



Research on Influencing Factors of Rural E-commerce Under the Empowerment of Blockchain Technology

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Abstract. Under the background of digital economy, with the development of blockchain technology, the value and service quality of rural e-commerce have been improved. Specifically reflected in two aspects: one is to change the traditional rural e-commerce industrial chain and enhance the value of rural e-commerce. Such as tracing the source of agricultural products or decentralized management; Second, the coordinated development of blockchain, artificial intelligence and other technologies to improve the service quality of rural e-commerce in payment security and other links. The characteristics of easy corruption, high timeliness and strong experience of fresh products restrict consumers' online shopping intention and greatly hinder the development of e-commerce of fresh products. This paper will take 30 seafood farmers in Wangjiatan village, Rizhao City as the research object to analyze the influencing factors of rural e-commerce. The empirical results show that high educational level, large-scale seafood breeding, convenient logistics and government policy support are conducive to enhance the farmers' willingness to sell fresh seafood online, while older age, fixed offline sales channels, seafood varieties and high cold chain logistics costs will reduce the seafood farmers' willingness to sell fresh seafood online. The main factors are analyzed from the farmers themselves The industry itself and government policies put forward corresponding countermeasures and suggestions in order to improve the online sales willingness of fresh seafood farmers in Rizhao Wangjiatan village and promote the development of seafood e-commerce in Rizhao Wangjiatan village.

Keywords: Digital Economy · Blockchain Technology · Rural E-commerce · Electronic Commerce · Influence factor

1 Introduction

In recent years, with the development of digital economy and the continuous progress of blockchain technology, with the development of e-commerce, fresh e-commerce also began to appear in China. Although e-commerce has developed rapidly in other industries, fresh e-commerce has not been driven and developed rapidly in the early stage of

development. Sunshine in these coastal cities rich in seafood is relatively backward in economy, and the development of fresh e-commerce is even slower. The Central Document No. 1, issued in 2013 for 5 consecutive years in 2018, emphasized the important role of rural e-commerce in rural economic development. The characteristics of fresh products, such as easy corruption, high safety, high timeliness and strong experience, restrict consumers' online shopping intention, which also greatly hinders the development of e-commerce of fresh products. Therefore, it is important to study the influencing factors of rural e-commerce [1].

Rizhao has few heavy industries, the quality of seawater is very high, and large-scale aquaculture has not been formed, so the price of seafood is preferential and fresh. Many consumers buy Rizhao fresh seafood online. If the online sale of fresh seafood in Wangjiatan village becomes the norm, it will not only increase the choice of consumers to consume high-quality fresh seafood, but also broaden the sales channel of seafood in Wangjiatan village. In the long run, it is more conducive to the stable development of e-commerce in Rizhao. Therefore, it is of great significance to study the influencing factors of rural e-commerce.

2 Research Status at Home and Abroad

The research literature on e-commerce of fresh products at home and abroad can be divided into three research fields: behavior, mode and system. The willingness of consumers to buy fresh products online and the behavior of sellers are two important parts of behavior research.

2.1 Research Status Abroad

Giustiniano (2002) found that the Internet is only used as an auxiliary distribution channel by the surveyed enterprises, rather than a new business system [2]. Cloete (2008) and others conducted a questionnaire survey on 795 agricultural enterprises in South Africa to investigate whether they have applied e-commerce. The research results show that among the 74 effective respondents, 2/3 of the agricultural enterprises have their own websites, of which 55.4% of the agricultural enterprises can apply e-commerce; Even among the agricultural enterprises that have not yet applied e-commerce, more than 80% of them said they are ready to apply e-commerce in the future [7]. Zapata (2013) and others studied the influencing factors of agricultural enterprises' willingness to access e-commerce platform. Their case study based on market maker shows that these influencing factors include user type, transaction volume and annual sales of enterprises [6]. The degree of improvement of the Internet shopping environment is of great significance to customers (nezanid 2015). Quetal (2015) also used B2B market data from 27 European countries to confirm that social trust plays a positive role in promoting the construction of B2B online sales [3].

