

Application of Big Data in Electronic Bidding

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Abstract—With the integration of information technology into social life, data acquisition, transmission, application scale reached an unprecedented level. The quantitative change has accumulated to a certain extent resulting in some industries caused a qualitative change. At present, big data has been applied to many fields of modern science. In China, the large amount of data generated in the process of electronic bidding transaction is a valuable resource, but how to use large data analysis to explore its potential value is still in its infancy. According to the characteristics of large data and electronic bidding, this paper analyzes the application of big data in the electronic bidding, and looks forward to the application prospect of electronic bidding data.

Keywords—*electronic bidding; big data analysis; application; tendering; bidding*

I. INTRODUCTION

At present, China is in a critical period of transformation and development, changing from the information technology era (IT) to the data technology era (DT). As the representative of the era of data technology, big data has gradually become a new focus of innovation, competition and productivity". After the emergence of the concept of big data, data has become a commercial capital, an important economic input, can create new economic benefits. Big data is a kind of innovative thinking. The arrival of the impact of big data and changed our traditional way of thinking, the core of data thinking is to speak with data". By collecting and sorting out the massive data generated during the operation of the business, and using the appropriate data mining methods, big data can analyze and find the unknown valuable information hidden behind these data, and achieve the purpose of guiding the operation of the business.

Big data is "gold". Large data processing technology includes: acquisition, transmission, processing and application. It is a series of techniques to deal with a large number of structured, semi-structured and unstructured data.

Big data analysis focuses on the relationship, correlation analysis and causal analysis, it is concerned about what is, but also explore why. Data resource management needs to transform from the scattered collection, step by step summary, layer by layer reporting to the source collection, centralized management, authorization sharing. Finally, it realizes the information synchronization, data sharing and platform sharing between different levels and different specialties, promotes professional integration and synergy, and breaks the barriers of professional division. Big data analysis has the higher requirements of the analyst. The analyst needs both professional knowledge and data mining ability. Big data analysis is helpful to fully tap the potential of talent, to broaden their knowledge structure. On the basis of traditional professional knowledge, data mining technology, information technology, network technology, software development and digital system knowledge are gradually increased. Through the analysis of large data, we can promote the goal of fine evaluation, fine operation, and fine management, to achieve the purpose of digging the potential of data resources and serving their own needs.

II. ELECTRONIC BIDDING ON THE DEMAND FOR BIG DATA

Bidding is a kind of rational allocation of resources under the market economy system. The fairness, openness and universality of the market have been widely recognized by the society. However, with the expansion of the scope and scale of bidding, there are many problems such as low efficiency, long cycle and so on. In 2013, the national development and Reform Commission and other eight ministries issued a Decree No. 20 "electronic bidding procedures". Based on the interconnection of the electronic bidding network, it aims to promote the sharing of information between various electronic bidding platforms. To promote the national unified and open, competitive and orderly bidding market will become the future development

direction of bidding. With the development and popularization of electronic bidding, it is bound to produce huge amounts of data, which provides the possibility of large data analysis. Through the use of big data technology, mining information from these data, to determine the trend, improve efficiency, will certainly have a profound impact on the cause of China's bidding, and cause the relevant supervision departments and bidding activities of the parties attach great importance and concern. The rapid popularization of big data is an opportunity, but also a challenge for the electronic bidding work. In order to successfully complete the project bidding, we need to use a large number of projects related to the tender. Through the collection, collation, analysis of various types of information generated by the bidding process, it is conducive to providing more objective, comprehensive and accurate bidding information and judgment. It also provides a strong guarantee for the bidding work.

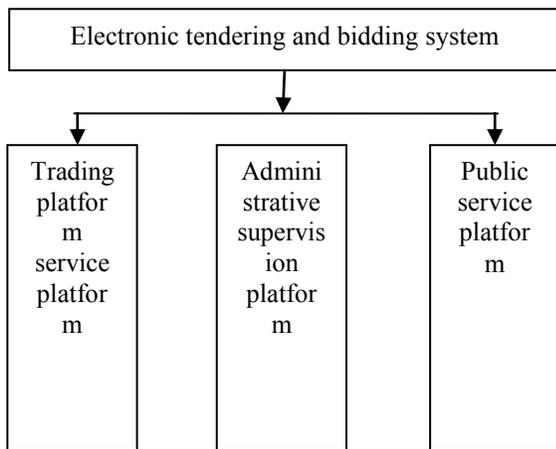


Figure 1. Construction of electronic bidding system

Based on China's geographical scope, large economies, transaction types, and the regional and industry supervision, according to different functions, the electronic bidding system is divided into the trading platform, administrative supervision platform and public service platform. As shown in Fig. 1.

