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Factors Affecting the Star_Rating of OCOP Foods in Tuyen Quang, Vietnam

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

OCOP (abbreviated in English as One commune one product), understood in Vietnamese as one commune (ward) one product. OCOP is an economic development program for rural areas in the direction of developing internal resources and adding value. By 2023, Tuyen Quang province has 191 OCOP products achieving three_star or more, of which 171 products belong to the food industry, accounting for 89.5%. The study surveyed a total of 120 product manufacturers in the food industry, of which 60 products have been ranked OCOP, 60 products have not been ranked OCOP. The study used a regression model to analyze the impact of the classification results of OCOP products on the sales revenue of the owners. Multivariate regression model is also applied to analyze factors affecting star- ratings for Food OCOP products of Tuyen Quang province. Based on the study results, the authors have proposed a number of solutions such as: Rejuvenate human resources; Strengthen links in production and business; Increase support for capital loans; Exploiting favorable factors for the development of OCOP product production; Promote ratings and star_upgrades for OCOP food products in Tuyen Quang province.

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Keywords: One commune one product program; factors affecting; star rating; OCOP; tuyen quang province.

1. INTRODUCTION

OCOP[1] (abbreviated in English as One commune one product), understood in Vietnamese as one commune (ward) one product. OCOP is an economic development program for rural areas in the direction of developing internal resources and adding value. This is considered a key solution and task in implementing the National Target Program on building new rural areas in Vietnam. According to the Central New Rural Coordination Office, after more than 4 years of implementing Decision No. 490/QD/TTg dated May 7, 2018 of the Prime Minister approving the Program "One commune, one product for the period 2018-2020", the OCOP Program has been actively and successfully implemented by all localities, becoming a priority solution in rural economic development associated with new rural construction. As of October 31, 2022, all 63/63 provinces and cities have organized the evaluation and classification of OCOP products. Across the country, there are 8,565 OCOP products with 3 stars or higher, including 65.4% 3-star products, 33.4% 4-star products, 0.7% 5-star potential products and 0.2 % of 5-star products. At the same time, the whole country has more than 4,392 OCOP entities, of which 38.3% are cooperatives, 25.8% are enterprises, 33% are production and business establishments, and the remainder are cooperative groups [1].

The OCOP program has had positive and significant impacts on rural economic development. Through the implementation of the program, it has contributed to the transformation from small-scale agricultural production to production towards value chain links, according to standards and regulations, with traceability and according to market demand. Awaken the potential of land, products, comparative advantages, especially regional cultural values to form "multi-value" integrated OCOP products, linking agricultural development with services and tourism. From the implementation of the OCOP program, many localities have planned specialty raw material areas, developed rural industries, especially preserving and developing many traditional craft villages. Forming many OCOP products associated with the role of an "ambassador" conveying humanistic product stories of the region. Many OCOP products have met food safety and quality standards and regulations; have diverse designs and packaging that are environmentally friendly, meet the needs and desires of consumers. From there, it contributes to increasing value, helping owners increase production scale and revenue. Of these, more than 60% of OCOP entities achieving 3 stars or higher had an average increase in revenue of 17.6%/year. The selling price of products after being officially recognized as OCOP increased by an average of 12.2% [2].

In the world and in Vietnam, there have been many authors with research related to the development of OCOP products. These studies have addressed different content aspects: Natsuda, K., Igusa, et al. [3] pointed out that the OTOP program (in Thailand) gave communities the opportunity to market local products and create employment opportunities. Thu, N.T.A. [4] compared and drew useful lessons from OTOP's experience for the application of the OVOP model in developing economies in the future. Issa, F. O. and Lawal, A. O [5] recommended that the OVOP program should be adopted and included in the current Agricultural Extension Transformation Agenda (AETA) to enhance sustainable rural transformation. In the research of Mukai, K. & Fujikura, R. [6] stated: The One Village One Product project has promoted rural development in more than 30 countries. The principles considered sustainable in this project are: local yet global, self-reliance and innovation, and human resource development. These principles can also be applied to overseas projects. Huynh Quang Thanh [7] in the study "Current status and solutions for implementing the OCOP Program in Khanh Hoa province" affirmed: OCOP is an economic development program for rural areas. It has effectively implemented the group of criteria "Economy and production organization" in the National Criteria Set for New Rural Communes. Vu Phuong Nhi [8] believes that: The OCOP program is a key program for economic development in rural areas

