The Operation Mechanism of University Collaborative Innovation Association Based on Big Data

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ABSTRACT

Recently, every industry cannot develop without the driving force network information technology. With the advent of the age of big data, big data technology which exploits masses of information has been applied in many different fields. Faced with the current condition of industry-study-research combination, how to take the advantage of big data to move industry-study-research collaborative innovation forward is worth study. This passage first introduces the basic theory of collaborative innovation and its operation mechanism and then explores current problems and at last discusses feasibility and specific measures when big data technology is applied in the operation mechanism of industry-study-research collaborative innovation.¹

INTRODUCTION

Collaborative innovation, which is one of strategies put forward for China’s scientific and technical development, is a process in which resources from colleges and universities, R&D institution, enterprises, governments and financial institutions can be integrated to create values and its core is to add value in knowledge. In recent years, achievements have been made in Chinese university collaborative innovation but there are still many problems especially the one about which different subjects integrate and share information have to be settled urgently. In 2015, Premier Li Keqiang first put forward “Internet plus” initiative in the government work report at Third Session of the 12th National People's Congress and proposed that the internet

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should promote the development of industries especially traditional industries. With the advent of the age of big data, how to integrate and use these data has become a new topic in every country. At present, big data technology has been successfully applied in many different fields. In the practice of university collaborative innovation, its application is practicable which plays an important role in the complementation and integration among different disciplines, information sharing between institutions for scientific research and enterprises and team building on collaborative innovation projects.

ANALYSIS ON THE OPERATION MECHANISM OF INDUSTRY-STUDY-RESEARCH COLLABORATIVE INNOVATION

University collaboration innovation means that a university takes advantage of its disciplines and works with other universities, research institutions, industries and enterprises and foreign institutions for scientific research to collect data and resources can flow freely within the industry-study-research system with the support of local governments and sci-tech inter-mediating organizations and financial institutions so as to attain the goals including scientific research, technological development, talent training, discipline construction and transformation of research achievements.

The operation mechanism of university collaborative innovation refers to operational principles, related systems and modes of action in every link of the whole process from the beginning when every subject such as universities, enterprises and research institutions is willing to build a team to the termination of interest distribution. This passage will divide operation mechanism of collaborative innovation into three links: dynamic factors, collaborative process, interest distribution and risk sharing, as shown in Figure 1.

Figure 1. The Operation Mechanism of University Collaborative Innovation.
The Dynamic Factors of University Collaborative Innovation

Every subject of collaborative innovation which belongs to different systems has different values and self-interests. Therefore, university collaborative innovation will deal with different issues concerning economics, technology, market, culture and interest. In order to solve these problems, we must establish an effective motivation mechanism and make a comprehensive survey of these dynamic factors so that we can improve the motivation of every subject to involve in university collaborative innovation. For now, the dynamic factors of university collaborative innovation include external factors and internal factors. It is generally believed that external factors include mainly governmental environment, financial environment, technological environment and tie strength between subjects of collaborative innovation and internal factors include self-interests of every subject of collaborative innovation centered on colleges and universities.

The Collaborative Process of University Collaborative Innovation

The collaborative process is a process when a collaborative innovation project begins to put in operation after subjects of collaborative innovation centered on colleges and universities reach agreement to form an alliance. In the process of project operation, talents, capitals, equipment, knowledge and information from every subject can flow freely and be utilized to the greatest possible extent. The degree of contribution of every subject in the process of university collaborative innovation will be served as basis for interest distribution.

The Interest Distribution and Risk Sharing of University Collaborative Innovation

The interest distribution mechanism means that a feasible interest distribution method formed in the process of collaborative innovation. A feasible interest distribution method is a guarantee for the effective operation and long-term cooperation of university collaborative innovation. In the process of interest distribution, the degree of contribution and self-interests of every subject should be taken into consideration when it comes to interest distribution, otherwise their motivation will be decreased. There still exists risk of failure so we should make full preparation and prediction of every aspect in the process of collaborative innovation so that we can take preventive measures as far as possible. Even if the failure comes, the risk will be shouldered reasonably to cut losses down.

