Data-Analysis-Based Discussion on the Current Situation and Prospect of Direct Broadcasting to Help Agriculture

Wenxin Zhou, Xingyu Gao, Wei Ji, Jing Yang
zwx2473852737@outlook.com, 1066712494@qq.com, 2582897686@qq.com, *Corresponding author: jyangh82@163.com

Anhui University of Science & Technology Anhui, China

Abstract—Under the background that China has eliminated absolute poverty, direct broadcasting to help agriculture plays an essential and positive role in seeking the compelling connection between comprehensive poverty alleviation and Rural Revitalization. Through multiple response analysis, cross-analysis, logistic regression analysis, this essay focuses on investigating and researching the current direct broadcasting with goods to help the agriculture marketing model from the perspective of the demand side. This essay finds the advantages and disadvantages of the existing model of direct broadcasting to help agriculture, forecasts its prospect, and puts forward suggestions from different perspectives, to explore the way of direct broadcasting to support agriculture in the future sustainable development.

Keywords-direct broadcasting to help agriculture; rural vitalization; rural e-commerce; webcast; Logistic regression analysis

1 INTRODUCTION

The Chinese government is seeking a compelling connection between comprehensive poverty alleviation and Rural Revitalization. Under the background of the epidemic and the development of the Internet, "live broadcasting to help farmers" has widened the market with the help of the Internet platform, which is of great significance to the economic development of rural areas. Using a video e-commerce platform for sales is conducive to bringing a large audience of users, reducing the sales cost (Liu Gang 2020), stimulating the consumption of agricultural products, promoting the brand construction of farm products, and achieving precise Poverty Alleviation [1]. On the other hand, the quality of farm products needs to be improved. There are still good and bad agricultural and sideline products, inadequate rural infrastructure [2], Slow delivery speed, unsatisfactory after-sales service, and short video e-commerce talents [1].In addition, promoting agricultural supply-side structural reform, the B2C model, reducing transaction costs, and policy support for helping agriculture and poverty alleviation are all reference ways to help agriculture in the future [3].To sum up, most of the existing studies have explored direct broadcasting to help farmers from the three central bodies of farmers, enterprises, and the government. The market demand guides the direct broadcasting of goods, and consumers, as the primary role subject of the market, need a channel to put forward their ideas in the process of purchase and use. This paper investigates consumers through questionnaires and explores the current situation and future development prospects of live

MSIEID 2022, December 09-11, Chongqing, People's Republic of China

DOI 10.4108/eai.9-12-2022.2327743

broadcasting to help farmers get rid of poverty from the perspective of the demand side (consumers).

2 SAMPLING METHOD

The survey adopts the method of combining stratified sampling and simple random sampling, focusing on Anhui Province and taking into account other parts of the country. To facilitate data collection and improve the reliability of the obtained data, the pre-investigation validity test is carried out first, and the results are as follows:

Table 1 pre-survey validity test results

KMO and Bartlett test		
KMO sampling suitability quantity		0.709
Bartlett sphericity test	Approximate chi-square	679.827
	freedom	325
	Significance	0

The above figure shows that the KMO value is 0.709, more significant than 0.6, which means the data has validity. The overall validity of the questionnaire in this pre-survey is good.

According to the results of the pre questionnaire, the understanding of direct broadcasting to help agriculture is taken as the estimation object, so we pay attention to the sample variance of the overall understanding. The formula for calculating the optimal sample size N0 before correction is:

$$n_0 = \frac{u^2 PQ / d^2}{1 + \frac{1}{N}[(u^2 PQ) / d^2 - 1]} \tag{1}$$

N is the total number. Take the U value when the confidence is 95%, u = 1.96, and u is the two sides of the standard normal distributionαQuantile, P is the sample proportion, D is the absolute allowable error, d = 0.04. According to the pre-survey result, we find that P = 0.4. in practice, if P is near 0.5, the sample can be estimated according as the maximum overall variance when p = 0.5, so p = 0.5 is taken. The total number of permanent residents in Anhui Province is n = 65.2637 million; then the best sample size can be approximately obtained as follows:

$$n_0 = \frac{u^2 p(1-p)}{d^2} = \frac{1.96^2 \times 0.5 \times 0.5}{0.04^2} = 600 \tag{2}$$

Based on the sample size, when the sampling proportion P is estimated at 600, the optimal sample size is obtained according to the requirement that the absolute sampling error does not exceed 4% with 95% confidence. The number of questionnaires distributed was 700, and 642 valid questionnaires were obtained by removing the apparent errors in the returned questionnaires.

3 MULTIPLE RESPONSE ANALYSIS

Multiple topics are often used when using questionnaires to study consumers who help farmers directly. To eliminate the relevance of the responses to the same questions, multiple response analysis is used to study the advantages of direct broadcasting to help farmers understand consumers' concepts.

