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Research on Management Optimization of Industry-University-Research Cooperation Projects in Universities and Colleges from the Perspective of Collaborative Management

Tianyu Zhang

School of Business, Belarusian State University, Minsk, 220030
Zty98cn@163.com

Abstract: *In the current university talent education and training, industry-university-research collaboration has become a very important teaching philosophy and concept. At present, there is certain room for innovation and development in industry-university-research collaborative management in colleges and universities. How to better realize innovative management and adapt to the needs of talent training in the current new period is an issue and content that we must pay attention to and explore. In this paper, the construction of project-based management mode of industry-university-research collaborative innovation in colleges and universities was analyzed and discussed.*

Keywords: *collaborative management; industry-university-research collaboration; Management Optimization*

1. Introduction

Industry-university-research collaborative innovation has become a key point in the current university education. The realization of industry-university-research collaborative innovation itself involves the cooperation among universities, local governments, enterprises, research institutions and other social institutions. Therefore, how to better promote the close cooperation of various institutions is also an emphasis in the development and implementation of industry-university-research collaborative innovation in colleges and universities at this stage. In the development of industry-university-research collaborative innovation in colleges and universities, we should introduce the project-based management ideas and characteristics, use project tasks to practice the strategic development needs, build a better project-based operation and management mechanism, and further realize the goal of collaborative innovation, to achieve the effective aggregation of resources, and solve the existing problems of industry-university-research collaborative innovation.[1]

2. Connotation of industry-university-research collaborative management

2.1 Industry-university-research cooperation

Industry-university-research cooperation is a systematic project of innovation cooperation, which is a systematic collaboration of production, teaching, scientific research and practical application. In this paper, it refers to the coordination and connection of talent training and scientific research in universities with talent demand, user demand and technology demand of enterprises/industries. It highlights that the combination of industry, university and research must take enterprise as the main body, user as the center, and market as the guidance. “Industry-university-research cooperation” further stresses the application and user.

2.2 Collaborative management

Since 1965, when H. IgorAnsoff, an American strategic management scientist, introduced the idea of collaboration into management for the first time, numerous scholars kept exploring and innovating, and applied collaborative management into concrete practice.[2] As for the concept of collaborative

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management, researchers at home and abroad have not reached a unified definition due to the different research backgrounds, objectives and levels. In this paper, the connotation of collaborative management was concluded and summarized from different perspectives.

2.2.1 Internal perspective of enterprises

Scholars who study the internal collaborative management of enterprises claim that collaborative management is the integration of internal resources of enterprises from the basis of internal supply chain to achieve internal collaborative management.[3] All the internal institutions, systems, information systems, personnel and so on are built around this idea of collaboration, so that every business unit is embedded in the system, enabling the enterprise itself to construct effective information through such a powerful coupling method, and to achieve barrier-free communication, so as to create enterprise value greater than the simple sum of all parts, and truly become a whole at a higher level.

2.2.2 Perspective from homogeneous enterprises

The cooperative management among homogeneous enterprises mainly lies in the cooperative management among supply chain enterprises. Scholars who study the collaborative management of supply chains hold that supply chain management, as a brand new management idea, focuses on the coordination and joint efforts of all nodes of supply chain enterprises with unique advantages in different value-added links, so as to establish strategic partnerships.[4] From the whole point of view, it requires the internal and external integration management of supply chain enterprises to achieve the global dynamic optimization. The idea of “cooperation”, “win-win results” and “integration” should run through supply chain management, which is the key to realize collaborative management among enterprises.

2.2.3 Perspective from enterprises and heterogeneous organizations

The most typical collaborative management between enterprises and heterogeneous organizations involves the three parties of enterprises, universities and research institutions, namely the industry-university-research collaborative management. Scholars who have conducted researches on this issue indicate that the industry-university-research collaborative management requires the emphasis on the cooperation and coordination of the three parties of enterprises, universities and research institutions. The goal, organization, system and mechanism of enterprises, universities and research institutions should be coordinated for management, to further enhance the synergistic effect and agglomeration effect of $1+1+1 > 3$. This kind of collaborative management is of great significance to promote the industry-university-research collaborative innovation.

