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Research on Improving the Management Mode of Scientific Research in Colleges and Universities Under the Background of Big Data

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Abstract. In recent years, the concept and technology of big data has attracted the attention of industry, academia and government departments. As an important base of scientific research and innovation in China, the level of scientific research management has a great impact on the development of university innovation. At present, there are many problems in the management of scientific research in Colleges and universities in China, such as large and complex amount of scientific research data, lack of data support in scientific research evaluation and decision-making, and unreasonable allocation of scientific research resources. As scientific research management is an important part of the development of colleges and universities and is increasingly affected by big data technology, how to further improve the scientific research management mode and optimize the operation mechanism of scientific research management under the background of big data becomes more and more important. This paper briefly expounds the concept of big data and the traditional problems of scientific research management in Colleges and universities, and puts forward some suggestions to improve the scientific research management mode and operation mechanism in Colleges and Universities under the background of big data.

Introduction

Scientific research is an indispensable part of universities to improve the comprehensive level, reserve the power of follow-up development and enhance the international influence, and the level of scientific research management in universities greatly affects the smooth development of scientific research in universities. Scientific research management in Colleges and universities involves a wide range of aspects, including project application, project approval demonstration, organization and implementation, inspection and evaluation, acceptance and appraisal, achievement declaration, science and technology promotion, file entry, etc. The original data recorded in the process of scientific research management has not been effectively mined, which can not provide effective support for scientific research evaluation and decision-making. With the introduction and development of the concept and technology of big data and its influence on the management of scientific research in Colleges and universities is more and more profound.

The Significance of Introducing Big Data Technology into Scientific Research Management in Colleges and Universities

Big data is the collection of a large amount of data that is difficult to manage with the existing general technology. The characteristics of big data are usually described by four key words beginning with "V": Volume (capacity), i.e. large data volume, has jumped from TB level to Pb / EB level; variety (diversity), i.e. a variety of data types, data from a variety of data sources, data types and formats are increasingly rich, including various structures and semi-structured data; velocity, i.e. the frequency of data generation and update, is also The important characteristics of big data are that the global data volume doubles every 18 months; value and data value density are low, and massive data may contain a small amount of valuable information. How to mine valuable data from the original and surface data becomes the key to improve efficiency.

Because the management of scientific research in Colleges and universities will receive and produce a large number of data, so there are inherent advantages and necessity in the application of big data technology. With the rapid development of scientific and technological activities in Colleges and universities, each department has higher and higher requirements for the accuracy and professionalism of scientific research management. However, there are many shortcomings in the current scientific research management methods and concepts, which need to be supplemented and improved with the help of big data technology.

First of all, there are many problems in the process of scientific research management in Colleges and universities, such as the complexity of data collection and the blocked channels of information sharing. Because each department runs different kinds of management systems, resulting in the differences of data types and formats, which makes it difficult to standardize data processing and information sharing among schools, colleges and researchers, and to process information at a higher level, thus affecting scientific decision-making of scientific research management, resulting in blindness and one sidedness of scientific research management. The information sharing channels in scientific research management work are not smooth, which also increases the workload of scientific research managers on scientific research information collection and statistics, greatly reduces the work efficiency, is not conducive to the understanding of the development of related research fields at home and abroad, and affects the smooth development of scientific research activities.

Secondly, with the rapid development of information technology and the explosive growth of all kinds of data, the statistical and analytical functions of previous management systems are too simple, and the correlation between them is also relatively low. Scientific research managers often only have access to the basic functions of project quantity, project funds, results entry, query, reports, etc., and the information they get is only original and superficial, but hidden in these functions However, the deep and high-level information in a large number of data, which will support the development of decision-making in the future, has not been fully mined.

Therefore, by introducing big data technology and concept into the traditional scientific research maagement, using big data technology to collect standardized data, unobstructed information sharing channels, processed the collected original data, and mined the available information, so as to improve the scientific research management level and technical content, and provide more objective, scientific and high water for management departments and scientific researchers to make decisions It is necessary to support at a high level.

Application of Big Data in Scientific Research Management of Colleges and Universities

How to establish a scientific and efficient scientific research management mode, use big data technology to provide data support for scientific research evaluation in Colleges and universities, improve the rationality of project decision-making, provide in-depth services for scientific researchers and optimize the allocation of scientific research resources, and ensure the healthy and rapid development of scientific research in Colleges and universities has become an important part of the reform of scientific research management system in Colleges and universities It has a wide application prospect in this field.

