Financial Engineering and Risk Management (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/ferm.2024.070521
ISSN 2523-2576 Vol. 7 Num. 5

Research on the Challenges and Countermeasures of Enterprise Financial Risk Prevention under Big Data Environment Research on Data Security and Processing Technology

Yunpeng Zhao

Treasury Department, Bank of China, New York, NY 10018, USA
JackZ20241@outlook.com

Keywords: Big data environment, Financial Risk Management, Enterprise internal control, risk response strategy, data protection, organizational structure optimization, Strategic alliance, data management

Abstract: In the era of big data, the diversity and unpredictability of corporate financial risks are becoming more prominent, and enterprises are facing more severe challenges when responding to changes in market dynamics. The traditional internal control system has been difficult to effectively deal with these emerging complex risks, resulting in greater pressure on the financial security of enterprises. This paper focuses on the challenges and countermeasures of enterprise financial risk prevention under the big data environment, and believes that enterprises must go beyond traditional thinking and actively adjust corporate culture and organizational structure to flexibly adapt to the rapid changes in the external environment. Enterprises should actively seek and establish strategic partnerships based on their own actual conditions, or join big data alliances to enhance their risk prevention and control capabilities with the help of external resources and data power.

1. Introduction

With the unprecedented development of information processing technologies, especially in the areas of collection, processing, storage, analysis and visualization, a solid foundation has been laid for the broad application of big data in all areas. These technological innovations have greatly increased the efficiency and accuracy of data management by strengthening the mechanisms for protecting and preserving the confidentiality of confidential information, which is an integral part of a modern digital society. Throughout the world, China's position as a major consumer market has given rise to an abundance of data that has been transformed into important strategic resources with enormous commercial value and key importance of national security.

The widespread use of large information technologies allows companies to better assess market needs, improve product competitiveness and have a profound impact on talent management strategies. In large areas of information, companies often face limited resources and technical challenges, including a lack of professional platforms and the necessary interdisciplinary expertise, which can put firms at a disadvantage when faced with new risks. To overcome these obstacles,

companies must actively seek external partnerships, engage in technology sharing and gradually improve the viability of enterprises in big data environments. The organization can better mitigate financial risks and take advantage of the opportunities offered by the big data era by building a strong infrastructure for data security and processing. This article will examine in detail the use of large information technologies in financial risk warning, with particular emphasis on the key role of data processing technologies in enabling enterprises to address these problems.

2. Related research

Big data and computer information processing technologies form the basis of the modern data-driven society. Big data involves the whole process from data generation and collection to analysis and application, and its characteristics include huge amount, variety and rapid update of data, which makes traditional data processing methods difficult to cope with. Advanced information processing techniques must be used to efficiently manage and analyze these complex data. In the enterprise financial risk prevention, in the face of the challenges brought by big data, improving data processing capacity and security has become the key. F Wang's team discussed the risk control and coping strategies of state-owned enterprises in the context of big data. Uncertainties in the global economy have created new challenges for state-owned enterprises, requiring innovative risk management approaches[1]. Z You and S Zhao take the data of China's A-share non-financial listed companies from 2009 to 2021 as samples to empirically analyze the impact of digital transformation on corporate financial risk[2]. Y Zhao makes a systematic analysis of risks in the innovation process and finds that risks of business model innovation mainly include: environmental risks brought by technological progress, policy changes and other factors; The market risk caused by factors such as poor industrialization effect of new products; Strategic risks caused by the combination of innovation and ineffective strategy and financial risks caused by unreasonable capital structure[3]. C Peng used AHP-TOPSIS method to make a comprehensive analysis of local government debt risk in different periods before and after COVID-19[4].

3. Internal control risk analysis and countermeasures of small and medium-sized enterprises in big data environment

3.1 Challenges and risk prevention measures for small and medium-sized enterprises in the big data environment

In an era of unprecedented data uptake, smes face multifaceted challenges that go far beyond the basic tasks of data collection and storage, and even more complex questions about how to use these data effectively to achieve competitive advantages; Many small and medium enterprise sales, payment and process corrected figures achieved significant progress, various nacop huge platforms Dan user, for lack of Dan analychesk able still has a significant number of small and medium enterprise large is difficult, it is serious obstacles it from the accumulation Dan operation able to look. The ability to block their ability to make wise decisions in the market has a negative impact on their overall profitability; Investigator, in order to solve this problem, overcome the collection of Dan lag behind strategichesk advantages of interd, small and medium enterprise is not only an investment transfer analyticesk tool Dan, developing and implementing a sustainable strategy, promoted the initial Dan preimage in strategg business advantages, allowing them optimizer Dan asset, increased procedures adopted resolved, finally best nalad detection and finance production from the market.

