Research on the Construction and Improvement of University Scientific Research Management Information System Based on "Internet +"

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Abstract: the Continuous Integration of the Internet and Various Fields Has Promoted Social Progress and Innovative Development. as the Main Base of Scientific Research and Technological Innovation, Colleges and Universities Shoulder the Important Task of Cultivating Innovative Talents in Society. under the Background of "Internet +", How to Strengthen the Fine Management of Scientific Research Funds and Improve the Efficiency of the Use of Funds is Particularly Important. This Paper Focuses on the Endogenous and Exogenous Characteristics of Scientific Research Management in Colleges and Universities from the Perspective of System Theory, Analyzes the Problems and Dilemmas Existing in the Traditional Scientific Research Management Mode on the Basis of Fully Interpreting Its Regularity, and Puts Forward for the First Time the Thinking of Future Transformation from Scientific Research Project as the Core to Multi Intelligent Scientific Research Service Platform with Teachers as the Core, Using Social, Mobile, Cloud Service, Big Data and Other Technologies, Integration of Scientific Research Management Data and Other Scientific Research Resources Big Data, Transformation and Expansion of Scientific Research Management and Service Concept. At Last, the Paper Explores How to Realize the Innovation of Scientific Research Management in Colleges and Universities.

1. Introduction

At Present, the Informatization Construction of Scientific Research Management Has Been Widely Paid Attention by Universities, Especially in Domestic Universities with Large Scientific Research Volume. However, the Management Level of Scientific Research Achievements in Colleges and Universities in China is Still Relatively Backward, Especially the Market Conversion Rate of Scientific Research Achievements is Only about 6%, Resulting in Huge Waste of Resources [1]. as One of the Three Major Functions of Colleges and Universities, Scientific Research is Becoming More and More Important in the Field of Higher Education. However, the Traditional Scientific Research Management Mode in Colleges and Universities Has Been Difficult to Adapt to the Requirements of the New Situation [2]. the Internet and Artificial Intelligence Technology Are Changing People's Life and Work Style, But Also Bring New Opportunities to the Financial Management of Colleges and Universities. Therefore, Colleges and Universities Should Seize the Opportunities and Actively Solve the Problems in the Financial Management Process with the Help of Advanced Internet Information Technology. in the Field of Education and Teaching, the "Internet +" Undoubtedly Set Off a Wave of Teaching Reform. the New Teaching Methods Such as Mob, Flipped Classroom, Mobile Learning and Future Classrooms Have Completely Overturned the Traditional Way of "Teaching" and "Learning" between Teachers and Students. [3] with the in-Depth Development of the Special Inspection of Scientific Research Funds Management, the Scientific Research Management Departments in Colleges and Universities Will Set Off a Boom in the Construction of Scientific Research Management Information System.

2. The Content and Significance of Constructing Scientific Research Management Information System

The So-Called Construction of Scientific Research Management Information System, At Present,

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Refers to a Comprehensive Management Information System and Decision Support System Composed of People, Computers and Other Peripheral Equipment. under the Background of "Internet +", the Construction of Scientific Research Fund Management System is Mainly Based on the Scientific Research Application Management System to Connect Financial Accounting System, Online Reimbursement, Online Approval, Self-Service Delivery System and Wechat Public Platform Inquiry and Other Financial Systems [4]. the System is Characterized by Integrity, Comprehensiveness, Orderliness, Dynamics, Openness and Optimization. the Research on the System Not Only Lies in Understanding the Composition, Characteristics and Laws of the System, But Also, More Importantly, in Using These Characteristics and Laws to Perfect, Optimize or Innovate the System [5]. "Internet +" Scientific Research Management in Universities is to Make Full Use of Information and Communication Technologies Such as Cloud Computing, Internet of Things, Big Data and Mobile Internet in the Management of Scientific Research in Colleges and Universities. It Takes Scientific Research Subjects as the Main Body to Realize the Information Management of Scientific Research Projects, and Creates an Environment [6] for Orderly Arrangement and Sharing of Resources Information of Scientific Research Projects in Universities. the Scientific Research Management Information System is a Scientific Research Management Information Network System That Standardizes the Data Information of All the Contents, Links and Stages of the Scientific Research Management of the Whole University by Manual or Independent Electronic Data. the Intermediate Shared Database Can Interact with Other Financial Systems, Realize the Dynamic Processing of Data in Each System, and Provide More Convenient Query Channels and Accurate Real-Time Data Resources for University Administrators and Teachers and Students.

