The Dilemma and Countermeasures of Electronic Whole Process of Bankruptcy Cases from the Perspective of Big Data

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Keywords: Big Data; Bankruptcy Cases; Full Process Electronicization; Dilemma; Countermeasure

Abstract: At present, the application of big data in the whole process of bankruptcy cases has become an important direction of judicial reform. The purpose of this article is to deeply discuss the issues related to the whole process electronization of bankruptcy cases from the perspective of big data, and put forward targeted solutions. This article lays a theoretical foundation by expounding the theory of big data, the concept of electronic whole process of bankruptcy cases and the mechanism of their combination. By using the method of literature research and practical investigation, this article comprehensively analyzes the difficulties it faces in laws, regulations and systems, technology realization and application, and personnel concept and ability. The research results show that these difficulties seriously restrict the promotion of the whole process of bankruptcy cases. Based on this, this article puts forward practical countermeasures from the aspects of perfecting laws, regulations and system construction, strengthening technology research and development and application guarantee, and improving personnel's concept and professional ability. It is hoped that this can promote the effective implementation of the whole process electronization of bankruptcy cases from the perspective of big data, improve the efficiency and fairness of bankruptcy case handling, and promote the modernization of bankruptcy judicial system.

1. Introduction

Driven by the development of information technology, big data has been deeply integrated into all fields of society, profoundly changing people's production and lifestyle [1]. In the judicial field, the application of big data promotes the process of judicial reform, and the electronization of the whole process of bankruptcy cases is an important exploration under this background [2]. Because bankruptcy cases involve many stakeholders, complicated legal relations and complicated procedures, the traditional handling mode often faces problems such as inefficiency and opaque information [3]. And the whole process electronization from the perspective of big data is expected to break down the information barrier and improve the efficiency and fairness of bankruptcy cases with the help of the data integration, analysis and prediction capabilities of big data technology [4].

At present, some regions have tried to introduce electronic means into bankruptcy cases, but they still face many difficulties in practice [5]. The relevant laws, regulations and systems are not perfect, and the electronic process lacks clear and standardized guidance, which leads to many uncertainties at the operational level. In addition, there are shortcomings in the stability and safety of technology application and the adaptability of personnel to new technologies.

In view of this, it is of great practical significance to deeply explore the dilemma of the whole process electronization of bankruptcy cases from the perspective of big data and seek effective countermeasures. The purpose of this article is to analyze the existing problems in this field, and put forward targeted strategies from the perspectives of laws and regulations, technical application, personnel literacy and so on, with a view to providing useful reference for promoting the healthy development of the whole process of electronic bankruptcy cases, improving the bankruptcy judicial system, helping to improve judicial efficiency and optimizing the business environment.

  DOI: 10.25236/etmhs.2025.066

2. The theoretical basis of the whole process of electronic bankruptcy cases from the perspective of big data

Big data refers to a collection of data that cannot be captured, managed and processed by conventional software tools within a certain time range. Its core value lies in revealing the inherent laws and potential trends of things through deep mining and analysis of massive data [6]. Big data technology covers data collection, storage, management, analysis and visualization, and can provide comprehensive and accurate information support for decision-making in various fields.

Electronization of the whole process of bankruptcy cases means that all kinds of bankruptcy affairs are handled and circulated in digital form by making full use of information technology in the whole process of bankruptcy cases from application, acceptance, trial to termination. From the debtor's submission of electronic bankruptcy application materials to the court's use of electronic systems to complete the case acceptance and distribution; From the creditor's declaration of creditor's rights through the online platform, participation in creditors' meetings, to the administrator's work of property inspection, price change and distribution with the help of electronic tools, electronic operation is realized [7]. This mode not only breaks the time and space constraints, improves the efficiency of bankruptcy proceedings, but also enhances the transparency and fairness of bankruptcy transactions.

The organic combination of big data and the electronic process of bankruptcy cases has brought new changes to the handling of bankruptcy cases. Big data technology can integrate and analyze the massive information involved in bankruptcy cases, and provide comprehensive and accurate decision-making basis for courts, administrators and creditors [8]. The electronic platform provides basic support for the collection and application of big data, and ensures the real-time and accuracy of data. The two promote each other, jointly improve the scientific and refined level of bankruptcy case handling, and help realize the efficient and fair operation of bankruptcy procedures.

