



# Unveiling the driving mechanism of farmer entrepreneurship regularization under e-commerce platform embedding

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**Abstract.** With the policy support of "e-commerce for poverty alleviation", informal entrepreneurial activities for farmers embedded in e-commerce platforms have proliferated. Guiding farmers' entrepreneurship from the informal market to the formal market and formalizing entrepreneurship has become an important means to consolidate the achievements of poverty alleviation and promote rural revitalization. Based on institutional entrepreneurship theory, we use willingness to formalise entrepreneurship as a mediating variable to explore the driving mechanism of farmers' entrepreneurship formalisation under the embedding of e-commerce platforms. The empirical results show that: institutional innovation of e-commerce platforms, structural embedding of e-commerce platforms and farmers' network capacity positively influence entrepreneurial formalization behaviour; farmers' knowledge potential difference negatively influences entrepreneurial formalization behaviour; Entrepreneurial regularization willingness plays a partial mediating role in the positive relationship between institutional innovation of e-commerce platforms and entrepreneurial formalization behaviour; Entrepreneurial regularization willingness plays a full mediating role in the positive relationship between structural embedding of e-commerce platforms, farmers' network capacity and entrepreneurial formalization behaviour. This paper broadens the theoretical research perspective on entrepreneurial formalization, and provides some insights for farmer entrepreneurs to formalize their entrepreneurial practices.

**Keywords:** Institutional innovation of e-commerce platforms, Structural embedding of e-commerce platforms, Farmers' network capacity, Farmers' knowledge potential difference, Entrepreneurial formalization willingness, Entrepreneurial formalization behaviour.

## 1 Introduction

Entrepreneurial formalization is the process by which entrepreneurs make the leap from the informal to the formal market [1]. The Fifth Plenary Session of the 19th CPC Central Committee pointed out that we should further consolidate and develop the results of poverty eradication, comprehensively promote the strategy of rural revitalisation, and focus all efforts on encouraging and supporting farmers' employment and entrepreneurship. To complete the huge leap from poverty eradication to wealth creation, one has to make the transition from smallholder farming to modern agriculture. Traditional farmer entrepreneurial activities are subject to informal institutions (values, interpersonal relationships, etc.) and take place in an informal marketplace, and are informal entrepreneurial activities. Survival-oriented farmer entrepreneurial activities can rely on resources in informal markets to succeed, but opportunity-oriented farmer entrepreneurial activities are difficult to sustain in this context [2]. In relatively backward rural areas, where informal economic activities are in the lead, farmers obtain the resources they need to make a living through, for example, street stalls or unlicensed operations. In such informal markets, the lack of a well-developed infrastructure and regulations, and the relatively low level of education of farmers, leads to inefficient market functioning, with farmers exchanging intensive labour for meagre output. Although supported by informal institutions, informal markets have shown some stability due to kinship-based arrangements that facilitate the sharing of resources, social customs that may require individuals to help others in need, etc. However, the lack of formal regulations and facilities to support them makes it difficult for informal markets to bring further development opportunities to farmers, and for farmers to rely on economic activities carried out in informal markets to achieve significant increases in returns and to support wider economic development [3]. In contrast, formal markets benefit from a higher degree of stability and standardisation, which facilitates economic exchange between a wider range of participants. Formal farmer entrepreneurial activities are grounded in formal institutions (i.e. contracts, laws, etc.), and entrepreneurs can efficiently conduct various operations and transactions in a standardised formal market, which not only enables the organic integration of smallholder farmers with modern agriculture and effectively raises the income levels of farmers, but also creates greater socio-economic benefits [4].

The formalization of farmer entrepreneurship is clearly distinct from ordinary innovative entrepreneurship and requires not only that farmers strengthen their own various technical skills and knowledge, but that they integrate relevant support from outside is equally important. In fact, good networking skills are indispensable for farmer entrepreneurs to access effective resources and technical knowledge from external networks. Network competence is the ability to manage network relationships and improve network position in order to identify and access the required resources [5]. Strong networking capabilities of farmers can help their start-ups to establish trusting and friendly trading relationships with business partners, identify and access external resources in a more timely manner, and thus effectively reduce the cost of resource acquisition for start-ups [6]. In addition, knowledge resources are also an important influencing factor for entrepreneurial success. For small farmers, there is a large gap between the quantity