Scientific research management in colleges and universities is a complete system structure, which consists of three subsystems: management organization, human resources and scientific research resources, as well as external environment such as policy, law and culture. The subjective elements such as organizational system and management team and the objective elements such as scientific researchers, scientific research projects, scientific research achievements and scientific research information are interrelated and interact in each subsystem (see Figure 1 below)

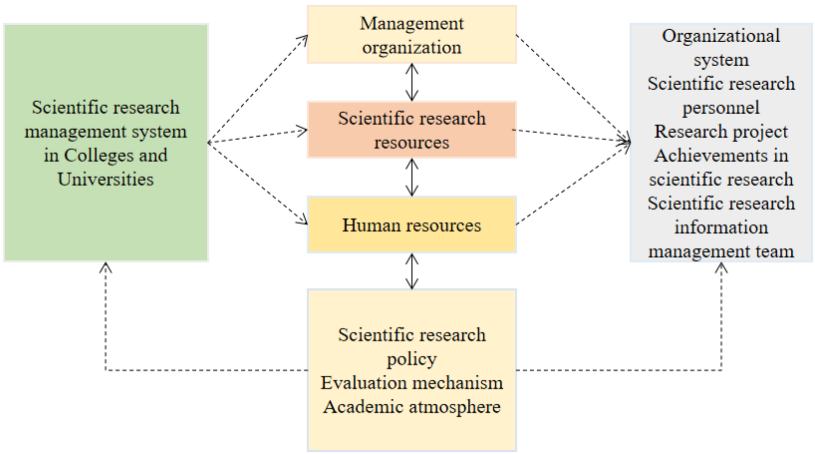

Fig.1 Structure of Scientific Research Management System in Colleges and Universities

The purpose of constructing the scientific research management information system is to sort out the backward and unreasonable links in the original work, and to construct a set of scientific and standardized scientific research management work flow composed of three-level platforms of researchers, colleges and schools by means of information technology. The advanced network system is the core technology for the construction of scientific research fund management system based on "Internet +". The dynamic real-time interaction and real-time update of data need the help of advanced Internet information technology [7]. According to a certain level and structure, the system is integrated into an organic whole with certain functions. At the same time, the whole system is affected by external environment such as scientific research policy, evaluation mechanism

and academic atmosphere. At any time, you can log in the financial online platform, fill in and submit the budget application form, budget adjustment form, reimbursement form and other fund related information. It is a modern scientific research management idea to change the low efficiency work form, which makes researchers repeat to and from the scientific research management department, fill in complicated forms, etc., at the same time, it also reduces the work pressure of scientific research management personnel, reflects the reform and innovation of scientific research management mode.

3. Opportunities and Challenges Faced by Scientific Research Management in Colleges and Universities in "Internet +" Era

3.1 Opportunities for University Scientific Research Management in the Era of Internet +

Under the background of the "Internet +" era, big data thinking, platform thinking, flow thinking, user thinking and other Internet thinking modes have been widely applied in various professional fields. "Internet +" represents an open, collaborative, non-linear and innovative mode of thinking [8]. On the one hand, the scientific research management departments of colleges and universities obtain a large number of scientific research information and academic exchange opportunities through high-quality management team, optimize all kinds of scientific research information resources, and at the same time, according to the characteristics of disciplines and market requirements, realize the optimal allocation of interdisciplinary and scientific research talent resources. In addition, the research fund management system based on the background of "Internet +" can optimize the business workflow and improve the efficiency. The most notable feature of "Internet +" is to make full use of information and communication technologies such as cloud computing, Internet of things, big data and mobile Internet, while effectively optimizing the management process of scientific research, and effectively breaking the barriers between colleges and disciplines [9]. Colleges and universities do not have enough impetus in the market, and it is difficult to translate the scientific research achievements of the colleges and universities into practical productivity. In addition, the school does not provide enough scientific research results to the market, and some of the results are already out of the market, mainly to meet the professional title needs of some teachers in the school. However, under the influence of "Internet +", a scientific research management system platform is established by using the Internet to allow researchers from different schools, different disciplines and different professional backgrounds to carry out unimpeded scientific research cooperation and exchange, effectively breaking the traditional closed state and promoting collaborative innovation and development.