First, to provide data support for scientific research evaluation in Colleges and universities. Scientific research evaluation is an important means of modern scientific research management. The reasonable and effective distribution, utilization and management of scientific research resources, as well as the comprehensive and objective evaluation of scientific research projects and scientific research institutions and other aspects all put forward new requirements for the performance evaluation of scientific research.

In the scientific research evaluation system, data processing plays a key role. With the promotion of university informatization and the popularization of large-scale scientific and technological literature, patent, paper database systems in the field of scientific research, the amount of scientific and technological data information in the world has increased dramatically. In the face of these huge and complex raw data, it needs quick and effective technical means to screen and obtain valuable

knowledge. In the current situation of geometric growth of scientific research data, the traditional data analysis and statistical methods used by most scientific research management departments, due to the limitations of human, material and financial resources, cannot effectively collect, analyze and use the deep-seated knowledge hidden behind the original data, on the contrary, it brings "data disaster" and "data waste". Big data technology can solve this problem.

Big data technology can integrate internal, external and network data: obtain the category and quantity of research projects from the scientific research management department of the University; obtain the personnel, funds, equipment and other information from the internal database; obtain the quantity and quality information of papers and patents from the network database; finally integrate all kinds of research projects in combination with the awards and patent achievements transfer in previous year's project achievement report Data. Through the establishment of comprehensive data evaluation model to integrate all kinds of indicators, provide data support for scientific research evaluation experts, and finally get scientific and reasonable evaluation results.

Second, improve the scientificity of project decision-making. Project initiation decision is an evaluation of the necessity, feasibility, positioning, objectives, tasks, investment, organization and management of the implementation of the activity before the implementation of scientific and technological activities, mainly to provide basis for the project initiation decision. The domestic scientific research project establishment mainly adopts the management mode of applying by scientific researchers, organizing experts to review, demonstrate and screen by the competent scientific and Technological Department, and then selecting the best research unit and person in charge. Such a scientific research project establishment process involves a lot of data management work, including mastering the information data of the project application unit, applicant, project, funds, review experts, etc. At present, although the data management system of scientific research management departments at all levels covers most of the data needed in daily work, the current process of inputting the original data into the management system or extracting the original data from the management system is only an information-based process in the traditional management mode, basically without any auxiliary decision-making function.

How to use the existing internal and external original data for data analysis and mining to reduce some factors such as repeatability, unreasonable fund arrangement and incompetence of project supporters in the project approval of scientific research projects, so as to guide the project approval of scientific research projects, promote the optimal allocation of scientific and technological resources, improve the use efficiency of scientific and technological funds, and promote fair competition? This work itself is a major one Research topics. With the introduction of the concept of big data, from the perspective of screening projects, we can use big data technology to test the scientific and innovative nature of the research field and expected results of the project through the combination of analysis with external literature base, and judge the necessity of the project; from the perspective of screening applicants, we can conduct joint multi data check on the factors involved in the applicants Inquiry and analysis, find and establish a scientific index system and screening methods, and finally get a list of candidates, so as to improve the scientificity of project decision-making.

Third, provide in-depth services for teachers' scientific research activities. Big data technology can not only provide more detailed data support for school leaders to make decisions at the macro level, but also play a strong guiding role for teachers to carry out scientific research by using big data technology to establish models and text reports.

For example, a scientific researcher wants to apply for a project from an organization. In the past, researchers were only able to analyze the needs of each other's units through their own understanding or application in previous years. Because the information collected by individuals is not comprehensive and accurate enough, as well as the lag of information transmission and other issues, research objectives tend to deviate from the actual needs, and the application results are often not ideal. With the popularization of big data technology, through the effective mining of large data warehouse, we can analyze and predict the key technologies, key areas and development directions concerned by relevant units. By establishing models, data visualization and generating text reports, we can provide reference information for researchers, understand the internal relationship between

various impacts, guide researchers to carry out research work, and achieve the purpose of providing in-depth services for researchers.

Fourth, optimize the allocation of scientific research resources. On the one hand, there is a shortage of scientific research resources, on the other hand, scientific research resources are not effectively used and reasonably distributed. These two problems have almost become the common problems in the current scientific research management of colleges and universities in China. These problems have greatly restricted the overall development of scientific research activities in the school, resulting in serious waste of resources and low-level reuse, reducing the efficiency of scientific research.

The basic big data technology can be divided into three steps for the optimal allocation mode of scientific research resources. Firstly, data should be collected and screened, and different kinds of databases should be established, such as personnel database, achievement database, equipment database, etc.; secondly, evaluation models suitable for the scientific development of the university should be established, including calculation parameters and rules database of various scientific research resources and achievements; finally, resource allocation tools and decision support management tools based on quantitative performance appraisal should be established, so as to pass Big data technology completes the optimal allocation of scientific research resources in schools.