and quality of their knowledge mastery and other farm-related business entities in the same field, which leads to a knowledge potential gap, which is also the reason why farmers' entrepreneurship is less competitive compared to other business entities. Therefore, how farmers can make use of their network capabilities and bridge the knowledge gap in order to promote the success of formalized entrepreneurship has become one of the hot topics of current research. In addition, it is difficult for farmers to break through the barrier between informal and formal markets on their own, and external forces are needed to make this leap. With the successive issuance of policy documents supporting rural e-commerce, the development of rural e-commerce in China has gained momentum, and farmers' entrepreneurial activities embedded in e-commerce platforms have proliferated, with e-commerce platforms becoming an important driver of farmers' entrepreneurship. Therefore, under the e-commerce poverty alleviation model, how e-commerce platforms can guide farmers to formalize their entrepreneurship through institutional innovation and structural embedding has become a hot issue of concern at present. Willingness to formalize entrepreneurship is a farmer's attitude towards formalizing entrepreneurship, a conscious plan and a self-awareness to create or own a formal enterprise. Any behaviour must be motivated by willingness, and only when a person develops a strong will to accomplish something will he put more effort into that behaviour. Therefore, when we explore the influence of numerous antecedent variables on entrepreneurial formalization behaviour, we also have to consider the mediating role of willingness to formalize in this context.

It is worth noting that the embedding of e-commerce platforms has not really changed the status quo of farmer entrepreneurship, with many farmers' entrepreneurship remaining in the informal market and not yet entering or integrating into the formal market. Guiding farmers' entrepreneurship from the informal market to the formal market and formalizing entrepreneurship is not only conducive to consolidating the achievements of poverty eradication, but also to promoting rural revitalisation. Therefore, based on institutional entrepreneurship theory, this study adopts a combination of qualitative and quantitative research methods, and integrates the institutional innovation of e-commerce platforms, structural embedding of e-commerce platforms, farmers' network capacity and farmers' knowledge potential difference, entrepreneurial formalization willingness and entrepreneurial formalization behaviour in a theoretical model to systematically explore the driving mechanisms of farmers' entrepreneurship formalization under the embedding of e-commerce platforms, improve the relevant theoretical framework of farmers' entrepreneurship formalization, and provide a basis for the formalization of e-commerce platforms. The theoretical framework of farmers' entrepreneurship formalization is improved, and countermeasures and suggestions are provided to improve the efficiency and effectiveness of farmers' entrepreneurship formalization under the embedding of e-commerce platforms.

## **2 Research hypothesis**

### **2.1 Institutional innovation of e-commerce platforms and entrepreneurial formalization behaviour**

Early scholars' researches on service quality of e-commerce platforms mainly focused on technical services. In recent years, scholars have gradually focused on platform rules and institutions. Pavlou and Gefen believe that the e-commerce platform system is an objective institutional condition established by a third party to ensure the successful transaction. Various systems of e-commerce platforms can help users avoid potential risks in e-commerce transactions. Institutional innovation refers to the reform of the current system by organizations or individuals to maximize benefits when they find the possibility of benefits. Under the Internet business model, e-commerce platform system has various forms. Referring to the research of Han Feiyan, this paper defines e-commerce platform system as the service system, training system and structure guarantee provided by e-commerce platform for farmers and entrepreneurs. The service system can improve farmers' satisfaction with the platform by improving the service quality, the training system can help farmers enrich the knowledge base, and the structure guarantee reflects the stability and security of the e-commerce platform.

Zhao Xuefeng believes that a sound e-commerce platform system can strengthen consumers' trust in sellers and platforms. According to the trust transfer theory, farmers' entrepreneurs will enhance their trust in e-commerce platforms due to consumers' trust in e-commerce, thus stimulating farmers' entrepreneurs to start e-commerce businesses. The ability to undertake risks is an important factor influencing the success of entrepreneurship. As a relatively poor group, farmers are short of start-up capital and weak in risk bearing capacity. However, with the support of e-commerce platforms, peasant entrepreneurs can effectively reduce the cost of formal entrepreneurship and minimize the risk of start-up costs. The less risk farmer entrepreneurs feel, the more likely they are to carry out formal entrepreneurship independently. In addition, effective institutional innovation on the e-commerce platform can improve the service level of farmers, bring the network entrepreneurial mode and new entrepreneurial opportunities to poor areas, popularize the knowledge of innovation and entrepreneurship, improve the network entrepreneurial awareness of farmers in poor areas, and motivate them to abandon the traditional smallholder management mode. And then with the help of e-commerce platform under the formal system of formal entrepreneurship enthusiasm. Therefore, this paper puts forward the following hypothesis:

H1: The institutional innovation of e-commerce platforms positively and significantly influences the entrepreneurial formalization behaviour.