After obtaining the response rate of each advantage of live broadcasting with goods, to better reflect the benefit of live broadcasting with interests in the eyes of consumers, a percentage pie chart of each advantage response rate is made, as shown in Figure 1.

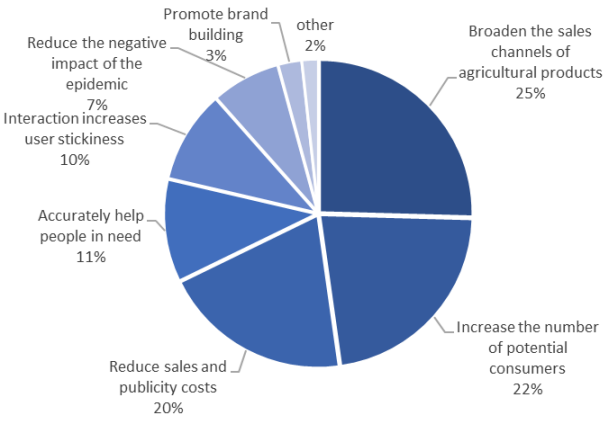

Figure 1. Pie chart of response rate of various advantages of direct broadcasting in helping agriculture

Through multiple response analyses, it is found that the response rates of "expanding sales channels of agricultural products," "increasing the number of potential consumers," and "reducing sales and publicity costs" are high, and the number of respondents has reached 1 / 5 or more. Channel expansion, customer source expansion, and cost reduction are the main advantages of direct broadcast agricultural assistance projects, which have been greatly improved compared with the traditional sales of farm products. At the same time, helping farmers through live broadcasting also plays a specific role in increasing user stickiness and accurately assisting people in difficulty. In contrast, the advantage of "promoting the brand construction of agricultural products" is not great. Users can not understand the brand in-depth, and there is still more room for development.

Secondly, the disadvantages of direct broadcasting to help agriculture are analyzed by multiple response methods. After calculating the response rate of each advantage of live broadcasting with goods, make a percentage pie chart according to the response rate of each gift, as shown in Figure 2.

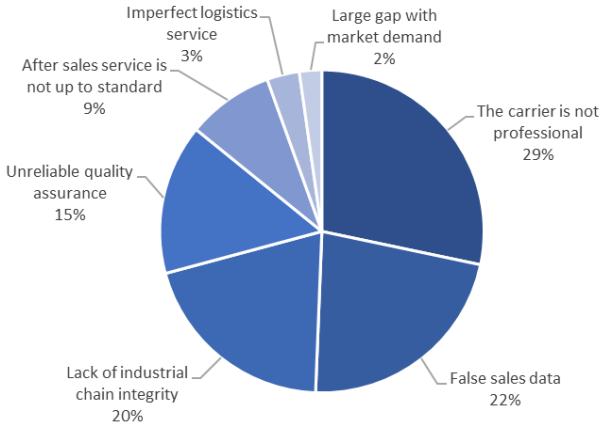

Figure 2. Pie chart of response rate of disadvantages of direct broadcasting to help agriculture

The pie chart of response rate shows the disadvantages of live broadcasting agricultural assistance projects in the eyes of potential consumers. Among them, "the carrier is not professional" accounts for the highest proportion. The professional degree of the anchor (including the understanding of products and the proficiency of live broadcasting) will have a significant impact on the viewers. The response rates of "false sales data" and "unreliable quality" have exceeded 20%. Like traditional consumption, quality and reputation are still the two issues most valued by consumers. With the development of e-commerce, logistics and after-sales service have gradually reached a high level, which has a relatively small impact on consumers' choices.

4 CROSS-ANALYSIS

This paper also uses the method of cross-analysis to explore the impact of various factors on consumers' choices.

Cross-validation is often used to find the relationship between two variables. Its advantage is that it can reduce overfitting and selection deviation problems and generalize the model on an independent data set [4]. Note that "whether you have purchased the goods of the live broadcast tape to help poverty alleviation" is the independent variable x (merge the non purchased and purchased into two categories), and "what are the advantages and disadvantages of the live broadcast method to help agriculture" is the independent variable y. The data obtained are shown in the following table:

Table 2 Cross-relationship between advantages and disadvantages of direct broadcast agriculture assistance and purchase intention

aspect	Y	X (%)	
		Purchased (n = 324)	Not purchased (n = 315)
advantage (χ^2=5.938,	Broaden the sales channels of	168(49.85%)	169(50.15%)

p=0.000)	agricultural products		
	Increase the number of potential consumers	149(50.34%)	147(49.66%)
	Reduce sales and publicity costs	197(74.34%)	68(25.66%)
	Accurately help people in need	85(59.03%)	59(40.97%)
	Interaction increases user stickiness	90(69.23)	40(30.77%)
	Reduce the negative impact of the epidemic	51(52.58%)	46(47.42%)
	Promote brand building of agricultural products	12(36.36%)	21(63.64)
inferiority (χ^2=4.204, p=0.003)	The carrier is not professional	347(72.14%)	134(27.86%)
	False sales data	265(69.92%)	114(30.08%)
	Lack of industrial chain integrity	189(55.10%)	154(44.90%)
	Unreliable quality assurance	201(78.52%)	55(21.48%)
	After-sales service is not up to standard	63(42.86%)	84(57.14%)
	Imperfect logistics service	31(56.36%)	24(43.64%)
	The large gap with market demand	26(68.42%)	12(31.58%)

It can be seen from the above table that the P values of the two cross-analysis models are less than 0.05, indicating that consumers (including potential consumers), understanding of the advantages and disadvantages of live broadcasting to help agriculture has a particular impact on their purchase intention.

Among them, for the advantages of live broadcasting to help farmers, respondents who choose "reducing sales and publicity costs" and "increasing user stickiness through interaction" have a higher proportion of buying agricultural products. The low price and the trust and interest built in the purchase process bring more users to live broadcasting to help farmers. In purchasing live broadcast agricultural products, respondents are more concerned about feeling material or psychological benefits.

As for the disadvantages of live broadcasting to help farmers, "the carrier's professionalism is not strong" and "the quality and sales data are not trusted" have the most severe negative impact on the respondents' purchase intention. In addition, in choosing whether to buy or not, respondents also showed that agricultural aid products should meet market demand and keep pace with contemporary trends.

5 LOGISTIC REGRESSION ANALYSIS

Logistic regression is a kind of generalized linear regression, which can directly predict the probability of event occurrence. Let the probability of event occurrence be expressed as [5]:

$$Logit(p/1-p) = \beta_0 + \beta_1 x_1 + \cdots \beta_p x_p \tag{3}$$

The development of direct broadcasting to help agriculture is affected by many factors, including the natural broadcasting party, sellers, viewers, and government agencies. According to the overall structure and process of direct broadcasting to help agriculture, this paper selects nine factors related to the development degree of direct broadcasting to support agriculture. The detailed results are shown in the table3.

Table 3 Description of logistic regression model variables

Variable type	Variable name	datatype	Unit or description
dependent variable	Whether the audience is willing to watch and buy the corresponding products	Second classification	0, 1
independent variable	Professional level of the broadcasting party	Multi classification	I~III
	Recommended times of live broadcast home page within one month	Continuous type	Times / month
	Quality of products sold	Multi classification	I~III
	Seller's service attitude	Multi classification	I~III
	Delivery speed of delivered products	Multi classification	I~III
	Age of viewer	Continuous type	year
	The economic situation of viewers	Continuous type	Yuan/year
	Viewers' understanding of agricultural assistance policies	Multi classification	I~III
	Local government's assistance to farmers	Multi classification	I~III

In the process of parameter estimation of the logistics model, the professional degree of the live broadcast party, the quality of products sold, the seller's service attitude, and other variables are classified variables, so they need to be transformed into dummy variables. Using SPSS software to take "the professional degree I of the live party (the live party is very unprofessional)" as the reference level of the two, set "the professional degree II of the live party (the live party is more professional)" and "the professional degree III of the live party (the live party is very professional)" as dummy variables, and record them as "the professional degree of the live party (1)" and "the professional degree of the live party (2)" respectively. Similarly, for other classification variables, the lowest level of classification variables is used as the reference level to convert the classification variables.

Except for the seller's service attitude, the delivery speed of delivered products, and the age of viewers, there were significant differences in other factors ($P < 0.05$), which were included in the regression model. The variance expansion factor Vif of the regression model is $8.359 < 10$, passing the multicollinearity diagnosis. This paper introduces continuous variables, many independent variables, and a large sample size, so the HL index is selected to evaluate the model's goodness of fit. The HL value is 9.732, and the logistic regression model passes the test.

