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Innovation, entrepreneurship and operating performance of farmers in forest zone: evidence from China

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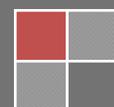
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ABSTRACT

Innovation and entrepreneurship are effective ways to improve operating performance. This study investigates how innovation and entrepreneurial behaviors influence operating performance of farmers in forest zone in China, which is rarely discussed. With 238 questionnaires from some provinces in China, Structural Equation Models are used to test the relationships. Results indicate that innovation has positive impact on proactiveness (one dimension of entrepreneurial orientation) and operating performance directly. Simultaneously, proactiveness is the mediating factor between innovation and operating performance.

KEYWORDS

Innovation; Entrepreneurship; Proactiveness; Operating performance; Forest zone.



INTRODUCTION

According to the seventh census of Chinese forest resources, the forest area of China is 195,452,200 hectares, and the coverage rate is 20.36%. In order to liberate the productivity of forestry, China has implemented tenure right reforms of collective forest in recent years, and given the tenure right to farmers. Institutional reforms leads to innovation and entrepreneurship in forest zone (Lunnan, 2005)^[1]. After the reforms, more and more farmers have innovational and entrepreneurial behaviors. At present, many farmers expand the scale of production or create new organizations to develop forest planting, forest breeding, wood processing, forestry by-products production, industries of under forest. Therefore, innovation and entrepreneurship have been topics of growing interest among famers in China.

Innovation impacts forestry significantly, and the recognition of innovation opportunity is the center of entrepreneurship (Ireland et al., 2003)^[2]. Entrepreneurship is the process of carrying out new combination or the creation of new organizations. Meanwhile, research in the field of entrepreneurship has mainly assumed that entrepreneurial initiatives were the results of an individual's actions (Beaudoin et al., 2011)^[3]. Therefore, in this research, the innovation and entrepreneurship of famers are investigated. The first objective is to develop an understanding of how innovation and entrepreneurship influence the operating performance of famers in forest zone in China.

Tenure right reforms provide the basic and opportunity of entrepreneurship, but the background of entrepreneurship is innovation (Krueger, 2007; Thompson, 2009)^[4,5]. Still, innovation isn't able to improve the operating performance of famers directly, because innovation need change into practice through entrepreneurship, and then influence the operating performance. The second objective is to explore the relationship between innovation, entrepreneurship and the operating performance of famers in forest zone in China.

Based on the above cognition, a framework of the relationship is formed. The process can be described as that innovation affects two variables of entrepreneurial behaviors, which are proactiveness and risk-taking propensity, and the proactiveness and risk-taking propensity would affect operating performance. This study investigates, firstly the effects of innovation on proactiveness, risk-taking propensity, and operating performance, secondly, the effects of proactiveness and risk-taking propensity on operating performance; thirdly, the mediating effects of proactiveness and risk-taking propensity on the relationship between innovation and operating performance. Figure 1 presents the research framework.

