Risk assessment of Chinese technology enterprises' foreign direct investment

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Abstract: with the vigorous development of science and technology, countries around the world pay more and more attention to the important role of science and technology in economic development, and the competition of science and technology enterprises has become a hot competition point in the international competition. Foreign direct investment can help enterprises obtain technological development and expand overseas markets. With the development of China's science and technology enterprises, the amount of foreign investment of enterprises increases year by year. How to effectively evaluate the risk in the process of investment is of great significance to the development of China's science and technology enterprises. According to the characteristics of science and technology enterprises, this paper determines the risk assessment indicators from the four levels of politics, economy, law and technology, analyzes and evaluates various risk indicators by using analytic hierarchy process, and puts forward corresponding countermeasures.

Key words: Science and technology enterprises; Foreign direct investment; risk assessment

1. introduction

With the continuous development of economy, the investment in scientific and technological research of Chinese enterprises has gradually increased, and more and more scientific and technological enterprises are going abroad to invest. In 2020, China's foreign direct investment reached US $153.7 billion, ranking first in the world. Foreign direct investment in scientific research and technology services, manufacturing, software and information technology services increased by 8.8%, 27.6% and 67.7% respectively. Chinese science and technology enterprises gradually set off a boom in foreign direct investment.

But in this process, the loss caused by investment risk is also huge. The investment risk faced by Chinese science and technology enterprises has a special risk structure of the industry. When making foreign direct investment, science and technology enterprises should have the corresponding prevention and control ability for the special risk factors such as the degree of science and technology development, industry support, population quality and intellectual property rights of the host country. Therefore, how to identify and evaluate the risk of foreign direct investment of science and technology enterprises has become an important issue to be solved.

2. literature review

As for the research on the risk of enterprises' foreign direct investment, due to the late development of domestic science and technology enterprises, the foreign investment and investment of science and technology enterprises have only gradually developed in the past two decades.

First of all, the traditional risks faced by science and technology enterprises in the process of foreign direct investment are inevitable. Taiping and Li Jiao believe that political risk is the most important risk encountered by technology enterprises in foreign direct investment. Zhuxinglong summarized and analyzed that the political risk faced by science and technology enterprises is the primary factor in many risks of foreign direct investment. Zhao Qing used the international investment gravity model to empirically confirm the conclusion that there is a negative correlation between the size of national risk and the amount of overseas investment. Longxiaobai and Yang Li believe that when investing in high-tech industries, effective plans should be formulated for various regulatory risks faced by the host country in the process of green space investment. According to Huang Ying's research, Chinese science and technology enterprises have encountered serious political barriers and stringent safety reviews in the process of overseas investment.

In addition, enterprises must face the local laws and economic development level in the process of foreign direct investment. Zhang Xiaoquan pointed out that with the "going out" strategy, Chinese enterprises, especially emerging technology enterprises, have frequent external activities and increased scale, so enterprises must pay attention to the legal risks they face. Sunnanxiang pointed out that the overseas investment of Chinese science and technology enterprises is facing a more severe situation, which is reflected in the increasing legal risk of overseas investment of Chinese enterprises. Meng Yan emphasized that emerging enterprises, especially science and technology enterprises, often ignored the legal protection of intellectual property rights in the host country, which led to more severe legal risks of intellectual property rights. Qiuyang and Fang Yili pointed out that enterprises should consider the business environment of the host country while learning from domestic experience. They also need to pay attention to non economic risks and effectively control risks. Luyang believes that opportunities for science and technology enterprises in the international market must be accompanied by risks, and foreign exchange risk is the most common risk. Li E and Ma qiuya, taking the overseas investment of Longping high tech as the research object, believe that technology enterprises need to correctly assess the long-term risks and benefits of overseas investment.

At the same time, science and technology enterprises need to pay more attention to avoiding the loss of technology risk in foreign direct investment. Li Bin and Chen Yi believe that only breaking the technological monopoly can realize the change of status in the world economy. Liping and shiyaru proposed that the protection of intellectual property rights has a positive impact on foreign investment in general, and it is necessary to strengthen the protection of intellectual property rights in the process of foreign investment. Caixiaotian and Li Zhe pointed out that the internationalization level of internal talents is the key factor to determine the external investment of innovative enterprises. Chajun and xuwanyu believe that enterprise technology is the core risk faced in the process of overseas investment.

To sum up, the research on outward direct investment of technology enterprises mainly focuses on the risk classification, and the research on the risk effect of technology factors is less. This paper hopes to make a research supplement in this regard.

3. research methods

3.1 evaluation index

The indicators of the evaluation system are determined according to the risk level and risk type and combined with the availability of data. Some indicators are difficult to measure accurately, so similar indicators are used to replace them. The following is the description of each evaluation index.

3.1.1 political risk indicators

Due to the changes in the political environment of the host country, the previous equilibrium situation has been broken, bringing the possibility of loss to investors. It is divided into stability, regulation, corruption and diplomatic risks.

3.1.2 economic risk indicators

It refers to the possibility of economic losses incurred by multinational enterprises when they are engaged in normal economic activities due to the uncertainty of the economic future of the host country. Changes in the economic environment of the host country directly lead to fluctuations in the economic benefits of investment. It is divided into interest rate, exchange rate, inflation and tax risks.

3.1.3 legal risk indicators

It refers to the legal liability or other adverse consequences incurred by the parties themselves. It is divided into legal improvement and intellectual property risk.