Smes are often at an obvious disadvantage during business negotiations with large enterprises, mainly because of their limited computing power. These discrepancies are mainly based on two

important factors: first, inadequate data processing leads to asymmetries of information, preventing smes from making full use of their data resources; Second, the enormous costs and potential risks associated with reliance on external data analysis services further exacerbate the financial and operational constraints faced by small and small-scale enterprises, making it difficult for them to maintain a competitive advantage in negotiations; The external services of smes are provided with data analysis, which often cannot effectively compensate for the competitive disadvantages arising from the imbalance of information, exacerbating the problems faced by smes when using data to counterbalance the advantages of large enterprises, worsening their bargaining position and overall competitiveness.

To cope with these challenges, smes need to place strategic emphasis on improving internal data processing and analytical capacity, which requires significant investment in advanced data management technologies and sophisticated analytical tools that can effectively handle vast amounts of data and generate operational insights; An efficient internal data processing system would reduce smes' dependence on external services, reduce the risks and costs of outsourcing, significantly increase their ability to compete more honestly in the market and promote more balanced competition.

Developing in-house expertise in data analysis is vital for small and medium-sized enterprises (smes), which requires them to invest in training existing staff and data analysts who can explain complex data sets, identify emerging trends and shape views on business strategies; Smes are thus able to undertake a comprehensive and thorough analysis of data, significantly enhancing their decision-making process, strengthening their negotiating status and increasing their overall strategic benefits.

In addition to strengthening internal data processing and analytical capacity, smes should adopt an innovative data consolidation strategy, including the integration of data from different sources, a better understanding of the market situation, client preferences and the dynamics of competition; Effective data consolidation will thus allow small and medium-sized enterprises to become more integrated into their business environment and better manage market fluctuations and negotiation situations, improve response efficiency and strategic agility.

By investing in advanced data processing technologies, cultivating in-house knowledge and implementing strong data integration practices, small and medium-sized enterprises can address the fundamental disadvantages they face in negotiating with large enterprises; Such a strategy would enable small and medium-sized enterprises to make better use of information, strengthen competitive advantages, enhance their ability to negotiate, increase their confidence and efficiency, and obtain fair playing conditions and more favourable results in commercial transactions.

In the context of technological progress and growing competition in business, small and medium-sized enterprises should adopt proactive and multilateral strategies to improve the use of their data; This will require significant investment in strengthening internal data analysis capacity, including the recruitment and development of highly qualified data analysts, the development of powerful and complex data processing platforms capable of managing and optimizing massive data resources. Building strong partnerships with specialized analytical companies providing expert guidance and specialized services is critical to bridging the existing data processing capacity gap, where smes can improve data-driven decision-making. The implementation of these integrated measures will enable small and medium-sized enterprises to significantly improve their competitive position in the market, promote wiser and strategic decisions and ultimately contribute to greater economic success. This strategic approach will enable small and medium-sized enterprises to navigate and develop in an increasingly centralized and complex business environment.

3.2 The challenge and optimization strategy of internal oversight framework for small and medium enterprises within a large-scale data context

The traditional internal control mechanism is a reliable method for analyzing complex tasks faced at a given time within the current time frame. Once strict processes are applied and threshold settings are predetermined, effective risk management is insufficient to solve the dynamic function problems of big data features with liquidity, real-time performance, and huge capacity. This static threshold has proved ineffective in managing the multifaceted risk graphics that currently exist; Moreover, the problem is compounded by the growing evolution of data and rapid changes in the external environment, and traditional control methods, which often fail to accurately reflect and reflect the true nature of new risk scenarios, resulting in potential inefficiencies and unforeseen losses in resource allocation. This highlights the urgent need to develop and implement more adaptive and reactive internal management structures to adapt to the delicate requirements of today's data environment.

This is particularly applicable to small and medium-sized businesses. If they cannot solve the problem of information communication and integration, they will struggle to meet the demands of the large-scale data landscape, and then lose market competitiveness. The primary benefit of vast data sets is rooted in their ability to amalgamate and scrutinize information, enabling comprehensive insights that drive informed decision-making which can break through information silos and achieve comprehensive data interoperability. Smes need to build advanced information exchange and processing systems, integrate internal financial, sales and inventory data, and combine this data with external market information. This integration not only improves operational efficiency, but also enhances speed of response and decision-making in response to market changes.

Smes should strive for well-adapted and flexible data management systems, coupled with advanced intellectual analytical technologies that are skilfully processed and used in real time, through which enterprises can better anticipate and mitigate potential risks, optimize resource allocation and significantly improve overall productivity; In addition, strategically complex tools for data integration and analysis will help small and medium-sized businesses to better manage risks by making wise strategic decisions within the complex and broad framework of a modern data ecosystem so that they can better examine emerging trends and potential threats. By targeting these enterprises, using operational ideas derived from comprehensive data analysis, they can manage the complexity of the data-driven environment with greater agility and foresight, which greatly enhances their competitiveness in the market place.

