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Triple Helix model the state - university - enterprise

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Abstract
This paper aims to analyze the Triple Helix model which includes three key actors: the State, universities, and enterprises. Cooperation and coordination are inevitable trends in socio-economic development. The model helps three actors maximize their strengths, employ the product "chain", and connect inputs with outputs. This enhances the quality of training, research, and knowledge commercialization to meet the demands of society. The effectiveness of this model depends on policies, cooperation methods and agreements among the actors. The Triple Helix model brings collective benefits to society, raises the prestige and brand value of the participants, and increase their revenue. The article focuses on analyzing the role, benefits, and current situation of the model, and it proposes an appropriate linkage model for our country's reality.

Keywords: Model, cooperation, the state, universities, enterprises, Triple Helix

Introduction

In the context of globalization and the robust development of the 4.0 industrial revolution, collabrative relationships among the three actors plays a crucial role in encouraging innovation and creativity. These collaborations guide socio-economic development, improve the quality of human resources, promote applied research and technology transfer, and align products with usage needs, which contribute to a sustainable economy. The Triple Helix model, developed by Henry Etzkowitz and Loet Leydesdorff, has been widely adopted in many advanced countries, such as the US, Japan, and Korea. Although our country has made efforts in connecting the participants, we still face many difficulties and challenges. Building and developing this model in Vietnam is not only an inevitable trend but also an urgent requirement in the context of autonomy and social responsibility. This aims to meet the needs of developing high-quality workforce, improve the efficiency of scientific research and technology transfer, strengthen the brands and values of the actors, and enhance the competitiveness of the economy.

Content

1. Overview and operating conditions of the Triple Helix model

1.1. Overview of the Triple Helix model

The Triple helix model refers to the interactions among three main components: the State, universities, and enterprises. It becomes a popular trend in socio-economic development, with the goal of stimulating innovation, enhancing research capabilities, and applying knowledge into practice, thereby producing goods and services to satisfy the requirements of society.

The government is responsible for managing, establishing policies and creating favorable conditions in terms of law, finance, and infrastructure. It also builds a legal corridor and provides mechanisms and open policies to support the university-enterprise coordination. In addition, the government introduces programs and projects to encourage innovation, creativity, and social development.

Universities play a role in providing knowledge, scientific research and training high-quality human resources. They will develop applied research and new technology while supporting training and skills development for workers.

Enterprises are in charge of applying technology and research from universities into production and business. They offer internships, hire highly-skilled workers and contribute guiding ideas to modify majors and training programs to aligh with the labor market needs, while at the same time, they set requirements for human resources and technology.

This relationship creates a knowledge cycle, in which interactions among the participants adds new economic values. In the systems of advanced education and industry, the model has led to great advancements in training, research and development (R&D), technological innovation, and entrepreneurship.

Endogenous growth theory highlights that direct investments in education and training are significant contributors to economic development. The State is accountable for establishing policies and mechanisms for education and training development, encouraging businesses to invest in training and scientific research, and promoting the production-consumption interaction. The interactive relationship among the three actors is important for improving high-quality human resources and developing scientific and technological products, which serves as a decisive factor for economic growth.

According to world bank expert S. Yusuf (2007), universities engage in not only training but also research and technology transfer. High-quality human resources and technological products invented by universities have contributed to socio-economic development. In the Triple Helix model, the role of universities is to foster knowledge that facilitates to socio-economic innovation. The evolution of the innovative system and market competition strengthen the cooperation between universities and enterprises, in which the State plays a guiding role in providing policies and building the triangular relationship among universities - enterprises - the State.

The Triple Helix model of the state-university-enterprise relationship was designed by Etzkowitz (1993) and Etzkowitz and Leydesdorff (1995) in the 1990s. Based on the works of Lowe (1982) and Sábato & Mackenzi (1982), it

aims to transition from the dominant state-industry relationship in the industrial society to the tripartite interactions among the State, universities and enterprises in the intellectual society. The Triple Helix model emphasizes the potential for innovation and economic development in an intellectual society. Under the leadership of universities and intermediary organizations by university and industrial elements, the model can create new social formats for the production, transfer and application of new knowledge. Over the past two decades, both theoretical studies and empirical experiments of the Triple Helix model have created a common framework for national development and innovation policy making.

1.2. Role and benefits of the Triple Helix model

It can be seen that bilateral interaction is signifiantly improving because each actor gradually shares the roles and responsibilities of the others. Meanwhile, it will tend to bring in a third actor to solve problems and meet new needs. The Triple Helix model usually begins when the entities build a reciprocal relationship with each other, in which each one tries to improve the performance of the others. Most initiatives are launched at the regional level, where the specific context of industrial clusters and zones (including enterprises), the advancement of science and technology (universities), and the presence or dominance of power (the State) influence the overall development.

