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The Recognition and Repair of Fracture Zone in University-Enterprise Innovation Chain

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ABSTRACT. *University-Enterprise cooperation has entered a new era, optimizing university-enterprise innovation chain and promoting the transfer of scientific and technological achievements are important measures for China to implement innovation-driven national strategy. Based on the analysis of University-Enterprise innovation chain and its breaking zone, this paper analyses the reasons for the formation of University-Enterprise innovation chain breaking zone, and puts forward some countermeasures for optimizing university-enterprise innovation chain.*

KEYWORDS: *Innovation chain; fracture zone; recognition*

Innovation is the unique cognitive and practical ability of human beings, the advanced expression of human subjective initiative, the inexhaustible motive force to promote social development, and the important source to enhance the competitiveness of enterprises.Universities are one of the main carriers of innovation, but there are many obstacles and obvious fault zones in the innovation chain of research and development of university scientific and technological achievements and their application to the ultimate realization of industrialization. These fault zones block the transfer of scientific and technological achievements and form a large number of "dormant patents".(Xue Eryong, 2012, Yi, 2018).Therefore, it is necessary to study the University-Enterprise innovation chain break zone and its causes, repair the University-Enterprise innovation chain break zone and improve innovation efficiency.

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1.Identification of University-Enterprise Innovation Chain fracture zone

"Innovation" was first put forward by Sehumpeter (1912), an Austrian-American economist. He believed that innovation is an economic category rather than a pure technical category. It not only refers to the invention and creation of science and technology, but also refers to the introduction of invented science and technology into enterprises to form a new production capacity. Innovation covers a wide range of functions, including new ideas, new inventions, new product design and development, new production processes, new marketing strategies and new market development and diffusion. The sequence set of all these functional activities can be represented by an "innovation chain".

In 1977, Visvanathan put forward the concept of innovation chain, which is composed of theoretical research, applied research, development, manufacturing and marketing in innovation activities. Scholars have studied the problems of Industry-University-Research cooperation, collaborative innovation and technology transfer in the university innovation chain (Gonzlez & Cristina, 2015; Hu Jianhua, 2012; Shi Qiuheng, 2018). They have found that there are some problems in the innovation chain, such as insufficient application development and research capacity, immature product trial conditions, insufficient investment, insufficient entrepreneurial motivation of scientific and technological personnel, poor operational mechanism, and imperfect supporting policies. Problem. Based on the investigation and research, this paper argues that the University-Enterprise innovation chain includes the whole process of theoretical research, application development research, commercialization of scientific and technological achievements and even social utility. Innovation chain consists of several functional nodes. The government, universities, upstream and downstream enterprises that directly or indirectly participate in innovation activities can be called innovation nodes. The core elements of innovation chain are the relationship between innovation subject and innovation subject and their innovation activities. The university-enterprise innovation chain fracture zone mainly occurs in a distinct fault zone from theoretical research to product application and development stage, i.e. fracture zone I; the second distinct fault zone from product application and development to product intermediate test stage, i.e. fracture zone II; and the third distinct fault zone from product intermediate test to product commercialization and

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industrialization stage, i.e. fracture zone III.

2. The Formation Reasons of University-Enterprise of Fracture Zone Innovation Chain

(1)Origin of fracture zone I of Innovation Chain

University-enterprise innovation chain rupture zone I is from theoretical research stage to product application development stage, mainly because there is a gap between university scientific research innovation behavior and subsequent product application development. The main reasons for the formation of this fault zone are as follows: First, the objectives of universities and enterprises are not consistent. Scientific research innovation in universities tends to focus more on basic research than on applied research. University researchers pay more attention to whether scientific research results can be converted into high-quality academic papers. Enterprises hope that scientific research results can be quickly converted into products to meet market demand. Second, there are different incentive mechanisms between universities and enterprises. The university's incentives for scientific research personnel's innovative behavior mainly include: professional title evaluation, promotion basis, a small amount of material incentives, lack of classification, evaluation and management of scientific research personnel, lack of reasonable distribution and incentives for the economic benefits of academic entrepreneurship, and thus affect the enthusiasm of scientific research personnel to engage in the transfer of scientific and technological achievements. Thirdly, there is a lack of platform and corresponding policies to coordinate University Science and technology innovation behavior and enterprise entrepreneurship behavior. University science and technology innovation behavior often occurs in the laboratory within the university, and the interaction with the enterprise industry is insufficient.