Countermeasures and Suggestions on Improving Research Management Mode with Big Data Technology

How to make more effective use of big data technology to ensure the healthy development of scientific research in Colleges and universities has become an important part of the reform of scientific research management system in Colleges and universities. In order to ensure that universities can use big data technology well, we should pay attention to the following points.

First, strengthen the infrastructure of data collection. The infrastructure of data collection and analysis has always been the top priority in the process of university informatization. On the one hand, it should be able to collect data with rich content, clear type and meaningful, on the other hand, it should have the function of providing data mining and data analysis. Therefore, in the context of big data, if you want to improve the level of scientific research management, perfect informatization is necessary. Colleges and universities should adopt advanced and stable technology to ensure the rapid transmission and storage of data, select appropriate generic cabling technology and equipment, and take precautions to provide a good infrastructure for data storage. Facing the explosive growth of data in the future, FTTO (fiber to the office) mode can be considered, which is characterized by large bandwidth, fast speed, cost and energy saving, and electromagnetic interference reduction. The construction of data storage center should consider virtualization and cloud platform to ensure the speed and accuracy of data transmission.

Second, strengthen the construction of scientific research management team. Even in the background of big data, with the help of information equipment and technology, the specific details of scientific research management are ultimately operated by scientific research managers. Strengthening the construction of scientific research management team is the fundamental to improve the level of scientific research management in Colleges and universities.

In order to make better use of big data technology and improve the level and efficiency of scientific research management, scientific research managers should have the ability to collect, analyze and analyze data. The relevant data of scientific research management in Colleges and universities are various and large in size. Managers should pay attention to the collection and collation of these data at ordinary times, and avoid collecting data in a temporary manner to avoid mistakes and omissions. The collected data can be easily inquired by managers and researchers, but a wide range of original data often come from different sources. Scientific research managers should evaluate the quality of the data obtained, evaluate whether the data source is reliable, whether the data collection method is scientific, whether the data has timeliness, etc., then check the data, remove the miscellaneous and disturbing data, pay attention to clearing or correcting the error data, and finally transform the data into the shareable standardized information. After data collection and mining, scientific research

managers should also have a certain interpretation of the results. The interpretation of the data is essentially the disclosure of the relationship between variables in the data.

Third, change the concept of scientific research management. In the past, scientific research managers were only used as intermediate nodes to report the situation to the superior and the inferior, and only played a passive role in recording and sorting out data. Due to the particularity of the identity of institutions in Colleges and universities and the fact that scientific research management is in the administrative department, some managers have lazy ideas such as waiting, relying, wanting, and being content with the status quo. They have a certain bureaucratic style to the internal, outdated management ideas, lack of service awareness, and fail to play their subjective initiative actively. However, as the main body of its management, scientific research itself has made rapid development in these years. If it continues to be accompanied by backward management concepts, it will seriously hinder the level and achievements of scientific research management in Colleges and universities for a long time.

In the era of big data, the service consciousness of various industries will be strengthened. The traditional scientific research management concept cannot guarantee the healthy development of scientific research in Colleges and universities, which needs us to change. First of all, under the trend of big data, information mining should be forward-looking, and analyze the social and national needs from the data, so as to make scientific research objectives more valuable and targeted. Secondly, in the trend of big data, services should move forward, not wait for researchers to ask for data and results as in the past. Instead, we should make full use of the data, analyze and mine the data, grasp what data or conclusions researchers may need, and move the service work forward.

Fourth, actively promote data sharing and utilization. At present, an important feature of scientific research is the high degree of interdisciplinary, and more and more dependent on data. Scientific research itself is the production process of scientific data. Some scientific data are extremely important research results. Scientific research data resources are not only the achievements and accumulation of research, but also the indispensable resource stock to support more complex innovation research institutes. In the era of big data, the amount of scientific research data is increasing rapidly, and scientific research increasingly relies on systematic and reliable basic scientific data analysis. At present, the global scientific and technological activities are constantly increasing. The rise of a series of major scientific projects, the proposal of complex scientific problems and the emergence of large-scale scientific research plans have led to the unprecedented international cooperation situation, as well as the objective demand for the exchange and exchange of scientific and technological resources worldwide. Therefore, scientific research managers should actively promote the efficient and accurate sharing and utilization of scientific research data in order to improve the level of scientific research management according to the characteristics of big data technology, rich data sources and fast data update.

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