Dodds and others believe that purchase intention is the possibility that consumers are willing to pay for a product. After that, some scholars concluded that willingness plays a decisive role in consumers' purchase decision-making process. On this basis, through the research of many scholars, it is generally recognized that purchase intention can

guide the production and operation activities of enterprises, affect consumers' purchase behavior, and is the basic factor for predicting consumers' behavior [4]. Zielka agrees with this view and proposes that when predicting whether consumers buy a product, they can use purchase intention to judge [8]. Mullet (1997) believes that consumers' purchase intention is determined by internal and external factors [4]. Magnusson et al. (2001) believes that as an important purchase standard, if the price does not match the perceived belief of consumers and organic food, the purchase volume will not increase, that is to say, consumers are most concerned about shopping belief and price. Research shows that the price of fresh agricultural products purchased online is also an influencing factor for consumers' willingness to buy. Enrique B.P. (2016) believes that the honor of suppliers and the quality of goods directly affect the perceived risk of consumers' online shopping, and ultimately determine consumers' purchase intention.

2.2 Domestic Research Status

Wang Chong (2011) believes that the reason why consumers make purchase decisions is that the goods purchased by consumers can meet their certain needs, which is a manifestation of consumer psychology. Therefore, he believes that purchase intention is a psychological tendency. Zhang Zan (2009) summarized the factors affecting consumers' purchase intention into four aspects: personal factors, social factors, psychological factors and situational factors, and believed that these four factors affect consumers' purchase intention at the same time, and will eventually lead to consumers' consumption behavior. Feng Liangxuan, Qi Zhenhong, Tian Yun and Zhou Hui (2012) concluded after studying the purchase of genetically modified food that consumers' gender, education level, family, commodity source, cognitive level and preference will jointly restrict consumers' purchase intention. Shi chaoguang et al. (2011) concluded that product quality and safety will positively affect consumers' shopping intention when studying the purchase decision of fresh agricultural products such as fruits and vegetables. Zou Jun (2011) found through the optimal scale regression model and factor analysis that consumers' online shopping experience, online shopping evaluation and attitude, online shopping usefulness and ease of use, online store trust and online store information quality have a significant positive impact. Yang Jilian (2012) believes that product quality is an important factor restricting consumers' online shopping and has a positive effect on consumers' online shopping intention.

Domestic scholars have done a lot of research on consumers' online shopping intention, among which there are many studies based on the buyer's perspective, mainly focusing on the significant impact of consumers' personal characteristics, risk likes and dislikes, and online shopping experience [5]. Yu Jianbo (2015) studied the influencing factors of e-commerce platform users' purchase intention, mainly including user evaluation, website popularity and word-of-mouth, perceived risk and logistics distribution service. Zhao Xiaofei and Gao Qiyuan (2016) concluded from the perspective of reference effect that perceived value, perceived risk and awareness of agricultural product quality and safety will affect consumers' online shopping intention. He Dehua (2014) analyzed from the perspective of consumers' perception and expectation and concluded that the expectation of website content, product safety and quality significantly affected

consumers' willingness to buy fresh food online, while consumers' expectation of service, price and packaging level was not significant. Wang Kexi (2017) constructed a binary logit selection model from three dimensions: individual characteristics of consumers, attributes of agricultural products and online shopping platform services, and analyzed the influencing factors of consumers' willingness to buy fresh agricultural products online.

3 Descriptive Analysis of Influencing Factors of Rural E-commerce

The object of this survey is the seafood farmers in Wangjiatan village, Rizhao City. A total of 30 questionnaires were distributed, and 25 valid questionnaires (excluding 5 errors and omissions) were actually recovered. The recovery rate of the valid questionnaire was 83.33%.

3.1 Analysis of Breeding Years and Scale

There are 3 people who have been breeding for 1–3 years, accounting for 12%; There are 4 persons in 3–5 years, accounting for 16%; There are 10 people in 5–10 years, accounting for 40%; There are 8 people with more than 10 years, accounting for 32%. There is one person with a breeding scale of 2–4 mu, accounting for 4%; There are 3 people in 4–5 mu, accounting for 12%; There are 15 people in 5–50 mu, accounting for 60%; There are 4 people in 50–60 mu, accounting for 16%; There are 80–80 mu of people, accounting for 2%

3.2 Analysis on the Nature of Wangjiatan Seafood Breeding Unit and Fixed Offline Channels

There are 13 persons in the nature of individual industrial and commercial households, accounting for 52%; there are 9 persons in the nature of limited liability companies, accounting for 36%; There are 3 persons in the nature of professional cooperatives, accounting for 12%. There are 15 persons acquired by middlemen, accounting for 60%; There are 3 people whose offline channels are hotels, accounting for 12%; There are 2 people whose offline channels are seafood stores, accounting for 8%; There are 2 people whose offline channels are seafood processing enterprises, accounting for 8%; There are 3 people selling online, accounting for 12%

3.3 Analysis of Expanding Online Sales Channels

In the five level Likert scale of the questionnaire, aiming at the problem that online sales of fresh seafood can broaden sales channels. A total of 6 people disagreed, accounting for 24%; A total of 3 people disagreed, accounting for 12%; There are generally 3 people, accounting for 12%; 8 people agreed, accounting for 32%; There are 5 people who fully agree, accounting for 20% (as shown in Table 3).

