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The Influencing Factors of the Counterintelligence Joint Decision-making in the International Science and Technology Cooperation

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Abstract: The influencing factors of the counterintelligence joint decision-making in the international science and technology cooperation mainly include such seven aspects as the international science and technology cooperation enterprise's ability to strengthen its own counterintelligence, the cooperation between the international science and technology cooperation enterprise and the third party channel, the third party channel's sense of participation, the third party channel's negotiation ability, physical contract, psychological contract and all of the partners' controlled social capital. By carrying out the factor analysis on a typical international science and technology cooperation enterprise, the study finds such three main factors as the international science and technology cooperation enterprises' controlling force, the third party channel's influence on the joint decision-making and the international science and technology cooperation enterprise's cooperation expectation with the third party channel and thinks that the international science and technology cooperation enterprise's controlling force is the most important factor.

Key words: International science and technology cooperation, Counterintelligence, joint decision-making, physical contract, psychological contract, social capital

INTRODUCTION

The enterprises participating in the international science and technology cooperation often need to face the tough problem that the third party channel leaks. The third party channel refers to customers, suppliers, distributors, advertisers, the news media, banking, consulting agencies, transportation departments, etc. that have the existence of interests or business relationships with the enterprises, these institutions are important sources of leaking secret information. Obviously, the more close the cooperation relations are, the greater the leaking information may be; the more intimate the partnership is, the more chance the leaking information may be; the more rich and comprehensive content the cooperation has, the more information content may be leaked; the more system the cooperation has, the more channels will leak information; the higher the level of cooperation is, the bigger possibility the key information leakage is (Zhou, 2010). Therefore, the anti-leak work against the third party channel leak not only relates to signing a confidentiality agreement, avoiding the leakage of valuable information in the business development process, censor sensitive news, strictly and appropriate restrictions on the visitors, etc. (Zhu, 2009) but also the practical operability of each work is low, the effect is poor, difficult to effectively monitor. So, it's particularly important for the international science and technology

cooperation enterprises to cooperate with the third party channel in the field of counterintelligence. The study aims to explore the various kinds of influence factors of the counterintelligence joint decision-making in the international science and technology cooperation and their effect and hopes to be useful to the international science and technology cooperation enterprises in preventing the third party channel leak.

INFLUENCE FACTOR ANALYSIS AND MODEL BUILDING

A main influencing factors of the counterintelligence joint decision in the international science and technology cooperation: The factors affecting the joint decision counterintelligence in the international science and technology cooperation mainly involves the external general environment, industry environment, competitors, international science and technology cooperation enterprises and the target market (customers). Considering that it's difficult to control the external general environment, many industries involved in the international science and technology cooperation and that the competitors and target market (customers) have great differences in different industries, we find that it's not easy to study its general regularity. So, the extracted factors affecting the joint decision counterintelligence in the international science and technology cooperation

mainly involves the enterprise participating in international science and technology cooperation and it's the third party channel.

The international science and technology cooperation enterprise's ability to strengthen its own counterintelligence: The international science and technology cooperation enterprise's ability to strengthen its own counterintelligence refers to the ability to attract the other nodes enterprises around it to form a network chain (Harland, 1997) and influence their decisions, by using its own status in information exchange center and logistics distribution "dispatch center" in the international science and technology cooperation (Ma, 2000), through the tangible and intangible contract role. In the course of international science and technology cooperation, the international science and technology cooperation enterprises provide other nodes enterprises a platform for the exchange of information and resources, other nodes enterprises can obtain the required information for decision-making and the scarce resources needed for actions through this platform, thus forming dependence on the international science and technology cooperation enterprise. The more dependent other node enterprises are, the stronger the international science and technology cooperation enterprises strengthen their own counterintelligence.

The cooperation between the international science and technology cooperation enterprise and the third party channel: The cooperation between the international science and technology cooperation enterprise and the third party channel refers to the course that the international science and technology cooperation enterprise and the third party channel carry out the effective cooperation based on their core expertise so as to realize the maximization of the overall effect of the international science and technology cooperation in order to achieve a common goal. Each node in the international science and technology cooperation has the independent legal person status, no subordinate administrative relation between them. It's thus clear that the interests of the community of international science and technology cooperation is not established by administrative means but by some common interest cohesion to form up a new mode of organization structure with many enterprises, so the cooperation is the basic premise of the existence of the community of interests in the international science and technology cooperation.

