The Influence of Recreational Fishery Organization Scales on Choice of Innovation Channels and Consequence for Performance
The Moderating Role of Government

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ABSTRACT

Innovation is the first power in the development of recreational fishery industry. The knowledge innovations including knowledge search are the important way in designing, mapping, building up the recreational fishery projects, and effectively managing them, resulting in achieving good performances. This paper investigates the relationship between the recreation fishery organization scales, channels of knowledge innovation and performance. An empirical study was conducted in a number of domestic recreational fishery enterprises. The author assumed that large, medium and small-scale recreational fishery enterprises had path relationships to the selection of multiple channels of knowledge innovation, thus positively affecting the performance of enterprises. The function of government in the development of domestic recreational fishery industry is also discussed. The results of analysis of latent moderated mediation structural equation model (SEM) show that the recreational fishery organization scales have impact on the choice of knowledge innovation channels and the choice of knowledge innovation channels can mediate the relationship between recreational fishery organization scales and performance. Policy guidance, financial support and professional supervision of the government can promote this positive transformation.

Keywords: Recreational fishery unit scale, Choice of knowledge search channel, Performance, Role of government, Moderation, Mediation, SEM.

1. INTRODUCTION

In recent years, a body of researches are emerged with emphasis on knowledge innovation and its related performance. The influence of knowledge innovation on performance is related to many factors, which leads to various studies: hypothesis, background, specific knowledge and its channels, types of innovations and types of performances being studied (Frenz & Gillies, 2009) [1]. Frenz & Gillies (2009) held that knowledge owned by companies and individuals was a concept that was difficult to measure quantitatively, while knowledge innovation channels were relatively easy to identify and capture. Cohen and Levinthal(1990) [2] believed that using external knowledge ability was a key component of innovation performance. They studied knowledge

transfer from a geographical dimension. They classified the knowledge innovation channels into internal R&D and external absorption and divided the external channels into: purchase of R&D products, cooperation agreements between the company's branches around the world, and types of cooperation agreements between the company and other companies internationally. Their conclusions were that the first three channels had a positive relationship with performance, especially the knowledge transferred within branches around the world had the most effective impact on the company's performance, while the fourth channel had no positive relationship with performance, or even a negative relationship. Laursen & Salter, 2006 [3] pointed out that the core part of the innovation process was related to the way in which enterprises organize search or new ideas with

commercial potential. Companies often spend a lot of time, money, and other resources looking for new and innovative opportunities. Such investments increase the ability to create, use, and reorganize new and existing knowledge. Therefore, various empirical studies have shown that the trajectory of search strategy within a company can significantly affect its innovation performance (Katila & Ahuja, 2002) [4]. Scholars who study innovation channels have proposed that most innovations come from borrowing rather than invention (e.g., March and Simon 1958 [5]: Mueller, 1962 [6]; Myers and Marquis, 1969[7]; Von Hippel, 1988[8]). The importance of innovation performance comes from the information of other departments within the company, that is, outside the R&D laboratory, such as the market (Mansfield, 1968) [9].

The rise of recreational fishery industry and the research on it started in 1960s in the Caribbean region, and then gradually spread in Europe, America and the Asia-pacific region. The study on the development mode of domestic recreational fishery industry began around 1990s. For the last decade, Chinese scholars have made remarkable achievements in the study of recreational fishery. Domestic and foreign literature on recreational fishery survey includes the following categories: 1. Review (eg, Gilbert & Sass, 2016) [10]; Zhao Qilei et al., 2020 [11]) 2. Biology: (eg. Pinder & Raghavan 2013 [12]; Arlinghaus, 2007 [13]), 3. Integrity and sustainable development of social-ecosystem: (eg. Font & Lloret(2011) [14]; Hasegawadeng et al., 2020[15]; Quach & Flaaten, 2010 [16]; Olaussen & Skonhof , 2008 [17]; Gordon 1973 [18] Guo ying, Jiang Qijun, 2021[19]). 4. Laws and regulations: (eg. Van Poorten et al. 2013 [20]; Shin, 2020[21]). 5. Psychology and health: (eg.Griffiths et al., 2020[22]). 6. Safety (eg. Carpenter et al., 2017[23]). 7. Interdisciplinary: (eg.Diogo et al,. 2020[24]). 8. The role of scientific and technological progress in the economic development of recreational fisheries (eg. Zhang Guanghai et al. 2019[25]).

