Investigation on Tax Planning and Risk Prevention Based on Financial Big Data

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Abstract: In today's increasingly perfect market economy system and constantly improving national economic development level in China, enterprises are facing more and more challenges and challenges. Tax expenses are also a major expense of a company. Without violating tax regulations, reducing the company's tax burden through tax planning can greatly help enhance the company's core competitiveness. At the same time, after the reform of business tax to value-added tax, there have been many positive changes in tax planning for enterprises, which have played a guiding role in adjusting their investment and financing decisions. In order to explore the application of Big Data (BD) technology in enterprise tax risk prevention and control, enrich the existing research theory of BD risk control, and bring inspiration and reference to other enterprises that are building BD risk control, this paper selected Z Company, a group company that started earlier and had the characteristics of BD risk control platform construction, to conduct an example analysis of Z Company's application in BD financial risk control. Taking Company A, a subsidiary of Company Z, as the research object, through experiments, it was found that the highest number of serious risks in Company A reached 38, while the maximum number of general risks was 115. Therefore, in the context of financial BD, tax financing and risk prevention and control were very necessary.

1. Introduction

In the new era of development, the environment in which the company is located has undergone significant changes. During the company's development process, data has been truly integrated into the company's production factors and has become the most important strategic resource for the company's future development. The company's transformation towards digitalization is gradually becoming a trend for future development. In this situation, companies in the process of developing new industries, formats, and models in the economy have greatly reduced the role and benefits that traditional risk control models can play. With the rapid development of BD at a geometric multiple speed and the continuous improvement of information technology, risk control using BD is not only a concept, and it has become a practical practice. On this basis, risk control technology based on BD has received more and more attention and application, and has gradually become a new development trend.

With the emergence and development of BD, people's use and exploration of its technology is also expanding and deepening, and its value has been recognized by people. How to apply BD technology to the company's risk management process to maximize the value of BD is an important aspect of contemporary company risk management. In the existing research on BD risk control, more research has been carried out on the control of credit risk in the financial industry, while research on BD financial risk control is rare, especially for case study of enterprises that use BD platform to control financial risk. Based on the existing research, and taking the case of Z Company using BD technology for financial risk control as the background, a profound analysis was carried out. This is of great significance to enrich and improve the concept logic, framework structure and connotation elements of the enterprise's BD financial risk management and control system. It would also enrich the existing BD risk management and control theory system, providing a certain theoretical basis and guidance for the transformation of enterprises to BD financial risk management and control.

The research on financial BD is one of the hottest topics at present. Among them, Neuman, Stevanie S' research results would help managers and tax practitioners focus on the tax risk components of specific industries, assess the risks in tax planning initiatives, prudently engage in additional risks when ETR was low, and adjust tax risk strategies to meet the needs of specific companies [1]. Ebimobowei, Appah concluded through research that corporate governance characteristics would affect tax planning of Nigerian listed companies, so it was suggested that shareholders must retain a structure to ensure that the board of directors could obtain financial incentives for effective tax planning, which would help solve the principal-agent problem used by management [2]. Nagumanova, Regina V. proposed the institutional tax risk management system as one of the components of the financial management system and as an indicator of the effectiveness of the enterprise tax management system itself [3]. Oats Lynne suggested that the possibility of disputes increased as new information leads to new misunderstandings and uncertainty in determining the final tax situation. There was a risk that greater disclosure might not effectively address concerns about unacceptable corporate tax avoidance [4]. However, due to insufficient data sources, the research is only in the theoretical stage and lacks practicality.

2. Tax Planning and Risk Prevention Evaluation Based on BD Platform

2.1 Financial Risk Control Framework Based on BD Platform

The prevention and control of financial risks in the BD environment is different from conventional risks. It is required to build a closed-loop management process of "pre-warning, real-time monitoring in the event, and post response supervision" [5-6]. The enterprise financial risk management and control framework based on the BD platform is shown in Figure 1. The purpose of this platform is to use the BD platform to help enterprises to carry out real-time monitoring and intelligent analysis and early warning of financial risks, to discover valuable information from a large amount of data, and to provide support for the company's management activities.
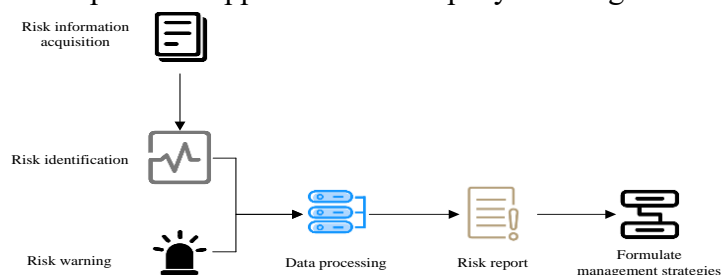

Figure 1: Financial risk management framework based on BD platform

Firstly, the collection and analysis of financial risk data.