The third party channel's sense of participation: The third party channel's sense of participation refers that the

third party channel actively carry out information exchange with the international science and technology cooperation enterprises, actively participate in making the joint decision scheme and earnestly perform their duties in the implementation process of joint decision scheme in order to achieve their strategic goals. Active participation of the third party channel will help to win the trust of the international science and technology cooperation enterprises and can effectively reduce the transaction cost, so as to form the "cyber source" (Gulati, 1995).

The third party channel's negotiation ability: The third party channel's negotiation ability refers to the bargaining power that the third party channel has for their own position in the international science and technology cooperation, integrating into the international science and technology cooperation enterprises, the distribution mode cooperation surplus (Che and Hausch, 1999). It is the key to measure the third party channel's negotiation ability that the third party channel can strive for the equality with the international science and technology cooperation enterprises, integration into the international science and technology cooperation with the identity of the cooperator, as well as to allocate the cooperation surplus according to the negotiation ability.

The physical contract: The physical contract refers to the rules that can be determined by the written contract form and be observed (Larson and Starr, 1993). In the beginning of forming the interests community of the international science and technology cooperation, the nodes don't understand each other in their reputation, with the temporary lack of trust, the arbitration from the third party is necessary, so the contract relationship more performances for the tangible bond, instead of the relational contract. In the joint decision, through the form of visible contract, the rights and obligations of each node are in the written form, in enhancing mutual trust at the same time; also effectively protect the interests of each node.

The psychological contract: The psychological contract refers to the sum of the implicit, undisclosed mutual expectation between nodes which is a kind of "non-written contract". The psychological contract is the metaphor derived from the social relations between nodes which could not be achieved through a written contract, also does not need to punish by the official position. The psychological contract includes two main components: Transactional and Relational component, the differences between different types of psychological contract is mainly for the component difference (Rousseau, 1990;

Rousseau, 1998). the contract with higher transaction component proportion is suitable for the exchange between the economic resources, with the short-term economic exchange characteristics; and the contract with higher proportion in the relationship not only focuses on the economic exchange but also usually pay attention to the long-term social emotion exchange relationship (devotion, trust, etc.) which suits for the social and affective resources exchange (Sun and Qi, 2006). The psychological contract is important factors that each node retains and maintain the stability in the interest community of the international science and technology cooperation that the mutual expectation between nodes makes them consider the joint decision from the overall interests of the community of the international science and technology cooperation which will contribute to the long-term development of the interests community of the international science and technology cooperation.

All of the partners' controlled social capital: All of the partners' controlled social capital refers to the sum of actual or potential resources that the enterprise network members possess which is embedded in each node and available by the relationship network and from the relationship network (Nahapiet and Ghoshal, 1998). The social capital controlled by the members of the enterprise has the positive significance for its coordination

relationships, understanding the joint decision-making information, better participation in the joint decision-making process and the implementation of the established joint decision-making scheme.

B model building: Based on the analysis of such main factors affecting the counterintelligence joint decision in the international science and technology cooperation as the international science and technology cooperation enterprise's ability to strengthen its own counterintelligence, the cooperation between the international science and technology cooperation enterprise and the third party channel, the third party channel's sense of participation, the third party channel's negotiation ability, the physical contract, the psychological contract, all of the partners' controlled social capital, etc. the study confirms that the existence of the theoretical link between these factors and the counterintelligence joint decision in the international science and technology cooperation. Accordingly, this study proposes a model to analyze the factors affecting the counterintelligence joint decision in the international science and technology cooperation (Fig. 1).The model describes the relationship between the counterintelligence joint decision in the international science and technology cooperation and seven indicators which fall into four broad categories. In Fig. 1, the arrow connected the

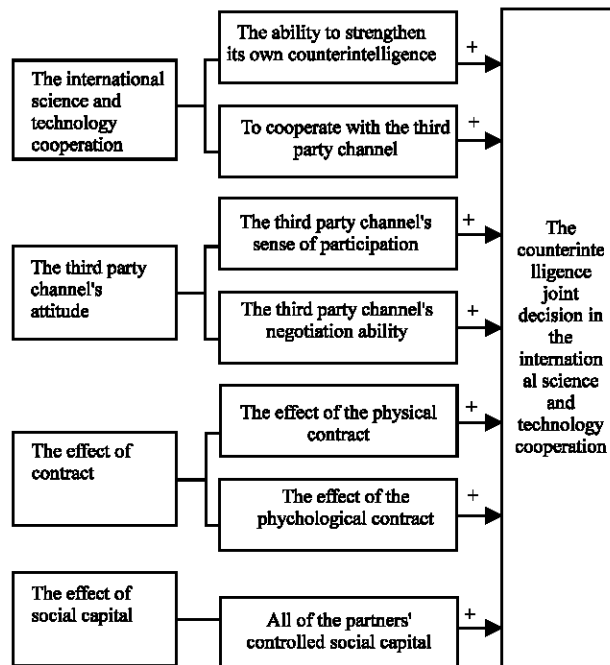


Fig. 1: The factors affecting the counterintelligence joint decision in the international science and technology cooperation model

counterintelligence joint decision in the international science and technology cooperation to the variables indicates a causal relationship, nock as exogenous variable (variable), arrow tip as endogenous variable (the dependent variable). “+” indicates positive correlation between two variables, the study assumes 7 positive correlation in Fig. 1.