The leisure fishery is divided into large, medium and small scale according to the characteristics of the industry in this paper. Reference to the categories of the knowledge innovation and knowledge search channels made by some scholars, the knowledge innovation and knowledge search channels including foreign experience, domestic scientific research institutions, fairs and internal channels are selected in this study, analysing how recreational fishery sizes affect

leisure fishery performance through the selection of channels of knowledge innovation. At the same time, it explores that in this process, government at all levels promotes the transformation of knowledge innovation into enterprise performance through financial support, training and other professional guidance and management supervision.

An empirical study was conducted in 213 domestic recreational fishery units. In this paper, the latent moderated mediate structural equation model is used for the first time in China. Structural Equation Modeling (SEM) is a multivariate statistical technology that integrates factor analysis and path analysis. It can simultaneously consider and deal with multiple causes and multiple results, and also measure latent variables that cannot be directly observed, so as to solve problems that cannot be well solved by traditional statistical methods, making up for the deficiency which the traditional statistical methods have and becoming an important tool for multivariate data analysis. At present, the test methods of moderated mediation effect are almost all multivariate linear regression analysis based on explicit variables (Edwards & Lambert, 2007[26]. Hayes, 2013[27]; Muller, ET al., 2005) [28]). The biggest shortcoming of the mediation and moderating effect analysis based on multiple linear regression is the assumption that all variables are measured without measurement error, which leads to the underestimation of the mediation and moderating effect (Cheung & Lau, 2008[29]; Ledgerwood & Shrout, 2011) [30]. The greatest advantage of establishing structural equation model to analyse the moderated mediation effect based on the path diagram and analysis idea based on latent moderated mediation model lies in setting latent variables, effectively controlling measurement errors and accurately estimating mediating and moderating effects (Fang Jie et al. 2018) [31].The LMS method with latent moderator makes use of the full information of the original data of the latent variable (interaction) model, which is the joint distribution function of all indicators ()to estimate the parameters. Therefore, it is superior to the product-indicator method which is complicated. It also does not require only mean and covariance matrices like normal structural equation models (Klein & Moosbrugger, 2000 [32] method. This structural equation (Klein & Moosbrugger, 2000) manages to approximate it as a finite mixed distribution, each of which is a conditional normal distribution and is estimated by the EM algorithm (Expectation Maximization algorithm). Another advantage of LMS is that it can provide maximum

likelihood estimation of parameter values and parameter standard errors (Sardeshmukh & Vandenberg, 2017) [33]

However, a literature review by Holland, et al., (2017 [34]) showed that only a few articles containing mediating and moderating variables published in international top management journals were statistically analysed by SEM. At present, only a couple of articles published in domestic psychological journals introduce moderated mediation effect and analyse whether SEM model is acceptable (Fang Jie et al. 2018). So far, there is no empirical study using LMS to conduct moderated mediation SEM analysis in China.

The author of this paper contributes to the literature of management by following aspects:

- The definition of large, medium and small-scale domestic recreational fishery was identified and examined for the first time in this paper.

- The impact of domestic recreational fishery scales on choice of knowledge search channels were investigated for the first time.

- The mediation function of choice of knowledge search channels on performance was explored for the first time in the field of domestic recreational fishery industry.

- The moderation role of government support in the relationship between the recreational fishery organization scales, innovation channels and performance were examined for the first time.

