

Research on Open Sharing of Scientific and Technological Resources based on Collaborative Innovation

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Abstract

Scientific and technological resources are the prerequisite, foundation and guarantee for the development of higher vocational colleges. Due to the limitation of resources and the urgency of technological innovation, the opening and sharing of scientific and technological resources has become one of the most important ways to enhance the competitiveness of higher vocational colleges. Based on the study of the connotation of scientific and technological resources, this paper analyzes the problems in the resources open sharing in higher vocational colleges. Some suggestions are put forward to promote the resources open sharing and synergistic innovation.

Keywords

Collaborative Innovation; Technological Resources; Open Sharing of Resources.

1. Introduction

The development of higher vocational colleges is inseparable from the integration of high-quality resources. High quality resources are the premise, foundation and guarantee for higher vocational colleges to cultivate high skilled talents and create achievements. Due to the limitation of resources and the urgency of talent training and scientific innovation, resource sharing has become one of the most important ways to enhance the competitiveness of colleges and universities. However, the development of resource sharing is restricted by the sharing subject and environmental policy factors. Collaborative innovation can effectively solve these problems, achieve in-depth cooperation by breaking the barriers between innovation subjects to promote resource sharing in the region, and use various resources to the greatest extent. The opinions on comprehensively improving the quality of Higher Education issued by the Ministry of education also stipulates that colleges and universities should vigorously promote collaborative innovation [1]. Considering the shortage of various resources, the research on the open sharing mechanism of scientific and technological resources in Higher Vocational Colleges based on collaborative innovation can provide theoretical basis and guidance for the specific implementation of resources sharing. The research can play a vital role in the optimal utilization of resources.

Many scholars have studied resource sharing based on collaborative innovation. The factors restricting resources sharing were studied, which included the enthusiasm of the sharing subject, the timeliness, regionality and vulnerability of the sharing object, environmental factors etc. Mechanism of these factors affecting the effectiveness of resource sharing was analyzed. Some suggestions like reasonably allocate scientific and technological resources were put forward [2]. Chen Keke pointed out that the maximum benefit of resource sharing can be achieved through the synergy between sharing subjects [3]. Some studies have also analyzed the theoretical model of resource sharing. The most used model was the tripartite model based

on game theory. The model analyzes the dynamic evolution system of resource sharing based on collaborative innovation, and puts forward a game model among regulators, enterprises, universities and research institutes. The research results give the method to promote collaborative innovation. On one hand is to increase the punishment for innovation subjects who do not actively implement resource sharing. On the other hand, the cost should be reduced to participate in resource sharing [4].

At present, most of the research mainly focuses on the open sharing of education and teaching resources [5-6]. However, with the promotion of the construction of high-level colleges and universities, all kinds of resources are needed for students' all-round development. Therefore, the research on the Higher Vocational resources open sharing based on collaborative innovation is of great significance to comprehensively improve the quality of higher vocational colleges.

2. Connotation and Classification of Scientific and Technological Resources

The connotation of scientific and technological resources is the basis for the study of resources sharing. There are many expressions about scientific and technological resources. The most common is the scientific and technological resources adjustment plan jointly formulated by the National Science Foundation of the United States and the Japan revitalization Association, which divides the resources into two categories: human resources and financial resources. However, this classification method is relatively general, especially the financial resources, which includes not only funds, but also equipment and so on.

Another common view is the "four element theory", which holds that scientific and technological resources are various elements in scientific and technological production activities, including human resources, financial resources, equipment and information. This classification method further is more convenient for analysis and discussion. Another view is the "five element theory", which introduces policy and management resources based on the "four element theory" [7].

Generally speaking, human resources, financial resources, equipment resources and information resources are the most common and key resources for higher vocational colleges. Considering the different characteristics of these resources, sharing methods are also different.

3. Common Forms of Resources Sharing

There are many forms of resources sharing. The following studies the open sharing methods considering the characteristic of different resources.

1. Human resources is mainly focused on the scientific researchers, which are the main body of scientific and technological innovation. They have high sensitivity to the development of new technologies and industries, and master strong professional knowledge and innovation ability. The sharing methods mainly include part-time, temporary, project cooperation, etc. Experts and professors from some universities and enterprises can take the way of "flexible flow" to engage in part-time, lectures, training, scientific research and other work in other universities and enterprises. Some colleges and universities employ enterprise elites as student tutors and part-time professors to work in a variety of ways, such as lectures and joint training of students. This kind of sharing can promote scientific innovation and the complementary advantages of resources. In higher vocational colleges, the open sharing of human resources has a good foundation, since talent training is directly oriented to enterprises and personnel from both schools and enterprises cooperate frequently.

2. Financial resources sharing is most difficult of various resources sharing. Many factors such as distribution mode and management scheme will restrict the effective sharing. Many studies have pointed out that it is difficult to share financial resources due to competitiveness and exclusivity and the sharing scope is not large. The most common sharing method is the joint application for R & D, platform construction and other projects.