1 OCOP is understood "One commune one product". This form of organizing production and trading of traditional products has advantages in rural areas. "Commune" is an administrative unit at the commune, ward, and town level in Vietnam. This program has many similarities with the OVOP (One Village, One Product Movement) movement in Japan, as well as the craft village economic development strategy in Thailand called "One Tambon One Product" – OTOP.

in the direction of promoting internal resources and increasing value. Thanh Hoa Thi Phan [9] analyzed the current status of OCOP Program implementation in Vietnam and from there proposed a number of recommendations to improve the effectiveness of the program. Tuyen Quang Business Association [10] carried out the project "Research to improve the quality of art, design techniques, labels, packaging, bags and boxes of OCOP products in Tuyen Quang province". The project has evaluated and identified the potential and strengths of the "One Commune One Product" Program of Tuyen Quang province, assessed the current situation and oriented goals to improve the quality and design techniques for labels, packaging, bags for goods in general, and OCOP products in particular of Tuyen Quang province. Overview of the research situation shows that there have been domestic and foreign studies on the development of OCOP product production in different research aspects in terms of content, approach and area. However, there has been no research on analyzing factors affecting the ranking results of OCOP products in the food industry in Tuyen Quang province.

1.1 Research Goals and Methods

Research goals: Analyze factors affecting the ranking results of OCOP products in the food industry of Tuyen Quang province, thereby recommending appropriate solutions to develop OCOP product production in the province.

Research object: Based on a survey data set of food product producers, the study analyzes factors affecting the ranking results of OCOP food products in Tuyen Quang province.

Research scope: This study was conducted in Tuyen Quang province. Data to assess the current status of product production development in the food industry of Tuyen Quang province are collected in the period 2021 - 2023, economic model running data is surveyed in 2023.

1.2 Research Methods

Multivariate regression analysis for quantitative research is extremely important, it helps determine which factors contribute more or less, or do not contribute to the change in the dependent variable, from there, come up with the most necessary and economical solutions [11]. The study used a multivariate regression model to quantify the factors affecting the OCOP product ratings of the surveyed producers. Based on the theoretical and practical basis of previous research and the actual conditions of OCOP product producers in Tuyen Quang province, it is possible to identify potential factors affecting the ranking results of OCOP products in the study area, including the following factors (Table 1).

Table 1. Variables used in the multivariate regression model

Encoding variables	Definition of variables	Unit
Star_rating	Dependent variable: OCOP product ranking results	Star class
Gender	Gender of the producer	1= male; 0=female
Age	Age of the producer	Year old
Education	Educational level of the producer: grade.../12.	Class
Experience	Number of years of experience of the producer	Year
Sale_contract	Link in product sales: Value is 1 if the producer has signed a contract to sell the product; The value is 0 if the producer has not signed a contract to sell the product.	1= yes; 0=no
Loan	Borrowing capital: Value is 1 if the producer has borrowed capital; The value is 0 if the producer does not borrow capital.	1= yes; 0=no
Favorable	Favorable level of production and business factors: Average score of favorable level of factors: land, labor, materials, equipment, technical processes, policy mechanisms, natural conditions. Scale from 0 to 100 points.	Point

The study conducted a questionnaire survey of producers in the food industry. With a sample size of n=120, multivariate regression model analysis was performed to determine factors affecting the OCOP rating (star_rating) of producers in the study area. The multivariate regression model in this study is determined as follows:

$$Star\_rating = \beta_0 + \beta1\ Gender + \beta2\ Age + \beta3\ Education + \beta4\ Experience + \beta5\ Sale\_contract + \beta6\ Loan + \beta7\ Favorable.$$

Based on the multivariate regression model and surveyed data, the study used SPSS 22.0 software to analyze and process data, and draw conclusions about the influence of factors on OCOP product ranking results (star_rating) of food products in the study area.

