The Evaluation Model of Legal Risk of Enterprises' Foreign Investment Based on Data Mining

Luyuan Yang$^{1,*}$

$^1$Oxford College of Kunming University of Science and Technology, China, 650100

*Corresponding author e-mail: ffdsfk@kmu.edu.cn

Abstract. In a highly competitive market economy, data and information have become a very important economic resource for enterprises. Because of the huge and redundant data information, companies make full use of the acquired data and build a legal risk evaluation model for corporate foreign investment. This model can effectively use foreign investment companies to conduct risk assessments to ensure that the company can achieve maximum victory. Through the use of data mining technology in the legal risk assessment model of foreign-invested enterprises, the correlation between data can be quickly and efficiently mined, which is conducive to enterprises to obtain known related data mining conditions, to evaluate the results that will appear in the future, and to help enterprises to do Make correct strategic decisions.

Keywords: Data Mining, Enterprise, Legal Risk Evaluation Model of Enterprise Foreign Investment

1. Introduction

Establishing and perfecting the legal risk evaluation model of enterprises' foreign investment is the development requirements of enterprises themselves and the trend of the overall social environment in the new era$^{[1-2]}$. In particular, the emergence of the financial crisis has allowed many companies that have established and perfected the legal risk evaluation model for corporate foreign investment to taste the sweetness. These companies have withstood the pressure of survival on the cusp of the financial crisis and achieved new development$^{[3-4]}$. Today’s economy is a data economy. Many companies face a large amount of data that needs to be processed every day. If companies use artificial techniques to distinguish the pros and cons of data, they cannot keep up with the development of the whole society. Data mining technology is based on the large amount of data. A technology that discovers hidden and useful data with certain underlying laws and is then obtained by the demander$^{[5-6]}$. In foreign countries, data mining has been successfully applied to customer credit analysis, customer consumption interest analysis, customer loyalty analysis and target market analysis and other fields, and has created huge social and economic value. Due to the relatively short period of time for my country to implement economic system reforms, the immature competition mechanism, and the low level of informatization in my country, compared with developed countries, my country's foreign investment risks still lag far behind.
Changes in the legal environment often leave the country or the region in continuous legal turmoil, the social order has deteriorated, the basic conditions such as public security, transportation, and communications on which multinational companies rely on operations no longer exist, and the safety of corporate property and personnel cannot be guaranteed. Multinational enterprises cannot operate normally or have to fall into business suspension or termination; or when a country's legal structure is redistributed or legal interests undergo major changes, the operating policies on which multinational companies originally relied have undergone major changes, and they have even been discriminated against and punished. Sexual treatment will eventually lead to major losses for multinational companies, or inability to continue operations. Legal risks are unpredictable, difficult to control, and difficult to stop because of their large influence, wide radiation coverage, and strong destructive power, which seriously affect the safety and interests of my country's overseas investment, and also affect my country's economic development and development. National Security. However, the overseas investment of Chinese enterprises has great shortcomings in terms of history and experience. They often have insufficient understanding of legal risks, lack of prevention tools and prevention strategies. Most companies put very little effort into assessing and dealing with legal risks. Therefore, how to define, analyze and evaluate the legal risks of the host country in foreign investment by Chinese enterprises is worthy of in-depth study. In particular, the quantitative assessment of legal risks is of great significance for Chinese companies to measure investment and management decisions.

2. Data mining algorithm
In order to accurately predict the future foreign investment of network foreign investment products from the historical data of foreign investment, the method of data mining is used to complete the foreign investment forecast of network foreign investment products. Among them, the data mining tool uses the database API method to enter the database, thus a series of mining operations in the foreign investment forecast at night. The data mining tools here include both traditional and modern technologies. Traditional mining tools include linear regression, time series decomposition, moving average, autoregression, exponential smoothing, and gray theory. Modern intelligent mining tools mainly include BP neural network, Bayesian network, radial basis neural network, and time series The method of combining decomposition and neural network, etc.

