# Influence Mechanism of Improving the Networking Ability of University Students in Relation to the Entrepreneurial Cooperation Network

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**Abstract—**For student entrepreneurs with insufficient business experience, they need to hold an open attitude to maintain their competitive advantages in the market and improve their entrepreneurial performance via recruiting talents and creating sales channels using various network resources and advanced IT development technologies. Although field scholars in the world have conducted a lot of research on the evaluation of college students' innovativeness and entrepreneurship, the differences in study regions, education modes, education concepts, and measurement tools have resulted in large deviations in the evaluation results of different study regions and schools. For this reason, this paper aims to find out the influence mechanism of the improvement of college students' network ability on the scale of Entrepreneurial Cooperation Network (ECN). At first, the network ability of college students and their fitness degree to harmonious entrepreneurship were measured and analyzed; then, the influence of network ability improvement on ECN scale was studied empirically, and the model regression estimation results were given, which has verified that the psychological quality of student entrepreneurs has a moderating effect on the relationship between their network ability and the scale of ECN they created.

**Keywords—**network ability, Entrepreneurial Cooperation Network (ECN), fitness degree, harmonious entrepreneurship

## 1 Introduction

The development of new technologies creates new industries and new markets constantly, and the closed-type innovation mode can no longer catch up with the growing needs of the society [1-10]. For student entrepreneurs with insufficient business experience, they need to hold an open attitude to maintain their competitive advantages in the market and improve their entrepreneurial performance via recruiting talents and creating sales channels using various network resources and advanced IT development technologies [11-14]. Network ability improvement, resource sharing, and collaborative innovation are necessary links for student entrepreneurs to succeed

in starting a new business [15-18]. In China, student entrepreneurs have gradually begun to pay attention to their self-development and realized the huge commercial value brought about by the ECNs they created. For these student entrepreneurs, expanding ECN scale, optimizing ECN structure, and maintaining stable ECN relationship are important challenges.

To trigger economic growth and cope with societal challenges, policymakers usually attempt to create an Entrepreneurial Ecological System (EES) to promote technological entrepreneurship. Van Rijnsoever [19] developed a theoretical model which can estimate the extent to which each support mechanism contributes to overcoming weak network problems in financial support networks, their findings provided new insights into the research questions of how networks are developed in the EES and how incubators function as intermediaries in this process, also, the systemic benefits of incubators can greatly enhance their societal value proposition. Medvedeva et al. [20] built a model to analyze the effect of network companies functioning as a learning tool for educational information systems, and gave the results of applying the tools of system dynamics in modeling the target architecture of main processes of interaction between participants in an enterprise network, and their study demonstrated the feasibility of applying the system dynamics method in modeling indicators of the target architecture during the formation of a network format. Cavallo et al. [21] reviewed the existing structures and methods of strategy-value network that serves the emerging EES, studied how to evaluate the EES based on strategy and value, and offered a strategy-value network model which can be used as an original framework of EES evaluation strategy management; and now the Internet technologies are playing a vital role in helping entrepreneurs get out of financial distress and develop their social capital. Dai et al. [22] proposed a model of entrepreneurial information sharing and Internet entrepreneurial financing and constructed the paradigm of entrepreneurial events from a dynamic perspective rather than a static perspective of entrepreneurial social capital development; the authors proposed a two-stage trust-building strategy which has very good practical significance for Internet entrepreneurship and can facilitate the understanding and application of e-commerce and information sharing mechanisms in the context of sharing economy. Breznitz et al. [23] argued in their study that entrepreneur support organizations are devoting great efforts to create a good environment and more opportunities for interaction among start-up firms; they leveraged the social network and firm incubator literatures to hypothesize and test mechanisms that create such environment and opportunities for business interaction among member firms within a university-based entrepreneurial support organization, then, they also compared different levels of membership-support and identified the dimensions that have greater impacts on a firm's opportunity to establish ties with other members.