- Latent Moderated Mediation Structural Equation model was used as analysis tool in the empirical study for the first time in China.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1 Knowledge Innovation

American scholar Emidon proposed in 1913 that knowledge innovation is to create, evolve, exchange and apply new ideas to provide market-oriented products and services for enterprises, national economy and society. This definition is called knowledge innovation in the broad sense. While in the narrow sense, knowledge innovation refers to the process of acquiring and creating new knowledge through scientific research.

Scholars believe that external acquisition and internal research and development are the sources of innovation power. Innovation search leads to innovation performance (Banbury and Mitchell, 1995 [35]; Brockhoff, 1999) [36]. Knowledge search evolves from innovation search.

External knowledge channels Enterprises are increasingly using external knowledge channels, the so-called "open innovation" paradigm (Chesbrough, 2003) [37] as important sources to improve innovation performance and generate competitive advantage (Liebeskind, 1996) [38]. The key role of external knowledge sources can be traced back to literature focusing on enterprise resources and capabilities (Barney, 1991[39]; Peteraf, 1993) [40], bringing the knowledge-based perspective to its peak. Here, knowledge is seen as a core element for an enterprise to effectively manage its resources and capabilities in a constantly changing environment (Ndofor and Levitas, 2004[41]). Sources of external knowledge such as customers, suppliers, competitors, universities, product fairs, etc. are understood as the main elements of enterprise search strategy (Froste et al., 2002 [42]; Teece, 1986 [43]). External knowledge (Nelson) brings innovation performance (Banbury and Mitchell [44] Brockhoff, 1999) [45],

Internal channel is the utilization of established knowledge base, meaning that enterprises reuse existing knowledge to the extent (Katila and Ahuja, 2002) [46]. Internal knowledge innovation is a deeper study based on the original understanding and mastery of knowledge within an enterprise.

In this paper, foreign experience, domestic peers, research institutions, trade fairs and internal knowledge innovation are selected as the knowledge innovation channels according to the actual situation of China's recreational fishery industry.

2.2 Recreational Fishery Organization

The large, medium and small scale of recreational fishery organizations are defined in this paper according to their organizational structures, financial situations, operation scales, reception capacities and other factors.

Small-scale recreational fishery organizations include individual fishing households, recreational fishery cooperatives and sole proprietorship

enterprises. As an emerging industry in China, there are a large number of self-employed fishermen undertaking the recreational fishery industry. Although these units have huge potential for development, the overall scale is small, the overall capability is poor, the foundation is weak and the fluctuation is great. The cooperative is on the basis of unified management, paying attention to protect the interests of the members in the organization and achieving mutual benefit and win-win between members and cooperative. However, this kind of organization form is a loose coalition, lacking of strong constraints and coordination mechanism. The management of the unit will present relative lag, lacking of vitality and competitiveness after it develops to a certain extent. The sole proprietorship enterprise has independent and flexible operation mode, which's establishment procedure is simple. But a sole proprietorship enterprise is difficult to raise a large amount of funds. The operation scale of it is limited, and the owner has unlimited liability for the debts of the enterprise. There are great risks in operation and the service life of the enterprise is relatively limited.

Due to the limitation of knowledge level, the small-scale recreational fishery organizations seldom draw lessons from foreign experience to find management methods. Due to the lack of funds, few small-scale recreational fishery organizations choose trade fair channel for external knowledge search and few will find it necessary to seek technology from universities and research institutions. Small-scale recreational fishery entities often copy the business projects and models of their peers. However, the homogeneity brought by simple replication often leads to fierce competition for short-term benefits and vicious competition between each other, which ultimately leads to multiple failures. Due to their weak innovation ability, small-scale recreational fishery entities are hard to combine the external knowledge innovation information with the internal existing business model.