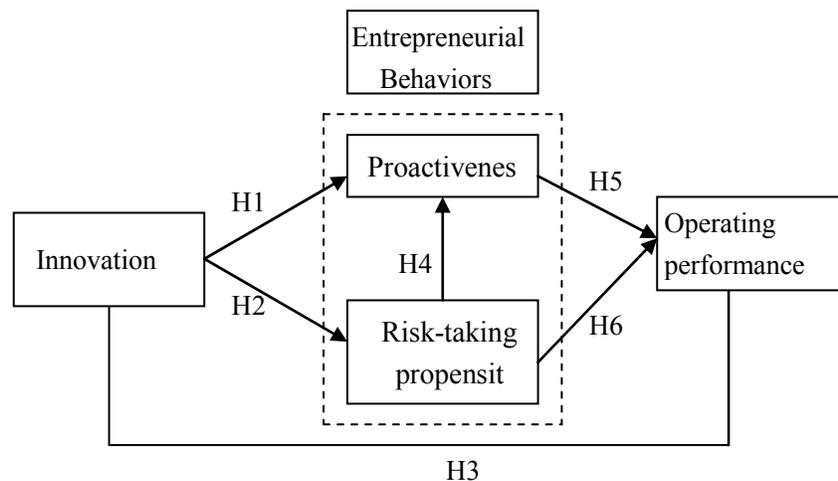


Figure 1 : Research framework

THEORETICAL BACKGROUND AND HYPOTHESE

Innovation and entrepreneurial behaviors

Innovation is defined as simply changes in routines, and it includes the creation of new combinations, new methods of production, new ventures, new markets, and new wealth (Candida et al., 2003)^[6]. In this study, Innovation is conceptualized as the willingness and tendency to engage in and support new ideas and create new process, thereby departing from established practices and technologies (Wiklund and Shepherd, 2005; Nybakk and Hansen, 2008)^[7,8].

Entrepreneurship is defined as the process by which individuals pursue opportunities without regard to alienable resources they currently control. An entrepreneur is a person who carries out new combinations. These new combinations can take several forms: new goods or new quality of a product, new methods of production, new markets, new sources of supply or a new way of organization (Nybakk and Hansen, 2008)^[8]. Entrepreneurship researchers have used the term entrepreneurial behaviors to describe a 'fairly consistent set of related activities or processes' (Lumpkin and Dess, 1996; Miles and Arnold, 1991; Morris and Paul, 1987; Smart and Conant, 1994)^[9-12]. Pro-activeness and Risk-taking are important dimensions of entrepreneurial behaviors (Miller, 1983)^[13].

Apropos to these logics, this study infers that Innovation can positively enhance the forming of entrepreneurship behaviors.

H1: Innovation can positively enhance the forming of Pro-activeness;

H2: Innovation can positively enhance the forming of Risk-taking.

Innovation and operating performance

Innovation is an important driver of performance (Darroch and McNaughton, 2003)^[14]. With innovation, individuals or organizations are able to provide the consumers with the attributes which they desire (Micheels and Gow, 2008)^[15]. Modern innovation literature divides innovation into product innovation and process innovation (Rametsteiner, 2005)^[16]. Product innovation can bring output of an enterprise or organization, and process innovation is technological innovation or innovations in the organization of and enterprise or organization. Therefore, innovation can contribute performance in many ways.

Apropos to these logics, this study infers that Innovation can positively enhance the performance of farmers in forest zone.

H3: Innovation can positively enhance the performance of farmers in forest zone.

Entrepreneurial behaviors and operating performance

Many literatures study the relationship between entrepreneurial behaviors and operating performance. Some researchers found entrepreneurial behaviors had positively significant relationship with operating performance (Wiklund and Shepherd, 2005; Nybakk and Hansen, 2008)^[7,8]. These researchers who think they have positive relationship find entrepreneurial behaviors exhibit superior performance (Zahra, 1991)^[17]. However, other researchers pointed out they had no relationship between entrepreneurial behaviors and operating performance, and their reasons were that risks were great with entrepreneurial behaviors (Wiklund and Shepherd, 2005; Hamel, 2000)^[7,18].

In this study, entrepreneurial behaviors are divided into two dimensions, which are Pro-activeness and Risk-taking. Proactiveness is an opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Rauch, et al., 2009)^[19]. Therefore, proactiveness has positive relationship with operating performance in theory according to the definition of proactiveness. Meanwhile, Risk-taking is more likely to initiate a new activity (Nybakk and Hansen, 2008)^[8]. In fact, risk is an important factor which influences the entrepreneurial behaviors (Cramer et al., 2002)^[20].

Apropos to these logics, this study infers that entrepreneurial behaviors can positively enhance the performance of farmers in forest zone. Meanwhile, entrepreneurs which have Risk-taking are easy to do things with pro-activeness.

H4: Risk-taking can positively enhance the pro-activeness of farmers in forest zone.

H5: Pro-activeness can positively enhance the performance of farmers in forest zone.

