuvachote & Phetphong, 2014; Zivkovic & Hudson, 2015; Pavão & Rossetto, 2015	+
X_2	Contributed capital (VND)	Walt, 2005; Arayest, 2011	+
X_3	Membership size (number of members)	Nyoro & Ngugi, 2007; Banaszak, 2008; Zivkovic & Hudson, 2015	+
$X_1 * X_2$	Correlation between management competency and contributed capital	Kachule, 2004; Suyanto, 2012	+
$X_1 * X_3$	Correlation between management competency and membership size	Kachule, 2004; Abdelrahman & Smith, 2007; Hovelaque *et al*, 2009	+
X_4	Members' participation (%)	Amini & Ramezani, 2008; Mahazril *et al*., 2012	+
D_1	Surveyed provinces (dummy variables)	Author's recommendations	+
D_2	Fields of operation of cooperatives (including rice production and fruit tree production) (dummy variables)	Author's recommendations	+
D_3	Service type of cooperatives (including mixed service; agricultural material inputs; seed production; irrigation services; consumption of agricultural products) (dummy variables)	Author's recommendations	+

target population. The sample was selected based on the following criteria such as (1) Provinces with a large number of ACs in rice production and fruit trees; (2) based on annual performance ranking results of ACs; (3) types of business services. In addition, the research also collated with the criteria to reject ACs for a survey such as: ceased operation while dissolution has not been filed for ACs; failure of conversion to new-type cooperatives according to the Law on Cooperatives 2012; "moderate" activities to fulfill new rural development criteria.

2.4 Empirical model specification

Previous studies on the factors influencing performance of ACs were reviewed, and nine explanatory variables (Table 2) were selected based on their relevance to MD's context. The performance of cooperatives is measured against five indicators (three financial performance indicators and two social performance indicators).

The proposed research model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha_1 X_1^* X_2 + \alpha_2 X_1^* X_3 + \sigma_1 D_1 + \sigma_2 D_2 + \sigma_3 D_3 + \varepsilon$$

Table 3: *Competency scales for cooperatives' management of ACs in MD.*

No.	*Competencies*	*Weight (%)*
1	General knowledge	15.85
2	Group work	17.81
3	Interpersonal relations	16.44
4	Effective directions	18.59
5	Management and administration	13.89
6	Promotion of creativity	17.42

Source: Research findings of Tri *et al.* (2019).

The scale of management competency is based on a scale built upon research findings of Tri *et al.* (2019) (Table 3), the measurement unit is in percentage with a 5-point scale (ranging from 0 %: Completely not applicable to 100 %: Always applicable) (Blayney, 2009). The overall competency of the AC management board was calculated as the average percentage of the assessment results for each specific competency multiplied by the respective weights.

The X_4 variable was measured through 6 indicators as (1) Participation in training sessions; (2) Regular meetings ; (3)

Input contribution; (4) Output contribution; (5) Operational solutions; (6) Implementation commitment. The value of the X_4 variable was calculated as the average of the percentage values of the six indicators. The measurement indicators were mainly based on the suggestion of Samson (2010).

3 Results

3.1 Sample collection result

From the 342 collected questionnaires, 34 have been declined due to incomplete data provided. The validated sample size used to estimate the research model was 308 observations. The characteristics of the sample by field and geographical location are presented in Table 4.

Table 4: *Sample characteristics (n = 308).*

Factors	*%*
Fields of operation of cooperatives	
Rice production	81.8
Fruit tree production	18.2
Surveyed provinces	
Hau Giang	12.3
Can Tho	5.2
Soc Trang	4.6
Tra Vinh	4.2
Kien Giang	18.5
Vinh Long	5.8
An Giang	17.2
Dong Thap	27.3
Tien Giang	4.9

3.2 Descriptive statistics

Management competency: The estimation of the overall competency is only 61.2 % on average, highest with "Effective Directions" competency at 71.07 % and lowest with "Management and Administration" competency at 55.04 % (Fig. 2). Descriptive statistics of the competency variables presented in Table 5 indicate that of the 308 observations collected, the overall competency of the Cooperative Management Board in MD ranges from the lowest of 23.07 % to the highest of 85.9 %.