The organization form of medium-scale recreational fishery entities is generally the partnership which is joint investment, joint operation, profit sharing and risk sharing. Compared with sole proprietorship enterprises, the knowledge structure of partnership employees in medium-sized recreational fishery enterprises has been improved. The enterprises have a certain awareness of literature search, but the search scope is limited. As the financing capacity of enterprises increases, they will be interested in taking part in the trade fairs to gain operational experience and innovative methods. However, the possibility of interest disputes in the partnership is much greater, so it is difficult to become bigger and stronger. As for the attitude toward to the channels of universities and scientific research institutions, the medium-scale recreational fishery organizations believe that the knowledge generated by academic institutions may be far from being applied, and a large amount of investment is usually required to develop the final products (Link et al., 2007) [47]. What's more, acquiring college knowledge can be very difficult. Berchicci, 2013, et al. [48] believed that there was also an inverted U-shaped relationship between search behavior and innovation performance of a company, revealing the negative impact of excessively extensive search activities. So, they pay more attention to internal channels of knowledge innovation to improve the competitiveness of enterprises. However, due to the limitations of technology and knowledge level, it is difficult for them to be strong and big and difficult to realize the combination of internal and external knowledge innovation. Medium-scale recreational fishery organizations also copy the business projects and modes of their peers. However, few products highlight local characteristics, product categories are relatively single, and entry barriers are small.

Large-scale recreational fishery organizations refer to the corporations which are legal entities. The corporation permits a group of people as shareholders to create an organization, which can then focus on pursuing set objectives. The implementation of the corporation system can not only bring the superiority of internal flexibility into full play, but also let whole enterprise operating in a scientific, standardized, orderly state. Therefore, it is easier for them to switch to the "open innovation" mode, participating extensively in the innovation process of the innovation system and utilizing their knowledge in the innovation process (Chesbrough, 2003) [49]. Competitors operate in a similar market and technology environment, which makes their impulses immediately relevant. They also consider that knowledge generated by universities and academic research institutions provides important business opportunities (Cohen et al., 2002) [50] and there do not exist excessive searching and easier to absorb (Dussaugeetal., 2000) [51]. Based on the above deduction, the author proposes:

Hypothesis 1: The recreational fishery organization scales have impact on the choice of knowledge innovation channels.

Due to their own financial situations, business objectives, knowledge levels and other factors, recreational fishing units choose suitable channels for knowledge seeking, applying the acquired knowledge, technology and experience to the development of enterprises and achieving good performance. Thus, the process from recreational fishery industry scales to enterprise performance is completed through the mediation of knowledge seeking. Therefore, the author proposes:

Hypothesis 2: Knowledge innovation channels can mediate the relationship between recreational fishery industry organization scale and enterprise performance.

2.3 Government Role of Promotion

The government's support in the aspects of finance and service for the development of recreational fishery and the regulation and supervision of recreational fishery operation promote the orderly development of recreational fishery organization innovation activities.

In recent years, the government has taken three-dimensional ecological recreational fishery and other services as important economic growth points and formulated a series of policies. Policies to promote the development of leisure fishery and other services have been clearly defined respectively in the 11th [52] and 13th [53] five-year plans for the National Economic and Social Development of the People's Republic of China and China Agricultural Development Plan issued by Ministry of Agriculture and Rural Affairs. The macro policy framework formulated by the central government plays a guiding role. Local governments make a series of innovative policies to support the development of regional recreational fishery enterprises and industries in response to the call of the central and superior governments and based on resource advantages, industrial basis and market demand. In places where conditions permit, recreational fishery should be actively developed on the basis of existing recreational fishery and mainly with private investment. Recreational fishery units should be encouraged to develop relying on aquaculture ponds, lakes, reservoirs and other large water surface and marine pastures. Strengthen support for small-scale recreational fishery units by means of broadening access areas

and directly providing financial subsidies. For example, local governments give start-up capital subsidies ranging from 100,000 to 300,000 yuan and loan interest discounts for small-scale recreational fishery units. For large and medium scale recreational fishery organizations, typical guidance should be given, project driven strategy should be adhered to, financial support would be increased, project subsidies would be adopted by the government, and taxes would be given to key recreational fishery projects, such as tax rebates and deductions.