### **2.2 Structural embedding of e-commerce platform and entrepreneurial formalization behaviour**

The structural embedding of e-commerce platform refers to the network structure formed by the connection between e-commerce platform and other stakeholders and the position characteristics of e-commerce platform itself in the network. Structural

embeddedness reflects the position of an enterprise or platform in the social network, which refers to the relationship network formed among social participants. Usually, researchers use structural holes and network centrality to describe structural embeddedness. This study analyzes its influence on the regularization of farmers' e-commerce entrepreneurship by studying the network centrality of e-commerce platforms. Network centrality describes the degree to which an enterprise occupies a central position in a social network. It is measured by the number of other participants connected by an enterprise. The more other participants connected, the higher the degree of network centrality of an enterprise. Salman believes that enterprises with a high degree of network centrality can obtain a large number of advantageous resources. The research of Wang Yonggui and Liu Fei (2019) [7] found that network centrality can also reflect the ability of enterprises to obtain information and control other network participants to obtain information.

In farmers' e-commerce entrepreneurship, e-commerce platforms often play an intermediary role connecting farmers with other stakeholders, which is a basic supply chain structure. In addition, e-commerce platforms are also in a larger stakeholder relationship network. By virtue of its size and influence, e-commerce platforms usually occupy a high central position in the network, while core enterprises occupying the center of the network are in a dominant position to obtain resources and information. In the network, farmers' new ventures or potential farmers' entrepreneurs have a weak connection with external stakeholders. With the support of the e-commerce platform at the center of the network, farmers' new ventures or potential farmers' entrepreneurs can keep in close contact with other nodes in the network, obtain more resources and information in the network, and solve the problem of farmers' low integration in the business network. The structural embedding of e-commerce platform enables farmers to obtain sufficient resources and information, so that farmers can timely identify entrepreneurial opportunities, improve their bargaining power in the market, and reduce entrepreneurial costs. Therefore, farmers' willingness to formalize e-commerce entrepreneurship and the possibility of entrepreneurial success will naturally increase. Therefore, this paper puts forward the following hypothesis:

H2: The structural embedding of e-commerce platforms positively and significantly influences the of entrepreneurial formalization behaviour.

### **2.3 Farmers' network capacity and entrepreneurial formalization behaviour**

Social competence reflects the overall effect of an individual's interaction with the outside world. All the activities carried out by people are characterized by social groups. Entrepreneurial activities need support from all parties, and network ability is essential for entrepreneurs to reach and maintain cooperative relations with others. Hakanson first proposed the concept of network capability. At the beginning, this concept was mostly used to study mature enterprises. In recent years, this concept was gradually introduced to the level of individual entrepreneur's ability for discussion. Network capability refers to the ability to obtain favorable resources by managing network relations and improving network status. According to the study of Song Shuizheng (2021)

[8], network capability can be divided into four dimensions: network planning capability, network construction capability, relationship management capability and location occupation capability. This study believes that, for farmer entrepreneurs, their network ability is mainly reflected in the aspect of relationship management, which reflects whether farmer entrepreneurs can handle the network relationship with other partners.

Ren Shenggang (2014) [9] et al. believe that network capability can help entrepreneurs deepen the cooperative relationship with different members of the value network. The successful creation of an enterprise cannot be separated from good entrepreneurial opportunities, and the healthy growth of new enterprises is accompanied by the integration of high-quality resources. A large number of studies have shown that network capability can help farmers and entrepreneurs occupy favorable network positions in the network. Excellent network relationship and network position can not only help entrepreneurs prioritize entrepreneurial opportunities with promising development prospects, but also connect more advantageous resources to farmers' new ventures. Network capability will encourage farmers' entrepreneurs to take conscious actions. Specifically, farmers' entrepreneurs with strong network capability take the initiative to establish more extensive social connections and form stable trust and reciprocal relationship with their partners, so that they can obtain all kinds of entrepreneurial information in time and mobilize all kinds of resources relatively conveniently on the network. On the contrary, farmers with weak network ability can hardly get in touch with those who have key information and core resources due to their limited social ability. Therefore, it is difficult for them to obtain the recognition and support from other potential partners in the process of entrepreneurship. As a result, farmers and entrepreneurs are extremely difficult in the process of obtaining resources and information. Therefore, this paper puts forward the following hypothesis:

H3: Farmers' network ability positively and significantly influences the entrepreneurial regularization behaviour.