To carry out risk prevention and control, the first thing to do is to comprehensively, persistently, and continuously collect internal and external risk information of the company, including cases of financial crises caused by inappropriate response to financial risks in the world. Analyzing the assets, liabilities, income, expenses, cash flow, information disclosure, and difference adjustment of an enterprise can obtain relevant raw materials and information, providing a basis for the identification of the enterprise.

The company's financial risk control work is to collect a large amount of financial data from various departments and subordinate units, related parties, the Internet and other channels, upload them to the BD risk control platform in real time, and finally form a "data warehouse". On this basis, the Data modeling method is used to conduct real-time analysis and calculation of financial risk elements, and generate corresponding data sources, so as to achieve real-time monitoring and dynamic early warning of financial risks. BD technology is used to collect and process these information, so that enterprises can dynamically grasp the external information and respond to changes in the external environment. During this period, they can exchange with each other [7].

Secondly, dynamic identification of financial risks.

The analysis and evaluation of financial risks mainly includes three stages: risk identification, early warning, analysis and evaluation [8-9]. Risk identification is to determine whether there are risks and what they are; Risk alerts refer to the preventive and handling measures taken for potential hazardous events that have been identified. The analysis and evaluation of risks is to determine the probability of their occurrence and the degree of their impact. Financial risk assessment adopts both qualitative and quantitative methods, and conducts periodic and non-periodic re-evaluations of the changes in financial risk information.

Based on a large amount of internal and external information collected, various types of risks were analyzed and analyzed. Through BD analysis, quantitative evaluation of financial and non-financial Risk factor is realized, and real-time monitoring and early warning of financial risks are realized.

Thirdly, the preparation of financial risk statements.

In the context of BD, the company should build a risk control system suitable for the company's current situation according to the company's specific situation. At the same time, the communication and interaction at all levels within the company should also be continuously strengthened. With the development of BD technology, financial risk data is presented to the company visually, intuitively and clearly. This report provides a comprehensive analysis of the company's internal and external risk information, showcasing the changes in financial risks at various stages from a comprehensive and multi-dimensional perspective. It helps risk reporting users gain a comprehensive understanding and grasp of the company's internal and external environment, thereby making timely and accurate risk management decisions.

2.2 Financial Risk Management and Control Characteristics Based on BD Platform

Risk management and control on the BD platform refers to the following: On this platform, all kinds of internal and external data that can reflect the company's operating status and capacity are collected. These data are processed on this platform, and then a risk warning model is used to warn these data, so as to achieve the purpose of effective control of these data. The characteristics of risk control on the BD platform are shown in Figure 2:
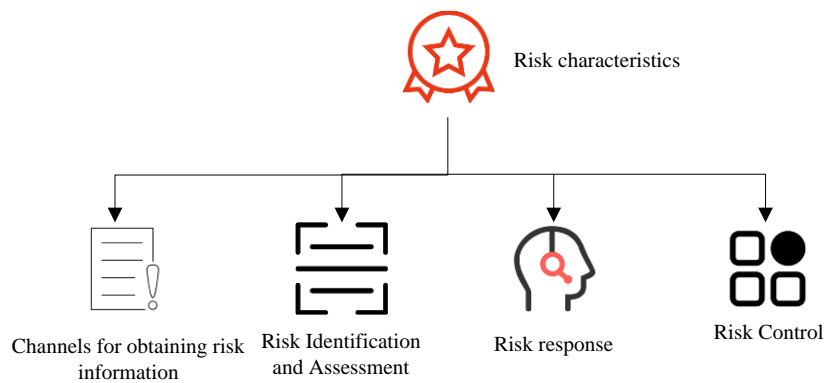
Figure 2: Financial risk characteristics in the era of BD

It can be seen from Figure 2 that in the financial risk management and control in the era of BD, the acquisition of risk information is fundamentally different from the traditional risk management and control. With the arrival of the era of BD, companies have more and more extensive access to financial information. The data collected by enterprises is no longer limited to the data in the internal financial statements of the enterprise, but rather the data generated in business activities and valuable to the enterprise in various aspects. With the advent of the era of BD, the company's financial risk analysis has not only stayed in the analysis of financial indicators, but also integrated various external factors into the company's financial risk evaluation system, so that the value of unstructured data has been fully reflected. The BD platform also supports enterprises in data mining and processing. By comprehensively analyzing the factors that lead to financial risks of different types, a more accurate judgment can be obtained on the likelihood and scope of financial risks [10].