After carefully reviewing existing literatures, it's found that although field scholars in the world have conducted a lot of research on the evaluation of college students' entrepreneurship ability, the differences in study regions, education modes, education concepts, and measurement tools have resulted in large deviations in the evaluation results of different study regions and schools; in addition, few of them have concerned about the influence of college students' network ability on their fitness degree to

harmonious entrepreneurship. To fill in these research blanks, this paper conducted relevant research, and the main content of this study includes: 1) measure and analyze college students' network ability and their fitness degree to harmonious entrepreneurship; 2) empirically study the influence of network ability improvement on the ECN scale; 3) give model regression estimation results, and verify the moderating effect of the psychological quality of student entrepreneurs on the relationship between their network ability and the scale of ECN they created.

## 2 Measurement and analysis of network ability and fitness degree

To figure out the influence mechanism of college students' network ability improvement on the harmonious entrepreneurial cooperation network, this paper built a research framework, as shown in Figure 1. As can be seen in the figure, according to the research logic of "ability evaluation - ability improvement - network construction", the entrepreneurial environment, entrepreneurial decision, and entrepreneurial performance of college students were incorporated into the model. College students' network ability mainly includes four aspects: network resource acquiring ability, network relationship processing ability, network managing ability, and network building ability.

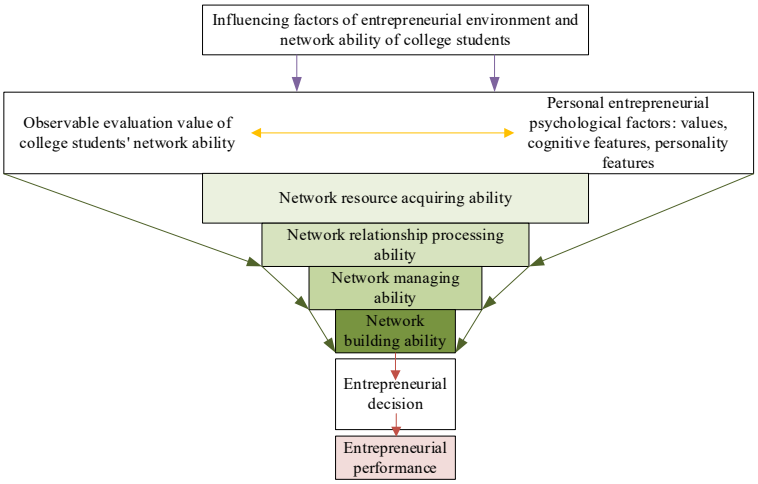


**Fig. 1.** Research framework of the influence mechanism

The student entrepreneurs' ability to create cooperation network and integrate and utilize network resources (hereinafter referred to as CIUA for short) can be described by whether they possess rich network knowledge, which was quantified using the network resource diversification in this paper. The First-Move Capability based on market sensitivity (hereinafter referred to as "FMC" for short) was quantified as well, assuming: $T_i$ represents the proportion of the $i$-th entrepreneurial cooperation object to

the total cooperation objects of network nodes; as for the measurement of CIUA, assuming: $t_i$ represents the proportion of the $i$-th network resource category to the total network resource categories of network nodes, then the formula for calculating the entropy index is given by Formula 1:

$$Div = \sum T_i ln(1/t_i) \tag{1}$$

The value range of the entropy value calculated by the above formula is [0, $ln\ m$]. The higher the degree of network resource diversification, the closer the entropy value is to $ln\ m$; otherwise, the closer the entropy value is to 1.

Figure 2 gives a diagram of the formation of the Harmonious Entrepreneurial System (HES) of college students. The HES is a complex network system formed by the correlations among student entrepreneurs with different professional backgrounds, other college students, schools (colleges and universities), and enterprises in a social entrepreneurial environment. The HES contains multiple sub-systems of different participants, and the subsystem of student entrepreneurs could be equivalent to an independent HES; assuming: $n$ represents the HES; $m$ represents the Harmonious Cooperation Factor (HCF), then the value of the $j$-th HCF of the $i$-th HES could be denoted as $A_{ij}$ ($i$=1,2,...,$n$; $j$=1,2,...,$m$).