H6: Risk-taking can positively enhance the performance of farmers in forest zone.

METHODOLOGY

Concept measurement

In this study, innovation was measured according to DiLiello and Houghton (2006)^[21], Krause (2004)^[22], and items were modified based on Chinese culture and the characters of famers in forest zone. Entrepreneurial behaviors were not measured directly, and divided into two dimensions, which are pro-activeness and risk-taking. Proactiveness and risk-taking were measured by Miller (1991)^[10], Lumpkin and Dess (1996)^[9], Zahra (1995)^[23]. Items were modified based on Chinese culture and the characters of famers in forest zone.

It is difficult for researchers to measure operating performance because of availability of financial data, and more and more scholars begin to measure it according to subjective feelings. Operating performance was measured according to Naman and Slevin (1993)^[24], Chandler and Hanks (1993)^[25], Cavalluzzo and Ittner (2004)^[26], and items were modified based on Chinese culture and the characters of famers in forest zone.

Demographic information was collected in this study, including educational level, the characters of their forest lands, and other information.

Data collection

To measure innovation, entrepreneurship, and operating performance, a questionnaire was designed. The questionnaire was pre-tested in Fujian province of China in 2011, and the total number of pre-test was 100. Questionnaire was modified based on pre-test, and only minimal changes were made. The formal investigation was made in Fujian, Zhejiang, and Jiangxi provinces, which are provinces with abundant forest resource. The questionnaire was forwarded to 1,000 famers with statistical sampling principles by face to face investigation. The response rate was 55%, with 238 valid responses collected.

Analysis

Firstly, this study tests non-response bias of samples. The first thirty respondents were compared to the last thirty respondents with respect to demographic characters, innovation, entrepreneurial orientation, and operating performance, as outlined by Bagozzi and Yi (1981)^[27]. No significant differences ($p > 0.05$) were found suggesting non-response bias was not of concern.

Secondly, AMOS17.0 has been used to analyze the research model. The measurement model of all constructs first assessed the adequacy of each multi-item scale in capturing its construct. This study checked internal consistency, reliability, convergent validity, and discriminate validity before testing the hypotheses via the causal model.

The model which used in this paper is:

$$SE : \eta = \gamma\xi + \beta\eta + \xi$$

$$\text{Equation of endogenous variable : } Y = \lambda\eta + \varepsilon$$

$$\text{Equation of exogenous variable : } X = \lambda\xi + \delta$$

In the equations, η is variable type, γ is regression type, ξ η is variable type, β is regression type.

In the equations of endogenous variables and exogenous variable, λ is regression type, ε and δ are variance or covariance type.

Thirdly, This study estimates the mediating effects through SEM as suggested by Lai et al.(2010)^[28], to respectively take competitive models to fulfill the related conditions.

RESULTS

Reliability and validity

Firstly, this study used confirmatory factor analysis (CFA) to delete items and compressed dimensions. According to the method, this study didn't change the items of variables because of good fit of the items, and the results shown in TABLE 1.

Secondly, this study tested the reliability of variances, and the results are shown in TABLE 1. The Cronbach of each variable is between 0.834 and 0.907, above 0.70 recommended by Nunnally and Bernstein (1994)^[29]. Furthermore, the composite reliability (CR) of each variable is between 0.8863 and 0.9314, above 0.6. Therefore, the reliability of variances is in the accepted range of research.

Thirdly, this study tested the validity of variances and the results are shown in TABLES 1. This study tested convergent validity and discriminant validity. TABLE 1 show that the factor loading t value is between 7.583 and 17.166, in the accepted range recommended. The AVE (Average Variance Extracted) of measurable variables is between 0.6113 and 0.7964, above 0.5. Meanwhile, the correlation coefficient of each variance was larger than its square root of AVE, and the discriminant validity was good. Therefore, this measurement model has good validity, and fit the analysis of the hypothesis.