Internal transformation of each actor is the key to innovation and development in the knowledge economy. Despite having their own roles and missions, all the actors have a "cumulative" interaction through strategic alliances. The influence of one particpant on the others creates an integral network and serves as the foundation for the formation of new ideas and the shaping of high-tech development. The bilateral relationship between government and schools, schools and businesses, and between government and businesses have expanded to triangle relationships in various fields.

Although the relationship of three participants has evolved from different institutions in different parts of the world, they share a common goal of stimulating knowledge-based economic development. The Triple Helix model is an institution with a new structure to encourage innovation, in which universities plays a leading role. The dynamics of society have changed from the boundaries between separate sectors and organizations to a more interconnected and flexible system.

Universities not only plays a crucial role in innovation through teaching and research but also concentrates on activities that create valuable products for socio-economic development. Autonomous and socially responsible universities must maximize the potential of knowledge and transform them into scientific products with commercial values if they desire to survive and flourish. Moreover, they become a supplier of technology, human resources, and new knowledge, contributing to the orientation and construction of society. In addition to providing new ideas, products, and new materials for businesses, universities also use their research capabilities in advanced fields of science and technology to build technology enterprises. When universities take part in technology transfer and founding companies, they will create a new business identity. A corporate university is an academic institution under the control of both the government and businesses, which is managed under the business model but still ensures accountability. Universities increase their business activities related to the commercialization of research results. Existing enterprises may consider universities as competitors and partners. Schools demonstrate their autonomy to set their own strategic development directions while participating in other areas of the three actors on an equal basis, launching common projects to serve the socio-economic development of the country.

Enterprises are increasingly becoming the center of national innovation strategies. By shrinking in size and becoming highly specialized, knowledge-based enterprises change from a scientific research group into a new source of economic growth. Knowledge-based enterprises and scientific research projects often have a similar development phase. As businesses seek continuous innovation, they tend to cooperate with similar entities first and then with other organizations. They will work together with technology-related startups and university research centers. New technology-based enterprises are established through a process of linking technology and business, thereby building trust and forming long-term relationships. University research projects and new business ideas witness a considerable increase in both quantity and diversity of fields. The role of universities in creating new businesses can be ususal, but it is coincidentally becoming a regular participant of knowledge commerce.

The State of a prosperous and democratic society will stimulate innovation in many ways, from free debates to the initiatives of individuals and organizations. The state takes on a new role in enhancing the interactions between universities and businesses. Furthermore, it functions as an important venture capitalist through programs to support universities in forming enterprises. In a three-sector economy, enterprises will develop new standards and products based on the coordination with universities and support from the State. The knowledge economy is characterized by unstable growth rates due to rapid changes in technology. For this reason, universities and specialized research units are crucial for economic development. Enhancing the development of specialized research with high applicability contributes to the effective operation of economy.

1.3. Operating conditions of the Triple Helix model

The path and conditions to implement the Triple Helix model can vary based on whether the society is state-controlled or operates under a market economy. The operational capacity of the State will affect the trajectory and vision of the model, regardless of whether it is organized openly and transparently or through hidden channels. Without the role of the State, the relationship of enterprises and universities can only develop to a certain extent. However, excessive control by the State will lead to a lack of creative ideas. Therefore, it is important to identify the appropriate role of the State and design the Triple Helix model properly, in which the State should only take on the part of guiding and creating agents from the three participants. The ideal structure of the Triple Helix model is the interactions among all three sectors, in which each sector assumes certain roles of the others with initiatives coming from all sides. A democratic and dynamic society is fundamental to the Triple Helix model because new and creative initiatives will be thoroughly implemented.

2. Current status and challenges for the Triple Helix model in Vietnam

2.1. Current status of the Triple Helix model in Vietnam

In June 2021, the survey on the cooperation between universities and businesses carried out by the Ministry of Education and Training indicated that more than 90% of training institutions cooperate with businesses (those institutions that do not work with businesses are primarily in the fields of arts, sports, military, and police).

Of the total number of enterprises associated with 135 surveyed higher education institutions (about 50% of existing higher education institutions), 40.7% of training institutions cooperate with enterprises, with a total of 6,126 enterprises, reaching an average ratio of 60 enterprises/ training institutions, of which many universities have cooperation with more than 200 business.