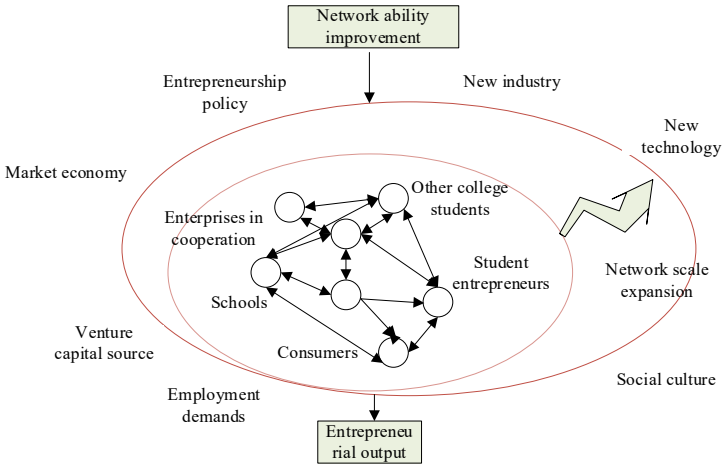


**Fig. 2.** The formation of the harmonious entrepreneurial system of college students

As for the fitness degree to harmonious entrepreneurship which describes the adaptability of each entrepreneurial activity participant to the entrepreneurial environment under the current status, it can be quantified by the difference between the actual value of HCF and the optimal value of HCF. The higher the fitness degree, the higher the degree to which the HCF can meet student entrepreneurs' cooperation requirements. This paper constructed a fitness degree model of harmonious entrepreneurship, the details are given below.

At first, the collected data were subject to nondimensionalization processing based on the following formula:

$$a_{ij}^{'} = \frac{a_{ij} - a_{jmin}}{a_{jmax} - a_{jmin}} \tag{2}$$

Then, the optimal status of entrepreneurial cooperation $A'_{xj}$ of the $j$-th HCF was determined:

$$a_{xj}^{'} = max\left(a_{ij}^{'}\right), \left(i = 1, 2, ..., n; j = 1, 2, ..., m\right) \tag{3}$$

In this way, the fitness degree model of harmonious entrepreneurship could be constructed as follows:

$$G_i = \sum_{j=1}^{m} q_j \frac{\xi_{min} + \beta\xi_{max}}{\xi_{ij} + \beta\xi_{max}} \tag{4}$$

Wherein $\xi_{ij}=|a'_{ij}-a'_{xj}|$; after that, the weight of HCF $\omega_j$ was determined, and the information entropy $F_j$ of each HCF was determined as well:

$$F_j = -\frac{1}{ln\, n} \sum_{i=1}^{n} \beta_{ij} ln \beta_{ij} \tag{5}$$

Wherein $x_{ij}=a'_{ij}/\sum^{n}_{i=1}a'_{ij}$; Formula 6 gives the formula for determining the weights based on the entropy weight method:

$$\theta_j = \frac{1 - F_j}{m - \sum_{j=1}^{m} F_j} \tag{6}$$

Let $\xi_{ij}=|a'_{ij}-a'_{xj}|/nm$, then model parameter $\beta$ could be attained from the following formula:

$$\beta = \frac{\overline{\xi}_j - 2\xi_{min}}{\xi_{max}} \tag{7}$$

The research focus of this paper is to explore the influence mechanism of college students' CIUA on the fitness degree of participating in entrepreneurship, therefore, this paper built a measurement model for characterizing the relationship among ECN structure features, CIUA, and fitness degree of harmonious entrepreneurship. Assuming: *CO* represents the control variables of the model; $G_i$ represents the fitness degree; *NAD* represents the clustering degree of the network; *NCD* represents the centrality degree of the network; $\sigma$ represents the random disturbance term, then there are:

$$G_i = \beta + \gamma_1 CO + \sigma \tag{8}$$

$$G_i = \beta + \gamma_1 CO + \gamma_2 NAD + \sigma \tag{9}$$

$$G_i = \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \sigma \tag{10}$$

Formula 8 is the influence mechanism model constructed based on a series of control variables, including the ECN scale, the participation years of participants, and the properties of participants. Formula 9 is used to measure the influence of the clustering degree of ECN on college students' fitness degree to harmonious entrepreneurship. Formula 10 is used to measure the influence of the centrality degree of ECN on college students' fitness degree to harmonious entrepreneurship.