TABLE 1 : The reliability and validity analysis of each measurable variable

Index	Mean	Standard Deviation	Factor loading	t	CR	AVE	Cronbach a
innovation 1	4.7311	2.01135	.730	standard			
innovation 2	5.0252	1.65844	.860	8.854			
innovation 3	4.4118	1.75221	.787	8.003	.8863	.6113	0.834
innovation 4	4.8776	1.70176	.850	8.773			
innovation 5	4.2857	1.74609	.665	7.583			
proactiveness 1	3.4706	1.92616	.830	standard			
proactiveness 2	3.9748	1.92019	.924	12.354	.9213	.7964	0.871
Proactiveness3	4.2563	1.96313	.920	12.478			
Risk-taking1	3.7437	1.94151	.827	standard			
Risk-taking2	4.2101	1.94816	.914	17.166	.9167	.7861	0.863
Risk-taking3	4.0840	1.91190	.916	12.374			
operating performance1	3.7941	1.74650	.849	standard			
operating performance2	3.5336	1.82022	.781	10.656			
operating performance3	3.9916	1.84869	.856	12.824	.9314	.7314	0.907
operating performance4	4.6092	1.84031	.901	15.389			
operating performance5	4.5546	1.84504	.884	15.174			

Structural model

After testing the validity and reliability, this study tests the fitness of the structural model, and the results shown in Figure 2 and TABLE 2. The structural equation modeling (SEM) analysis usually takes the χ^2 to verify model fitness (Lai

etc., 2010)^[28], however, the sample influences χ^2 , as the literature indicates. Therefore, except for considering sample size, while taking the χ^2 and the degree of freedom to measure model fitness. Following the suggestion of Bagozzi and Yi (1988)^[27], this study used seven indicators to measure fitness of the entire model. The result revealed that $\chi^2 = 3.023$ ($p = 0.000$), RMSEA=0.092, GFI=0.885, AGFI=0.800, NFI=0.887, CFI=0.921, IFI=0.922. RMSEA below 0.1 is accepted by the model. Simultaneously, other indicators all above 0.9 except AGFI and NFI, but they were closer to the standard. Therefore, the structural model and indicators fit the model very well, and the fitness should be acceptable.

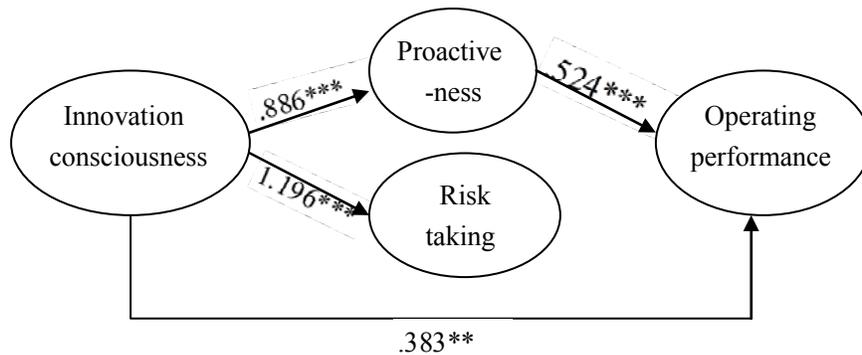


Figure 2 : The path of the structural model

TABLE 2 : The Index of the structural model

			Est.	S. E.	C. R.	P
Proactiveness	<---	innovation	.886	.132	6.706	***
Risk-taking	<---	innovation	1.196	.158	7.553	***
operating performance	<---	innovation	.383	.142	2.696	.007
operating performance	<---	Proactiveness	.524	.088	5.936	***
operating performance	<---	Risk-taking	.012	.062	.194	.846

Hypothesis testing

According to the results, innovation has positive impact on proactiveness ($\gamma_{11}=0.886$, $p=0.000$) and risk-taking ($\gamma_{12}=1.196$, $p=0.000$), and it impact operating performance directly ($\gamma_{13}=0.383$, $p=0.007$). Proactiveness has positive impact on operating performance ($\gamma_{23}=0.383$, $p=0.000$). However, Risk-taking hasn't positive impact on operating performance ($p=0.846>0.1$).