In the field of information technology and other fields (55/135 training institutions), only 44.4% partner with other fields (66/135); 8.1% in the information technology field (11/135); and 6.7% do not cooperate with enterprises (9/135 training institutions).

The above results demonstrate that enterprises and universities have a relatively close cooperation. Training institutions have been aware of the necessity of strenghthening this relationship. Besides, enterprises also realize their duties of training human resources with training institutions.

The most noticeable activity between universities and businesses in training is receiving students for internships (nearly 90%). Units that do not accept interns are mainly institutes or research centers.

The second most popular activity is sponsorship of training and extracurricular activities, including: awarding student scholarships, organizing job fairs, and recruiting new graduates (nearly 70%). This is also the activity that most training institutions aim for in order to find employment for their students.

Around 30% of enterprises take part in giving feedback on training programs and teaching. They mainly share experiences and train skills for students, evaluate output and build output standards in training programs. Similarly, the number of guest lecturers from enterprises is recorded less than 30%. This indicates that businesses do not pay special attention to their role in training human resources. It is essential to give feedback on training programs and provide criteria for evaluating output standards for students, which contributes to develop workforce to meet the demands of the labor market.

Moreover, the report points out that not many higher education institutions engage in scientific research. Most of the cooperative activities between schools and businesses emerge from immediate needs and short-term plans of companies, not from long-term strategies (78% compared to 22%). The level of cooperation is mainly at "initial development understanding" (214 out of 493 universities that businesses recorded as "having cooperation with..."), or "short-term cooperation" (174 out of 493). Only 58 and 47 universities are considered "long-term partners" and "strategic partners" of businesses, respectively.

2.2. Challenges for the Triple Helix model in Vietnam

The above data illustrates that although the Triple Helix model has been implemented positively in Vietnam, the interactions are still not well-integrated and effective. Some of the main challenges are mentioned below:

There is a lack of real interaction. Many businesses have not been aware of the value of cooperation with universities in research and technology development. In contrast, universities have not been proactive in seeking and building relationships with businesses.

Support policies are not strong enough. The government has issued many programs to strengthen the collabrative relationship between universities and enterprises, but there is still a lack of synchronization in implementation and enforcement.

There is a shortage of resources. Many universities struggle with inadequate finance, technology and human resources to conduct highly applicable research. Meanwhile, businesses do not have enough human resources and capabilities to manage and implement complex research projects.

3. Solutions to improve the efficiency of the Triple Helix model

Endogenous growth theory and Triple Helix acknowledge that the university-enterprise cooperation brings positive results to the economy. Partnership in training will enormously benefit schools and enterprises. Through cooperation with enterprises, universities have many opportunities to improve their facilities. Enterprises can support schools in terms of funding, lecture halls, laboratories, teaching equipment, and training. Systematic and well-organized training programs at universities can have a significant effect on organizational development, learning environment, and community development (Dr. Dinah W. Tumuti, Prof. Peter M. Wanderi, Prof. Caroline Lang'at - Thoruwa, 2013) [3]. Universities can help train employees and encourage learning (Daniel Schiller & Ingo Liefner, 2006) [4].

3.1. Developing innovation and technology transfer centers

It is important to build innovation centers at universities where schools, businesses and the government can work together to form strong research groups. These groups create highly applicable scientific products, research and develop new technologies, new materials with commercial value, and transfer them into production practices. Businesses can place orders, make finacnial investements, send experts, and assist universities in researching and developing new products. In the meantime, the government builds and improves mechanisms, tax incentives and financial support mechanisms for these cooperative projects to run effectively.

3.2. Public - Private Partnership model

Public-Private Partnership (PPP) model can be employed to attract the participation of enterprises in joint research and development projects with universities. The government acts as a bridge, providing financial and legal support policies to stimulate the interactions. Enterprises will have the opportunity to access scientific knowledge from universities, and they can also take advantage of these opportunities to put research results into practice. On the basis of promoting each other's potential strengths, they can carry out common projects with clear and transparent goals, tasks, and benefits.

3.3. Linkage model of training high-quality human resources

Enterprises can get involved in the process of opening new majors, designing training programs, reviewing training content, participating in practical instructions, internships, and selecting human resources at universities. This makes sure that graduates are equipped with suitable skills to satisfy the requirements of the labor market and businesses, thereby reducing retraining expenses. Students have access to internship programs and work at businesses during their studies; as a result, they can improve their practical skills and enhance their competitiveness in the labor market.