#### **2.4 Farmers' knowledge potential difference and entrepreneurial formalization behaviour**

"Potential" is a physical concept. Different positions of matter correspond to different potential. Ryu and Kim first proposed the construct of "knowledge potential" and introduced the idea of "potential" into the field of management. Knowledge potential refers to the state of an individual with a certain depth and breadth of knowledge. Knowledge potential difference reflects a knowledge potential gap, which is caused by the difference of individual knowledge stock. Simply put, knowledge potential difference is the concept of how much knowledge the subject stores. A widely accepted view is that knowledge gap will lead to the flow of knowledge from the side with high stock to the side with low stock. The knowledge potential difference of farmers studied in this paper refers to the knowledge ownership gap between individual farmers and other agriculture-related management subjects.

In the process of innovation and entrepreneurship, knowledge resources are very important influencing factors, and the knowledge ability of entrepreneurs is indispensable for identifying and developing entrepreneurial opportunities and operating new

ventures. In the complex and changeable market environment, mastering sufficient knowledge resources is helpful to accurately predict and grasp business opportunities. The smaller the knowledge potential difference between farmers and other agriculture-related management subjects, it means that farmers have mastered more knowledge resources and fully understood relevant knowledge technologies and information resources, which can provide a certain degree of knowledge guarantee for the success of farmers' entrepreneurship. On the contrary, if the knowledge potential difference is too large, it means that farmers and entrepreneurs lack sufficient knowledge reserve, and there is a huge knowledge gap between them and other agriculture-related management subjects, so that farmers are in a weak position in the market competition. Therefore, this paper puts forward the following hypothesis:

H4: Farmers' knowledge potential difference negatively and significantly influences the entrepreneurial regularization behaviour.

## 2.5 The mediating role of entrepreneurial formalization willingness

Behavioural theory holds that willingness is the best factor in explaining behaviour compared to other factors. Liu Yuna and Zhang Xiue (2018) [10] found through empirical research that entrepreneurial intention can significantly and positively promote entrepreneurs to identify entrepreneurial opportunities. Sutton pointed out that the stronger an individual's desire for an action is, the more likely it is to be carried out. Therefore, the will to act is a necessary condition for performing an action. The same is true of farmers' entrepreneurial regularization behaviour. In order to promote the regularization of farmers' entrepreneurial behaviour, they must first have a strong entrepreneurial regularization intention. The entrepreneurial regularization intention can stimulate the entrepreneurial regularization behaviour of farmers from two aspects. On the one hand, it can stimulate farmers to improve their own ability and master more knowledge, skills and resources. On the other hand is to seize opportunities, seize business opportunities, in the ever-changing market competition to find their own place. Entrepreneurs with the intention of entrepreneurial regularization will pay attention to the gap between themselves and their competitors, and actively seek to improve their individual abilities to narrow the gap. In addition, people with stronger normalization intention are more able to use their knowledge and skills to identify opportunities and obtain resources in the complex external market environment, so as to enhance their competitiveness. The structural embedment and institutional innovation of e-commerce platform have created more entrepreneurial opportunities and better entrepreneurial environment for farmer entrepreneurs, while the difference in network ability and knowledge potential reflects the competitiveness of farmers themselves. The former can stimulate farmers' entrepreneurial regularization intention from the outside, while the latter can stimulate farmers' entrepreneurial regularization intention from the inside, so as to achieve the purpose of adopting entrepreneurial regularization behaviour. Therefore, this paper puts forward the following hypothesis:

H1a: Entrepreneurial regularization willingness plays a mediating role in the process of e-commerce platform institutional innovation affecting regularization behaviour;

H2a: entrepreneurial regularization willingness plays a mediating role in the process of e-commerce platform structure embedding affecting regularization behaviour;

H3a: Entrepreneurial regularization willingness plays an intermediary role in the process of farmers' network ability affecting regularization behaviour;

H4a: Entrepreneurial regularization willingness plays an intermediary role in the process of farmers' knowledge potential difference affecting regularization behaviour.

Based on the above research assumptions, this paper builds a driving mechanism model for the regularization of farmer entrepreneurship embedded in e-commerce platform ("Figure 1").