3.1.4 technical risk indicators

Due to the low production and operation efficiency of some enterprises, they can not well adapt to the market demand, which leads to the risk of low competitiveness of enterprises in the international market. It is divided into technology cost and technology protection risk.

3.2 empirical analysis and results

Based on the analytic hierarchy process (AHP), this paper establishes a multi-level and multi factor comprehensive evaluation model, quantifies the risk factors of China's science and technology enterprises' overseas investment, and constructs an investment risk evaluation index system on this basis to judge the degree of risk faced by science and technology enterprises, and provides the basis for risk evaluation.

3.2.1 construct comparison judgment matrix

For the recognition of the relative importance of each indicator, the scale of 1-9 is used to judge the risk importance. The pairwise comparison judgment matrix of indicators at all levels is obtained by using the expert scoring method, as shown in Table 1.

Table 1 pairwise comparison judgment matrix of risk indicators a-b

	B1	B2	B3	B4
B1	1	3	7	4
B2	1/3	1	5	3
B3	1/7	1/5	1	1/4
B4	1/4	1/3	4	1

3.2.2 hierarchical single sorting and consistency inspection

The eigenvectors of judgment matrix table 1 obtained by calculation are:

$w_1=(0.538, 0.285, 0.052, 0.125)^T(1)$

The total ranking weight of the corresponding indicators is calculated as follows:

$x_i=\sum_{i=1}^{n} b_i x_{mi}(2)$

The calculation formula of index CI of overall ranking consistency is as follows:

$CI=\sum_{i=1}^{n} b_i CL_j(3)$

Where, Cl_i For and b_i The consistency index of the judgment matrix in the corresponding risk index. The CI value of A-B judgment matrix is 0.0813.

Similarly, the calculation formula of the random consistency index of the total hierarchy is as follows:

$RI=\sum_{i=1}^{n} b_i RI_i$(4)

Where, RI_i For and b_i The consistency index of the judgment matrix in the corresponding risk index.

To sum up, the one-time ratio of total ranking of levels is:

$CR=\frac{CI}{RI}$(5)

When CR<0.1 It means that the consistency test has been passed.

The CR value of a1-b matrix calculated in the table above is 0.0913, and the judgment matrix passes the consistency test.

The weight vector of each judgment matrix and the calculation results of consistency test are as follows:

$a_1=(0.523, 0.133, 0.064, 0.281)^T$, $\lambda_{max}=4.189$, CI=0.063, CR=0.071<0.1;

$a_2=(0.078, 0.192, 0.483, 0.246)^T$, $\lambda_{max}=4.131$, CI=0.044, CR=0.049<0.1;

$a_3=(0.257, 0.743)^T$, $\lambda_{max}=2$, CI=0, CR=0<0.1;

$a_4=(0.685, 0.315)^T$, $\lambda_{max}=2$, CI=0, CR=0<0.1 The judgment matrices passed the consistency test;

3.2.3 evaluation results

See Table 2 for the weight score of the overseas investment risk index evaluation system of science and technology enterprises.

Table 2 evaluation results of index weight

Target layer	Primary indicator	weight W_1	Secondary index	symbol	weight W_2	weight W_{21}
section technique Enterprise trade right Outside straight meet throw Capital wind Insurance	Political risk	0.538	Stability risk	X1	0.281	0.523
			Regulatory risk	X2	0.072	0.133
			Corruption risk	X3	0.034	0.064
			Relations with China	X4	0.151	0.281
	economic risks	0.285	Interest rate risk	X5	0.022	0.078
			exchange rate risk	X6	0.055	0.192
			Inflation risk	X7	0.138	0.483
			Tax risk	X8	0.070	0.246
	Legal risk	0.052	Risk of legal perfection	X9	0.013	0.257
			Intellectual property risk	X10	0.039	0.743
	Technical risks	0.125	Technology cost risk	X11	0.086	0.685
			Technical protection risk	X12	0.039	0.315

Table 2 shows that in the process of science and technology enterprises' foreign direct investment, political risk has the greatest impact on investment, followed by economic risk, technical risk and legal risk.

4. countermeasures and suggestions

4.1 improve enterprise political risk early warning ability

Due to the uncertainty of political risk, in order to better protect their legitimate rights and interests, science and technology enterprises should build their own risk early warning management system, strengthen the research on countries with high political risk, and comprehensively evaluate the laws, policies and industry norms of the host country, so as to effectively avoid the adverse impact of uncertainty on enterprises themselves.

4.2 improve the information consulting service system of overseas investment enterprises

The investment subject of a single science and technology enterprise is small, and the channel for collecting information in the host country is limited, so it is difficult to master comprehensive international market information. Facing this reality, the government should take the lead in industry associations, chambers of Commerce, embassies abroad and other channels to jointly assist Chinese science and technology enterprises to provide reliable information and professional consulting services. Secondly, all data institutions and colleges and universities work together to establish a foreign direct investment database to provide support for the foreign direct investment of science and technology enterprises and promote the good development of overseas investment.

4.3 cultivate professional technical talents and strengthen intellectual property protection

Due to the demand of science and technology enterprises for technology, efforts should be made to strengthen the enterprise's own technology research and development ability, improve the level of high-tech competitiveness, absorb technical specialized talents, establish an incentive mechanism to attract talents, and improve the level of technological innovation. In addition, while actively breaking through the innovation ability, the existing patents and knowledge achievements should be effectively protected to protect the core technological competitiveness of enterprises.

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