As a service provider, the government supports recreational fishery organizations by providing social basic services. In the context of open innovation, the government promotes the effective acquisition of information, knowledge and other resources by different recreational fishery organizations, helping them improve their innovation ability, and at the same time realizing the flow of resources between the recreational innovation organizations. Finally, the government's role of innovation environment regulator in the establishment and development of recreational fishery organizations also support the development of recreational fishery organizations to a certain extent.

As an indirect means of support, the government's regulation and supervision to recreational fishery management promotes the orderly conduct of regional innovation activities. The main contents of supervisions include guiding and establishing legal market order, and formulating self-regulatory norms and standards of recreational fishery industry. The other contents are that implementing the basic state policy of resource conservation and protection, developing a circular economy, strengthening environmental protection, effectively protecting the natural ecology, and earnestly solving prominent environmental problems that affect economic and social development, especially those seriously endanger human health and civilization.

The author therefore proposes:

Hypothesis 3: Government's support plays an indispensable role in the process of the mediation effect knowledge innovation channels made from recreational fishery unit scale to performance.

The conceptual model is as follows:

Note: FE=Foreign Experience, DP=Domestic peer, RI=Research Institute，IR=Internal Research, U=Unit, GS=Government Support，

KIC=Knowledge Innovation Channel，LSRFU=Large Scale Recreational Fishery Unit，MSRFO=Medium Scale Recreational Fishery Unit，

SSRFU=Small Scale Recreational Fishery Unit, RFIUS=Recreational Fishery Unit Scale
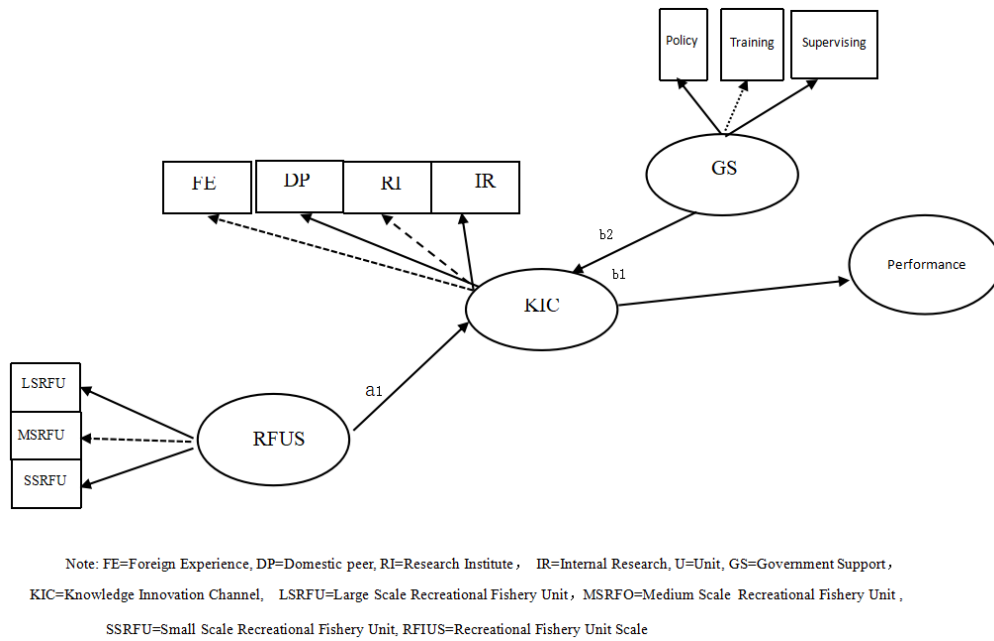
Figure 1 Research model.

3. METHODOLOGY

3.1 The Data Collection

The 213 recreational fishery units came from Jiangsu, Shandong, Tianjin, Hainan and Guangdong participated in this survey early 2022. The questionnaire survey was conducted in the form of questionnaire retrieval and telephone interview. Due to the limitation of telephone interview, the overall response rate was 68%. 110 small-scale recreational fishery units included fishing centers and fishing farms. 80 medium-sized ones included tourism recreational fishing and part of ornamental fish breeding bases, and 23 large-scale ones included recreational fishing pastures.