Table 4 parameter estimation of logistic regression model

independent variable	parameter estimation	S.E	$Wald\chi^2$	Degree of freedom DF	P	0R	significance level	HL
Professional level of the broadcasting Party (1)	1.087	0.084	8.345	1	0.002	2.463		
Professional level of the broadcasting Party (2)	1.256	0.159	9.586	1	0.005	3.753		
Recommended frequency of live broadcast Homepage	0.823	0.087	3.685	1	0.017	1.243		
Quality of products sold (1)	0.995	0.032	5.326	1	0.004	2.597		
Quality of products sold (2)	1.381	0.003	10.467	1	0.009	5.863		
Seller’s service attitude (1)	0.203	0.032	11.852	1	0.482	1.077	0.003	9.732
Service attitude of the seller (2)	0.315	0.093	9.453	1	0.845	1.462		
Delivery speed of delivered products (1)	1.306	0.244	1.306	1	0.632	0.835		
Delivery speed of delivered products (2)	1.962	0.317	3.745	1	0.791	0.731		
Age of viewer	2.044	0.005	7.952	1	0.084	1.294		
Viewer economy	0.437	0.288	4.358	1	0.014	1.057		
Understanding of direct broadcasting to help agriculture	1.176	0.042	6.326	1	0.003	1.849		

(1)						
Understanding of direct broadcasting to help agriculture (2)	0.739	0.123	9.427	1	0.024	2.469
Support for agricultural policies (1)	0.980	0.057	7.357	1	0.006	3.578
Support for agricultural policies (2)	1.391	0.031	5.367	1	0.013	5.384
constant	3.361	1.295	10.434	1	0.001	1E+008

According to the statistical results in Table 4, when the live broadcasting party "sells products with very high quality" and the government "gives solid support to the live broadcasting agricultural policy," users will be willing to buy the live broadcasting agricultural products to the greatest extent. The improvement of commodity quality and the value and preferential policy guidance given by the government can positively affect users' choices to the greatest extent. The recommended frequency of the live broadcasting platform, the economic status of viewers, and the understanding of live broadcasting to help farmers will also positively impact the audience's viewing and purchase intention to a certain extent. The delivery speed of delivered products and the seller's service attitude has no significant impact on consumers' preferences. Under the exact cost, the seller of live broadcasts should prioritize controlling the investment, improving the quality of products, and doing well in publicity to attract consumers. In addition, this model also proves the importance of the government in helping farmers consolidate the achievements of poverty alleviation and revitalize rural industries.

6 CONCLUSION

Based on statistical multiple response analysis, cross-analysis, and logistic regression model, this paper discusses the current situation and prospect of direct broadcasting to help agriculture under the Rural Revitalization Strategy from the perspective of the supply side.

Direct broadcasting for agricultural development has three advantages: channel expansion, customer source expansion, and cost reduction. It can revitalize the circulation of agricultural products, promote the virtuous cycle of the farm product market, drive farmers to become rich, remove the limitations of sales areas, and expand the potential market scope. At the same time, the main disadvantages of live broadcasting to help agriculture are the lack of people with solid delivery skills, sales data, and unreliable product quality. Especially when the quality is not supervised and controlled, it will significantly reduce the purchase intention of potential consumers. In the follow-up sustainable development, it is necessary to improve the action force, strengthen the supervision and monitoring of direct broadcast agricultural products and services, and improve the development and relationship system of the direct broadcast agricultural assistance system.

As far as the prospect is concerned, the live broadcast agricultural assistance has the audience prospect of a large user group, the multi-channel opportunity of real-time interaction, and the low-cost chance of small profits and quick sales. However, at the same time, the foundation for

developing the live broadcast agricultural assistance industry is to improve the quality of rural assistance products, establish a standardized and standardized evaluation and screening system, and improve the reputation of relevant agrarian products. At the same time, the government's publicity and policy help are also essential for developing the live broadcasting industry. This help should not be limited to money. Efforts to cultivate outstanding people who understand the Internet, understand the live broadcasting sales of agricultural products, and are committed to Rural Revitalization can also bring a longer-term virtuous circle to the live broadcasting industry.

Only by absorbing excellent experience and improving the current main problems can we maximize this business model's incentive, protection, and supervision, give full play to the potential of live broadcasting to help agriculture, and bring good development to the Rural Revitalization industry.

Acknowledgments. This work was finally supposed by the College Students' Innovative Entrepreneurial Training Plan Program of China under grants S202110361206.

REFERENCES

[1] F, Ma. (2020) Research on short video e-commerce operation of agricultural products under the Rural Revitalization Strategy. e-commerce, 23: 19-22

[2] G, Liu. (2020) Make good use of the live broadcast platform to help fight poverty. People's forum, 29:90-91

[3] L, Mao, X, Chen, Y, Wang. (2021) Discussion on the marketing mode of "live broadcasting with goods" to help agriculture. Cooperative economy, and science and technology, 3:88-89

[4] F, Sun, R, Feng. (2019) Research on Influencing Factors of online academic achievement based on learning analytics. China audiovisual education,3: 48-54

[5] J, Xu, G.Li, G.Chen.(2012)Driving force analysis of land use evolution in mining area based on the logistic regression model. Journal of agricultural engineering, 28: 247-255