3. The dilemma faced by the whole process of electronic bankruptcy cases from the perspective of big data

3.1. The dilemma of laws, regulations and systems

At present, there are many gaps and ambiguities in the laws and regulations of the whole process electronization of bankruptcy cases from the perspective of big data. For example, the standards for determining the legal effect of electronic evidence are not perfect. In bankruptcy cases, there is a lack of unified and detailed norms for judging the authenticity, integrity and relevance of electronic evidence such as electronic contracts and electronic financial statements. This makes the judge confused about the acceptance of electronic evidence in practice, which affects the trial process and fairness of the case. At the same time, the electronic process specification of bankruptcy cases is missing. From case acceptance to execution, the specific steps, time nodes, rights and obligations of participants in electronic operation lack clear legal provisions [9]. Taking the creditors' meeting as an example, the convening procedure, voting method and resolution effect of online meeting are not fully clarified at the legal level, which leads to different practices in practice and affects the authority and unity of bankruptcy procedures.

3.2. The dilemma of technology realization and application

Technical stability is a big challenge. Bankruptcy cases have a long processing cycle and complicated affairs, so the electronic system needs to run stably for a long time. However, in practice, system failures occur from time to time, as shown in Table 1.

Bankruptcy cases involve a lot of sensitive information of enterprises, such as trade secrets and financial data. Once the data is leaked, it will bring serious losses to enterprises and creditors. At present, although a variety of security protection measures have been taken, risks such as hacker attacks and illegal operations by insiders still exist, and the situation of data security protection is grim.

Table 1: Statistics of Failures in the Bankruptcy Case Electronization System in Some Regions

Region	Fault Type	Occurrence Frequency (in the past year)	First Occurrence Time	Scope of Impact	Impact Degree (Measured by Delay in Case Handling Time)	Average Fault Repair Duration	Preliminary Analysis of Fault Causes
City A	Data Loss	3 times	March 2023	Data related to 5 bankruptcy enterprises	An average delay of 5 days per occurrence	Approximately 2 days	Aging storage equipment and inadequate data backup mechanism
District B	Slow Page Loading	8 times	January 2023	All bankruptcy business processed through the system	Each occurrence affects business processing for 2-3 hours	30 minutes - 1 hour	Insufficient server performance and limited network bandwidth
County C	System Crash	1 time	July 2023	3 ongoing bankruptcy cases across the county	Results in a week-long business stagnation	3 days	Malicious software attack and vulnerabilities in the security protection mechanism
Town D	Data Transmission Error	5 times	May 2023	Transmission of some creditor claim data and debtor financial data	Each occurrence causes a 1-3 day delay in related business	1-2 days	Incompatible data interfaces and data format conversion issues
District E	System Lag	10 times	February 2023	Overall slow system response during frequent operations	Each operation experiences a 10-30 second response delay, affecting business continuity	About half an hour	Unreasonable system architecture design and poor caching mechanism

3.3. The dilemma of personnel concept and ability

Some judicial personnel and bankruptcy practitioners have a low degree of understanding and acceptance of big data and electronic technology. Some judges and administrators are used to the traditional case-handling mode and have resistance to new technology. They think that electronic operation will increase the workload and worry that technical risks will affect the quality of case handling. At the same time, the professional and technical ability of relevant personnel is insufficient. Big data analysis and electronic system operation require some knowledge of information technology. However, at present, most judicial and bankruptcy practitioners lack systematic training, and lack the ability in data mining, analysis and efficient business handling with electronic tools, which limits the in-depth promotion of the whole process electronization of bankruptcy cases from the perspective of big data.

4. Countermeasures for the whole process of bankruptcy cases from the perspective of big data

4.1. Improve laws, regulations and system construction

In view of the current difficulties in laws, regulations and systems, we should speed up the legislative process and clarify the legal validity criteria of electronic evidence in bankruptcy cases. Formulate detailed rules for the collection, storage, submission and review of electronic evidence to ensure that the authenticity, integrity and relevance of electronic evidence are accurately judged. The government should construct a comprehensive standardized system of electronic bankruptcy procedures. The electronic operation of all aspects of case acceptance, trial and execution shall be specified in detail, and the rights, obligations and operation procedures of all participants shall be clarified. The creditors' meeting shall establish specialized online rules, clearly stipulating that the meeting information shall be announced seven days in advance, electronic voting shall be adopted, and it shall be confirmed that online resolutions have the same legal effect as offline meetings.