Contributed capital: Contributed capital of AC members is relatively low, with an average of only VND 301.04 million per AC, with the lowest contribution amount of VND 8.1 million/ member and the highest amount of VND 3,450 million/ member (Table 5). Only 118/308 ACs have contributed capital valued at VND 300 million or higher. If classified by field of operation, the average contributed capital for ACs in rice production is VND 304 million and in fruit trees is VND 264 million.

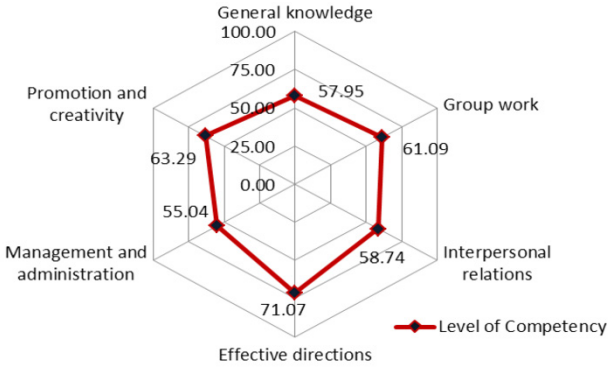

Fig. 2: *The competency of the management group of agricultural cooperatives in the Vietnamese Mekong Delta, 2019.*

Table 5: *Descriptive statistics of independent variables in the model (n = 308).*

*Variable name**	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
X_1 (%)	61.2	13.65641	23.07	85.90
X_2 (VND†)	301.04	274.3727	8.1	3,450
X_3 (member)	118	154.4	7	1,066
X_4 (%)	69.09	14.8786	19	98.33

*See table 2 for definition of variables X_1 - X_4.
†Vietnamese Dong × million.

Membership size: The average number of members in ACs is 118 members per AC, with 07 members as the lowest and 1,066 members as the highest quantity (Table 5). Only 107/ 308 ACs have a scale of 100 or more members. This data shows that the number of members in cooperatives is still small due to the small and fragmented operating model. ACs in rice production have the highest number of members, with 135 members each on average, which is higher than those in fruit tree production (32 members each on average).

Members' participation in ACs: The level of participation among members contributing to the operation of cooperatives accounts for only 69.09 %. The participation rate in cooperatives' activities is 19 % at the lowest and 98.33 % at the highest. The level of participation of members contributing to ACs in each field is also different, standing at 74.09 % among cooperatives in fruit tree production and 70.79 % among those in rice production. The participation of members in providing solutions for activities of ACs is quite low at 55.02 % only while the presence of members in

regular meetings of ACs reaches 82.05 % at the highest on average (Table 6).

Table 6: *Members' participation in cooperative activities.*

No.	*Members' participation*	*Ratio (%)*
1	Participation in training sessions	78.65
2	Regular meetings	82.05
3	Input contribution	72.25
4	Output contribution	71.71
5	Operational solutions	55.02
6	Implementation commitment	78.24

Source: Calculation results based on field survey, 2020.

3.3 Estimated results of the research models

After checking for non-violation of multicollinearity phenomenon and addressing heteroscedasticity, the estimation results for the regression model that were identified three selected models: (1) Affecting factors on ROS, (2) Affecting factors on ROE, and (3) Affecting factors on generation of jobs (Table 7). The regression results also showed that the model of affecting factors on ROA and the model of affecting factors on responsiveness to cooperative members' needs are not selected, because these two models haven't statistical significance or there is a low probability of correct prediction generated by the model. For the three selected models, the probability of correct prediction of the independent variables for the dependent variable in the model ranges from 32.4 % to 62.6 %.

4 Discussion

The results of competency measurement showed that the current competency of the management of ACs in MD is generally low, meeting only 61.2 % of competency needs on average. This problem depended on many factors in improving competencies such as old age, low quality of training courses, the limited initiative in self-training of personal competency, etc. The competency of the ACs management board mainly depended on the support from Cooperative Alliances in the provinces through short-term training courses. The biggest concern is the competency level of the members of the AC management board. Generally, these persons have limited professional qualifications, leadership skills or have lacked innovative thinking. Because of this, it significantly affected the performance of agricultural cooperatives. This result is consistent with the study results of Bao (2011), Thuvachote & Phetphong (2014), Pavão & Rossetto (2015), Zivkovic & Hudson (2015), and Singh *et al*. (2021). Who found that the cooperative manager played an important role and was directly related to the performance of the cooperative, helping achieve a competitive advantage and improve an organization's performance, also in Vietnam. Therefore, in parallel with participating in short-term training courses organized by Cooperative Alliances in the provinces, the ACs managers also should actively improve their competencies according to the competency needs of the task. Besides, they could refer to the study results of Tri *et al*. (2019), who found six necessary competencies for the ACs management board in the Vietnamese MD (Table 3). In this way, their competencies are gradually improving.