DATA COLLECTION AND ANALYSIS

A sample and questionnaire

Sample: Due to the complexity of the source and the dispersion of the distribution of the members of the international science and technology cooperation benefit community, a random investigation aiming at a plurality of international science and technology cooperation community is very difficult, the study used “convenience” method to carry out the research, selects an international science and technology cooperation benefits community to conduct an investigation, by using the opportunity of the information center in the international scientific and technological cooperation community and the third party channel node enterprises to apply for business opportunities, carries out a research on them with a questionnaire survey and interviews. The research performed from the beginning of 2013 May to 2013 June lasted a month, 65 questionnaires were sent out and recovered 42 valid questionnaires from the node enterprises including the science and technology international cooperation enterprise. A community of interests in the international science and technology cooperation in this research belongs to one of Anhui automobile equipment enterprises and its third party channel node enterprises. The research staff is mostly to the senior leaders of the enterprises, the reason to select the level of personnel as the research object is that the counterintelligence joint decision belongs to the company's overall strategy and the senior leaders in enterprises are involved in the strategy formulation process, they have a deep understanding of the joint decision.

Questionnaire: The questionnaire includes such seven factors affecting the counterintelligence joint decision in the international science and technology cooperation as the international science and technology cooperation enterprise's ability to strengthen its own counterintelligence, the cooperation between the international science and technology cooperation enterprise and the third party channel, the third party channel's sense of participation, the third party channel's negotiation ability, the physical contract, the

psychological contract, all of the partners' controlled social capital, etc. and the answer to the question is in 5 level such as (1) Very small, small (2-5) Very large

B FACTOR ANALYSIS

This study conducts the factor analysis using the statistical package for the social science SPSS17.0. The research from the data on the effect of the international science and technology cooperation in counterintelligence joint decision classifies such seven factors as the international science and technology cooperation enterprise's ability to strengthen its own counterintelligence, the cooperation between the international science and technology cooperation enterprise and the third party channel, the third party channel's sense of participation, the third party channel's negotiation ability, the physical contract, the psychological contract, all of the partners' controlled social capital, etc. so as to clear and simplify the problem.

Consider whether the original variables is suitable for factor analysis or not: Table 1 shows that, according to Bartlett's test of sphericity, the observation Approx. Chi-Square is 66.925, the probability of the corresponding p is close to 0, at the same time, the KMO value is 0.710, according to the KMO metrics given by Kaiser, the original variables is suitable for factor analysis.

The extraction factor: The maximum likelihood solution is used when factor extracting and varimax, the Kaiser standard (eigenvalue greater than 0.8) is adopted in analyzing and plot analysis. Stone testing and eigenvalue test show that, 7 indicators of the counterintelligence joint decision in the international science and technology cooperation can be used 3 factors for further analysis; three factors explain 70.916% of the total variance of the original variables. The situation that the factors explain the total variance of the original variable is showed in Table 2. On the whole, the information of the original variable is lost less, basically meets with the requirements of analysis factor.

The factor naming explanation: Factor loading matrix is orthogonally rotated by using the method of maximum variance to make factors have naming interpretation. Rotated factor loading matrix is in Table 3.

Table 1: KMO and Bartlett's test

Kaiser-meyer-olkin	Measure of sampling adequacy	0.710
Bartlett's test of sphericity	Approx. Chi-Square	66.925
	df	21
	Sig.	0.000

Table 2: Total Variance explained

Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
1	2.874	41.055	41.055	1.918	27.396	27.396
2	1.199	17.135	58.190	1.700	24.290	51.686
3	0.891	12.726	70.916	1.346	19.230	70.916
4	0.664	9.485	80.401			
5	0.608	8.618	89.082			
6	0.474	6.768	95.850			
7	0.209	4.150	100.000			