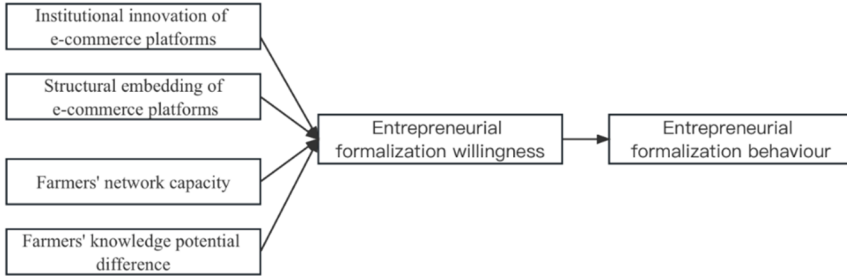


Fig. 1. Theoretical model.

### 3 Research design

#### 3.1 Scales

In order to ensure the reliability and validity of measurement tools and results, this paper tries its best to take existing mature scales at home and abroad as the basis, and then make some modifications according to the research purpose. Likert7-level scoring method was adopted for each measurement item, except for the item of farmers' knowledge potential difference, from "1" (completely disagree) to "7" (completely agree), and the item from: "1" to "7" indicates a growing gap. The institutional innovation of e-commerce platform is supplemented on the basis of the scale designed by Han Feiyan and Li Bo. The institutional innovation level of e-commerce platform is reflected through the service level of three aspects of the training system, service system and structural guarantee of e-commerce platform. Six items such as "structural guarantee of e-commerce platform, avoiding potential transaction risks" are designed for measurement. For the measurement of structural embedding of e-commerce platform, referring to the measurement tool adopted by Chung et al. , five items were designed, including "compared with other enterprises, e-commerce platform can cooperate with more enterprises in the network". Based on the research of Song Shuizheng and Shao Yunfei, the relationship management ability represents the network ability of farmers, and four items such as "I can properly handle differences or conflicts with partners" are selected for measurement. Based on the research of Dai Yong and Lin Zhenyang, farmers' knowledge potential difference is measured in seven items, such as "the gap in the



amount of accumulated knowledge in the industry between me and agriculture-related service subjects", from the perspective of breadth and depth of knowledge. Based on the scale of individual entrepreneurial intention of Chen and Greene and combined with the characteristics of entrepreneurial normalization, six items including "I am interested in the incorporation of a company" were designed for measurement. There is a lack of referable maturity scale for the measurement of entrepreneurial regularization behaviour. Combined with some entrepreneurial behaviour scales, this study designed four items for measurement, such as "I have learned about the relevant information of enterprise registration in the past three months". In terms of the selection of control variables, existing studies have shown that factors such as gender, age, family income, family population and educational background of entrepreneurs may have an impact on farmers' entrepreneurial behaviour. In order to eliminate the interference of such factors on the research conclusion, this study introduced them into the model in the form of control variables.

### 3.2 Reliability and validity test

In this paper, the reliability and validity of the scales were tested using MPLUS 7.4 software and SPSS 22.0 software, and the test results are shown in Table 1. In terms of scale reliability, the Cronbach's  $\alpha$  values of all variables were greater than 0.7, indicating that the reliability of the scales was good. In terms of content validity, the scale design of the variables was carried out with reference to the existing mature scales at home and abroad, and the questionnaire was improved by expert review and mutual translation between Chinese and English to ensure the content validity of the questionnaire. In terms of convergent validity, the minimum value of the factor loading coefficient for each item was 0.647, which was greater than 0.5, the minimum value of the combined reliability value (CR) for each variable was 0.852, which was greater than 0.7, and the minimum value of the average variance extracted (AVE) for each variable was 0.538, which was greater than 0.5, indicating that the convergent validity of the scale was good. In terms of discriminant validity, the square root of the AVE values of all variables was greater than the correlation coefficient on the basis of all variables with AVE values greater than 0.5, as shown in Table 2, indicating that the variables studied in this paper have good discriminant validity.