3.4 Analysis of Logistics Convenience

In the five level Likert scale of the questionnaire, aiming at the problem of convenient logistics. There are 2 people who disagree very much, accounting for 8%; A total of 3 people disagreed, accounting for 12%; There are generally 2 people, accounting for 8%; 8 people agreed, accounting for 32%; 10 people fully agree, accounting for 40%.

3.5 Analysis on the Transmission Speed of Seafood Disease

In the five level Likert scale of the questionnaire, it is aimed at the problems that the disease of seafood spreads quickly and is difficult to control. A total of 1 person disagreed, accounting for 4%; There are 2 people who disagree, accounting for 8%; Generally, there is one person, accounting for 4%; 11 people agreed, accounting for 44%; 10 people fully agree, accounting for 40%.

3.6 Analysis of Cold Chain Logistics Cost

In the five level Likert scale of the questionnaire, aiming at the high cost of cold chain logistics. A total of 1 person disagreed, accounting for 4%; A total of 5 people disagreed, accounting for 20%; There are generally 2 people, accounting for 8%; 7 people agreed, accounting for 28%; 10 people fully agree, accounting for 40%.

4 Analysis on Influencing Factors of Rural E-commerce

The personal characteristics, industrial characteristics and government policies of seafood farmers are the three main aspects that affect the willingness of seafood farmers to sell fresh seafood online. Personal aspects include age, education level, whether to install broadband and use smart phones; Industry characteristics include breeding years and scale, fixed offline channels, online sales characteristics of fresh seafood industry, logistics convenience, transmission speed of seafood disease, and analysis of cold chain logistics cost; Government policies include government policy support, e-commerce training and participation in cooperatives. The following analyzes the survey data of the willingness of seafood farmers in Wangjiatan village to sell fresh seafood online from these three aspects.

4.1 Influence of Farmers' Personal Characteristics on Willingness to Sell Fresh Seafood Online

From the survey data, the older the surveyed seafood farmers are, the smaller the proportion they are willing to sell online. It can be seen that online selling intention is negatively correlated with age. Because the older the age, the worse the physical quality, and the ability to contact new things is also declining (Table 1).

Table 1. ANALYSIS ON THE INFLUENCE OF AGE ON ONLINE SALES INTENTION

Age	Number of samples	Number of samples willing to sell online	Willing to sell online (%)
18–30	1	1	100
30–40	3	3	100
40–50	8	4	50
50–60	13	2	15.38

Table 2. ANALYSIS ON THE INFLUENCE OF AGE ON ONLINE SALES INTENTION

Education level	Number of samples	Number of samples willing to sell online	Willing to sell online (%)
Primary school and below	14	4	28.57
junior high school	7	3	42.86
High school or technical secondary school	2	2	100
junior college	1	1	100

4.2 The Influence of Education Level on Online Sales Intention

From the survey data, the higher the education level of the surveyed seafood farmers, the greater the proportion they are willing to sell online. It can be seen that the willingness to sell online is positively correlated with the level of education. Because the higher the level of education, the broader the horizon, and the stronger the willingness to contact new things Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is “Heading 5”. Use “figure caption” for your Figure captions, and “table head” for your table title. Run-in heads, such as “Abstract”, will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text (Table 2).

4.3 The Impact of Broadband Installation and Smartphone Use on Online Sales Intention

From the survey data, the larger the proportion of seafood farmers who have installed broadband who are willing to sell online. It can be seen that online sales intention is affected by broadband installation. Because the event of installing broadband itself can reflect that farmers are willing to access the Internet to a certain extent. Farmers who install broadband are more likely to access e-commerce than farmers who do not install broadband.