In 1948, Shannon, the founder of information theory, proposed that the amount of information \( I(a_i) \) of event \( a_i \) can be expressed in the following way:

\[
I(a_i) = p(a_i) \log_2 \frac{1}{p(a_i)}
\]  

(1)

Where \( p(a_i) \) represents the probability of occurrence of event \( a_i \).

Assuming that \( a_1, a_2, a_3, \ldots, a_n \) has one and only one occurrence of \( n \) mutually incompatible events, then the average amount of information of these \( n \) events can be expressed in the following way:

\[
I(a_1, a_2, \ldots, a_n) = \sum_{i=1}^{n} I(a_i) = \sum_{i=1}^{n} p(a_i) \log_2 \frac{1}{p(a_i)}
\]  

(2)

In the above formula, the base of the logarithm can be any number, and different values correspond to different units of entropy. But usually the value is 2, and it is stipulated that when \( p(a_i) = 0 \),

\[
I(a_i) = p(a_i) \log_2 \frac{1}{p(a_i)} = 0
\]  

(3)

In decision tree classification, \( S \) is used to represent the training sample set, then \( |S| \) is the number of training samples, which contains \( C_1, C_2, C_3, \ldots, C_n \) different classes, and use \( |C_1|, |C_2|, |C_3|, \ldots, |C_n| \) to indicate the size of these classes. Then the probability that any sample \( S \)
belongs to class C is:

\[ p(S_i) = \frac{|C_i|}{|S|} \]  

\[ \text{Entropy}(S, A) = \sum \left( \frac{|S_v|}{|S|} \right) \text{Entropy}(S_v) \]  

\[ \sum \]  

is all possible values v of attribute A, Sv is the subset of S with v value of attribute A, |Sv| is the number of elements in Sv; |S| is the number of elements in S.

Gain (S, A) is the information gain of attribute A on set S.

\[ \text{Gain}(S, A) = \text{Entropy}(S) - \text{Entropy}(S, A) \]  

The larger the Gain (S, A), the more information is provided for classification.

3. Main manifestations of political risks faced by Chinese companies in their overseas investments

Economic globalization and financial integration have created conditions and opportunities for China's foreign investment, but also brought major challenges; in recent years, the political crises in Southeast Asia, Russia, Latin America, Africa and the Middle East have increased the foreign investment of Chinese companies. Political obstacles to engaging in transnational operations; since the 2008 financial crisis, the global economy has fallen into recession, Western developed countries have suffered heavy losses, and the European sovereign debt crisis has continued to develop, all of which have triggered serious economic, political and social instability, and have contributed to Chinese companies' foreign investment bring huge political risks.

In fact, political risk has become the biggest, most unpredictable, and most uncontrollable risk in the process of overseas investment by Chinese companies. Specifically, there are mainly the following:

3.1. Confiscation, expropriation and nationalization

The government of the host country possesses the property of foreign enterprises for free or at a small price, or gradually brings the foreign enterprises under the control of the country through a series of laws. At present, the political risk of directly adopting the above approach in many countries has been greatly reduced, but the risk of indirect expropriation has increased relatively. The usual practice is that the host country government uses various measures to restrict or actually cancel the rights of foreign investors as shareholders to a large extent, which constitutes de facto expropriation. For example, in 2016, the cooperative oil exploration of PetroChina in Venezuela was changed to a joint venture and controlled by the Venezuelan Petroleum Company.

3.2. Corruption and ineffective government

Corruption or inaction of government officials due to the imperfect legal system of the host country, resulting in losses caused by rising corporate costs. This type of risk is a hidden risk, but uncontrolled will greatly affect the normal operation of the enterprise.

3.3. Government default

Government default refers to that the host country government violates part or all of the agreement conditions, which causes the multinational enterprise to be unable to continue to implement the relevant investment agreement according to the original contract or agreement, and causes the multinational enterprise to lose heavily. At the end of September 2011, the Myanmar government announced the shelving of the China Power Investment Corporation's Myitsone power station project, which was a government breach.