3.2 Challenges Faced by University Scientific Research Management in the Era of "Internet +"

Under the background of the "Internet +" era, the number of cross disciplinary and interdisciplinary research projects has been increasing. The traditional scientific research management mode has been unable to adapt to the development needs of the situation, and can not reasonably configure and share all the elements of scientific research. It is difficult for a scientific research institution to complete, which requires comprehensive coordination and combination from a large system, effective flow of scientific and technological personnel, and reasonable allocation of various disciplines, so as to produce high-tech achievements under the great science. The essence of the research funding management system based on the "Internet +" background is the docking and integration of the scientific research declaration system with financial accounting, online reimbursement, online approval, WeChat public platform query, and many other financial systems. Under the environment of "Internet +", the problems of repeated use of scientific research resources, unreasonable division of scientific research teams, lagging behind of scientific research achievements or difficult to effectively transform, and the difficulty of docking scientific research with supply and demand are increasingly highlighted. The operation and transformation of scientific research achievements need to go through four stages: market prediction, achievement generation,

achievement transfer and achievement use. The investment required in these stages is relatively large, and the investment time is relatively long, which undoubtedly increases the risk of management of scientific research achievements in colleges and universities. Its characteristics are not limited to the growth of data processing and the standardization of management, but involve the comprehensive level of knowledge, ideas and information technology and their role and position in the management of enterprises. For this reason, “Internet +” breaks the monopoly of traditional authority on scientific research knowledge and technological innovation, and requires the scientific research mode to gradually come out of the closed state and follow the market demand, so as to promote the healthy and stable development of scientific research in universities.

4. Construction and Improvement of University Management Information System in “Internet +” Era

4.1 Change the Concept of Scientific Research Managers

Scientific research management personnel are the core figures in the development and management of university scientific research projects in the era of “Internet +”. The transformation of their scientific research management concepts and the improvement of their sense of responsibility are important prerequisites for the smooth development of scientific research management. Generally speaking, if the system is mainly affected by the internal factors of the system, it is called endogenous; if the system is mainly affected by external factors, it is called exogenous. Data storage and management is the foundation of the design of university research funding management system based on “Internet +”, and an intermediate shared database is set up to record the occurrence of financial data. The informatization and networking of scientific research management also put forward higher requirements for the information literacy and ability of scientific research managers. They should not only master computer software and scientific research project management process, but also complete the collection of various scientific research information resources. Reform the individual appraisal system into a group appraisal system and adjust the appraisal objectives and reward system. Changing a single job to a variety of jobs will give teachers more opportunities and more support from their specialties. At the same time, the system should also embody high-efficiency first-class management concepts and a culture of serving scientific research and creating a scientific research atmosphere. The large-scale experimental testing center will be transformed into an open laboratory mode, fully open to the outside world, and an incentive mechanism based on service will be established. Through the establishment of science and technology innovation professor supervision committee, better play the role of professors in democratic management, strengthen the supervision of resource utilization efficiency.

4.2 Construction of Scientific Research Information Management Platform

The construction of a network-based scientific research information management platform is an important symbol of the reform of scientific research management mode in colleges and universities under the “Internet +” era. It breaks the restrictions of regions and departments and realizes the transformation of scientific research management from decentralized management, static management to system management and dynamic management. In essence, the realization process of the purpose of the scientific research system in colleges and universities is between the internal management organization system, scientific research resources, human resources and other subsystems of the system, the subjective elements such as management team and the objective elements such as scientific researchers, scientific research projects, scientific research information and scientific research achievements.

The school's scientific research department and software developers will jointly work out the overall objectives for the implementation of the scientific research management information system. According to the actual situation of the school, the developer shall assist in formulating the sub-module system promotion plan to ensure the smooth development of relevant businesses with the

cooperation of the system. The specific implementation process is shown in Figure 2.