2.3 Industry-university-research collaborative management

Based on the above perspectives, the author held that industry-university-research cooperative and collaborative innovation refers to the collaborative innovation activities of knowledge creation and technology development jointly carried out by enterprises, universities and research institutions with the support of governments, science and technology service intermediaries, financial institutions and other relevant service institutions by investing their own superior resources. The goal of knowledge management for industry-university-research cooperative and collaborative innovation is to promote the creation and transfer of knowledge, as well as make the limited knowledge play the maximum utility, so as to improve the innovation performance and technological innovation level, and realize the industry-university-research collaborative innovation.

Industry-university-research cooperation is a technological innovation activity involving multi-party collaboration. In the study of the cooperation, the relationship among the three parties should not be separated. In other words, the innovation behavior of only one party should not be studied at each stage, which is not in line with the reality, is not conducive to carrying out innovation activities, and will directly affect the effect of industry-university-research cooperation, since the activity in each stage results from mutual actions of these three parties. Therefore, in the industry-university-research collaborative innovation, enterprises, universities and research institutions take the three stages of technological innovation as the main line, communicate with each other and seek the best way to cooperate.

The basic structure and connotation analysis of industry-university-research-use collaborative management are shown in Figure 1.

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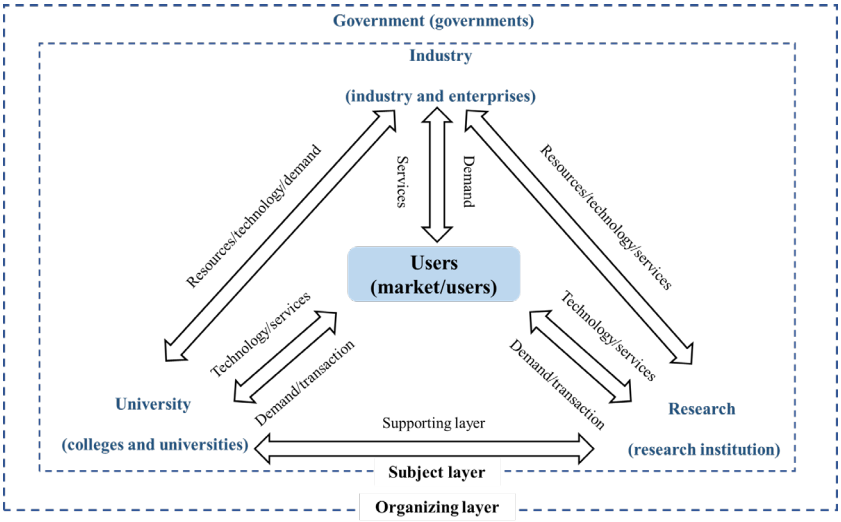

Figure 1: The basic structure of industry-university-research-use collaborative management [5]

3. Management optimization path of industry-university-research cooperation projects in colleges and universities

The essence of collaborative innovation is the effective convergence and integration of innovation resources and factors among different innovation subjects to produce new innovation factors, and then generate double synergistic benefits. The industry-university-research collaborative innovation, as a multi-subject innovation activity, its biggest obstacle lies in the need to break through the field boundary, namely from the economic field to the scientific field, or vice versa; at the same time, it is necessary to break through the boundaries among different innovation subjects, including the barriers caused by organizational attributes, organizational structure, system, culture and resource allocation methods. Hence, how to break through the boundaries of different fields and subjects and make the "talent, capital, information and technology" exchange and integration between each other is the core issue of the management optimization of industry-university-research cooperation projects in colleges and universities.