3.4. Discriminatory intervention—risk of policy changes
Including tax discrimination, policy discrimination, and legislative discrimination. Due to the adjustment of the industrial structure of the host country, or to adapt to economic globalization and allow the healthy development of the domestic economy, or to protect domestic enterprises or industries, the host country government can change the original policies through legislation or administrative orders, and even require foreign-funded enterprises to pay more or not. Let it enter certain industries or projects. In recent years, developed countries in Europe and America have often restricted Chinese companies from entering sensitive industries, such as resource and energy, high-tech industries, on the grounds of national security and the background of Chinese-funded enterprises. At present, this has developed into one of the main risks of political risks for Chinese companies in developed countries. At the end of 2016, the Russian government introduced relevant regulations to rectify the economic order of the wholesale and retail market and regulate the employment of immigrants, which caused nearly 100,000 Chinese businessmen to suffer heavy losses; after the new Thai government revised the "Foreigners' Business Law," foreign companies must adjust their shareholding structure. Chinese companies investing locally have also suffered huge losses.

3.5. Foreign exchange control
Foreign exchange control refers to the fact that the government prohibits or restricts the transfer of investment principal, profits and other legal income of the host country to the host country due to the balance of payments difficulties in the host country. Whenever a financial crisis comes, this risk is more likely to occur in countries that are vulnerable to international economic fluctuations.

3.6. War
Due to political instability, revolutions, civil unrests, riots, and wars in the host country have caused the risk of damage, loss, loss, seizure or lien in the property/personnel of my country's transnational investment projects; or taken to achieve a certain political purpose Loss caused by sabotage. The war in Libya is a typical example.

3.7. Terrorist attack
The conflicts caused by ideology, ethnic conflicts and religious factors eventually developed into localized terrorist attacks. Chinese multinational companies have been kidnapped and attacked many times in Africa and Asia. Although terrorist attacks are not necessarily targeted at multinational companies in our country, nor will they necessarily interrupt the normal operation of companies, their destruction of peace and the destruction of the environment in which multinational companies rely for survival will at least make these companies' operating costs Greatly improve.

3.8. Riots
Due to social and cultural reasons, the host country is disgusted or opposed to multinational enterprises, leading to strong social and cultural fluctuations in the host country, and ultimately causing riots, disrupting the business order of Chinese multinational enterprises, and causing their losses. For example, there are serious anti-Chinese anti-Chinese sentiments in Southeast Asia, and demonstrations often occur; shoe burning incidents in the Spanish town of Elche.

4. Construction of a legal risk evaluation model for corporate foreign investment based on data mining
The traditional corporate foreign investment legal risk evaluation model is based on the corporate information management system. The internal data mainly comes from the corporate database. The data format is relatively regular and easy to process. Therefore, the data analysis and processing is relatively simple. Data analysis can only stay at the shallow data mining level of OLAP. At present, there are more and more risk sources in the legal risk evaluation model of corporate foreign investment, including corporate internal databases, data warehouses, external networks, external databases, and so on. The legal risk evaluation model of corporate foreign investment needs to provide
users with subject-oriented data mining and in-depth data analysis. To achieve these functions, the legal risk evaluation model of corporate foreign investment must be based on data mining technology. However, data mining requires relatively high data, so it is necessary to strengthen the processing of data on the basis of the original corporate foreign investment legal risk evaluation model to meet the requirements of data mining. The application of data mining technology to the legal risk evaluation model of corporate foreign investment is mainly to improve the foreign investment risk collection and analysis subsystem of the traditional corporate foreign investment legal risk evaluation model.

5. Experiment and result analysis

Using the legal risk calculation results of this model from 2015 to 2019, this article attempts to use numerical and trend analysis methods to illustrate the revolutions and turmoil in the Middle East/North Africa 2010/2011, focusing on the analysis of Egypt, Tunisia, and Yemen (see Figure 1–Figure 3). The legal risk chart of the five countries).