**Table 1.** Reliability and validity test results.

Variables	Cronbach's $\alpha$	CR	AVE
Institutional innovation of e-commerce platforms	0.887	0.914	0.638
Structural embedding of e-commerce platform	0.783	0.852	0.538
Farmers' network capacity	0.855	0.902	0.698
Farmers' knowledge potential difference	0.941	0.952	0.741
Entrepreneurial formalization willingness	0.861	0.896	0.591
Entrepreneurial formalization behaviour	0.822	0.883	0.655

## 4 Empirical analysis

### 4.1 Correlation analysis

The correlation coefficients and square roots of AVE values for all core variables are shown in Table 2. Among them, institutional innovation of e-commerce platform and entrepreneurial formalization behaviour ( $r=0.675, p<0.01$ ), structural embedding of e-commerce platform and entrepreneurial formalization behaviour ( $r=0.585, p<0.01$ ), farmers' network capability and entrepreneurial formalization behaviour ( $r=0.573, p<0.01$ ) were significantly positively correlated, farmers' knowledge potential difference and entrepreneurial formalization behaviour ( $r=-0.535, p<0.01$ ) were significantly negatively correlated, institutional innovation of e-commerce platforms and entrepreneurial formalization willingness ( $r=0.682, p<0.01$ ), structural embedding of e-commerce platforms and entrepreneurial formalization willingness ( $r=0.695, p<0.01$ ), farmers' network capability and entrepreneurial formalization willingness ( $r=0.697, p<0.01$ ) were significantly positively correlated, farmers' knowledge potential difference was significantly negatively correlated with entrepreneurial formalization willingness ( $r=-0.568, p<0.01$ ), entrepreneurial formalization willingness and entrepreneurial formalization behaviour ( $r=0.725, p<0.01$ ) were significantly and positively correlated, laying the foundation for testing the research hypotheses.

**Table 2.**Correlation analysis results.

Variables	1	2	3	4	5	6
1. Institutional innovation of e-commerce platforms	<b>0.799</b>					
2. Structural embedding of e-commerce platform	0.606***	<b>0.733</b>				
3. Farmers' network capacity	0.554***	0.646***	<b>0.835</b>			
4. Farmers' knowledge potential difference	-	-	-	<b>0.861</b>		
5. Entrepreneurial formalization willingness	0.579***	0.522***	0.549***	-0.568***	<b>0.756</b>	
6. Entrepreneurial formalization behaviour	0.682***	0.695***	0.697***	-0.535***	0.725***	<b>0.809</b>
Mean value	4.988	4.434	4.389	2.662	4.558	4.370
Standard deviation	1.114	0.981	1.214	1.358	0.976	1.023

Note: \* represents  $p < 0.1$ , \*\* represents  $p < 0.05$ , \*\*\* represents  $p < 0.01$ , and the diagonal value is the square root of the AVE value, shown in bold.

## 4.2 Regression analysis

In this study, the main effect and intermediate effect were verified by stepwise regression method. The test results are shown in Table 3. Main effect test. As shown in Table 3, Model 3 tests the influence of control variables such as respondent's gender, migrant work experience, family income and poor counties on dependent variable entrepreneurial regularization behaviour. Model 4 is based on model 3, adding independent variable institutional innovation of e-commerce platform, structural embedding of e-commerce platform, farmers' network capacity and farmers' knowledge potential difference. According to model 4, institutional innovation of e-commerce platforms ( $\beta = 0.336$ ,  $p < 0.01$ ), structural embedding of e-commerce platforms ( $\beta = 0.152$ ,  $p < 0.05$ ), farmers' network capacity ( $\beta = 0.125$ ,  $p < 0.05$ ) had a significant positive effect on entrepreneurial regularization behaviour. If H1, H2 and H3 were verified, farmers' knowledge potential difference had a significant negative effect on entrepreneurial regularization behaviour ( $\beta = -0.118$ ,  $p < 0.05$ ), and hypothesis H4 was verified.