3.2 Measurement

• Innovation channels

Developed the questionnaire of Laursen and Salter (2006) [54], respondents were asked to rate the importance of their primary sources of innovation activities, using a four-point Likert scale ranging from "unused" to "high". The survey questions like "Does your unit use foreign experience for reference in its operation?" "Dose your unit get experience from domestic peers for reference?" "Does your unit get experience from domestic trade fairs?" "Does your unit independently develop the technology？" The

questionnaire is Chinese version. Cronbach alpha coefficients were calculated and they were .91, .93, .93 and .91 respectively.

• Performance

According to all kinds of awards and ranks the enterprises have won.

• Government support

Considering the availability of data, this study adopted the data issued concerning support funds, project funds, awards, on-site meetings, official news reports according to the relevant departments at all levels.

3.3 The Verification Process

The latent Moderated Mediation Structural Equations Model used in this study means that the independent variable (IV): recreational fishery organization scale exerts an impacts on the dependent variable (DV): enterprise performance through the mediation variable (ME): knowledge innovation channel and the second stage of the mediation process: (recreational fishery organization scale (IV)→ knowledge innovation channel (ME)→ performance (DV) is moderated by government support (MO).

3.3.1 Centralizing the Variables

As shown in "Figure 1", recreational fishery unit scale, knowledge innovation channel and

government support are latent variables with three, four, three observable variables respectively. All

variables including performance in this study are continuous.

*p<0,10   **p<0.05   ***p<0.01

Note: FE=Foreign Experience, DP=Domestic peer, RI=Research Institute， IR=Internal Research, U=Unit, GS=Government Support，

KIC=Knowledge Innovation Channel， LSRFU=Large Scale Recreational Fishery Unit， MSRFO=Medium Scale Recreational Fishery Unit，

SSRFU=Small Scale Recreational Fishery Unit, RFIUS=Recreational Fishery Unit Scale
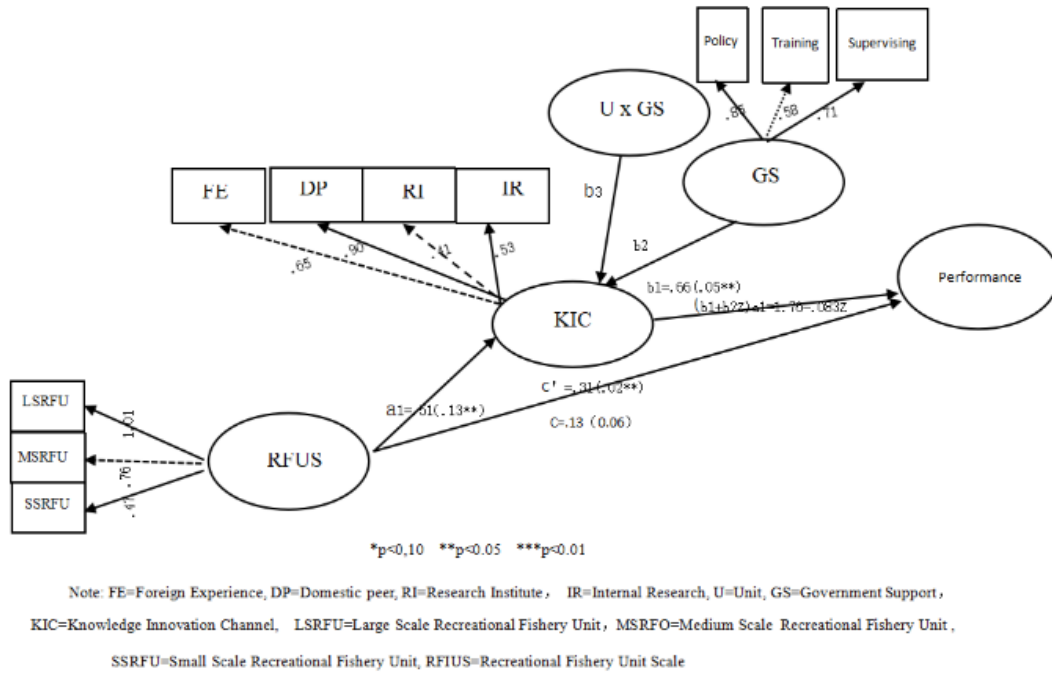
Figure 2 Model measurement results.