Empirical studies showed that the successes of cooperatives have a positive relationship with the participation of members and their commitments. Participation of members is a principal indicator in developing members' understanding and appreciation of cooperatives (Gray *et al*., 1998; Mahazril *et al*., 2012). However, the results showed that the member participation rate contributing to the operation of cooperatives accounts for only 69 %. The participation of members in providing solutions for specific AC activities is only 55 %, even lower. All AC operations require the efforts of the management board as well as members to solve issues that the cooperatives faced as climate change, market factors, product quality and competition, etc. The analysis results showed that ACs offering mixed services are more economically efficient than those with individual services. This finding can be seen through the D3 dummy variable from the regression model estimation results (Table 7). Most ACs in MD only focus on one of the traditional services as agricultural supplies, seed production, product consumption for farmers and members, especially irrigation services. The AC has not provided much support to its members, mainly due to limited internal competency, small scale, and weak competitiveness (Bao, 2011), affecting its performance. Therefore, a solution to improve performance and support more services for cooperative members is to offer a diverse portfolio of available services, especially input services, output services, and internal credit.

The model estimation results showed that independent variables (X_1 X_2, X_3, X_4) are all positively correlated with ROS, ROE, and Generation of Jobs. Among these, variable X_1 has the largest regression coefficient (from 0.458 to 0.545) and has statistical significance at 1 % and 5 %. This result is consistent with the previous study of Zivkovic *et al*. (2015), Mahazril *et al*. (2012), and Amini & Ramezani (2008). Results also indicated the correlation between the independent variables: X_1xX_2 and X_1xX_3. These findings have important implications for cooperative performance, making ACs stronger. There are generally many ACs only

Table 7: *Validation results of influencing factors on return on sales (ROS), affecting factors on return on equity (ROE), and affecting factors on generation of jobs.*

		Regression coefficient		
Symbol	*Variable name*	*ROS*	*ROE*	*Generation of jobs*
X_1	Management competency	0.526 *** (4.61)	0.545*** (4.94)	0.458** (2.00)
X_2	Contributed capital	0.0453*** (2.69)	0.0418*** (2.99)	0.0390 (0.68)
X_3	Membership size	0.0680** (2.17)	-0.00848 (-0.64)	0.136* (1.75)
$X_1 * X_2$	Multiplication of competency by contributed capital	-0.0829*** (-3.25)	-0.0795*** (-3.74)	-0.0215(-0.27)
$X_1 * X_3$	Multiplication of competency by membership size	-0.0831** (-1.97)	-0.00515 (-0.24)	0.439***(2.95)
X_4	Members' participation	0.198***(4.31)	0.150*** (2.76)	-0.124 (-0.90)
D_1	*Geographical location*			
2	Can Tho	-20.27*** (-7.12)	-6.358 (-1.07)	-9.722 (-0.90)
3	Soc Trang	4.923 (0.98)	2.249 (0.53)	21.54** (2.05)
4	Tra Vinh	-0.160 (-0.03)	7.696 (1.15)	10.33(1.04)
5	Kien Giang	2.977 (0.90)	1.155 (0.37	2.778 (0.41)
6	Vinh Long	5.045 (0.89)	-7.276** (-2.24)	10.15(0.98)
7	An Giang	-3.775** (-2.00)	-3.950* (-1.85)	-10.88* (-1.82)
8	Hau Giang	-4.197 (-1.47)	-2.006 (-0.56)	-10.28* (-1.84)
9	Tien Giang	-2.692(-0.65)	2.978 (0.61)	0.359 (0.03)
D_2	*Field of operation*			
	Fruit tree production	12.40*** (4.91)	8.214*** (2.77)	-7.158 (-1.18)
D_3	*Type of service*			
2	Agricultural material inputs	-6.743*** (-2.71)	-5.069 (-1.37)	6.251 (0.95)
3	Seed production	0.442 (0.11)	4.448 (0.73)	3.390 (0.30)
4	Irrigation services	-6.286**(-2.08)	-13.76*** (-5.74)	7.725 (0.68)
5	Consumption of agricultural products	1.748 (0.91)	-1.284 (-0.72)	17.61*** (4.12)
	Constant	-33.30*** (-3.93)	-26.64***(-3.27)	6.822 (0.41)
	Observations	294	295	246
	Significance level of the model	0.0000	0.0000	0.0000
	R^2	0.368	0.393	0.655
	Adjusted R^2	0.324	0.351	0.62