Table 3. ANALYSIS ON THE INFLUENCE OF BREEDING YEARS ON ONLINE SALES INTENTION

Online shopping experience frequency	Number of samples	Number of samples willing to sell online	Willing to sell online (%)
1-3	3	1	33.33
3-5	4	3	50
5-10	10	5	50
10-	8	3	37.5

Table 4. ANALYSIS ON THE INFLUENCE OF THE NATURE OF BREEDING UNITS ON ONLINE SALES INTENTION

Unit nature	Number of samples	Number of samples willing to sell online	Willing to sell online (%)
Individual industrial and commercial households	13	6	46.15
company with limited liability	9	5	55.56
Professional cooperative	3	0	50

It can be seen from the data that there is no obvious relationship between breeding years and online sales intention. Because the breeding years are related to age, the longer the breeding years are, the older the age is. Therefore, the age of farmers really has an impact on the willingness to sell online.

4.4 Effects of the Nature of Breeding Units and Offline Fixed Channels on Online Sales Intention

It can be seen from the data that farmers participating in professional cooperatives have the lowest willingness to sell online; Farmers whose units are not limited liability companies have the highest willingness to sell online. Because professional cooperatives are of mutual economic assistance, they will provide members with feed supply, product sales, information consultation and technical services for aquaculture products. Therefore, farmers participating in cooperatives do not have strong willingness to sell online (Tables 4 and 5).

Table 5. ANALYSIS ON THE INFLUENCE OF OFFLINE FIXED CHANNELS ON ONLINE SALES INTENTION

Offline fixed channel	Number of samples	Number of samples willing to sell online	Willing to sell online (%)
Middleman acquisition	15	9	60
Hotel	3	2	66.67
Seafood store	2	0	0
Seafood processing enterprise	2	0	0
Online sales	3	2	66.67

From the data, it can be seen that the online sales intention of farmers whose offline fixed channels are acquired by middlemen is the strongest, while the online sales intention of offline fixed channels are seafood stores and seafood processing enterprises is the lowest; As the quality of seafood is more and more strict with the middlemen, the middlemen and the consumers in the village will choose the best seafood. Therefore, they will have more and more strict requirements for the quality of seafood, and the middlemen will choose the best seafood together.

4.5 The Influence of the Spread Speed of Seafood Disease on Online Sales Intention

Seafood culture is divided into greenhouse culture and sea culture. Greenhouse culture is cultured in the pool in the shed. The water in the pool is seawater. It is artificially raised and the water temperature is controlled. In the past, the greenhouse temperature was controlled by burning boilers. Now, the water temperature is controlled by burning natural gas because of environmental pollution. Enclosure aquaculture is open-air aquaculture, that is, aquaculture in a sea area out of the inner ring of the coastal seawall. Most abalone and sea cucumber can only be cultured in enclosure. Wangjiantan mainly cultivates South American prawn, Chinese prawn, turbot and crab, and not many abalone. Seafood is easy to get sick, and once it gets sick, it is like a plague, which spreads very fast, so once it is found, it should be dealt with immediately. Therefore, local people buy and pick now, which can not be satisfied by online sales. Moreover, the cost of seafood breeding is high (breeding equipment, shrimp fry and fish fry). Once the disease spreads, the loss will be huge. Therefore, the seafood breeding industry is an industry with high risk. It can be seen from the table that this characteristic of seafood has greatly affected the online sales intention of farmers (Table 6).

Table 6. ANALYSIS ON THE INFLUENCE OF THE SPREAD SPEED OF SEAFOOD DISEASE ON ONLINE SALES INTENTION

Grade	Number of samples	Number of samples willing to sell online	Willing to sell online (%)
Very disagree	1	1	100
disagree	2	1	50
commonly	1	1	100
Agree	11	5	45.45
in full agreement	10	4	40

5 Conclusions

Under the background of “Internet plus” and the rapid development of China’s fresh e-commerce, the state attaches great importance to farmers, and the academic research on fresh agricultural products is increasing. However, most of the fresh electricity business research is from the perspective of consumers, and few are analyzed from the perspective of producers. From the perspective of farmers, this paper analyzes the influencing factors of Wangjiatan seafood farmers’ willingness to sell fresh seafood online from three aspects: personal characteristics, industry characteristics and government, obtains significant influencing factors through descriptive analysis, and puts forward corresponding marketing policies. Personally, we should improve our ability, invest more time and energy, and pay attention to fresh e-commerce and online marketing; In terms of fresh e-commerce industry, create a sharing and cooperative industry atmosphere, and peer incentives and help can reduce mistakes and risks; The government has given some policy support and financial support to the fresh e-commerce industry. Due to various reasons, the research on some contents of this paper is not perfect, especially in the assumption of government policy formulation and fund establishment, which needs deeper exploration and more professional analysis. At present, the society pays more and more attention to the research on the online sales intention of fresh producers, I believe there will be more professional empirical papers.

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