According to the results, H1, H2, H3, H4 and H6 were supported by the data, however, H5 was not supported by the data.

DISCUSSION AND IMPLICATIONS

Innovation versus entrepreneurial behaviors

Innovation and entrepreneurship are similar words in economics, and entrepreneurs are persons who carry out innovation. Speaking generally, Innovation need entrepreneurial orientation to put into practice, and entrepreneurial orientation need innovation to guide the direction. Findings suggest that forest owners with an entrepreneurial attitude are more likely to start up new activities related to their forest (Nybakk and Hansen, 2008; Lunnan et al., 2006)^[8,1]. This study indicates the relationship of Innovation and entrepreneurial orientation. Innovation has positive relations with proactiveness and risk-taking which are two dimensions of entrepreneurial orientation. The results are consistent with other studies (e.g. Nybakk and Hansen, 2008; Lunnan et al., 2006)^[8,1].

This result has important implications to policy makers. After the tenure right reforms of collective forest, policy makers of Chinese governments want to improve the enthusiasm of famers to take part in entrepreneurial activities. To gain the goal, policy makers should encourage farmers have entrepreneurial orientation in operating activities, and cultivate their Innovation forward.

Entrepreneurial orientation versus operating performance

Research findings in enterprises level suggest entrepreneurial behaviors of famers have positive impact on operating performance (Nybakk and Hansen, 2008; Lunnan et al., 2006)^[8,1]. This study indicates that entrepreneurial behaviors of

farmers have positive impact on operating performance in individuals' level. In details, proactiveness has positive impact on operating performance of farmers.

However, risk-taking hasn't positive impact on operating performance of farmers. This shows risk-taking is just the propensity of entrepreneurship, while risk has two sides. At one hand, it is necessary to take risks when taking part in entrepreneurial activities, and it is one part of entrepreneurship. At the other hand, risk means uncertain, and it shows the activities would be success or fail in certain probability. Therefore, it has no significant impact on operating performance.

This result has important implications to policy makers. As far as farmers, they weren't able to take high risk because of the lack of capital compared to entrepreneurs of enterprises. Therefore, policy makers should make the risk of entrepreneurial activities low according to provide interest-free loans, technology service, etc.

Innovation versus operating performance

It's an interesting topic to talk about the relationship between innovation and performance. Research findings suggest innovation has positive impact on performance (Dobni, 2011)^[30]. In the study of firms' level, Dobni (2011) indicates that the high innovating firms had a positive relationship with the top line growth, and customer satisfaction, and bottom line growth, and profitability. In this study, the positive relationship between innovation and performance is tested in farmers' level ($\gamma_{13}=0.383$, $p=0.007$).

However, there is mediating factor between innovations versus operating performance in this study. With the mediating influence of proactiveness, the significance of the relation is better. It indicates that it is not enough for farmers to have innovations, and it need proactiveness to put innovations into practice forward. This result is the important finding of this study, and it combines innovation, entrepreneurship and operating performance together.

This result has important implications to policy makers. To improve the operating performance of farmers, policy makers should use system policies, including improving the innovation according to education and set examples, cultivating proactiveness according to provide capital, technology service, etc.

LIMITATION AND FUTURE RESEARCH

This section addresses some limitations in our research and suggests related directions for future research. The first limitation is that our data all come from three provinces of China. As we all know that there are more than 20 provinces of China which have tenure right reforms of collective forest. Therefore, this study suggests the future researchers to investigate with data from other provinces. The second limitation is that this study just analyses the behaviors of farmers as individuals and didn't analyses cooperation organizations, enterprises or other groups behaviors. This study suggests that future researchers should investigate group behaviors and make compare with them. The third limitation is that this study just defines innovation, entrepreneurial behaviors and operating performance from literatures. This study suggests the future researchers to define these variables entirely and also recommend cultural views.

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