Extraction method: Principal component analysis

Table 3: Rotated component matrix a

	Component		
	1	2	3
Enterprise's ability	0.711	-2.21E-02	0.449
Enterprise's cooperation	0.731	0.345	-0.234
Sense of participation	0.461	0.536	0.200
negotiation ability	-5.09E-02	0.902	-1.33E-02
physical contract	0.766	-3.35E-03	0.262
psychological contract	0.133	0.130	0.844
social capital	0.240	0.681	0.519

Extraction method: Principal component analysis, Rotation method: Varimax with kaiser normalization, a: Rotation converged in 6 iterations

We can see from Table 3, the international science and technology cooperation enterprise's ability to strengthen its own counterintelligence, the cooperation between the international science and technology cooperation enterprise and the third party channel and the physical contract have higher loading on the first factor, the first factor is mainly explained by these 3 variables, can be interpreted as the control force of the international science and technology cooperation enterprises; the third party channel's sense of participation, the third party channel's negotiation ability and all of the partners' controlled social capital have higher load in the second factor, the second factor explains these 3 variables, can be interpreted as the third party channel's influence on the joint decision-making; the psychological contract has a higher load in the third factor, the third factor mainly explains the variables, can be interpreted as the cooperative expectations of the international science and technology cooperation enterprises and the third channel.

Table 4 shows the covariance matrix of three factors. It can be seen: no linear correlation among the three factors which achieves the design target of factor analysis.

Calculating the factor scores: By using the regression method to estimate the factor score coefficient and the output of factor score coefficient, as Table 5 shows.

According to Table 5, the following factor score function can be obtained:

Table 4: Component score covariance matrix

Component	1	2	3
1	1.000	0.000	-1.56E-16
2	0.000	1.000	0.000
3	-1.56E-16	0.000	1.000

Extraction method: Principal component analysis, Rotation method: Varimax with kaiser normalization, Component scores

Table 5: Component score coefficient matrix

	Component		
	1	2	3
Enterprise's ability	0.357	-0.204	0.224
Enterprise's cooperation	0.502	0.153	-0.479
Sense of participation	0.165	0.263	-0.026
negotiation ability	-0.181	0.634	-0.138
physical contract	0.443	-0.171	0.031
psychological contract	-0.170	-0.064	0.734
social capital	-0.098	0.350	0.314

Extraction method: Principal component analysis, Rotation method: Varimax with kaiser normalization, Component scores

$$F_1 = 0.375x_1 + 0.502x_2 + 0.165x_3 + 0.181x_4 + 0.443x_5 - 0.170x_6 - 0.098x_7$$

$$F_2 = -0.204x_1 + 0.153x_2 + 0.263x_3 + 0.634x_4 + 0.171x_5 + 0.064x_6 + 0.350x_7$$

$$F_3 = 0.224x_1 + 0.479x_2 + 0.026x_3 + 0.138x_4 + 0.031x_5 + 0.734x_6 + 0.314x_7$$

The joint decision practice behavior expression:

According to the contribution rate of the 3 factors to the counterintelligence joint decision behavior in the international science and technology cooperation (Table 2 shows), the expression can be reached for the counterintelligence joint decision practice in the international science and technology cooperation:

$$F = 41.055\% F_1 + 17.135\% F_2 + 12.726\% F_3 + 28.084\% F_4$$

Among them, F_1 as the control force of the international science and technology cooperation enterprises, F_2 as the third party channel's influence on the joint decision-making, F_3 as the cooperative

expectations of the international science and technology cooperation enterprises and the third channel, F_4 as the other factor.

CONCLUSION

When conducting the counterintelligence joint decision, the interests community of the international science and technology cooperation need to taken into account the factors such as the international science and technology cooperation enterprise's ability to strengthen its own counterintelligence, the cooperation between the international science and technology cooperation enterprise and the third party channel, the third party channel's sense of participation, the third party channel's negotiation ability, the physical contract, the psychological contract, all of the partners' controlled social capital, etc. The research shows that, in the joint decision-making practice, we should pay more attention to the control force of the international science and technology cooperation enterprises, the contribution rate reached to 41.1%; the third party channel's influence is also relatively followed with interest but its coefficient is 17.1% which shows that the international science and technology cooperation enterprises have not fully aware of its influence on the counterintelligence joint decision-making; as for the cooperative expectations of the of the international science and technology cooperation enterprises and third channel, its contribution rate is only 12.7% which illustrate that the international science and technology cooperation enterprises pays little attention to it and thinks that it will not have a significant impact on the practice of the counterintelligence decision-making in the international science and technology cooperation.

It should be pointed out that, due to the limited sample representative of the model and relatively limited number of samples collected and therefore, the conclusions of the study may have some limitations, further research is needed for other types of the international science and technology cooperation enterprises.

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