2.3 Tax BD Evaluation Based on Financial BD

Tax BD is the taxpayer related information collected from tax information and various third-party platforms that can fully and truly reflect the tax situation. In addition to system declaration data, financial data, invoice data, etc., it also includes a series of data generated through cooperation with other departments of the company, including corporate credit and economic behavior. Through the induction, sorting and systematic analysis of the BD obtained, the production, operation and economic operation of enterprises can be basically mastered, which provides a data basis for tax authorities to carry out risk assessment. With the rapid development of information technology, tax BD has become one of the key factors to promote the function of tax departments [11-12]. With the continuous development of tax informatization, tax authorities at all levels have accumulated a large number of tax BD, in which the types and sources of data have become more abundant, as shown in Figure 3.

From Figure 3, it can be seen that tax risk refers to the deterioration of tax sources, weakened economic regulation function of taxation, insufficient potential for tax growth, and the possibility of tax revenue not meeting the government's functions due to inadequate systems, loopholes in policy formulation and tax collection and management, as well as various unpredictable risks during the tax collection and payment process. Tax risk is a common phenomenon in the entire process and various links of tax management, which can be manifested in three specific forms: tax policy risk, tax compliance risk, and tax law enforcement risk. Tax risk management refers to the use of risk management theories and methods by tax authorities, supported by modern information technology, to comprehensively analyze taxpayers' tax compliance and make reasonable arrangements for various types and levels of tax risks that taxpayers face. It is a tax management activity that uses risk reminders, tax assessments, tax audits, anti-avoidance investigations, tax inspections, and other

risk response measures to prevent and control tax risks, thereby improving taxpayers' compliance with tax laws and enhancing the management level of tax authorities.
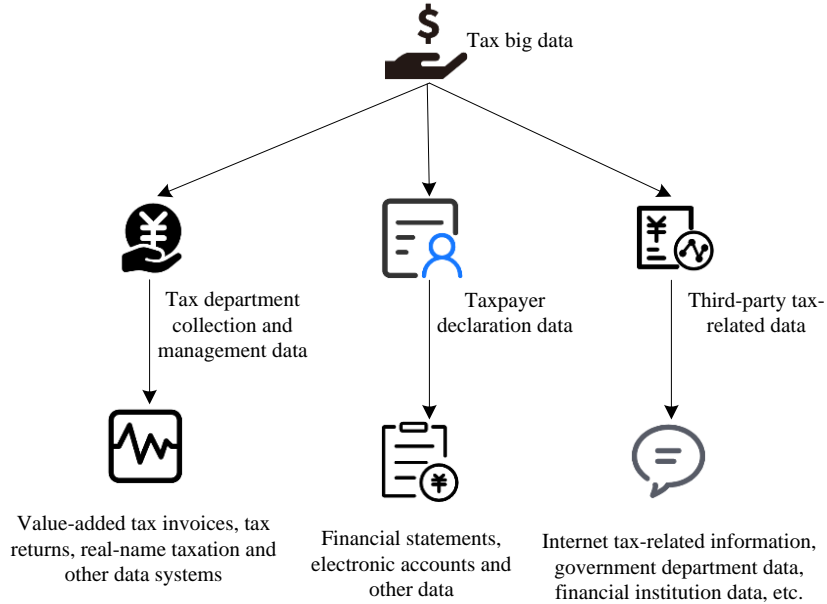

Figure 3: Types of tax BD

2.4 Investigation on Risk Degree Evaluation under Financial Risk Prevention

This article took Z Company as the research object and used analytic hierarchy process to evaluate its financial risks. First, the hierarchical classification system of counties and cities in each region is established by using the analytic hierarchy process, and the classification standards of counties and cities in each region are determined. Secondly, the fuzzy comprehensive evaluation method was used to establish a first-order and second-order financial risk evaluation system for the company, thereby providing a comprehensive analysis and evaluation of the company's financial situation.