Among them, through the collection, integration and dissemination of tender project transaction information and related public information, public service platform can meet the needs of information exchange and resource sharing between trading platforms, and provide information service for market players, supervision departments and the public. Electronic bidding platform for public service will be a major producer of data. Electronic bidding and the popularization, provide the basic data for the big data analysis of bidding field.

National electronic bidding public service platform can communicate with the state's website for the publication of the tender notice. It provides a large number of real data, such as electronic tender, electronic tender, performance, expert library, expert evaluation, trading, etc. These massive data contains important value, accelerate the pace of

electronic bidding industry into the era of big data. The whole process of the electronic bidding system is mainly composed of selling bidding documents, online filing, online bidding, bid opening, bid evaluation, bid results released, contract etc.. The bidding activities include the following stages. As shown in Fig. 2.

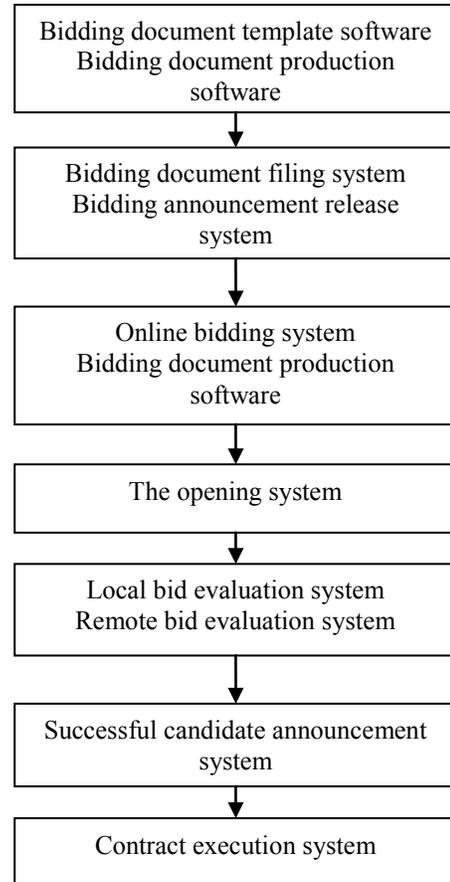


Figure 2. Flow of electronic bidding

III. APPLICATION OF BIG DATA IN ELECTRONIC BIDDING

The arrival of the era of big data brought new opportunities for the development of the field of bidding. In order to promote and improve the work of electronic bidding, specifically, big data can play a role in the following areas.

First of all, the use of large data set up dynamic purchasing information database. The tenderer, the tender project, the tender agent, the bidder, the successful bidder, the performance of the contract, including the completion of the project quality, time limit, the amount of settlement, etc., all this information must be open. This public information will produce large amounts of data.

Big data is to use more data and even all the data to be analyzed, rather than taking a random sample, will no longer pursue accuracy, but to allow poor data mixed. It uses probability to indicate the direction and trend of the development of things. Through the query and analysis of

the same type of projects in the bidding data, can help the tenderer to find the bidder qualification requirements of the project, the technical requirements of the business, bidding control price, etc.

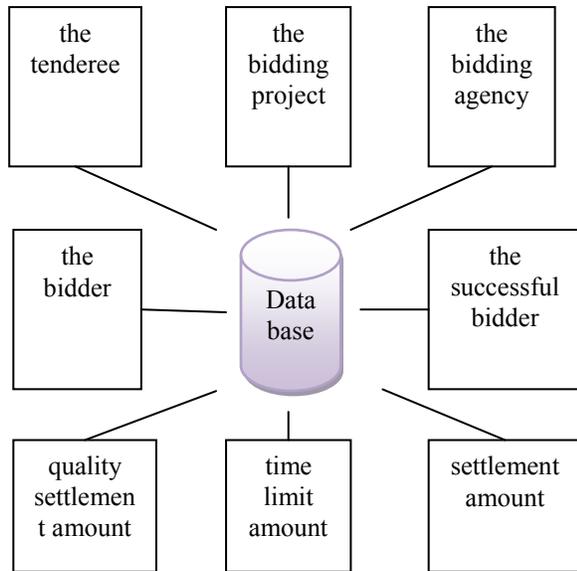


Figure 3. Dynamic purchasing information database

Based on the past history of accumulated transaction price data for in-depth analysis, the bidder can real-time grasp the raw material market price fluctuation information and change trend, and enhance the efficiency and accuracy of bidding decision. According to the actual situation of the market, the bidder can make a systematic summary of the price trend, the cause of formation and the index forecast, so that the bidding price of the product is more in line with the objective situation of the market.