2. RESULTS AND DISCUSSION

2.1 Production Situation of OCOP Food Products in Tuyen Quang Province

Carry out the plan No. 90/KH-UBND dated June 2, 2021 of the People's Committee of Tuyen Quang province on implementing the "One commune one product" program (OCOP Program), phase during the 2021-2025 period, the People's Committees of districts, cities, departments and branches have implemented the OCOP Program in their management areas. By 2023, Tuyen Quang province has 191 OCOP products achieving 3-star rank and 4-star rank[2], specifically: Food group 171 products; beverage group 13 products; Pharmaceutical group: 03 products; Handicraft group: 01 product; Group of community tourism services, ecotourism and tourist attractions with 03 products, in 94 communes, wards and towns of 134 producers, (including: 104 cooperatives, 11 enterprises, 04 cooperative groups and 15 business households), including: 149 products achieving 3-star rating, 41 products achieving 4-star rating and 01 product submitted to the OCOP Council Nationally evaluated, rated 5 stars (Shan Tuyet Hong Thai tea). In terms of product quantity, Tuyen Quang province ranks 4th among the 14 northern mountainous provinces [12].

Participating in the OCOP Program has helped product owners better understand legal regulations, specifically: Production according to standards and regulations (VietGAP, organic...); food safety conditions; Environmental protection during production; Use packaging and labels in accordance with regulations; Promoting community strength and potential values and regional advantages in production organization. From there, creating a rich source of products, ensuring quality, creating stable jobs, increasing income for local workers, contributing to the implementation of the National Target Program on building new rural areas [12].

Research data was collected from all 7 district/city level units under Tuyen Quang province. Of the total 191 products ranked OCOP, there are 171 products belong to the food industry, accounting for 89.5%. The processed food group accounts for the highest proportion at 35.7%, followed by the fresh food group at 27.5%. Notably, the spice group does not have any products rated OCOP. The proportion of products in the subgroups Processed from rice, cereals and Processed from vegetables, fruits, seeds is still low, 4.7% and 5.3% respectively.

Through field surveys and direct discussions with a number of producers who have products rated OCOP in the research area, it is shown that:

- Some products have been known and chosen by many consumers inside and outside the province. Initially, the local OCOP product brand was built. Product selling prices after participating in the Program increased from 10% to over 30%, such as: Shan Tuyet Hong Thai Tea, Na Hang Corn Wine; Chiem Hoa gai cake, Hung My buffalo meat, Mr. Chap's double-distilled sticky rice wine, Chiem Hoa black bean tea bags; Tan Thai Duong Tea; Lang Bat green tea (Ham Yen district); Ngoc Thuy Green Tea, Ngoc Thuy Tea, Xuan Van Grapefruit, Phuc Ninh specialty grapefruit, Tien Thanh Dried Buffalo Meat (Yen Son district); Truong Thinh peanut oil, Long Dai Tea, Hop Hoa Solanum tea; Trung Long green tea (Son Duong district); Forest honey, Lang fish, Thuat Yen dry noodles (Tuyen Quang city).

[2] *Product classification of the OCOP Program is based on product evaluation results according to the OCOP Criteria Set. The maximum total rating for each product is 100 points and is divided into 5 star categories: 1-star rank: < 30 points; 2-star rank: from 30 to 49 points; 3-star rank: from 50 to 69 points; 4-star rank: from 70 to 89 points; 5-star rank: from 90 to 100 points [13].*

Table 2. OCOP product production situation in Tuyen Quang province

No	District	Number of OCOP producers	Number of communes/ wards/towns with OCOP products	Total number of products	Star_rating		
					Recom-mend 5 star product	4-star products	3-star products
A	**The whole province**	**134**	**94**	**191**	**1**	**41**	**149**
B	**Divided by district**						
1	Lam Binh district	15	7	**25**		4	21
2	Na Hang district	17	11	**28**	1	3	24
3	Chiem Hoa district	20	16	**26**		7	19
4	Ham Yen district	17	11	**21**		2	19
5	Yen Son district	28	21	**41**		9	32
6	Son Duong district	26	20	**33**		12	21
7	Tuyen Quang City	11	8	**17**		4	13

Source: DARD of Tuyen Quang (2023)

Table 3. Results of ranking and upgrading OCOP products of Tuyen Quang province

No	Star rating/total	Implemented in 2020	Implemented in 2021	Implemented in 2022	Accumulated until 2023	Note
	Total (ranking and upgrades)	**79**	**51**	**67**	**191**	
1	3-star rating (first rated product)	62	35	57	149	
2	4-star rating (first rated product)	17	14	6	41	
3	Upgrade from 3 stars to 4 stars		2	3		
4	Enough points to recommend a 5-star upgrade			1	1	Shan Tuyet Hong Thai tea