EXISTING PROBLEMS OF OPERATION MECHANISM OF CHINESE UNIVERSITY COLLABORATIVE INNOVATION

The Lack of Momentum of Every Subject

Dynamic factors of university collaborative innovation include external factors and internal factors. From the perspective of external factors, firstly, there is a lack
of support of capitals, resources and systems for university collaborative innovation from Chinese government and the government has to act as a guide in the collaboration between enterprises and universities because the government has much information about universities, industries and enterprises but it cannot be integrated and shared. Secondly, China’s sci-tech inter-mediating organization now is still in its beginning stages because of its short history. As opposed to developed countries, China’s sci-tech inter-mediating organizations have to improve their core competence, the ability of resource integration, organizational coordination ability and the power to transform research achievements.

From the perspective of internal factors, the main problems lie in that internal interests of every subject centered on universities cannot get a very good integration. This is mainly due to the following two reasons. On one hand, subjects especially universities and enterprises do not have a comprehensive understanding of their internal resources and they cannot be fully integrated. This leads to that the mechanism of university collaborative innovation cannot make good use of every subject’s advantages to provide substantial assistance for every subject so as to affect the performance the mechanism of university collaborative innovation. On the other hand, there is a lack of platform for information sharing in the mechanism and it is difficult for subjects to find projects suit for their self-interests which lead to the lack of momentum of every subject.

**Poor Information Circulation in The Process of Collaboration**

Every subject in the university collaborative innovation has to mobilize and match their information and resources. They have to utilize their advantages and try their best to carry out projects and pay attention to communication and cooperation with other subjects at the same time. If one subject or one task goes wrong in the process of collaboration, other tasks will be easily involved in which will lead to the abortion of the project and the failure of collaboration innovation. Now lack of information-sharing platforms between subjects, poor information circulation and slowly resource mobilization are important factors for failures in the process of collaborative innovation.

**The Lack of Basis for Interest Distribution and Risk-sharing of University Collaboration Innovation**

In the process of collaboration, every subject’s degree of contribution, input quantity and acceptance of risks should be analyzed integratively to act as the basis for interest distribution and risk-sharing. While the mechanism of Chinese university collaborative innovation is not good enough when it comes to the integration of input and output of every subject so that interest distribution cannot be optimized and risk-sharing is difficult to rationalize. In addition, if a collaboration innovation project achieves success at last, we need to summarize valuable experience and analyze practicable projects in the future and study the situation of partners with
which we can build a long-term relationship. If a collaboration innovation project fails, we need to draw lessons from the abortion to make preparation for next projects. For now, the work concerning this part does not receive much consideration.

In general, the problems about Chinese university collaboration innovation from universities, the government, inter-mediationing organizations and operation mechanism of collaboration innovation are relevant to poorly circulated information without integration and sharing.

**FEASIBILITY ANALYSIS THE APPLICATION OF CHINESE UNIVERSITY COLLABORATIVE INNOVATION**

**The Advantages of Disciplines and Talents of Universities**

The mechanism of university collaborative innovation, centered on universities, aims to take advantages of disciplines and talents. Universities have complete equipment and other complementary infrastructure and many universities have disciplines such as information technology and computer science which lays foundation for big data application in the mechanism of university collaborative innovation.

**Maturer Big Data Technology and Its Lower-cost Application**

Currently, big data technology has been applied in many industries and enterprises. Baidu, Tencent and many domestic IT enterprises are quite mature in big data application and different enterprises are using big data to increase their sales and save costs so there is much experience to draw upon. Many challenges have been overcome in terms of big data. And now Google Troika and projects used widely are becoming even maturer. And more IT enterprises and elites are constantly developing new technologies and products to meet different demands. Moreover, it will not cost much to build a big data platform because it uses clusters to cut costs. For example, HDFS in Hadoop has a high fault-tolerance developed based on Java which makes Hadoop can be deployed in low-cost computer clusters and are not limited to certain operating system. Therefore, the application of big data technology can be realized in the mechanism of university collaborative innovation.

