

# Research on the construction path of entrepreneurial universities with integration of production and Education: a case study from University of Warwick

Xirong Gao, Wenxuan Dong

Chongqing University of Posts and Telecommunications, China.

1280425187@qq.com

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## Abstract

The entrepreneurial university with integration of production and education is of great practical significance to the establishment of China's modern economic system, and it is urgent to explore how to drive the integration of production and education in Colleges and universities. This paper uses the University of Warwick as a typical case material to analyze the key driving factors of Warwick University in the period of integration of different education through data coding analysis. So as to construct a comprehensive path model of the integration of production and education in colleges, "cultivating the consciousness of integration of production and education", "exploring the practice of integration of production and education", and "Improved ability of integration of production and education".

## Keywords

Integration of production and education; entrepreneurial university; construction path; case study.

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## 1. Introduction

In recent years, under the guidance of national policy, many colleges and universities in our country have begun to carry out the practice of integration of production and education, and generally adopt the forms of derivative enterprises, the establishment of scientific parks, and the commercialization of technology to break the traditional organizational boundaries and cooperate closely with the enterprises. However, due to the long-term separation of production, study and research, universities mainly focus on scientific and technological research, and pay little attention to the needs of enterprises, which makes it difficult to seamlessly interface the supply of scientific research technology with market demand. This situation is obviously not conducive to the integration of production and education in China's colleges and universities, and will also hinder the establishment of China's modern economic system.

In fact, it is not uncommon for foreign universities to realize the integration of production and education. For example, the Stanford University, the University of Warwick in the United Kingdom, and the Technical University of Munich, Germany, and so on. These universities rely on strong scientific and technological strength and human capital to carry out innovation and entrepreneurship in the market and continue to obtain economic resources to support their business. Technology development has gradually formed a unique mode of school enterprise collaboration, which has made great contributions to the development of local industry, and this kind of university is also called entrepreneurial university.

At present, in order to establish a modern economic system, China needs to integrate science and technology and industry, and the core of the deep integration of science and technology and industry

is the need for a batch of entrepreneurial universities to promote the integration of production and education.

## **2. Literature reviewed**

### **2.1 Research on the organizational characteristics of Entrepreneurial Universities**

Smilor(1993)defines entrepreneurial universities as universities directly involved in the commercialization of research results . Eczkovitz (2005) summarizes the five characteristics of entrepreneurial universities, namely, knowledge capitalization, interdependence, relative independence, mixed formation and self-reactivity. Clark (2003) analyzes five entrepreneurial universities in Europe and believes that entrepreneurial universities need to have a strong leadership core; strengthen contact with the outside world; diversified sources of funding; a strong academic core; entrepreneurial campus culture. Alexander (2009) believes that entrepreneurial universities can become a soft bureaucracy, a mixed organizational form that includes both bureaucracy and bureaucratic elements.

### **2.2 Research on the organizational characteristics of Entrepreneurial Universities**

Gheorghe (2014) pointed out that the attitude of scholars and students towards entrepreneurship is the most critical factor restricting the development of entrepreneurial universities. David (2014) believes that factors affecting economic growth and performance also affect the corresponding role of universities. Barbara (2015) argues that high or low entrepreneurial tendencies in the university sector may have a significant impact on whether academic staff engage in more entrepreneurial activities. Jiang Anqi and Shang Chao (2015) believe that the establishment of a space for domestic universities is a key opportunity and an important way to transform into an entrepreneurial university. The existing research has the following shortcomings: (1) Most of the existing researches focus on the connotation and organizational structure of entrepreneurial universities, and pay insufficient attention to the key factors driving the transformation of entrepreneurial universities. (2) The study does not systematically analyze the different key drivers of the university at different stages of development, and thus fails to provide valuable suggestions for the transformation of Chinese universities to entrepreneurial universities.