To use the AHP method for system analysis, the first step is to make the system hierarchical and establish a clear hierarchical structure. According to the desired effect and the degree of correlation between indicators, the system atmosphere is divided into different levels. At the same level, their identities are the same. Decision makers determine the importance of elements at various levels and express the decision matrix in numerical form. The decision matrix B is as follows:

$$B = \begin{bmatrix} b_{11} & b_{12} & \cdots & b_{1n} \\ b_{21} & b_{22} & \cdots & b_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ b_{n1} & b_{n2} & \cdots & b_{nn} \end{bmatrix} \qquad (1)$$

The weights of each layer are calculated, and each row element of the judgment matrix is multiplied:

$$m_i = \prod_{j=1}^{n} b_{ij} \qquad (i = 1, 2, ..., n) \qquad (2)$$

The eigenvector w_i obtained from the nth root of m_i is calculated:

$$w_i = \sqrt[n]{m_i}, (i = 1,2,...,n) \tag{3}$$

Vector $W = (w_1, w_2,..., w_n)$ is normalized:

$$W_i = w_i / \sum_{i=1}^{n} w_i (i = 1,2,...,n) \tag{4}$$

$W = (w_i, w_s,..., w_z)$ is obtained, that is, the approximate solution of the obtained eigenvector. The consistency check is performed, and the maximum feature root λ_{max} is calculated first.

$$\lambda_{max} = \frac{1}{n} \sum_{i=1}^{n} \frac{BW}{w_i} \tag{5}$$

Among them, B is the judgment matrix and W is the weight vector. Afterwards, the matrix consistency indicator CI is calculated:

$$CI = \frac{\lambda_{max} - n}{n - 1} \tag{6}$$

The consistency ratio CR is calculated:

$$CR = \frac{CI}{RI} \tag{7}$$

When the CR is less than 0.1, the consistency of the matrix can be sorted using detection methods. If the CR is greater than 0.1, it indicates that the matrix has not undergone consistency verification and must be re evaluated and modified until satisfactory results are achieved.

3. Corporate Tax Planning and Risk Prevention Design in the Context of BD

3.1 Planning of Preferential Policies for Corporate Income Tax

The implementation regulations for corporate income tax cover a wide range of tax incentives and have various types, which can be mainly divided into three categories: tax rate based reduction, tax amount based reduction, and tax base based reduction. Tax rate reduction: The tax rate applied to some companies is relatively low, such as 15% for high-tech companies and 20% for micro and micro companies that meet policy requirements. Tax deduction refers to the reduction achieved by reducing the taxable amount, which includes complete exemption, halved collection, and tax credit [13-14]. For example, Z Company is a software company that can enjoy two exemptions and three reductions in tax benefits, while Z Company's subsidiaries can also enjoy similar tax benefits. As mentioned earlier, this would not be repeated here.

Tax based deduction is achieved through tax reduction and exemption based on the taxable income, including additional deductions, accelerated depreciation, and reduced income. Company Z can carry out targeted tax planning through the three tax policies mentioned above. In terms of tax reduction, Company Z should plan from aspects such as technology transfer income and tax credits; in terms of tax deduction, Company Z can conduct tax planning by increasing deductions and reducing income [15-16]. Regarding tax rate based tax reduction, Company Z can obtain tax reduction through the business and geographical location of the company it operates. Considering that the tax planning of ratio based deduction is simpler and easier to understand, this article mainly conducts tax planning from two aspects: tax based deduction and tax based deduction.

3.2 Tax Planning for Fixed Assets

Z Mobile Software Limited Company is a high-tech enterprise that operates projects such as basic software and application software services; technology development, consulting, services, transfer, and training; computer system services; import and export of goods, technology, and agency. The depreciation calculation is shown in Table 1:

Table 1: Depreciation calculation table from 2013 to 2022

Years	Depreciation Rate	Net Value Of Fixed Assets(Unit: ten thousand RMB)
2013	9.5%	724
2014	9.5%	648
2015	9.5%	572
2016	9.5%	496
2017	9.5%	420
2018	9.5%	344
2019	9.5%	268
2020	9.5%	192
2021	9.5%	116
2022	9.5%	40

From Table 1, it can be seen that using the double declining balance method, the depreciation amount extracted in the early stage of depreciation is relatively large, and the corresponding income tax payable is also less. In the later stage of depreciation, if not, the income tax payable is more. During the entire amortization period, the total taxable income and payable income tax are the same.