![Figure 1. Trend chart of Egyptian legal risks.](image)

Egypt: Egypt's overall legal risk score is not high, belonging to the M3 level, but it is worth noting that Egypt's legal riot risk (VIO) is relatively high. It has been hovering above 3 for five years, although it has declined in 2016. However, it has continued to rise since 2018, and the risk of legal riots has always been above the overall legal risk. This can also explain why the turmoil in North Africa first started in Egypt.

![Figure 2. Tunisia legal risk chart.](image)

Tunisia: Although Tunisia’s legal risk score is not high, it is only at the M2 level, but the overall trend has been upward in the past five years. It is especially worth noting that the risk of legal violence continues to rise rapidly and is above the overall legal risk. This should explain why Tunisia's political situation changed suddenly.

![Figure 3. Yemen legal risk chart.](image)
Yemen: Yemen's legal risk has always been high, belonging to the H2 level. In the past five years, the overall legal risk level has trended upwards, and the risk of legal violence has continued to rise rapidly, indicating that legal riots and revolutions are on the verge. Large-scale protests and demonstrations have erupted in many places since January 2011. Since September 2011, the legal situation in Yemen has changed rapidly, with frequent armed conflicts. The government has almost no control over the situation, and finally the president stepped down to avoid greater legal instability. Therefore, it is foreseeable that the legal chaos in Yemen may continue.

Through the above case analysis, the author believes that:

(1) The legal risk level obtained by the model is basically consistent with the actual occurrence, so the calculation result of the model can roughly predict the legal risk of the country. And the data used in the model are all public and free, which has certain value for Chinese enterprises to evaluate and measure legal risks. Enterprises can adopt corresponding legal risk defense strategies and measures accordingly.

(2) The results calculated by the model are static and lagging, but the legal risk is essentially the result of the game of legal forces, so it changes dynamically, the result of quantitative changes to qualitative changes, so when conducting legal risk analysis We should not just look at the absolute value, but should pay attention to its development trend. If the trend continues to rise, indicating that the situation is deteriorating, we should be more vigilant.

(3) Due to the collection of indicator factors, the model indicators mainly consider the domestic factors of the host country, without taking into account the influence of geopolitical laws (as in Libya). However, in the contemporary world, the influence of geopolitical laws on changes in the world law and economic situation is increasing, and sometimes even decisive. Therefore, the model indicators should consider the influence of geological laws, so that the legal risk model is more realistic and the results are more reliable.

6. Conclusion

With the continuous progress of science and technology and the further development of the economy, the uncertain factors of foreign investment risks are also increasing. For large-scale data, structured and unstructured data through data analysis, extraction and technical analysis have been it gradually becomes the basis for the legal risk assessment of enterprises' foreign investment. Applying data mining technology to foreign companies can obtain valuable data and potential risks. Therefore, using data mining can speed up the effectiveness of risk assessment and improve the efficiency of the legal risk evaluation model for corporate foreign investment.

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References

[1] James, B. E., & Vaaler, P. M. (2017). Experience, equity and foreign investment risk: a pic perspective. Management International Review, 57(2), 209-241.
[2] Simona Hašková, & Fiala, P. (2019). Correction to: a fuzzy approach for the estimation of foreign investment risk based on values of rating indices. Risk Management, 21(3), 200-201.
[3] George, E. S., & Chilarez Dãnuþ. (2012). Risk typology in foreign investment. Ovidius University Annals, xii, 1408-1413.
[4] Yasuo, & Sanjo. (2012). Country risk, country size, and tax competition for foreign direct investment. International review of economics and finance, 21(1), 292-301.
[5] Güntner, Jutta, & Kristalova, M. (2016). No risk, no fun? foreign direct investment in central and eastern europe. Intereconomics, 51(2), 95-99.
[6] Huynh, V. N., Kreinovich, V., Sriboonchitta, S., & Suriya, K. (2015). [studies in computational intelligence] econometrics of risk volume 583 || the effects of foreign direct investment and economic development on carbon dioxide emissions, 10.1007/978-3-319-13449-9(Chapter 34), 483-496.