$$G_i = \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \gamma_4 JG + \sigma \tag{11}$$

$$G_i = \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \gamma_4 JG + \gamma_5 JG^2 + \sigma \tag{12}$$

In this paper, the inverted U-shaped influence of the non-redundant connection between two participants on the college students' fitness degree to harmonious entrepreneurship was tested. Assuming: *JG* represents the degree of non-redundant connection, then the nonlinear relationship between variables could be tested based on the quadratic term of *JG*. Formulas 13-16 are used to examine the moderating effect of student entrepreneurs' FMC and CIUA, assuming $S_x$ represents the FMC, $S_v$ represents the CIUA, then there are:

$$\begin{aligned} G_i = {} & \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \gamma_4 JG \\ & + \gamma_5 JG^2 + \gamma_6 NAD \times Sx + \gamma_7 NAD \times Sv + \sigma \end{aligned} \tag{13}$$

$$G_i = \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \gamma_4 JG + \gamma_5 JG^2 + \gamma_6 NCD \times Sx + \gamma_7 NCD \times Sv + \sigma \tag{14}$$

$$G_i = \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \gamma_4 JG + \gamma_5 JG^2 + \gamma_6 JG \times Sx + \gamma_7 JG \times Sv + \sigma \tag{15}$$

$$\begin{aligned} G_i = {} & \beta + \gamma_1 CO + \gamma_2 NAD + \gamma_3 NCD + \gamma_4 JG + \gamma_5 JG^2 \\ & + \gamma_6 JG \times Sx + \gamma_7 JG \times Sv + \gamma_6 JG^2 \times Sx \\ & + \gamma_7 JG^2 \times Sv + \sigma \end{aligned} \tag{16}$$

## 3 Influence of network ability improvement on ECN scale

Next, this paper conducted an empirical study on the influence of network capability improvement on the ECN scale, and a diagram of the influence mechanism is given in Figure 3. The paper also gave the measurement methods of control variables such as the scale of ECN, the initial construction foundation of ECN, and the expansion rate of ECN.

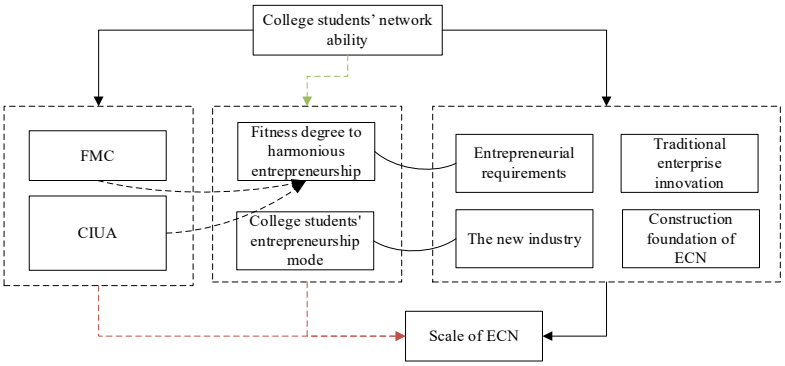


**Fig. 3.** The influence mechanism of college students' network ability improvement on ECN scale

When measuring the ECN scale, by default, if the collected data is time series data, then the scale of current ECN and the expanded scale of ECN within the certain time period are superimposed. Assuming: $L_p$ and $L_{p-1}$ represent the scale of ECN in time period p and in time period p-1; l represents the number of lag periods; $V_l$ represents the expansion coefficient of ECN converted from college students' network ability improvement after l periods lag; $O_{p-l}$ represents the degree of network ability improvement; ξ represents the structural index of the ECN, then there is:

$$L_p = \sum_{l=1}^{m} V_l O_{p-l} + (1-\xi) L_{p-l} \tag{17}$$

Assuming: the average lag period l of the constructed ECN is one year; the one period lag of college students' network ability improvement is fully converted into the scale of ECN, namely $V_l$ is equal to 1, then, the formula for calculating the scale of ECN in time period p is given by Formula 18:

$$L_p = O_{p-1} + (1-\xi) L_{p-1} \tag{18}$$

The structural index ξ of ECN doesn't have a unified definition. Based on the constituent elements of ECN, this paper selected PC and NC (the positive and negative correlation coefficients of different participants and other participants) to perform weighted calculation based on assigned weights to attain the scale of ECN:

$$L_p = O_{p-1} + \left[1-(\lambda * PC + (1\text{-}\lambda) * NC)\right] L_{p-1} \tag{19}$$

Wherein λ is the weight coefficient. Then following formulas give the calculation methods of the initial construction foundation $L_0$ and the expansion rate $h$ of ECN:

$$h_l = \frac{L_p - L_{p-1}}{L_{p-1}} = \frac{O_p - O_{p-1}}{O_{p-1}} \tag{20}$$

$$L_0 = \frac{O_0}{h_0 + \xi} \tag{21}$$

When calculating the network expansion rate based on the above formula, there may be situations that the expansion rate is less than 0 and its absolute value is greater than the structural index, therefore, this paper employed the geometric mean method to adjust the calculation of network expansion rate $h$:

$$h_l = h = \sqrt[p]{\frac{O_p}{O_{p-1}} \frac{O_{p-1}}{O_{p-2}} \cdots \frac{O_1}{O_0}} - 1 = \sqrt[p]{\frac{O_p}{O_0}} - 1 \tag{22}$$

After that, the model was subject to the *Hausman* test to examine the validity of results output by the network model, and the test results suggested that the model cannot be estimated by the random effect model. Thus, this paper constructed a Multiple Linear Regression (MLR) model based on the fixed effect model. Assuming: $z$ represents the constant term; $\beta_i$ represents the estimation coefficient of the explanatory variable; $\gamma_i$, $\alpha_i$, $\delta_i$, and $\psi_i$ represent the estimation coefficients of control variables; $\lambda_i$ represents the individual fixed effect of participants; $\mu_p$ represents the time fixed effect of participants; $\sigma_p$ represents the unobservable random error, then there is:

$$\ln B = z + \beta_i \ln A + \gamma_i \ln L + \alpha_i \ln K + \delta_i \ln S + \psi_i \ln H + \lambda_i + \mu_i + \sigma_i \tag{23}$$

With the passing of time, the influence of college students' network ability improvement on ECN scale exhibited significant changes, that is, when constructing the MLR model, it's necessary to fully consider the time fixed effect, finally, a two-way fixed effect model was attained.

The improvement of network ability has several thresholds, if there are two thresholds $\rho_1$ and $\rho_2$ that divide the network ability improvement into three intervals, which can be written as $lnA<\rho_1$, $\rho_1<lnA<\rho_2$, and $\rho_2< lnA$; when the level of network ability improvement falls into different intervals, there are significant differences in the elasticity coefficients of the scale of the constructed ECN, assuming $\omega_1$, $\omega_2$, and $\omega_3$ respectively represent the elasticity coefficients, then the model setting can be expressed as:

$$\begin{cases} \ln B\big|_{\ln A<\rho_1} = z_1 + \omega_1 \ln A + \gamma_1 \ln L + \alpha_1 \ln K + \delta_1 \ln S + \psi_1 \ln H + \lambda_1 + \mu_1 + \sigma_1 \\ \ln B\big|_{\rho_1<\ln A<\rho_2} = z_2 + \omega_2 \ln A + \gamma_2 \ln L + \alpha_2 \ln K + \delta_2 \ln S + \psi_2 \ln H + \lambda_2 + \mu_2 + \sigma_2 \\ \ln B\big|_{\rho_2<\ln A} = z_3 + \omega_3 \ln A + \gamma_3 \ln K + \alpha_3 \ln K + \delta_3 \ln S + \psi_3 \ln H + \lambda_3 + \mu_3 + \sigma_3 \end{cases} \tag{24}$$