focus on improving individual factors (management competency, business capital, working headquarter, etc.) but lack synchronization with other factors, such as the cooperative scale. Thereby, one lesson is that, for any changes in one of the three factors for cooperatives, namely management competency, contributed capital, and membership size. The cooperative should consider the interaction between the factors, ensuring suitability with operational context, responsiveness, also optimal exploitation of resources. In addition, the study also showed a correlation between management competency and performance of cooperatives by field of operation. The influence of management competency on the performance of fruit tree farming ACs ($\beta_{NLQL,ROS}$ = 1,164,$\beta_{NLQL,ROE}$ = 1,141) was always higher compared with those in rice farming ACs ($\beta_{NLQL,ROS}$ = 0.513, $\beta_{NLQL,ROE}$ = 0.468). These findings are in line with the current management competency of AC boards in these two fields. The results suggest important implications such as: (1) When measuring the performance of a cooperative, it is not only based on financial indicators but also social indicators. This issue is also consistent with the opinions of Singh *et al.* (2021) and Pavão & Rossetto (2015). The research results have overcome the research limitations of Zivkovic & Hudson (2015), Thuvachote & Phetphong (2014) based only on financial indicators to measure the performance of cooperatives; (2) the management competency has the greatest in-

fluence on and is positively correlated with the performance of a cooperative. When AC managers have the necessary competencies, they can best formulate, implement, as well as evaluate and control their strategies (Singh *et al*., 2021); (3) The research findings also showed that there is an interaction between the independent variables (X_1xX_2 and X_1xX_3) and that performance of cooperatives varies by geographical location, the field of operation, and types of business services provided. The ACs in MD that operate efficiently are often concentrated in places where these ACs are deeply supported and care of the local authorities. Besides, the ACs actively provide many services to their members, especially output service (product consumption to members) and internal credit service. The fruit tree field is one of the fields providing efficient output service.

5 Conclusions and recommendations

The cooperative sector plays an important role in facilitating household economy, generating jobs and income for members of cooperatives, developing relations of production, addressing multiple social issues and enhancing community development. This study contributes to the limited body of knowledge on the management of cooperatives as well as optimal utilisation of available resources of cooperatives in MD Vietnam. The study findings indicated four internal factors affecting the performance of cooperatives and the correlations between them. Based on these research results, the Cooperative Alliances in the provinces should consider the applicable criteria for annual assessment and classification of the agricultural cooperatives to make more appropriate adjustments. The important is paying attention to measuring the ACs' performance (including financial indicators, social indicators, and even environmental indicators). Policymakers should pay more attention to building the competency of the ACs' manager board. The scale of ACs' manager competency in MD proposed by Tri *et al*. (2019) can be used periodically to assess the actual competency of the AC manager boards. Building the competency of the ACs manager board also requires to reflect and possibly adjust capital contribution and membership size of each cooperative for the best output results. In addition, the AC manager board's members also need to actively self-improve their competency in running their cooperatives. To improve the performance of ACs, the participation of members and their suggested solutions for issues faced by the cooperatives are necessary. The cooperatives need to provide a diverse portfolio of available services, especially output and internal credit services.

This study provided a better understanding of the performance of ACs in MD of Vietnam through economic and social indicators, as well as through identifying the factors affecting the performance of ACs. However, the study has not considered the environmental performance of cooperatives. The factors affecting the performance of ACs only focused on internal factors of cooperatives. Further research should consider additional external factors that may affect the performance of ACs such as guidelines and policies of the government, legal framework, and market conditions.

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Conflict of interest

The author declares that they have no conflict of interest.

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