Mediation effect test. According to the research results of Wen Zhonglin and Zhang Lei et al., firstly, in the main effect test, the total effect of independent variable institutional innovation of e-commerce platforms, structural embedding of e-commerce platforms, farmers' network capacity and farmers' knowledge potential difference on the dependent variable entrepreneurial regularization behaviour has been verified. Secondly, according to model 2, the institutional innovation of e-commerce platforms ( $\beta = 0.245$ ,  $p < 0.01$ ), the structural embedding of e-commerce platforms ( $\beta = 0.265$ ,  $p < 0.01$ ), and the farmers' network capacity ( $\beta = 0.274$ ,  $p < 0.01$ ) had a significant positive effect on the entrepreneurial regularization willingness. Farmers' knowledge potential difference has no significant effect on entrepreneurial regularization willingness, so it is assumed that H4a is not supported. Thirdly, according to model 6, entrepreneurial regularization willingness had a significant positive effect on entrepreneurial regularization behaviour ( $\beta = 0.417$ ,  $p < 0.01$ ). Finally, the direct effect, according to model 6, the institutional innovation of e-commerce platforms has a significant positive effect on entrepreneurial regularization behaviour ( $\beta = 0.234$ ,  $p < 0.01$ ), while the structural embedding of e-commerce platforms and farmers' network capacity have no significant effect on entrepreneurial regularization behaviour. In conclusion, part of the mediating effect of entrepreneurial regularization willingness is significant in the relationship between institutional innovation of e-commerce platforms and entrepreneurial regularization behaviour, while the full mediating effect is significant in the relationship between structural embedding of e-commerce platforms, farmers' network capacity and entrepreneurial regularization behaviour. Hypothesis H1a, H2a and H3a are verified respectively.

**Table 3.** Regression analysis results.

	Entrepreneurial formalization willingness		Entrepreneurial formalization behaviour			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender	0.015 (0.305)	0.009 (0.235)	-0.061 (-1.168)	-0.055 (-1.227)	-0.070* (-1.658)	-0.058 (-1.396)

Age	-0.199*** (-3.717)	0.009 (0.202)	- 0.278*** (-5.010)	-0.094* (-1.889)	-0.157*** (-3.392)	-0.098** (-2.089)
Educational background	0.328*** (6.161)	0.117*** (2.827)	0.292*** (5.294)	0.125** (2.529)	0.093* (1.930)	0.076 (1.611)
Working experience	-0.084* (-1.651)	-0.089** (-2.412)	-0.022 (-0.417)	-0.026 (-0.597)	0.029 (0.673)	0.011 (0.263)
Entrepreneurial experience	0.081 (1.591)	0.067* (1.796)	-0.003 (-0.059)	-0.021 (-0.472)	-0.052 (-1.213)	-0.049 (-1.167)
Family monthly income	0.315*** (5.702)	0.062 (1.407)	0.266*** (4.653)	0.037 (0.709)	0.075 (1.519)	0.011 (0.228)
Family population	-0.028 (-0.550)	-0.014 (-0.369)	-0.011 (-0.214)	-0.003 (-0.064)	0.006 (0.133)	0.003 (0.070)
Region	-0.199*** (-3.717)	0.073** (1.972)	-0.038 (-0.732)	-0.023 (-0.522)	-0.067 (-1.574)	-0.053 (-1.283)
Institutional innovation of e-commerce platforms		0.245*** (4.404)		0.336*** (5.085)		0.234*** (3.625)
Structural embedding of e-commerce platform		0.265*** (4.914)		0.152** (2.364)		0.041 (0.649)
Farmers' network capacity		0.274*** (5.154)		0.125** (1.987)		0.011 (0.180)
Farmers' knowledge potential difference		-0.074 (-1.531)		-0.118** (-2.048)		-0.087 (-1.602)
Entrepreneurial formalization willingness					0.606*** (11.163)	0.417*** (5.747)
R <sup>2</sup>	0.396	0.688	0.353	0.560	0.575	0.614
ΔR <sup>2</sup>	—	0.292	—	0.207	0.222	0.261
F value	19.678***	43.404***	16.371** *	25.001***	35.893***	28.750***

Note: n=249; The data listed are standard  $\beta$  coefficients; \* means  $p < 0.1$ , \*\* means  $p < 0.05$ , \*\*\* means  $p < 0.01$ ; The t values are in parentheses.

## 5 Conclusion

### 5.1 Research conclusion

Based on the theory of institutional entrepreneurship, this paper explores the driving mechanism of farmers' entrepreneurial regularization. On the one hand, it discusses the driving mechanism of institutional innovation and structural embedding of e-commerce platforms on entrepreneurial regularization behaviour from the perspective of e-commerce platform embeddedness; on the other hand, it studies the driving mechanism of farmers' network capacity and knowledge potential difference on entrepreneurial regularization behaviour from the perspective of individual farmers. On this basis, the mediating role of entrepreneurial regularization willingness among independent variables and entrepreneurial regularization behaviour is further analyzed. The results show that:

(1) Institutional innovation and structural embedding of e-commerce platforms promote farmers' entrepreneurial regularization behaviour. The success of entrepreneurial regularization needs the dual support of opportunity and ability, and the e-commerce platform is mainly driven by opportunity for farmers' entrepreneurial regularization. On the one hand, through institutional innovation, the e-commerce platform can improve the service level for farmer entrepreneurs, enrich the knowledge base of farmer entrepreneurs, and help them identify formal entrepreneurial opportunities. On the other hand, the structural embedding of e-commerce platform helps farmers and entrepreneurs occupy a more favorable position in the network relationship, and provides more entrepreneurial opportunities to farmers through the core network position of e-commerce platform itself, and promotes the regularization of farmers' entrepreneurial behaviour.