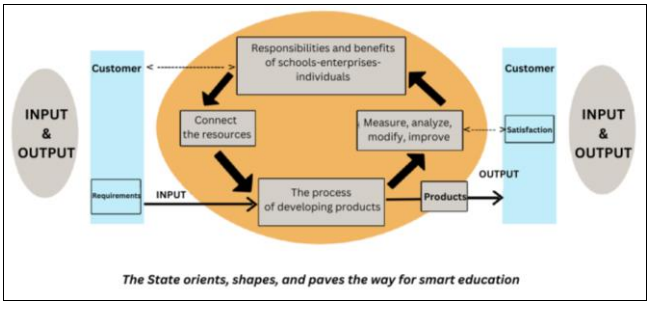
3.4. Startup incubators

Universities can collabrate with companies and the government to establish incubators, supporting entrepreneurs as students and researchers. The State can support capital while businesses provide opportunities for commercialization and product development. When students are fostered with an entrepreneurial mindset early, they have a chance to take trainings in management, leadership and business planning skills during the studies. Cooperating with companies to combine training with use, incubators play a role in creating conditions for students at the initial stage to expand networks, practice and intern at businesses. Therefore, they can enhance their practical skills, labor discipline, and expand job opportunities upon graduation. Through the process of developing applied research products, scientific research products from lecturers and students can be commercialized by incubators, turning research into practical products with commercial value.

4. Proposed Triple Helix model for Vietnam

The Triple Helix model, which is specifically designed for Vietnam, aims to maximize the potential of innovation, creativity and development with higher economic efficiency and social responsibility. Together with the leading role of the State, the model is employed by universities and enterprises to create new social formats for smart education, the production, transfer, and application of new knowledge.

Triple Helix model



The model works in an open and cyclical manner. It clearly specifies the responsibilities and benefits of the participants; the level of investment in resources; the duties of the participants in the process of product development; and the products analyzed, evaluated, and measured through user and social satisfaction. Moreover, this model intends to increase productivity, quality and labor efficiency, and lift the entrepreneurial spirit of students. It also provides higher education with opportunities to be associated with practical needs of economic development. The Triple Helix model helps change the approach to universities in an open and dynamic way, particularly, schools are not only a training and research institution but also a center for innovation, resolving practical problems, and developing valuable products for society. The “school" environment now extends beyong the confines of lecture halls, classrooms or laboratories; it has evolved to integrate with businesses and the global labor market to become an "educational ecosystem". In addition, schools invest in forming teams of elite lecturers and scientists (both inside and outside the school), together with other resources (e.g. facilities, finance, etc.) to train highly-qualified human resources with better efficiency. At the same time, they develop products and applied research projects with high commercial value to meet the demands of businesses and society. The complexity of social life or the "real world" is reflected through output standards in training content and programs. Therefore, it is essential to simplify the training process and develop lifelong learning.

The model offers learning conditions for students to have the opportunity to develop their own capacity in a free direction. Specifially, they can personalize and proactively choose the content and learning methods based on their individual needs, helping change their thinking as well as their approach to learning. They also apply technology to economic and social development. During the learning process, especially self-study, it is vital to equip each student with sufficient knowledge so that they can themselves deal with exercises, multiple choice questions or practical problems effectively.

To commercialize scientific research products, universities and enterprises build technology transfer departments and business incubators, as well as laboratories. With the effective operation, these departments can stimulate the process of technology transfer and commercialization of scientific research results. Furthurmore, universities can establish affiliated and associated enterprises, spin-offs, or startups with independent legal status to directly commercialize or market intellectual property products to the market.

Conclusion

In the Triple Helix model, universities are fundamental to a knowledge society, which guarantee a highly-skilled workforce, develope scientific products and shape the development of society. Enterprises are the main factor in creating and using products while the State contructs, develops and builds a legal corridor to maintain the cooperation process in the fastest and most stable way. The Triple Helix model highlights its emphasis on the close cooperation among the participants based on the circular economic model and a closed cycle with the potential of innovation, creativity and growth of a knowledge economy. Together with the leading role of universities and intermediary organizations formed from elements of universities, enterprises and the State, this model creates new social formats for production, transfer and application of knowledge into practical life, developing an open and smart education.

The Triple Helix model is a potential model that plays an important role in the advancement of science and technology, innovation, and creativity. However, to implement it effectively, it is crucial to make a strong commitment and close coordination from all participants,

especially in perfecting the institutions, policies and financial support mechanisms of the three main components (the State serves as the leader). The successful implementation of the model will not only create values and gain brand reputation for universities and businesses but also contribute to the sustainable development of society and economy in Vietnam.

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