3.3 Quantitative Assessment and Dynamic Warning of Financial Risks

The risk management system of Company Z is based on BD and takes risk identification as the core. Through the BD risk control system, the risk is quantitatively assessed and judged, so as to achieve effective risk control [17-18]. Firstly, using technologies such as artificial intelligence and data mining, the vast amount of collected case data is compared and classified into various financial risks. The risk preference and tolerance of enterprises are comprehensively considered, and corresponding financial risk warning indicators are constructed. Based on the risk data collected in real time, using the indicator model in the BD intelligent risk control platform, it was carried out quantitative analysis and prediction, and then the financial risk was identified and quantified. Its risk level was analyzed, and the probability of risk events was predicted [19-20]. During the evaluation process of the project, the project was evaluated and potential issues that may arise during the project implementation were analyzed. On this basis, by taking corresponding precautions against various identified risks, early warning of various risks has been achieved.

The BD intelligent risk control system can be used by all member enterprises of company Z at all stages from fund raising to use, helping company Z to make overall arrangements for the whole group's funds, so as to achieve the optimal fund application scheme, reduce financial costs, and control financial risks as early as possible. For Z Company, financial risks such as no budget, over budget, insufficient fund account balance to repay due debts on time, and misappropriation of funds during the fund payment process can be timely warned before the financial crisis arrives. The annual risk warning situation of Company A, a subsidiary of Company Z, is shown in Figure 4.
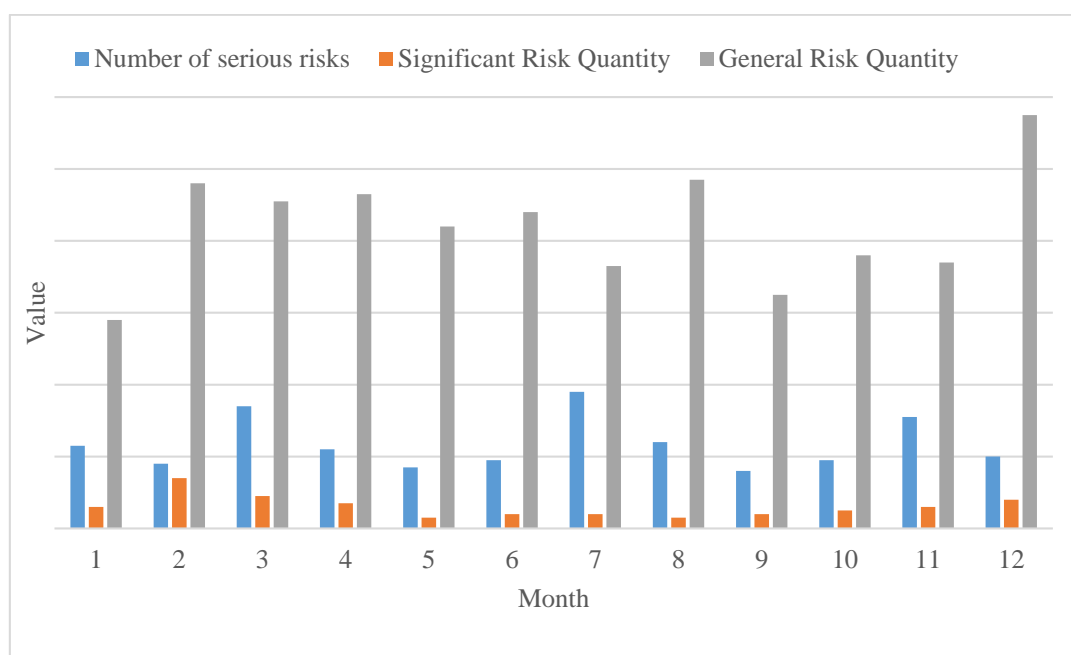
Figure 4: Annual risk warning of Company A

From Figure 4, it could be seen that the maximum number of serious risks reached 38, while the maximum number of important risks was 14, and the maximum number of general risks was 115. The minimum value for serious quantitative risks was 16, the minimum value for important risks was 3, and the minimum number of general risks was 58.

4. Conclusions

In this paper, Z Company, which started early in the enterprise risk control digital transformation and had a unique BD risk management and control system, was listed as the main research object. Based on the analysis of Company Z and the current situation of the financial risk management and control system of the BD risk control platform, it was concluded that the advantages of Company Z were mainly manifested in two aspects: First, by using the data resource sharing service platform, a large amount of internal and external data was collected. Especially in the process of cooperation with external professional institutions and teams, the data association, comparison subject database, risk assessment indicators and models established by the professional team were obtained, thus forming a scientific BD risk control system, and completing the integration of internal and external advantageous resources. The second was to integrate a regulatory system that integrated audit, risk control, internal control, compliance, systems, and accountability into the company headquarters, thus enabling the company to better monitor various risks in various businesses, thereby reducing contradictions and waste in the regulatory system, saving regulatory costs, and improving regulatory efficiency.

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