(2)Origin of fracture zone II of Innovation Chain

The break zone II of University-Enterprise innovation chain mainly occurs in the intermediate test stage from product application development to product development. The main reasons for the formation of this fault zone are: the market expectations of universities and enterprises are often inconsistent. On the one hand, enterprises underestimate the prospects of University R&D products, there are

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feelings of wait-and-see and doubts, the enthusiasm of intermediate testing of products is not high, and even interrupt the intermediate testing of products in the middle of the way. On the other hand, University researchers are good at the basic research and development of scientific and technological achievements, but lack the practical ability of product application development and intermediate test. At the same time, if universities do not cooperate with enterprises, they often lack the experimental conditions, funds and market feedback information needed for the pilot test, which will lead to the failure to complete the product test.

(3)Origin of fracture zone III of Innovation Chain

The break zone III of University-Enterprise innovation chain mainly occurs from intermediate test to commercialization and industrialization of products. The main reasons for the formation of this fault zone are as follows: First,Changes in the external market environment make it difficult to commercialize intermediate test products. From basic research to commercialization of products is a complex and long process. When some innovative R&D products reach the intermediate test stage, competitors may have launched more advanced new products earlier than R&D enterprises, and the demands of customers may have changed, which makes it difficult to commercialize products.

In addition, if the University-Enterprise lacks the corresponding collaborative innovation support platform, it will easily lead to the re-emergence of the fault zone, blocking the commercialization process of R&D products, resulting in low conversion rate of R&D results.

3. Restoration Strategy of University-Enterprise Innovation Chain Fracture Zone

(1)Strengthen the capacity-building of basic research and applied research

Basic research is the basic function of colleges and universities, and its core element is scientific research ability. As the carrier of knowledge production, knowledge dissemination and knowledge transfer, university undertakes the important responsibility of basic research in innovation system. However, if universities only "close the door" to carry out basic research, it will cause the break of innovation chain and make basic research difficult to play its role. Universities

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can adopt the methods of jointly introducing talents with governments, industries or enterprises, or flexible mobility of schools and enterprises to attract talents. They can adopt "industry professors" as subjects, enter laboratories, master professional frontier theory, and "academic professors" as systems to enter enterprises and workshops. They can deeply understand market demand, promote the interaction between industry professionals and academic professionals, and ensure the improvement of basic research ability and applied research. Research ability.

(2)Integrating the spirit of innovation and entrepreneurship to promote the transformation of scientific and technological achievements

Universities should reform the assessment and incentive system for scientific research personnel. Scientific research assessment should not only focus on papers, but also assess whether the output is valuable and whether the results are translated into practical application. Universities should encourage scientific researchers to further cooperate with enterprises, integrate innovation and entrepreneurship, further improve products, and achieve the goal of transforming scientific and technological achievements. The characteristics of "application" should be highlighted in the origin, process and end stages of scientific research and development. In the origin of scientific research and development, the problems that need to be solved urgently in the production line and the special market demand should be selected as research subjects, so as to lay a foundation for the transformation of scientific and technological achievements. At the same time, we should break the idea of "iron rice bowl" for University researchers, encourage them to start their own businesses, and ensure the benefits after the transformation of scientific research achievements. In the process of scientific and technological research and development, we should strengthen the pilot links, promote the commercialization of products, and avoid the results becoming "dormant patents".

(3)Constructing University-Enterprise Strategic Alliance

In the early stage of emerging technological innovation, market competition is often inadequate and product development is not perfect. Emerging technologies may not be able to quickly find suitable market undertakers, relying solely on the strength of university research and development team, which will lead to the breakdown of innovation chain. One is to form cooperative projects based on the actual needs of both universities and enterprises. Through cooperation with industry

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associations, local government authorities and enterprises, a university-enterprise cooperation demand information database can be established, and demand information can be published regularly. The second is to seek the support of the government to ensure the development of the project. Establish special government funds and formulate preferential policies to broaden the sources of funds, solve the problem of insufficient funds for cooperative projects, and form institutional safeguards. The government establishes a joint conference system for industry-university-research cooperation, and coordinates the cooperation between university-enterprise strategic alliance and industries, enterprises and universities.

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