4.2. Strengthen technology research and development and application guarantee

In order to solve the problems of technology realization and application, we must first increase the investment in technology research and development to improve the stability of electronic systems. The establishment of a professional technical team ensures regular maintenance and upgrades of the system, reducing the occurrence of data loss, slow page loading, and system crashes through measures such as optimizing system architecture, improving server performance, and expanding network bandwidth. The improvement situation is shown in Table 2.

Table 2: Upgrade and Optimization Plan for the Bankruptcy Case Electronization System

Optimization Project	Specific Measures	Expected Effects	Implementation Time Planning
System Architecture Optimization	Conduct a comprehensive assessment of the existing system architecture, redesign the database structure and business logic modules to improve system scalability and compatibility	Reduce the frequency of system lags and crashes, and enhance overall system operating efficiency by over 30%	Months 1-3
Server Performance Enhancement	Increase the number of servers, adopt distributed storage and computing technologies to improve data processing capabilities	Increase page loading speed by 50% and shorten data processing response time to within 1 second	Months 2-4
Network Bandwidth Expansion	Negotiate with network service providers to upgrade the network bandwidth from the current 100Mbps to 500Mbps to ensure smooth data transmission	Reduce the data transmission error rate to below 1% and ensure business processing is not restricted by the network	Months 3-5

In terms of data security, a multi-level data security protection system is constructed. Advanced encryption technology is adopted to encrypt, store and transmit data to prevent data from being stolen or tampered with during transmission and storage. Relevant departments should also strengthen the management and supervision of internal personnel, formulate a strict data access authority system, and prevent internal personnel from violating regulations and causing data leakage. In addition, a data backup and recovery mechanism is established, and important data are backed up regularly and stored in different places to cope with sudden data loss or damage.

4.3. Enhance personnel's concept and professional ability

In order to change the status quo of personnel's concept and ability, it is necessary to strengthen publicity and education, and enhance the awareness and acceptance of big data and electronic technology among judicial personnel and bankruptcy practitioners. By organizing special lectures and training seminars, we will show them the advantages of big data and electronic technology in improving the efficiency and quality of case handling, and eliminate their resistance to new technologies.

Relevant departments can carry out systematic professional and technical training to improve the technical application ability of relevant personnel. For big data analysis, electronic system operation and other content, develop personalized training courses and invite professional and technical personnel to give lectures. Training content can include data mining and analysis methods, electronic evidence processing skills, electronic platform operation process, etc. After the training, a rigorous assessment will be conducted to ensure that relevant personnel can master and apply these technologies skillfully, so as to provide talent guarantee for the smooth progress of the whole process of electronic bankruptcy cases from the perspective of big data. By improving the concept and professional ability of personnel, they will become a positive force to promote the electronic reform of bankruptcy cases.

5. Conclusions

The electronization of the whole process of bankruptcy cases from the perspective of big data is an inevitable choice to adapt to the development of the times, which is of great significance to improving the efficiency and fairness of bankruptcy cases. However, at present, its development faces many difficulties. At the level of laws, regulations and systems, the lack of electronic evidence identification standards and electronic process norms leads to the lack of clear guidance for practical operation. In terms of technology implementation and application, the system stability is not good, and the hidden danger of data security is prominent, which affects the normal progress of bankruptcy proceedings. In terms of personnel concept and ability, some judicial personnel and bankruptcy practitioners have a low degree of understanding and acceptance of new technologies, and their professional technical ability is insufficient, which limits the in-depth development of electronic technology.

In view of these difficulties, the countermeasures proposed in this article, such as perfecting laws and regulations, strengthening technical support and improving personnel quality, are expected to break through the existing obstacles if they can be implemented. Perfecting laws and regulations can ensure that electronic operation has laws to follow; The strengthening of technological research and application helps to enhance system stability and data security; The improvement of relevant personnel's concepts and professional abilities can promote their better adaptation to electronic work modes. In the future, with the gradual implementation of these countermeasures, the whole process of electronic bankruptcy cases from the perspective of big data will be continuously improved, which will bring new development opportunities to the bankruptcy judicial field, further optimize the business environment and promote the healthy development of the economy.

Acknowledgements

Shandong Social Science Planning Project (No. 18CFXJ06): "Research on Improvement Pathways for Civil Electronic Litigation System in Shandong Province"

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