3.3.2 Judging the Baseline of SEM Model Without the Latent Moderation (Interaction) Variable

LMS based moderated mediation analysis is based on the assumption that SEM model is acceptable. If it doesn't fit, then it doesn't make sense to add interaction item to it. Assuming that it is appropriate, you can then evaluate whether interactions variable can be included. Fit indices are used to judge whether the benchmark SEM model without the latent moderator (interaction variable): independent variable (IV): recreational fishery organization scale→ mediator (ME): knowledge innovation channel→ dependent variable (DV): enterprise performance (U x GS is removed from "Figure 1") is acceptable because the baseline model is consistent with normal distribution theory (Klein & Moosbrugger, 2000[55]; Maslowsky, et al., 2015) [56].

Table 1. Optimal standard of the fit indices

Index name	Evaluation criteria
Goodness of fit	The smaller the better
GFI	Greater than 0.0
RMR	Less than 0.05, the smaller the better
SFMR	Less than 0.05, the smaller the better
RMSEA	Greater than 0.9, closer to 1, the better
NFI	Greater than 0.9, closer to 1, the better
TLI	Greater than 0.9, closer to 1, better
CFI	Greater than 0.9, closer to 1, better
	The smaller AIC, the better

a   Note: the table is made in this paper referring to AMOS.

The above is the optimal standard of the fit indices. In practical research, it can be analysed according to the specific situation.

Results show that all fit effects are acceptable according to the initial model operation (see "Table 2"):

Table 2. Fit effects results

X^2	Chi-square value of fit index (degree of freedom)	CFI	TLI=.99	RMSEA	SRMR
18.51	1031.4 (180)	0.926	0.963	0.005	. 013

3.3.3 Judging the Fit of the Whole SEM Model Compared with That of the Benchmark Model

One way to Judging whether the whole SEM Model (including the latent interaction item) is better fit than Benchmark Model is the usage of AIC values (Sardeshmukh & Vandenberg, 2017[57]). When comparing AIC values, the smaller the better because a larger AIC value indicates more information loss. If AIC value is smaller or unchanged, it means that the model is better or at least not worse and the moderated mediation SEM model is acceptable. Therefore, the author could do moderated mediation effect analysis.

Comparative analysis results showed that: AIC=45262.27 in the moderated mediation SEM model (see Figure 2), which was 3.49 less than the AIC value of the benchmark SEM model (45265.76), indicating that the moderated mediation SEM model was improved compared with the benchmark SEM model. So, the moderated mediation effect could be analysed next.

- Hypothesis 1 Test

Mplus was used to calculate the matrix of the total effect of each variable (See Figure 2). As predicted, the correlation of three observable independent variables--OIV1: small-scale recreational fishery unit scale, OIV2: medium-scale recreational fishery unit and OIV3: large-scale recreational fishery unit with total effect of latent independent variable (LIV): recreational fishery organization scale was significant, respectively, $\gamma=,47$, $\gamma=.76$, $\gamma=1.01$). Also, IV: recreational fishery unit scales (including OIV2, OIV2. OIV3) had a significant relationship with the mediator (ME): knowledge innovation channels (including four observable variables-- OME1: foreign experience, OME2: domestic peers, OME3: scientific research institutions, and OME4: internal research) b=.51, indicating that recreational fishery organization scales had a positive relationship with the

knowledge innovation channels and that our hypothesis 1 was valid.