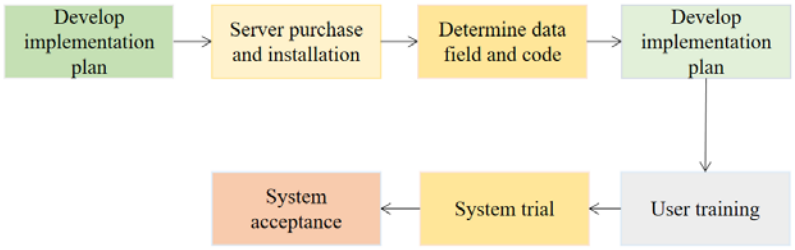

Fig.2 Research on the Construction Process of Management Information System

On the one hand, we cannot overemphasize quantity, thus leading to the prevalence of speculative psychology and the wind of empty floating. On the other hand, we cannot restrict scientific research activities that are more difficult and have a longer cycle by quantitative standards. However, the research contents of such difficult and long-cycle research projects are precisely scientific theories and technologies that may have original and higher academic value. Comprehensive research universities can set up overseas project management modules when they have more international cooperation projects. Some industry characteristic colleges and universities have confidential projects, so the scientific research management information system needs to set up special confidential project management module; create a loose and open scientific research environment for scientific researchers, so as to improve the timeliness, convenience and standardization of scientific research management, and meet the requirements of teachers' scientific research project application, project approval and conclusion. Therefore, improving the quality of scientific research management team and fully mobilizing its subjective initiative and creativity are the key points to realize innovation in the soft power level of scientific research management.

4.3 Construction of Scientific Research Organization Based on Network

In the era of “Internet +”, the management mode of scientific research in universities needs to change to the network mode. In the Internet environment, we should give full play to the advantages of the network, such as openness and real-time. Relying on the network, and linking scientific research projects, we can build a scientific research network organization, which can be adjusted according to the changes of scientific research tasks.

Data construction is the key content of scientific research management information system. The workflow of data construction is shown in Figure 3. Data construction content needs to build data coding and determine data content.

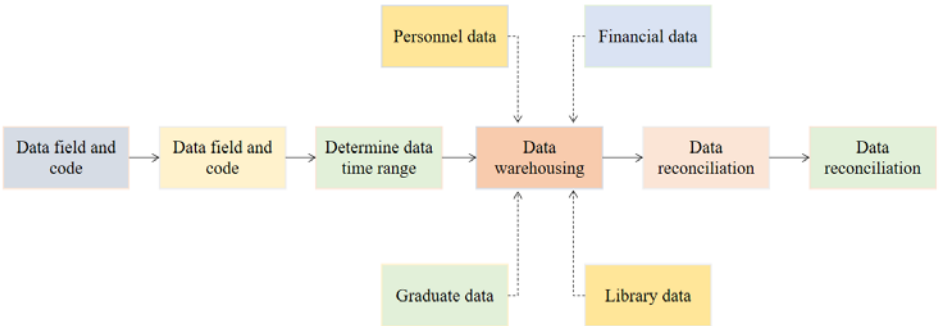

Fig.3 Data Construction Workflow

How to guide and support the research organizations, research teams and research institutions in Colleges and universities to become the main body of their own management, fully enjoy the decision-making power, information processing power, etc., and try to get rid of the interference of the administrative system. On the one hand, encourage and support scientific research personnel to cooperate with enterprises or take part-time jobs in enterprises to transform and promote research results, which can be carried out by means of technical guidance, technical consultation, technology

transfer, technology shareholding, etc.; on the other hand, consider setting up science and technology achievements transformation or promotion awards, which will give heavy awards to departments or individuals that have made outstanding contributions in the transformation or promotion of science and technology achievements. Building the interface between scientific research management information system and other school systems, such as opening the interface with school finance, personnel, educational administration, graduate students, libraries and other systems to provide information sharing; In essence, scientific research management is actually a dynamic practical process in which subjective elements and objective elements build and shape each other, rather than simply providing hard services. In addition, relying on Internet information technology to embed internal control means and management concepts into the financial system and to optimize and reengineer the business execution process can effectively manage scientific research funds before, during and after the event.

5. Conclusion

The construction of scientific research management information system is a systematic project, it is not a short-term behavior, quick success and quick profits will bring great waste of economic cost and time cost. The endogenous and exogenous characteristics of scientific research management in colleges and universities provide us with a way to reflect on innovative scientific research management from the interaction between various elements of the system and the relationship with the external environment. Based on the background of “Internet +”, a refined management system of scientific research funds will be established to integrate various isolated business systems, realize the interconnection and information sharing of information systems, optimize the management process of scientific research funds, and ensure the scientific and information-based management of scientific research funds. The advent of the “Internet +” era has introduced the advantages of openness, interactivity and convenience of the network into the research and management of universities, so as to realize the information management of scientific research projects. It has played a positive role in promoting the scientific management of scientific research and improving the management level of scientific research, and has become a common trend. It is of great significance to realize the sustainable development of scientific research in colleges and universities and meet the needs of the current social reality.

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