3. Equipment resources mainly include instruments and equipment, which are important conditions for R & D and innovation. This kind of resources is also a weak part of enterprises and higher vocational colleges compared with scientific research institutes and undergraduate colleges. The most common way of equipment resource sharing is project cooperation. In the process of project cooperation, equipment resource sharing can be well realized. Another common form of sharing is entrusted processing, measurement, etc. Initially, due to the lack of smooth information channels, this type of resource sharing was greatly limited. With the continuous progress of network conditions, it provides a better platform for the sharing of equipment resources, and it is also an opportunity to promote the resources open sharing.

4. Information resources refer to the achievements of various scientific research and innovation in the form of knowledge information. It includes books, journal, documents, patents and other scientific databases that provide services for scientific research. This kind of resources is highly shared. The sharing methods of information resources mainly include academic conferences, seminars, exhibitions, databases, etc.

Among these resources, information resource sharing is the easiest to realize, with wide coverage. Followed by human resources and equipment resources, which are also very common in practical operation, but the scope is relatively small. Financial resources are difficult to share.

4. Some Problems in Resources Open Sharing

After clarifying the above resource types and sharing methods, analysis of the practical problems of resources sharing in the process of collaborative innovation is important for putting forward solutions. It is of great significance to further promote the collaborative innovation of higher vocational colleges.

1. The collaborative structure needs to be optimized and the scale needs to be expanded.

Considering that the ultimate purpose of resources open sharing is to promote innovation and industrial development. The number and scale of enterprises is the direct embodiment of the scale of industrial development. At the same time, enterprises are also the direct demander of innovation and the beneficiary of the resources open sharing. In the process of collaborative innovation, enterprises should occupy an important position. In addition, some resources are weak in enterprises and higher vocational colleges. Therefore, we should actively expand resource source and introduce different collaborative subjects.

2. The driving force is insufficient.

The main driving force for the resources open sharing comes from the limitation of resources and the demand for scientific and technological innovation. At present, the motive force for sharing resources in most units is insufficient. Firstly, many units are not aware of the lack of scientific and technological resources, and the urgency of resource open sharing is not obvious. When the demand for resources is not urgent, many units still choose to immerse themselves in their own research and will not rely too much on the open and shared scientific and technological resources of other units. The units with resource shortage lack corresponding channels and ability to share the resources of other units. Most of them are unwilling to strive for it, and then enter a vicious circle. Secondly, the driving force of innovation plays a significant role in promoting human resources and information resources. However, it is not significant in promoting other scientific and technological resources.

3. The information platform needs to be improved.

At present, information release platforms have been built. But there are still some deficiencies. Firstly, the information release is not comprehensive. Taking equipment resources as an example, some equipment lacks important information such as technical indicators, which is not conducive to the specific implementation of resources open sharing. Secondly, the promotion is not enough. Taking open sharing of large-scale instruments and equipment as an example, the low click through rate indirectly leads to the low utilization of the information platform. Thirdly, most human resources and equipment resources come from undergraduate universities and scientific research institutes. In these information platforms, the role of higher vocational colleges is not obvious and their participation is not high.

5. Some Suggestions on Further Promoting Resources Open Sharing

1. Collaborative innovation is the method to increase the driving force for the resource open sharing fundamentally. Successful cases such as Silicon Valley show that it plays an obvious role in promoting scientific and technological innovation. At present, the main cooperative units of higher vocational colleges are mainly enterprises, and the main role of enterprises has been basically clarified. However, the scale and depth of cooperation are limited. Relying on the existing platform of higher vocational colleges, the scope and scale of collaboration need to be further expanded. Only by taking market demand as the guidance and serving enterprises as the purpose, we can further promote the rapid development of collaborative innovation. At the same time, actively introduce collaborative partners such as undergraduate universities and scientific research institutes to make up for the shortage of resources for themselves and existing partners.

2. Increasing the driving force is difficult, especially on the premise that it has been built into a perfect platform. How to make units, which are rich in resources, willing to share resources with units with weak resources is a great challenge.

To deal with this problem, the feasible method is to seek the leadership of the government to further promote the integration of government, industry, university and research. The combination of different unit and collaborative innovation are effective way that can fundamentally increase the driving force for the open sharing of scientific and technological resources. At the same time, we also need to constantly strengthen our own advantages and differentiated construction resources. In the case of insufficient motive power, this weakness can also be made up by increasing internal and external power. The following methods can be adopted. Opportunities should be created so that all units can communicate and cooperate more. Strategic partnership should be established in the process of cooperation to make more willing to open in all aspects and increase internal motivation. In addition, various incentives can be formulated to support the resources open sharing. These methods can further promote the resources open sharing by increasing external power.

3. Since some platforms have been built, we can vigorously promote the existing provincial and municipal resource open sharing platform and encourage teachers to use the existing platform to engage in teaching and scientific research. At the same time, resource sharing platform in the same industry can provide more targeted services. Actively cooperation with enterprises and research institutes has a positive effect on the promotion of such platforms. In addition, strengthen domestic and international exchanges is necessary to constantly improve the level of scientific and technological resources. Making full use of the influence of various collaborative subjects in the industry is also significant to attract more advantageous resources and expand the scale and depth of domestic and international cooperation.

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