To further analyze the continuous dynamic influence of college students' network ability improvement on ECN scale, this paper constructed a vector autoregressive model, assuming: $b_{i,p}$ represents endogenous variables; $i$ represents entrepreneurial region; $p$ represents time; $\gamma_j$ represents the regression coefficient of the model; $j$ represents lag period; $t$ represents the lag order of the model; $\lambda_i$ represents the individual fixed effect of participants; $\mu_i$ represents the time fixed effect of participants; $\sigma_{i,p}$ represents the random disturbance term, then there is:

$$\begin{aligned} b_{i,p} &= \gamma_1 b_{i,p-1} + \gamma_2 b_{i,p-2} + \ldots + \gamma_t b_{i,p-t} + \lambda_i + \mu_i + \sigma_{ip} \\ &= \sum_{j=1}^{t} \gamma_j b_{i,p-j} + \lambda_i + \mu_i + \sigma_{ip} \end{aligned} \tag{25}$$

According to the analysis results in the previous section, the scale of the constructed ECN, network ability improvement, the FMC of student entrepreneurs, and their CIUA were analyzed, and the following model was constructed to analyze the dynamic relationships between the variables:

$$\begin{cases} \ln B_{ip} = \sum_{j=1}^{t} \gamma_{1j} \ln B_{i,p-j} + \sum_{j=1}^{t} \gamma_{2j} \ln A_{i,p-j} \\ + \sum_{j=1}^{t} \gamma_{3j} \ln K_{i,p-j} + \sum_{j=1}^{t} \gamma_{4j} \ln S_{i,p-j} + \lambda_{1i} + \mu_{1i} + \sigma_{1i} \\ \ln A_{ip} = \sum_{j=1}^{t} \gamma_{5j} \ln B_{i,p-j} + \sum_{j=1}^{t} \gamma_{6j} \ln A_{i,p-j} \\ + \sum_{j=1}^{t} \gamma_{7j} \ln K_{i,p-j} + \sum_{j=1}^{t} \gamma_{8j} \ln S_{i,p-j} + \lambda_{2i} + \mu_{2i} + \sigma_{2i} \\ \ln K_{ip} = \sum_{j=1}^{t} \gamma_{9j} \ln B_{i,p-j} + \sum_{j=1}^{t} \gamma_{10j} \ln A_{i,p-j} \\ + \sum_{j=1}^{t} \gamma_{11j} \ln K_{i,t-j} + \sum_{j=1}^{t} \gamma_{12j} \ln S_{i,t-j} + \lambda_{3i} + \mu_{3i} + \sigma_{3i} \\ \ln S_{ip} = \sum_{j=1}^{t} \gamma_{13j} \ln B_{i,p-j} + \sum_{j=1}^{t} \gamma_{14j} \ln A_{i,p-j} \\ + \sum_{j=1}^{t} \gamma_{15j} \ln K_{i,p-j} + \sum_{j=1}^{t} \gamma_{16j} \ln S_{i,p-j} + \lambda_{4i} + \mu_{4i} + \sigma_{4i} \end{cases} \tag{26}$$

## 4 Experimental results and discussion

When building the model, the variables (ECN scale, network ability improvement, FMC, and CIUA) were input into the model one by one to control the individual fixed effect and time fixed effect of each participant in the HES of college students. To attain the research results of the influence of network ability improvement on the scale of ECN, this paper compared the model output results of different samples, and the regression results of the model are listed in Table 2. According to the experimental results shown in the table, the improvement of college students' network ability has a significant promotive effect on the scale of the constructed ECN.