(2) Farmers' network capacity promotes farmers' entrepreneurial regularization behaviour. Social network is an effective way for entrepreneurs to obtain information and resources, and the network ability of farmer entrepreneurs is mainly reflected in the relationship management ability. Farmer entrepreneurs establish cooperative relations with external parties, obtain the regularization entrepreneurial opportunities with good prospects, integrate and introduce all kinds of regularization resources, and share their regularization risks by virtue of the interest correlation of all parties. And then promote their own entrepreneurial positive planning behaviour.

(3) Farmers' knowledge potential difference hinders farmers' entrepreneurial regularization behaviour. Knowledge ability is the key factor for the success of entrepreneurial regularization. A large knowledge potential difference indicates that there is a large gap between farmer entrepreneurs and other competitors in the same industry in professional technology and ability. Such a gap also leads to the weak position and strong competitive pressure of farmers in the regularization of entrepreneurship, with a high risk of failure. Farmer entrepreneurs understand the existence of this knowledge gap, in order to avoid the risk and failure of normalization, they will not choose the normalization of entrepreneurship.

(4) Entrepreneurial regularization willingness plays a partial mediating role in the relationship between institutional innovation of e-commerce platforms and entrepreneurial regularization behaviour. Through institutional innovation, e-commerce

platforms can popularize network entrepreneurial consciousness, introduce e-commerce entrepreneurial mode and entrepreneurial opportunities, which can stimulate farmers' willingness to formalize entrepreneurship to a certain extent, and further promote farmers' entrepreneurial regularization behaviour. Entrepreneurial regularization willingness plays a complete mediating role in the relationship between structural embedding of e-commerce platforms, farmers' network capacity and entrepreneurial regularization behaviour. The structural embedding of e-commerce platforms provides potential farmer entrepreneurs with good normalized entrepreneurial opportunities and resource access channels. With high-quality entrepreneurial opportunities and resources, it can maximize farmers' entrepreneurial regularization intention and effectively promote farmers' entrepreneurial regularization. Farmers' own network ability can help them optimize the cooperative relationship with stakeholders and gain more external support and trust, thus enhancing farmers' willingness to regularize their entrepreneurship and promoting their regularized entrepreneurial behaviour. The mediating effect of entrepreneurial regularization intention on the relationship between farmers' knowledge potential difference and entrepreneurial regularization behaviour is not significant. As a single individual, the knowledge stock of peasant entrepreneurs is often far smaller than that of relevant agriculture-related business subjects. It is difficult for peasant entrepreneurs to eliminate the knowledge gap even through their own continuous efforts. As a result, ordinary peasant entrepreneurs are always at a disadvantage in the aspect of knowledge competition. Therefore, the narrowing of knowledge potential difference to a certain extent will hardly stimulate farmer entrepreneurs to produce entrepreneurial regularization willingness.

## 5.2 Theoretical contribution

At present, the research on entrepreneurial regularization has just started in China, and the existing research perspectives mostly focus on the driving factors and the impact of performance. However, at present, these two types of research have the characteristics of decentralization and mainly adopt qualitative research methods. This study takes the informal entrepreneurship of farmers embedded in e-commerce platform as the entry point, and through large sample empirical test, discusses the problem of entrepreneurial regularization, and expands the research perspective of entrepreneurial regularization. Based on the theory of institutional entrepreneurship, the driving mechanism of farmers' entrepreneurial regularization is deeply discussed from the two aspects of ability and opportunity, and the relationship between the institutional innovation and structural embeddedness of e-commerce platform and the difference of farmers' network ability and knowledge potential on entrepreneurial regularization behaviour is clarified. It also clarified the utility path of entrepreneurial regularization intention in the relationship between e-commerce platform institutional innovation, e-commerce platform structure embeddedness and farmers' network ability and entrepreneurial regularization behaviour, further deepening the theoretical perspective of entrepreneurial regularization.

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