## **3. Research design**

### **3.1 Research methods**

This paper intends to explore the key driving factors and paths in the construction of entrepreneurial universities with integration of production and education. According to this purpose, the main purpose of the single case study is as follows: (1) the key factors in the construction process of entrepreneurial universities need to be discussed logically, and the key factors are often hidden after the phenomenon, and the case study is a simple combing of the development process and the effective discovery of the law of the development of things. It is easy to reveal the hidden mechanism behind the phenomenon; (2) compared with the multi case study, the single case study is more suitable for the in-depth analysis of the longitudinal development of colleges and universities, so as to facilitate the refinement of the relevant customs.

### **3.2 Case selection**

In the selection of cases, the main research aspects are as follows: first, the university must succeed in becoming an entrepreneurial university with integration of production and education, and play its economic function. Second, the information of the development process of the university is as detailed and complete as possible to facilitate the extraction of key factors, and the construction path of the entrepreneurial university with integration of production and education; third, example is typical, and it is necessary to promote and learn. Based on the above premise, we choose University of Warwick as the object of this study by theoretical sampling. First of all, University of Warwick

has been adhering to the concept of excellence, gradually entering the economic field, using the external economic resources and its own academic resources to interact well, and finally establish excellent reputation and academic reputation in Europe and the world, enjoy the reputation of "Hua Wei company", and make an indelible contribution to the development of the land. At the second time, University of Warwick's unique "Warwick model", scholars have left a lot of documents to facilitate the collection and arrangement of data. Finally, the University of Warwick has become a world class famous school for more than 50 years. Its success is the combination of contingency and inevitability, and has a higher research value. Based on this, University of Warwick has a high degree of agreement with the content of this study.

### **3.3 Coding process**

In the aspect of data analysis, multilevel encoding is adopted to analyze the data obtained according to the time sequence. In the coding process, first of all, the first level encoding of the collected material is carried out, and the case material is coded according to the different collection methods, which are labeled as A1~A3. Then, we recognize the typical characteristics of University of Warwick in different periods and conceptualize coding to form a two level entry database in three periods. In this process, the key factors that affect the integration of industry and education in University of Warwick are identified. Finally, the coding results in the two level entry library are connected in accordance with the canonical code paradigm "condition -action / interaction - results" to form a three level encoding, and finally the path model of the entrepreneurial university construction is obtained.

## **4. Divisions of production and education in University of Warwick**

### **4.1 Stage of integration and willingness to nurture Education (1965-1980 years)**

After the Second World War, the British government was gradually aware of the importance of intellectual resources to economic development, and in the 1963 Robbins report proposed to build seven new universities, including the University of Warwick. In 1965, the University of Warwick was established in the British industrial center. At the beginning of the establishment, the president hoped that the University of Warwick should be a university to adapt to the development of the times. However, at that time, the British "Donnie ideology" has been the mainstream. In 1969, the largest student riot broke out in University of Warwick, and it opposed industrial and commercial contacts. After the collapse of the riots, the University of Warwick did not give up the idea of linking up with industry and commerce. It founded the University of Warwick Art Center in 1970 and opened up to industry and commerce. In 1978, merged an Education Institute near University of Warwick to provide educational resources for the local community. In 1979, the second oil crisis broke out worldwide. In the same year, the British Conservative Party came to power and adopted the policy of educational austerity.

### **4.2 Integration of production and education in practice and exploration stage (1980-1995)**

In 1979, the British Conservative Party came into power and began to implement neoliberalism, reducing education funding and encouraging universities to find their own way out. So in 1980, Professor Kumar Bhattacharyya of the Engineering Department of University of Warwick began to start the "Warwick manufacturing group" to cooperate with local enterprises. In 1981, the government began to cut the first round of education expenditure. University of Warwick, which had only been built for more than ten years, was also cut by 10%. After the reduction of education funds, the University of Warwick put forward the policy of "half of the province and half earned". In practice, it shows that the policy of "half the province" cannot reach the expectation, but the policy of "earning half" is a good surprise to University of Warwick. In 1984, University of Warwick founded the Huawei Science Park with local industry, commerce and government to provide a platform for achievement transformation. The establishment of the science park attracts a large number of enterprises to enter, not only to bring a large number of partners to the Huawei manufacturing group, but also to reflect the market demand in time to University of Warwick to achieve the cooperative

development between the three enterprises of the school, the Warwick manufacturing group and the enterprise. By the end of 1995, Warwick manufacturing group has developed into a with world reputation.