Source: DARD of Tuyen Quang [12]

Table 4. Classification of OCOP foods in Tuyen Quang province

No	Product Groups	Quantity	%
1	**Fresh food**	**47**	**27.5**
1.1	Subgroup: Fresh vegetables, tubers, fruits, seeds	31	18.1
1.2	Subgroup: Meat, seafood, eggs, fresh milk	16	9.4
2	**Raw and semi-processed foods**	**22**	**12.9**
2.1	Subgroup: Rice, cereals, other processed seeds	12	7.0
2.2	Subgroup: Honey, other honey and other agricultural products	10	5.8
3	**Processed foods**	**61**	**35.7**
3.1	Subgroup: Processed from rice and cereals	8	4.7
3.2	Subgroup: Processed from vegetables, tubers, fruits, seeds	9	5.3
3.3	Subgroup: Processed from fish and seafood	26	15.2
3.4	Subgroup: Processed from meat, eggs, milk	18	10.5
4	**Spice**	0	0.0
5	**Tea products and other foods**	**41**	**24.0**
	Total	**171**	**100**

Table 5. Production and business characteristics of surveyed producers

No	Content	Unit	Rated OCOP	None_Rated OCOP	Average (Total)
1	Number of surveyed producers	establishments	60	60	120
2	Ages of owner	ages	47.1	54.8	50.9
3	Ratio of male/female producers	%	75/25	85/15	80/20
4	Educational level	class	11.3	8.7	10.1
5	Years of experience producing OCOP	years	4.6	-	2.3
6	OCOP star rating	star rating	3.1	-	1.5
7	Sale_contract	%	73	-	37
8	Loans	%	48	15	32
9	Revenue/year	million VND	3,587	550	2,075

Source: Surveyed data in 2023

- Some products, after participating in the OCOP Program, have created motivation for producers and affiliated members to develop products, initially increasing value and income for people, such as: Bo Khai vegetables, Jiaogulan vegetables, dried bamboo shoots, Duy Vuong black pork sour meat, Vang Seng stream duck eggs (Lam Binh district); Khau Lang sticky rice, black hill chicken and Nang Kha hill chicken (Na Hang district); Pa Then tea, Nhan Son tea (Chiem Hoa district); Binh Ca longan honey, Bat Tien tea (Yen Son district); Trang Da persimmon, Thai Long grapefruit (Tuyen Quang city).

However, some producers still have difficulties and limitations as follows: Some products have a small output scale, such as: Tho Binh mountain goat meat, Bo Khai vegetables; cabbage, Hong Thai squash; Pa Then tea; Minh Huong duck; La Khai specialty rice; Quynh Nhi oil; Fried fish, Bung fish, Quat fish. Some production and processing facilities have not been invested or upgraded by entities, such as: Lang fish cake, Lang fish floss, Chien fish (Lam Binh district); Fresh goat meat from May Mountain, Cuong Dat dried bamboo shoots, Tan Tien dried bamboo shoots (Yen Son district); Minh Huong duck, Minh Huong rice (Ham Yen district); La Khai specialty rice, Tan Trao honey, Son Thuy grilled cake (Son Duong district); Chien fish, Bong fish, Quat fish of Yen Nguyen, Lang fish of Yen Lap (Chiem Hoa district); Quynh Nhi sa chi oil (Tuyen Quang city). For some products, producers have not paid attention to improving or upgrading the packaging.

A general assessment of the current status of OCOP product production in Tuyen Quang province shows that there are many favorable factors for developing OCOP foods such as: Natural conditions, land, labor, experience and production traditions of local people; Policy support of local government; The spread and support of consumers for OCOP-rated products. However, the development of production of OCOP products in Tuyen Quang province still faces many difficulties in production techniques, product quality, goods output, facilities, techniques for harvesting, preserving, processing, brand and market. Some problems still exist in developing OCOP products such as: The scale of output is still small; Production and processing facilities have not been upgraded; The product has not had its design improved or packaging upgraded; The product has not yet reached consumers; Planning for development of raw material areas is not synchronous; The links between producers and actors at all stages in the chain are not really tight; A process for caring for raw material areas has not yet been developed; The harvesting stage is not well controlled, leading to the supply of input materials to purchasing, production and processing establishments that do not ensure quality and output; Capital from the state and the investment community in the field of infrastructure for OCOP product development is still limited and does not meet demand.