**Table 1.** Variables of the constructed regression model

| Variable | $L_p$ | $O_p$ | $Sx$ | $Sv$ |
|---|---|---|---|---|
| Mean | 213.26 | 341.94 | 362.58 | 181.42 |
| Standard deviation | 341.52 | 715.26 | 405.15 | 481.52 |
| Maximum value | 124.73 | 119.26 | 114.28 | 167.53 |
| Minimum value | 364.82 | 713.16 | 432.58 | 203.64 |

**Table 2.** Model regression estimation results

| **No.** | ***ln $L_p$*** | | ***ln $O_p$*** | | ***ln Sx*** | |
|---|---|---|---|---|---|---|
| 1 | 0.236** | (12.596) | | | | |
| 2 | 0.025** | (0.619) | -0.063*** | (-3.584) | 0.261 | (7.159) |
| 3 | 0.025 | (1.629) | -0.074* | (-2.659) | 0.084** | (2.369) |
| 4 | 0.069* | (2.458) | 0.027*** | (0.269) | 0.137* | (3.485) |
| 5 | 0.035*** | (2.846) | -0.027** | (-0.629) | 0.032*** | (2.158) |
| **No.** | ***ln Sv*** | | **Individual fixed** | **Time fixed** | ***AdjR*$^2$** | |
| 1 | | | | | | |
| 2 | 0.637** | (22.615) | *Y* | *N* | 0.815 | |
| 3 | 0.538* | (25.625) | *N* | *N* | 0.862 | |
| 4 | 0.549** | (23.416) | *N* | *Y* | 0.806 | |
| 5 | 0.623** | (26.419) | *Y* | *N* | 0.837 | |

Table 3 shows the thresholds of network ability improvement, all thresholds had passed the 1%-level significance test, and the estimated values of the regression coefficients of the four threshold intervals were respectively 0.063, 0.035, 0.071, and 0.054. When the network ability improvement itself has become a threshold variable, the positive influence of network ability improvement on the ECN scale exhibits a U-shaped status. That is, when the level of network ability improvement of college students is relatively low, then the network ability improvement has a significant promotive effect on the expansion of ECN scale; when the network ability improvement raises to a middle level, then it has a certain promotive effect on the expansion of ECN scale; when the network ability improvement increases to a high level, then the promotive effect becomes significant again.

According to the research framework shown in Figure 1, this paper holds that the student entrepreneurs' psychological quality has a moderating effect on the relationship between their network ability and the scale of ECN they created. To verify this moderating effect, this paper further established a regression model for relevant analysis.

**Table 3.** Thresholds of network ability improvement

| Constant | *ln $L_p$* | *ln $O_p$* | *ln Sx* | *ln Sv* |
|---|---|---|---|---|
| Regression coefficient | 0.036 | 0.057** | 0.539* | 0.084* |
| *t*-Test | 1.326* | 1.486*** | 22.168 | 1.528 |
| *p*-value | 0.236 | 0.152 | 0.029 | 0.027 |
| Constant | *lnA* | *lnA* | *lnA* | *lnA* |
| Regression coefficient | *lnA*≤4.629 | 4.629<*lnA*≤5.95 | 5.95<*lnA*≤6.174 | *lnA*>6.174 |
| *t*-Test | 0.063** | 0.035* | 0.071*** | 0.054* |
| *p*-value | 4.329 | 3.274 | 3.162 | 4.528 |
| Constant | 0.268 | 0.015 | 0.037 | 0.048 |

Table 4 gives the analysis results of the moderating effect of psychological quality on the relationship between network ability and ECN scale. As can be seen from the table, the coefficient of the interaction term of network ability and psychological quality is significant, the F-value changes significantly, and the regression coefficient is positive, which has verified the moderating effect of psychological quality on the positive relationship between network ability and ECN scale.