- Hypothesis 2 Test — Baseline Model — Mediation Effect Analysis

In this study, knowledge innovation channel (including four observe variables) was taken as the intermediary variable, the independent variable recreational fishery organization scale was taken as the predictive variable, and recreational fishery enterprise performance was taken as the result (see "Figure 2"), constructing a mediating effect model. The total effect of IV: recreational fishery organization scale on recreational fishery enterprise performance was significant, b = 0.31, T = 7.58, P <.001. The IV: recreational fishery organization scale also had a significant direct impact on recreational fishery enterprises performance (B = 0.09, t = 2.87, P <.01). IV: recreational fishery scale significantly predicted ME: knowledge innovation channels (b = 0.51, t = 9.79, P <.001). The direct influence of IV: recreational fishery scale on DV: recreational fishery enterprise performance became insignificant under the mediation effect (b = 0.13, T = 8.88, P <.001), indicating that knowledge innovation channel had a complete mediating effect on recreational fishery organization scale. So, hypothesis 2 was true.

- Hypothesis 3 Test — Moderated Mediation Effect Analysis

The second stage of moderated mediation model was shown in "Figure 2".

This study adopted the coefficient product method based on Bootstrap to analyse the moderated mediation effect proposed by Hayes (2013), that was, if the Bootstrap confidence interval did not include 0, it meant that the moderated mediation effect was significant.

All reported here were 95% boot Strapped confidence intervals (BCa CI), and the confidence intervals were [-.13, -.02], excluding 0. According to the coefficient product method, recreational

fishery organization scales were moderated by government support through the intermediary effect of knowledge innovation channel. The mediating effect varied with moderator. Simple effect analysis results showed that when MO was -2.37 (1 standard deviation below the mean), the mediating effect value was 1.83, BCa CI is [1.65, 1.37], excluding 0, the mediating effect is significant. When MO was -.06 (mean value), the mediating effect value was 1.76.1, BCa CI is [1.46, 2.09], excluding 0, the mediating effect was significant. When MO was 2.26(1 standard deviation above the mean), the mediating effect value was 1.53, and The BCa CI was [1.25, 1.78], excluding 0, indicating significant mediating effect. The above results indicated that, with the increase/decreases of the moderating variable: government support, the mediating effect of knowledge innovation channels on enterprise performance increased/decreased significantly. That meant that the moderating variable MO significantly adjusted the size of the mediating effect. Thus, hypothesis 3 was established.

4. CONCLUSION

This study provides a more detail perspective for the knowledge innovation for recreational fishery enterprises, and can obtain the expected results from their application. We conceptually consider different instances of knowledge search to be qualitatively different in terms of the sources they contain. Firms can selectively influence their performance by targeting external knowledge channels and industry trajectories. For example, the large-scale recreational fishery enterprises often undertake government planning projects which are standards of demand are high. So, to fulfill the objects, they need to do a lot of research works, find variety of knowledge search channels, namely need to draw lessons from foreign advanced experience, need to communicate with domestic peers, may also want to cooperate with scientific research institutions and furthermore, need their own strong R&D teams. Although the imitation of products for small-scale recreational fishery units to similar enterprises is very limited in terms of knowledge novelty and height, it can meet the short-term performance requirements. However, small-scale recreational fishery organizations cannot stay in this short-term behavior stage for a long time. They should strengthen their own knowledge learning, improve their innovation ability under the support of government capital policies, funds and technologies, and gradually update the existing conditions to improve their own

performance. In China, medium, large-scale recreational fishery organizations should broaden knowledge innovation channels; learn from foreign and domestic advanced experience. The imitation provided by knowledge search may not need to increase the innovation risk for new market entry. However, to achieve sustainable development, the enterprises often need to gain new insights from science to remain invincible in development. In addition, in order to improve the potential performance capacity, enterprises should strengthen deep connection with institutions that can provide external innovation knowledge and departments that can provide infrastructure support, such as government departments and financial sector suppliers. These companies also need to do a better job of nurturing their in-house R&D teams.

AUTHORS' CONTRIBUTIONS

This paper is independently completed by Chang Liu.

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