3.1 Defining collaborative innovation ideas

From the aspect of universities, they should accurately position themselves, correctly view the important role they should serve in the realization of industry-university-research collaborative innovation, actively play the leading role, and constantly improve and explore the effective development mode. Only with a clarified understanding, the follow-up collaborative innovation ideas will be clearer and better meet the needs of the actual work. From the perspective of project-based management, industry-university-research collaborative innovation should define specific tasks and needs, and adopt the combination of centralized management and decentralized implementation to make reasonable improvement and innovation for the current organizational content more flexibly, so as to build a talent training and supply mode that meets the needs of current talent development.[6] Only by comprehensively providing the corresponding resources for collaborative innovation from multiple perspectives, can the development of collaborative innovation have a stronger implementation effect, and at the same time, supports should be guaranteed from the technical and management levels.

3.2 Optimizing the organization model

In terms of the organizational model, industry-university-research collaborative innovation itself should adjust the previous organizational form, break through all kinds of boundaries existing in the previous organizational form, enhance its entire flexibility, and then adapt to the specific needs of collaborative innovation. In the course of optimizing and adjusting the organizational model, the market demand should be fully investigated, and market-oriented means should be utilized to control and solve a series of problems encountered in actual innovation. From the perspective of project-based management mechanism, the related task demands of universities and research institutions also need to be rationally analyzed in the innovation of organizational structure, and the basic principles of resource

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sharing, advantage complementarity, equality and voluntariness should be adopted to establish a new type of collaborative innovation organization.

In order to improve the operation ability of the whole collaborative innovation organization, it is of necessity to absorb the relevant social forces, and give play to the important significance of their auxiliary participation, so as to realize the complementary utilization of resources. The coverage effect of the overall collaborative innovation should be improved, the comprehensive development of regional economy should be supported, and the industrial transformation of regional economy should be promoted. In this way, the effect and value of the whole industry-university-research collaborative innovation development can be reflected to the maximum extent. From the view of the operation mode of collaborative innovation organization, the specific needs in the actual operation process should also be taken into account. Also, in combination with the needs of internal personnel management, financial management and other aspects, the autonomy rights of the actual internal management of colleges and universities should be clarified to provide support and help for resource innovation and talent training.

3.3 Optimizing resource allocation

From the angle of project-based management, the industry-university-research collaborative innovation mode itself has improved the previous single management mode, and integrated a more centralized way of scientific research cooperation, with project cooperation as a new innovative cooperation mode and method. According to the specific needs of industry-university-research collaborative innovation, a professional innovation team should be set up. Following the characteristics of different projects, such as major projects, national urgent needs and enterprise market demands, the project tasks should be classified, the integration and application of resources and technologies should be perfected, and the corresponding allocation should be conducted according to different tasks. In the process of classification, the specific relationship between different tasks should be reasonably explored. At the same time, the research positions should be set up and the project team should be established based on the characteristics of the tasks. In collaborative innovation, a corresponding team-based management and decision-making system should be constructed in combination with different research directions. Related management activities should be carried out in a project management manner, the responsible person for management should be identified, and corresponding consultants and researchers should be equipped. In terms of the introduction and selection of the team, independent recruitment from the society can be conducted to improve the flexibility of team member allocation.

In addition, attention should be paid to resource integration. In the past, some barriers remained in the sharing of resources in the industry-university-research collaborative innovation activities in colleges and universities, also an important factor affecting the effect of collaborative innovation work before. To this end, we should further perfect the resource integration mechanism, and meanwhile, adopt overall planning and classified management according to the project-based management needs to provide corresponding guarantee for the optimal allocation of resources. On the basis of the specific needs of project tasks, we should select the centralized scheduling method, and support the call of corresponding resources for different tasks.

4. Conclusion

As an effective way to integrate innovation resources and improve innovation efficiency, collaborative innovation has become a new trend of scientific and technological innovation activities as well as a new focus of innovation theory research in the world, which has been highly valued by countries and regions. On the basis of promoting the technological innovation of industry-university-research cooperation in China for a long time, the active role of industry-university-research collaborative innovation has been underlined from the national strategic level.

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