Whether the business and technical requirements of the project is reasonable and effective, whether it can fully reflect the characteristics and requirements of the project itself, is the key to successful bidding. Due to the lack of relevant information, people often rely on the experience and some of the knowledge inherent in the mind to set the business requirements of the subjective, making some provisions do not fully meet the actual needs of the project. The use of large data analysis, you can have the same type of project that has been analyzed and compared with the relevant content of the project, making the project bidding business and technical requirements set more scientific and effective.

Secondly, improve the scientific level of government investment decision. Through the analysis of the mass data of the national bidding, the government can find the potential investment direction or the problems that need to be solved urgently, forecast the trend of economic development, and then make forward-looking decisions. Based on the analysis of the data, it is necessary to model and analyze the problems. According to the data analysis of the specific problem, the government can predict the effect of the policy. The results

can be used as a reference for government decision making, which can prevent the blind decision-making and make the government decision-making scientific.

Third, big data for the selection of evaluation methods and evaluation of the factors set up a strong reference value. It is difficult to reflect the characteristics of the project by using the traditional and unified evaluation method. Different evaluation methods and the corresponding evaluation factors and the weight will affect the tender results. The tenderer may formulate a scientific evaluation method according to the requirements of each bidding project, and set up the evaluation factors suitable for the project.

The scientific evaluation method should be able to meet the final goal of the project. The evaluation factors should be able to reflect the characteristics and needs of the project itself. This requires a deep understanding of the tender project, and the tenderer accumulated some experience. The setting of each bid evaluation factor and the determination of the score are scientific. This requires careful analysis and summary of previous similar projects bidding.

According to the previous big data resources, as well as the project characteristics, the procurement needs of the bidders and the market supply of the contractor associated. The influence of different evaluation methods and evaluation factors on the final bidding effect is analyzed. Finally, the evaluation method and the evaluation factors suitable for the project are determined, and the scores are set reasonably, so as to improve the quality and efficiency of the bidding.

Fourth, through the big data, thereby establishing the contractor credit file system, you can get the tender project and the successful bidder to match the situation and performance. The contractor integrity file system can also be used to communicate with other integrity databases to restrict or influence the activities of dishonest contractors in other areas. By increasing the cost of their breach, force them to tender in strict accordance with the law in the bidding process. In the tender, if the contractor has a bid rigging, providing false information, to bid at a price below the cost of malicious bidding and other bad behavior, they are credited to the integrity of the file. The integrity of the bidder's files can be obtained from the public resource transaction data platform or other government departments through the Internet, tied as an important evaluation factor.

Fifth, big data can guide the development direction of bidders. Through the analysis of the national bidding data, we can get the bidder's strength, size, performance, performance and other related data. Through these data, guide the bidders to make scientific and reasonable development strategy, realize the connotation development of enterprises, and improve the quality and level of economic development of our country. At the same time, with the help of the system of supplier rating system, we can quickly select the first-class quality suppliers, and achieve strategic cooperation, to create an efficient online supply chain management ecosystem.

In the opening phase of bidding activities, some of the content of the bidding documents in public. The bidder can analyze and summarize some information, understand their position and strength in the same industry enterprises, find

their own shortcomings and short board, take some measures to improve their overall strength, and ultimately improve their competitiveness in such projects bidding.

Sixth, big data can regulate the behavior of the bidding agency. Bidding agency arrangements for the project, the level of personnel working ability, the quality of bidding agency services will be rendered in the big data. Bidding agency irregularities will be no shape. Therefore, the bidding agency will analyze and make use of its accumulated experience for many years and the advantages of market, talent, and historical transaction data. Based on the analysis of electronic bidding data, sorting and commercial use, so as to better regulate the bidding agent behavior, improve service quality.