4. Key application and risk prevention of digital information systems processing technology in big data environment

4.1 Data acquisition technology in big data environment and its application in financial risk prevention

Data collection technology has become a key factor in a large area of data, using a variety of sources - including touch networks, cybernetic crawling, logbooks, trade records, social media flows, and aips - to collect a large amount of information; The rapid development and expansion of the things network (iot) in particular is accelerating this evolution, transforming data collection from traditional isolated inputs into complex systems capable of continuous real-time monitoring. This significant shift is evident in the application of smart cities that optimize and manage all aspects, including transport networks, energy distribution, public safety measures and environmental monitoring. Advances in data collection technology have enabled businesses and municipalities to have full and immediate access to an integrated set of data, facilitating active risk

management and informed decision-making; By building on these achievements, the organization can achieve a better, more thorough understanding of the dynamic environment, enhance its ability to confront new challenges and take advantage of opportunities that emerge in real time.

Data collection faces a number of complex challenges that need to be systematically addressed to ensure the effectiveness and reliability of the process, including maintaining the integrity of the data, ensuring its reliability, timely accumulation and management of key issues such as the integration of data from different and isometric sources; In order to deal effectively with these multidimensional challenges, the organization must develop a comprehensive and flexible data collection strategy that emphasizes the scalability and adaptability of its system in order to ensure efficient and sustainable efficiency and functions associated with increasing data and species, coupled with robust data protection to protect sensitive information. It is necessary to ensure compliance with legal requirements and ethical standards in data collection practices, so that organizations can improve the reliability and efficiency of the data collection process and provide a solid foundation for data management and protection in increasingly complex and dynamic environments.

4.2 Data Preparation Techniques and Their Role in Financial Risk Management

The data processing process contains a number of complex and interrelated tasks, such as data cleansing, aggregation, transformation and specification, carefully designed to solve a number of problems related to error, incomplete and noise in the data concentration; This multifaceted process requires the application of different algorithms, each of which was created to correct or correct incorrect data records, often using alternative methods of managing missing signs, complex statistical technologies to detect and correct anomalies in the data, which are a key element of the process, focus on integrating information from different sources into a single system. In managing a decentralized data set, reducing duplicative reconciliation by adjusting and coordinating different points of view is by no means unanimous, ultimately ensuring that the data set is accurate and consistent and significantly improves the quality and reliability of the data for further analysis and application.

Data conversion is a key process in which the conversion of original data sets into a format favourable to more effective analysis in order to meet the specific requirements of different analytical tools and methods of analysis, usually by standardizing or merging programmes to adapt the data to complex requirements in advanced analytical technologies; At the same time, the data protocol was implemented with the aim of simplifying the amount of data while preserving the basic information in order to reduce and save data processing operations, which are usually achieved by means of technologies such as data reduction and compression, which are aimed at minimizing the size of the data and maintaining the integrity of its main content. Integrated methods can improve data availability for complex analytical tasks, optimize the overall efficiency and effectiveness of data processing operations.

5. Conclusion

In the era of big data, small and medium-sized enterprises are facing rapid changes and competitive pressure in the market environment around the media. Enterprises need to adapt to the landscape pattern of China's rapid recovery of Internet transformation, and at the same time regard big data as an inevitable trend, which is crucial to the future important and relevant markets; For managers, actively responding to the influx of various challenges, focusing on improving the competitive advantage and flexibility of organizers, as well as effectively utilizing internal control systems and strategic risks, can penetrate into daily life. Management is endowed with the smartest

operational support to cope with the business environment required by the times.

In the age of extensive data, small and medium-sized businesses are facing a newly transformed market environment and increased competitive pressure, as the Internet continues to evolve and advance, making big data an inevitable trend that these businesses must swiftly adapt to in order to remain relevant in the future market; consequently, executives are required to proactively address the complexities introduced by the vast amount of data and to enhance the competitive edge and flexibility of their organizations by refining and improving internal control systems. This not only contributes to enhancing the effectiveness of the organization's operations, but also makes the analysis results more intuitive through data visualization tools, so that management can make informed decisions. Data security and privacy safeguards are also essential to ensure compliance and ethics in data processing, thereby enhancing public confidence in big data applications.

References

[1] Wang F, Hou Z, Juanatas R, et al. Research on Influencing Factors and Countermeasures of Risk Control of State-Owned Enterprises under the Background of Big Data[J].Proceedings of Business and Economic Studies, 2023, 6(6):128-133.

[2] You Z, Zhao S .Enterprise Digital Transformation and Financial Risk [J].Advances in Economics and Management Research, 2023. DOI:10.56028/aemr.4.1.114.2023.

[3] Yan Z .Research on enterprise risk prevention and control countermeasures based on business model innovation — Taking Shandong as an example [J].IEEE, 2021.DOI:10.1109/ICEKIM52309.2021.00139.

[4] Peng C, Da F, Wu J, et al. China's local government debt risk assessment and countermeasures under the influence of COVID-19[J]. Procedia computer science, 2022, 199:354-360.DOI:10.1016/j.procs.2022.01.043.