**Table 4.** The moderating effect of psychological quality on the relationship between network ability and ECN scale

| | | Control variable | | | | Independent variable | Moderating variable | Interaction term | $R^2$ | $\Delta R^2$ | $F$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Variable* | | *Sx* | *Sv* | *ξ* | *h* | $O_p$ | *Entrepreneurial psychological quality* | *L* | | | |
| $L_p$ | Sample 1 | -0.025 | -0.268 | 0.132 | 0.162 | | | | 0.028 | | 4.625 |
| | Sample 2 | -0.084 | -0.264 | 0.192 | 0.137 | 0.258** | | | 0.137 | 0.069 | 7.152** |
| | Sample 3 | -0.058 | -0.295 | 0.135 | 0.174 | 0.274** | 0.469* | | 0.362 | 0.347 | 18.392*** |
| | Sample 4 | -0.084 | -0.162 | 0.159 | 0.062 | 0.217*** | 0.483** | 0.247* | 0.362 | 0.098 | 18.247* |

Table 5 presents the analysis results of the moderating effect of psychological quality on the relationship between FMC and ECN scale, as can be known from the table, the coefficient of the interaction term of FMC and psychological quality is significant, the F-value changes significantly, and the regression coefficient is positive, which has verified the moderating effect of psychological quality on the positive relationship between FMC and ECN scale.

**Table 5.** The moderating effect of psychological quality on the relationship between FMC and ECN scale

| | | Control variable | | | | Independent variable | Moderating variable | Interaction term | $R^2$ | $\Delta R^2$ | $F$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Variable* | | *Sx* | *Sv* | *ξ* | *h* | $O_p$ | *Entrepreneurial psychological quality* | *L* | | | |
| $L_p$ | Sample 1 | -0.041 | -0.215 | 0.136 | 0.195 | | | | 0.048 | | 4.032 |
| | Sample 2 | -0.041 | -0.284 | 0.129 | 0.118 | 0.219** | | | 0.175 | 0.037 | 7.629** |
| | Sample 3 | -0.026 | -0.214 | 0.139 | 0.028 | 0.129** | 0.482* | | 0.318 | 0.138 | 12.025*** |
| | Sample 4 | -0.062 | -0.174 | 0.139 | 0.085 | 0.164*** | 0.448** | 0.129* | 0.384 | 0.037 | 14.674* |

Table 6 gives the analysis results of the moderating effect of psychological quality on the relationship between CIUA and ECN scale, as can be known from the table, the coefficient of the interaction term of CIUA and psychological quality is significant, the F-value changes significantly, and the regression coefficient is positive, which has verified the moderating effect of psychological quality on the positive relationship between CIUA and ECN scale.

**Table 6.** The moderating effect of psychological quality on the relationship between CIUA and ECN scale

| | | **Control variable** | | | | **Independent variable** | **Moderating variable** | **Interaction term** | $R^2$ | $\Delta R^2$ | $F$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Variable*** | | ***Sx*** | ***Sv*** | ***ξ*** | ***h*** | $O_p$ | ***Entrepreneurial psychological quality*** | ***L*** | | | |
| $L_p$ | Sample 1 | -0.037 | -0.261 | 0.195 | 0.163 | | | | 0.069 | | 4.748 |
| | Sample 2 | -0.058 | -0.217 | 0.136 | 0.174 | 0.219** | | | 0.137 | 0.048 | 4.624** |
| | Sample 3 | -0.415 | -0.237 | 0.129 | 0.117 | 0.135** | 0.405* | | 0.274 | 0.169 | 16.294*** |
| | Sample 4 | -0.048 | -0.263 | 0.152 | 0.097 | 0.137*** | 0.458** | 0.248* | 0.386 | 0.062 | 18.127* |

## 5 Conclusion

This paper studied the influence mechanism of college students' network ability improvement on the harmonious entrepreneurial cooperation network. At first, the paper measured college students' network ability and their fitness degree to harmonious entrepreneurship, and empirically studied the influence of college students' network ability improvement on the scale of the ECN they created. Then, combining with experiment, this paper gave the statistical results of the variables of the constructed regression model, compared the model output results of different samples, and verified the significant positive effect of network ability improvement on the ECN scale. After that, this paper proposed that there're several thresholds in the network ability improvement of college students, and the experiment results proved that the positive influence of network ability improvement on the ECN scale exhibits a U-shaped status. At last, this paper gave the analysis results of the moderating effect of student entrepreneurs' psychological quality on the relationships among network ability, FMC, CIUA, and ECN scale, and verified such moderating effect via experimental results.

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