2.2 Production and Business Characteristics of the Surveyed Producers

The study surveyed a total of 120 food producers, of which 60 products were OCOP rated, 60 products were not yet OCOP rated. Production and business characteristics of the surveyed producers are presented in Table 5.

Survey results show that the average age of surveyed OCOP producers is 50.9 years old. This age is relatively old compared to the average working age in the study area. This also shows the limitations in the acuity, flexibility as well as physical strength of the workforce participating in production and business in the market mechanism and international integration. However, the average age of the group of producers that products have been rated OCOP is 47.1 years old, 7.7 years younger than the group of producers that products have not been rated OCOP.

Of the total 120 producers surveyed, 80% were male, the remaining 20% were female. This also shows the characteristics and customs of rural households in Vietnam when the majority of household heads are men. The proportion of women participating in the management and operation of production and business establishments is still low. However, the male/female ratio of the group of producers that products have been rated OCOP is 75%/25%, which has a significant shift compared to the group of producers which products have not been rated OCOP, which is 85%. /15%. This shows that the role of women is increasingly promoted in participating in the development of the local OCOP program.

The average educational level of producers is 10.1/12, which is also a relatively high level compared to the general labor level in the study area. The cultural level of the group of producers that products have been ranked OCOP is 11.3/12,

with a significant shift compared to the group of producers that products have not been ranked OCOP, which is 8.7/12. This is a favorable factor in the production and business conditions of the 4.0 period, when producers need access to management software, accounting software, sales software, and e-commerce.

The number of years of experience in producing and trading OCOP products of the surveyed producers is still low, on average for the group of producers that products have been ranked OCOP is 4.5 years. This shows that production and business activities of OCOP products in the research area are still new. But it is also consistent with the period when the Prime Minister approved the implementation of the One Commune One Product (OCOP) Program nationwide from 2018.

Regarding star ratings for OCOP food products, the study surveyed 60 products that were evaluated and rated stars, of which 45 products were rated 3 stars, accounting for 75%, and 15 /60 products rated 4 stars, accounting for 25%, there are no products rated 5 stars. The average star rating of OCOP food products surveyed is 3.1, which is a relatively low value when the products have been rated OCOP products at 3 stars, 4 stars and 5 stars.

Surveyed data shows that 37% of surveyed producers have signed product sales contracts. This rate is relatively low while the increasing requirements for production and business entities in the economy need to implement economic contracts to ensure stable and planned production and business activities. However, the survey results also show that there is a clear difference between the two groups of producers, for the OCOP group this rate is 73% while the non-OCOP group is 0%. Producing and supplying products according to signed contracts is also a condition for producers to implement the committed terms, and ensure the quantity, quality, design and style of products meet market requirements.

The proportion of surveyed producers with loan activities is 32%. This is also a low number while the locality has implemented many policies to support and encourage people to borrow capital to increase production and business capacity, expand scale, invest in machinery and equipment, and apply advanced technology. The loan rate of the group of producers whose products have been rated OCOP is 48%. There has been a significant shift away from the group of producers whose products are not yet OCOP rated at 15%. Increasing financial resources is a condition to improve quality and output of products to meet domestic and export market needs.

The average annual revenue of the surveyed food producers is 2,075 million VND/year. While the average annual revenue of OCOP-rated food producers is 3,588 million VND/year, much higher than the revenue of the group of non-OCOP-rated food producers (550 million VND /year), 6.5 times. This shows that participating in the OCOP program, ranking and upgrading OCOP foods will create conditions for producers to improve capacity, expand scale, increase value, and generate great revenue to develop the local economy.

2.3 Analyze the Impact of OCOP Product Ranking Results on Producers ' Revenue

The study surveyed by questionnaire 60 OCOP food producers and 60 unranked OCOP food producers in Tuyen Quang province. The study used a regression model to analyze the impact of OCOP ranking results on the revenue of producers. Summary of the regression model is as follows:

$$Y_1 = \beta_0 + \beta 1\ X$$

In there:

Y_1 – Dependent variable: Product sales revenue of surveyed producers;
X – Explanatory variable: Product's OCOP star rating;
β_0 = Intercept coefficient;
β_1 = Slope coefficient.

Based on the regression model and surveyed data, the study used SPSS 22 software to analyze and process data. The regression results are presented in Table 6.