**APPLICATION ANALYSIS THE APPLICATION OF CHINESE UNIVERSITY COLLABORATIVE INNOVATION**

**Exploitation and Integration of Dynamic Factors of University Collaborative Innovation with the Application of Big Data**

The mechanism of university collaboration innovation established on the basis of the analytical protocol of big data, extracts valuable information from the data
platform and identify dynamic factors of university collaborative innovation to match with complementary dynamic factors of other subjects. It is an important scientific way to find partners of collaborative innovation which can reduce the aimlessness and

increase the success rate of collaborative innovation, as shown in Figure 2.

![Figure 2. Exploitation and Integration of Dynamic Factors of University Collaborative Innovation with the Application of Big Data.](image)

**INTERNAL FACTORS: TO INTEGRATE INTERNAL FACTORS OF SUBJECTS AND IDENTIFY THEIR SELF-INTERESTS**

The establishment of the big data platform of university collaborative innovation mechanism can help subject to build their own data base to integrate and analyze information and clarity their advantages and disadvantages and self-interests. It is particularly important for universities which can integrate their disciplines and talents to move disciplines forward.

**EXTERNAL FACTORS: TO COLLECT AND INTEGRATE EXTERNAL FACTORS TO MAKE RIGHT DECISIONS**

Every subject can get information about potential partners from the big data platform and integrate useful external information according to their self-interests to determine their partners. The sharable big data platform of university collaborative innovation extends the range of choices for every subject and enhance their independence. At the same time, the sharing platform help information-sharing among the government, research institutions and other inter-mediating organizations. It values up information and help subjects get more external information, choose suitable partners and make decisions reasonable when they integrate their own internal resources.
TEAM BUILDING ON COLLABORATIVE INNOVATION PROJECTS

A good team of collaborative innovation plays important roles in the success of collaborative innovation. Big data platform exploits and integrates dynamic factors of university collaborative innovation and make every subject get more information easier and enhance the scientific decision-making and choose suitable partners. After determining projects, subjects integrate their predominant resources and build a good team of collaborative innovation with high-quality equipment and talents to increase the success rate of collaborative innovation.

Information Exchange in The Process of University Collaboration Innovation with the Application of Big Data

TO PROMOTE INFORMATION CIRCULATION

In the process of collaborative innovation, sometimes a subject will have some communication obstacles and is unfamiliar with other subject’s information. The big data platform of university collaborative innovation can share all information after the team of collaborative innovation is built. And the platform greatly promotes the exchanges and communication among all subjects.

LOGGING TASK PROGRESS OF SUBJECTS OF COLLABORATIVE INNOVATION

In the process of collaborative innovation, task assignments for subjects and their task progress can be logged on big data platform. Subjects updates their progress and problems every day and know other subjects’ progresses so that they can help with each other and tackle problems in the project. It helps log the input and output of every subjects and provide basis for interest distribution and risk-sharing.

The Coordination of Interest Distribution And Risk-sharing of University Collaborative Innovation with The Application of Big Data

In the process of collaborative innovation, data logging of distribution degree and inputs of subjects makes interest distribution fairer and more equitable. If a collaborative innovation fails, the integrated analysis of data can also provide basis for risk-sharing of subjects. When a collaboration is over, it can exploit and analyze data to find valuable information—successful experience or lessons from the abortion to make preparation for next projects.

CONCLUSIONS

In recent years, with the support of governments and sci-tech inter-mediating organizations, the implementation of university collaborative innovation in China
which centered on universities has made some achievements in the collaboration of resource integration with research institutes, industries and enterprises. But there still exist many problems. And poorly circulated information of subjects without integration and sharing is the common problems. This passage, based on the theoretical analysis of the mechanism of university collaborative innovation, aims to clarify that the information-sharing platform of university collaboration innovation with the application of big data technology play an important role in solving these problems. Now, data has become a kind of resource and how to make use of it to create values is worth thinking. University collaborative innovation is a tremendous development opportunity for every subject. If we can give play to strong points of data to continuously exploit the value of it and integrate and share information, we will get twice the result with half the effort.

REFERENCES