IV. CONCLUSION AND OUTLOOK

The construction of the bidding data should be based on the development level of the information technology, but also take full account of the current situation of China's electronic bidding system step by step. First, the various departments need to achieve ideological consensus and coordinated action. The construction of bidding and bidding data involves information collection, processing, storage, mining, sharing, and opening and so on. Relying on a single department to building big data is difficult. Secondly, the bidding data should be classified management. It can be divided into the basic data of the main body of the bid invitation and bidding, the data of the administrative or criminal punishment by the contractor and the main personnel, the evaluation information of the tenderer to the contractor, etc.

Big data is to serve our country's economic construction, as well as the electronic bidding. Big data technology is essentially a tool, not our purpose. Big data tentacles have extended to all aspects of people's lives. The collection, collation, processing, analysis and application of massive information data will gradually replace the dominant position of traditional production methods. The application of big data technology will make the public service function of the electronic bidding system more perfect, and the service quality will be greatly improved.

With the continuous improvement of the function of the electronic bidding transaction, the transaction volume continues to rise; the amount of data generated by bidding began to surge. The use of big data technology will be better to achieve the purpose of electronic bidding, bidding activities, protect the interests of the state, the public interest and the legitimate rights and interests of the parties involved in the bidding activities and finally improve economic efficiency and ensure project quality.

REFERENCES

- [1] Du Dong. Research on the risk analysis and Countermeasures of electronic tendering and bidding operators [D]. Southwest Petroleum University, 2014.
- [2] Tan Jie. Research on the construction and implementation of government electronic bidding mechanism [D]. Central South University, 2009.
- [3] Zhang Jin. Research and implementation of electronic bidding platform [D]. Jilin University, 2015.
- [4] LIU Peng, LEI Lei, ZHANG Xue feng. A Comparison Study of Missing Value Processing Methods[J].
- [5] Huang Wen. Algorithm and Application Researches of Data Mining[D].Computer Technology of Nanjing Post and Communications University, 2013.
- [6] CHEN Xia, FANG Fang, HU Zhan li. Fuzzy Clustering Methods[J]. Life Science Instruments, 2013,11(12): 33-37.
- [7] Song Lei. Design and implementation of electronic bidding information management system based on WEB platform [D]. University of Electronic Science and technology of China, 2014
- [8] Wang Wenhua. Application of electronic bidding data analysis in the industry [J]. Construction market and bidding, 2014
- [9] Li Fu, Sun Xingming, Sun Guang. Design and application of security system for electronic bidding system[J]. Science technology and Engineering, 2008
- [10] Liu Xinyi. Application and development of modern information technology in electronic bidding management[J]. Bidding practice, 2010
- [11] Jianghua Wu, Ling Li, Li Da Xu. A randomized pricing decision support system in electronic commerce[J].Decision Support Systems, 2013:512 — 524
- [12] D.Rosaci, G.M.L. Sarne. Multi-agent technology and ontologies to support personalization in B2C E-Commerce[J].Electronic Commerce Research and Applications, 2013:612-623
- [13] Wilson Lee, Izak Benbasat. Designing an electronic commerce interface:
- [14] attention and product memory as elicited by web design[J].Electronic Commerce Research and Applications, 2003:240-253
- [15] Albin Zuccato. Holistic security management framework applied in electronic commerce[J].Computer&Security, 2007:256-265
- [16] Mohammed Quaddus, Didi Achjari. A model for electronic commerce success[J].Telecomm}anications Policy, 2005:127-152
- [17] Han Zhang, Haizheng Li. Factors affecting payment choices in online auctions:A study of eBay traders[J].Decision Support Systems, 2006:1076-1088
- [18] Y.Kamijo. Bidding behaviors for a keyword auction in a sealed-bid environment[J]. Decision Support Systems, 2013:371 — 378
- [19] R.Mclvor P. Humphreys, L. P}IcCurry. Electronic commerce: supporting collaboration in the supply chain [J].Journal of Materials Processing Technology, 2003:147 — 152
- [20] Kiku Jones, Lori N.K. Leonard. Trust in consumer-to — consumer electronic commerce[J].Information&Management, 2008:88 — 95
- [21] Kim Heldman.Project Manager's Spotlight on RISK MANAGEMENT[M].London:John wiley&Sons Inc, 2005.
- [22] Simon J.Eventt,Bernard M. Hoekman.The WTO And Government Procurement [M].Edward Elgar Pub, 2006.
- [23] Anthony Walker. Project Management in Construction[M].Blackwell Pub, 2005.