Research on Practice and Application of Big Data Mining Technology in Project Management

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Abstract: With the progress of science and technology and the development of times, big data also got rapid development. Previous project management methods failed to adapt to this era with rapid development. These methods are under a series of challenges. In this paper, the author makes a research on practice and application of big data mining technology in project management from four perspectives: interaction of project management and big data mining, dilemma of big data mining management in project management, optimization approaches of big data mining technology in project management and construction period progress control model of big data mining.

Key words: project management, big data mining, technology, practice, application

At present, big data mining technology has been applied into many fields of social economy. In this paper, the author discusses its application by combining project management. In the project management, the key factor is to establish a project team of big data mining, optimize relevant technologies, establish a construction period progress control model and provide effective information to decision making of project management. Now, scientific management of information resources has already become the most important issue in project management. The appearance of big data mining technology brings forth a new orientation for project management, provides effective data information for project decision making, and results in great improvement to the efficiency of various links in project management.

I. Interaction of Project Management and Big Data Mining

(I) Development tendency of project management under the background of big data

With continuous economic development in modern society, all industries must have advanced scientific and technological management, so as to win in competitions. However, scientific and technological management is just a very important content of work in project management. Scientific and technological management is a

network information platform which can provide a series of items (such as collection, selection and filing) for multifarious information resources. Based on computer technology, the platform manages huge information flow and resource flow, which can make scientific and technological management to realize informatization and automation. China's project management also has many features of scientific and technological management. Data presents the development orientation of diversification and informatization. The project industry is characterized with great project scale, big data size, wide coverage area, multiple participants and numerous influence factors. These features make project management to present the feature of diversification. This feature is reflected in all links of project management. Lots of management information is sourced from this, such as management of labor, material and financial resources as well as information source channels. In addition, relatively long period management mode is used for engineering project. Thus, information flow can be constantly distributed in time stream. Thus, it can be seen that it is an inevitable trend for informatization management of engineering project.

(II) Big data mining proposes a new orientation for the optimization of project management

Big data mining can provide a new approach for scientific and technological information management of engineering project and remarkably improve the efficiency of engineering project and risk & quality management. Big data mining technology can greatly improve the project management efficiency. Due to many reasons, the project management efficiency is made to be very low. Big data mining technology can effectively improve the efficiency of data management. In the evaluation of many projects, a series of issues often occurred, such as index and evaluation costs exceeding expectations. All these issues can be solved through big data mining technology. Introduction of the big data mining technology into project management can easily find out the most critical indexes in the database, so as to obviously improve the working efficiency of project management and remarkably reduce the workload.

In the field of project, various risks are concealed in complex and huge data, making the whole project fail to realize normal and stable development. Data warehouse of big data management can not only collect existing and historical data but also process and transfer all kinds of data, so as to form a closely correlated data

set, provide convenience to project data users, make the information platform to become transparent and effectively avoid risks of some false information and communication barriers in the information circulation.

II. Dilemma of Big Data Mining Management in Project Management

(I) Project products are facing challenges.

Rigidity and inertia exist in the evaluation process of project design all the time. Thus, it fails to realize perfect combination with market needs. Under the background of big data mining, market needs are converted into various data. The following difficulties may occur if untimely processed:

1. Insufficient understanding of data makes project design and evaluated products in non-conformity with market needs;

2. Not enough accurate judgment on data results in difference between project design & evaluation and original data, leading to products beyond original expectations and beyond popularity in the market.

Thus, it can be seen that the market has demands in many aspects. It is very easy for project management to deviate from correct track and face challenges.

(II) Changes in economic environment are quickened, and project is facing risks.

In quick changes in the current social economy, many new technologies emerge, and social and economic environment is influenced by many factors. It probably will change at any time. Many aspects of engineering project are also under a series of challenges, such as cost, quality, progress and safety. For example, funds certainly will increase as the same time, if the project scale is continuously enlarged. Then, there will be a great deal of cost data and fund data. Under such circumstances, traditional project management mode fails to adapt to this large-scale project construction. The project cost and progress will also be influenced. The increase in project scale will cause changes in some basic data. Traditional construction management mode fails to guarantee high-quality completion. Moreover, it will also bring forth safety hidden risks.

III. Optimization Approaches of Big Data Mining Technology in Project Management

(I) Optimize management and system of big data mining

1. Determine the train of thought; the thought of centralized control and decentralized management should be taken into account while determining the structure. A project company can use it to collect data and take the data as the

control carrier. According to the data requirements of the group company, the project company can collect. Then, the group company should analyze the data and make decision. The data includes both the data collected by the project company and external data collected by the group company. Thus, the integrity of data can be maintained;

2. Formulate some systems according to a series of principles; these principles include the principle of centrality in the perspective of business, the principle of centrality in the perspective of control, the principle of centrality in the perspective of data and the principle of centrality in the perspective of management. Systems to be established include the system in the perspective of project construction, the system in the perspective of data processing center, the system in the perspective of business review & approval and the system related to data communication in the company's decision-making level. The data should be mined and managed by the data center. After arranged and analyzed by the project department, the data should be recorded into the information system center. After that, the company's decision-making level should put forward suggestions and supports for decision making. The project department can perform relevant construction works according to these data indexes and hints.