Testing results show:

The variance inflation factor (VIF) is less than 2, so the regression model does not have multicollinearity.

Durbin-Watson coefficient (1< d=1,321 < 3), so the regression model does not have autocorrelation.

The statistical significance level (sig. column) of the independent variable Star_rating shows P < 0.05. Thus, this factor affects the revenue of food producers in the study area with 95% confidence.

Table 6. Summary of regression model of the influence of OCOP product ranking results on revenue of food producers

Descriptive Statistics

	Mean	Std. Deviation	N
Revenue	2068.58	3083.464	120
Star_rating	1.56	1.644	120

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.512[a]	.622	.562	2659.404	1.321

a. Predictors: (Constant), Star_rating
b. Dependent Variable: Revenue

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	571.323	335.175		1.705	.091		
Star_rating	960.804	148.297	.512	6.479	.000	1.000	1.000

Source: Surveyed data in 2023

Table 7. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.885[a]	.784	.770	.788	1.204

a. Predictors: (Constant), Favorable, Experience, Gender, Age, Loan, Sale_contract, Education
b. Dependent Variable: Star_rating

Model	Coefficients[a]			t	Sig.	Collinearity Statistics	
	Mean	Unstandardized Coefficients B	Standardized Coefficients Beta			Tolerance	VIF
(Constant)	1.56	1.307		1.234	.220		
Gender	.78	-.162	-.041	-.909 NS	.365	.960	1.042
Age	50.93	-.071	-.304	-5.017**	.000	.525	1.907
Education	10.01	.085	.109	1.732 NS	.086	.487	1.927
Experience	4.55	.034	.034	.728 NS	.468	.909	1.101
Sale_contract	.37	1.233	.363	5.961**	.000	.520	1.921
Loan	.32	.365	.104	2.133*	.035	.814	1.228
Favorable	65.37	.037	.330	5.588**	.000	.553	1.808

*Note: ** Significance level <0.01; * Significance level <0.05; NS: Not statistically significant (2-sided test)*

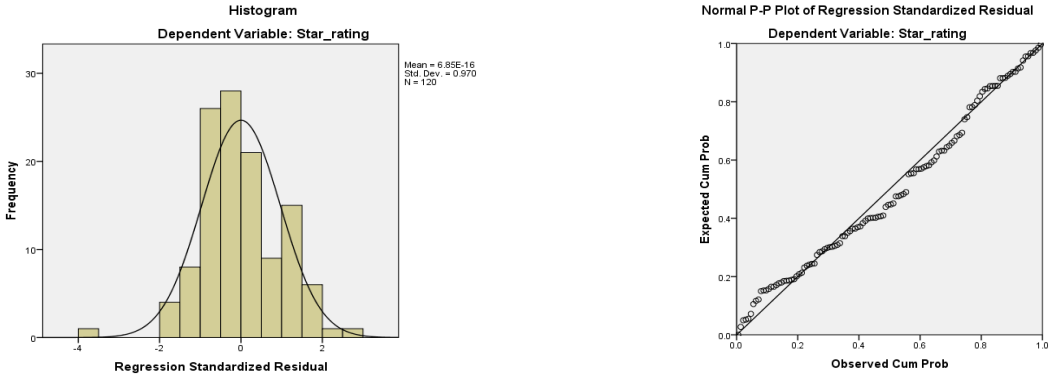

Fig. 1. Results of testing the phenomenon of heteroskedasticity
Source: Surveyed data in 2023

The adjusted R^2 coefficient reached a value of 0.562, which means that 56.2% of the change in revenue of food producers in the study area is explained by the independent variable in the model (Star_rating). The remaining 43.8% is explained by other factors that cannot be included in the model. Thus, it can be concluded that the proposed model is consistent with reality.

The test results also show that the independent factor (Star_rating) is statistically significant and positively related to the dependent variable (Revenue). That means upgrading the star_rating of OCOP products will increase the revenue of food producers. Specifically, with the slope coefficient β_1 = 148,297, it means that increasing 1 star_rating for OCOP product will increase the revenue of food producers by an average of 148,297 million VND/year. This research result is the basis for proposing solutions to develop OCOP food production in the study area. To increase revenue for food producers, implement solutions to star-rate products that have not yet reached OCOP and upgrade star-rating products that have been ranked OCOP.