(II) Establish a big data mining project management team for effective solution to issues detected in the management process

This big data mining project team is established according to certain reasons and purpose. The purpose is to obtain good results with low costs and short construction period under the precondition for restraint to some resources.

1. Establish a project progress data mining project team; the work of this project team is to integrate all kinds of data (such as supplier data, basic construction data, integrated fund data and project plan data). Through mining of the data, some relevant control systems can be established. Thus, the construction period can be made to develop according to the schedule;

2. Establish a project quality data mining project team; the work of this project team is to integrate all kinds of data (such as quality test data, project progress data, logistic storage data and basic construction data). Relevant systems can be established by the data mining technology, so as to effectively avoid some risks of construction quality issues caused by non-standard management and non-scientific scheduling;

3. To solve some issues in the management process, a project team is established for cost control data mining. The work of this project team is to integrate all kinds of data (such as project progress data, fund data, quality control data and cost accounting data). Likewise, a relevant control system is established to effectively avoid some issues, such as improper quality control and project delay.

IV. Construction Period Progress Control Model of Big Data Mining

The most difficult issue in the project management is the control issue of project progress. Project delay can be caused by many reasons, such as improper preparations in the primary stage, deviation in the project design, improper construction management and failure of equipment to put into place on schedule. In practical construction work, all these reasons are not inevitable. Both the weather and environmental factor will influence the project progress, but not all projects will be influenced by such factors. Therefore, there are also some other reasons. We can understand these reasons. There are also many reasons that we are familiar with. Generally, we failed to pay enough attention to these factors. However, they will also influence the project progress. In practical construction work, some cause and effect relations exist objectively. If we want to properly solve these issues, we must mine data in the project management and make decisions on the basis of rational analysis on the data.

In the process of construction data mining, it is of great importance to establish relevant mechanisms and departments. Relevant mechanisms and departments can make the data to be stored and analyzed. Under normal conditions, business liaison exists between the project department and field construction personnel. It is necessary for the project department to use the information system to completely record all kinds of field construction information. On this basis, the project department also needs to transfer the data to the company’s database. Likewise, the company can also send the data in the database to the project department. In the practical management process of various departments, information in the database can provide important reference data. Moreover, data information can also be analyzed by the data project team.

Different types of project management will result in different data characteristics in big data mining. The different data should be reasonably distributed for the purpose of data mining. Moreover, a solid foundation should be laid for the establishment of a complete data warehouse by combining different data characteristics according to

different data types, making the established data warehouse system in conformity with certain scientific provisions and obtain some obvious effects.

(I) Reasons for time delay

In practical works, I made an analysis on reasons for time delay by adopting the method of association rules, so as to guarantee the veracity of data mining. So-called association refers to certain rules between two or more data. Association analysis is focused on finding out the association network of data information and analyzing and discussing association rules for the purpose of obtaining effective solutions. Some reasons are sightless, such as snowy & rainy weather, high wind, heavy fog, hailstone and typhoon. All these factors will influence time delays of various aspects in the project construction process, thus influencing the scheduled completion and declining the project management quality.

(II) Estimated work weight of subproject

There are many tasks in the project management. Thus, the project should be subdivided for management, so as to make the project progress clear and specified as much as possible. In specific work links, the percentage of subproject is usually used for certain scientific measurement. While estimating a subproject, we should avoid blindly and mechanically adding up all percentages of the overall project. Instead, we should use the addition method to obtain it according to the construction period. At the same time, we should also make relatively effective plans to guarantee the most accurate project progress. If the completion period of a subproject exceeds the workload, then there will be an issue during the collected period of the overall project. In the construction process, the completion time will be greater than the workload in many aspects, for instance, putting into place of purchased materials or equipment. Under such circumstances, estimated values of various subprojects should be obtained through data mining, so as to obtain more accurate project progress results.

V. Conclusion:

To sum up, the author, starting with the interaction of project management and big data mining, analyzes the development tendency of engineering project under the background of big data and the new orientation proposed by big data mining for the optimization of project management. Then, the author analyzes management dilemma of big data mining in project management, discusses challenges and risks facing project management, and then proposes approaches for the optimization of

the big data mining technology in project management. Through such transformation, the function of big data mining will be made to be more obvious in project management. Moreover, it can also effectively solve a series of issues in the process of project management.

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