2.4 Analysis of Factors Affecting OCOP star Ratings for Foods

The study used multivariate regression models to analyze factors affecting OCOP star ratings for 120 foods. Summary of the multivariate regression model is presented in Table 7.

Based on the analysis results from Table 7 shows that the adjusted R^2 coefficient reaches the value 0.770. This means that 77% of the variation in star ratings of OCOP foods depends on the explanatory variables in the model. The remaining 23% is explained by other factors that cannot be included in the model.

Thus, it can be concluded that the proposed model is consistent with reality. The variance inflation factor (VIF) is all less than 2, so the regression model does not have multicollinearity. Durbin-Watson coefficient (1< d=1,204 < 3), so the regression model does not have autocorrelation. The results from Fig. 1 show that the regression model does not have the phenomenon of heteroskedasticity because the distribution of the residuals belongs to the normal distribution. The statistical significance column (sig. column) in Table 7 shows the variables Age ; Sale_contract; Loan; Favorable has a statistical significance level of P < 0.05, these factors affect the star_rating results of OCOP foods of the surveyed producers with 95% confidence.

Test results show that the factor Age of the producer has an inverse relationship with the star rating of OCOP foods. This can be explained because the older the producer is, the more limited his or her ability to proactively participate in activities to upgrade the product to OCOP standards. Therefore, rejuvenating human resources involved in the production and trading of OCOP foods is necessary to meet the requirements of competition, integration, flexibility and sensitivity in the market mechanism.

The variable Sale_contract is statistically significant and has a positive relationship with the dependent variable (Star_rating). That means that to increase the star-rating of OCOP foods, producers need to participate in signing product sales contracts. This is a condition to ensure price and market stability, ensure output and

product quality standards are produced and traded according to signed contracts.

The Loan variable is statistically significant and has a positive relationship with the dependent variable (Star_rating). That means to increase the star_rating of OCOP foods, producers need to borrow capital to invest in OCOP food production and business. Borrowing capital creates conditions to increase financial resources, expand scale, and invest in both breadth and depth to ensure an increase in both quantity and quality, in order to meet the ranking standards and raise stars for OCOP foods.

The Favorable variable is statistically significant and has a positive relationship with the dependent variable (Star_rating). That means to increase the star_rating of OCOP foods, producers need to exploit favorable factors for the production and business of OCOP products. This is a composite variable of many sub-variables, including favorable factors of land, labor, materials, equipment, technical processes, policy mechanisms, and natural conditions. The implication is that the combination of production and business factors has a positive and favorable influence on OCOP food development in the study area. Further studies can analyze the influence of each of these sub-factors on the development of OCOP food production in Tuyen Quang province.

3. CONCLUSION

OCOP is an economic development program for rural areas in the direction of developing internal resources and adding value. This is considered a key solution and task in implementing the National Target Program on building new rural areas in Vietnam. Tuyen Quang has implemented the OCOP Program since 2018 throughout the province. The OCOP program in Tuyen Quang province has helped producers better understand legal regulations, specifically: Production according to standards and regulations (VietGAP, organic...); food safety conditions; Environmental protection during production; Use packaging and labels in accordance with regulations; Promoting community strength and potential values and regional advantages in production organization. From there, creating a rich supply of products, ensuring quality, creating stable jobs, increasing income for local workers, contributing practically to the implementation of the National Target Program on agricultural construction. new village.

The study has summarized the development situation of OCOP food production in Tuyen Quang province, and analyzed the advantages and disadvantages in developing OCOP food production in the study area. The study surveyed a total of 120 food producers, of which 60 products were OCOP rated, 60 products were not yet OCOP rated, and analyze the production and business characteristics of the surveyed producers. The study used a regression model to analyze the impact of OCOP food ranking results on producers' revenue. From there, it is concluded that rating and raising stars for foods will be a positive factor to promote sales and increase revenue for producers. The study also used multivariate regression models to analyze factors affecting the OCOP ranking results of the surveyed foods. The research results are the basis for proposing solutions to develop OCOP food production in Tuyen Quang province. Some proposed solutions are: Rejuvenating human resources; Strengthen links in product production and business; Increase support for capital loans; Exploit favorable factors in terms of land, labor, materials, equipment, technical processes, policy mechanisms, and natural conditions for food production development. Continue to rank and upgrade foods according to OCOP standards in the research area.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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