### 4.3 Improving the integration ability of production and education (1995-2017)

Through thirty years of exploration and practice, University of Warwick gradually got rid of the idea of anti-industry, overcame the pressure of school funding, and formed its own unique Warwick model. After such achievements, the University of Warwick did not stop the pace of development, but pursued the realization of self-value and contributed to the development of the local economy and the solution of the global problems. In 2006, University of Warwick participated in the Birmingham Science City initiative to integrate technology and power in cities and regions. In March 2012, University of Warwick successfully acquired Huawei Science Park, carried out enterprise operation and strengthened its links with local enterprises. In 2015, University of Warwick announced the development of the world's most advanced analog driver, leading the development direction of the automotive industry. In 2017, University of Warwick promulgated the cultural strategy for the next ten years in Coventry, and planned to contribute 1 billion to the development of the local economy in the future, so as to achieve a positive impact on the national economy.

## 5. Path analysis of the integration of production and education in University of Warwick

### 5.1 Production and education integration willingness cultivation module

The cultivation module of the integration of production and education includes the reflection on the traditional education, the government emphasizes the economic value of the University, the entrepreneurial orientation of the school, the school enterprise cooperation and the willingness of the university to start a business. Figure 1 shows the training module for the integration of production and education.

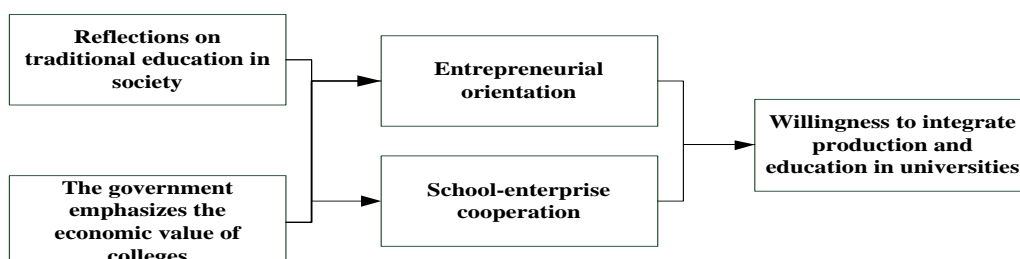


Figure 1 Production and education integration willingness cultivation module

(1) society is the environment of Ideological and cultural dissemination, and it plays an indirect role in promoting the integration of production and teaching in universities. The traditional education viewpoint believes that colleges and universities should carry out academic research and ignore the needs of industry and commerce. This thought leads to the disconnection between universities and the market, and seriously hinders the emergence of the idea of integration of production and education. The society's reflection on traditional education provides a good social and cultural environment for the cultivation of university students' willingness to integrate production and teaching, and promotes the cultivation of university students' willingness to integrate production and teaching.

(2) Government policy plays a guiding role in the university running ideology and school running goal, and directly promotes the cultivation of the integration of production and teaching in universities. The government emphasizes that the economic value of colleges and universities can help universities reflect on their own position and give them economic functions, so as to implement the measures to foster the willingness of integration of production and education.

(3) universities themselves are the main body of integration of production and education. Their school running ideas and school orientation have a direct impact on the integration intention of production and teaching. Entrepreneurship oriented school is to encourage teachers and students to carry out

entrepreneurial activities in the course of teaching, to strengthen the connection with the market and to carry out academic income creation activities. School enterprise cooperation in running schools means that schools closely connect with industrial and commercial schools, introduce industry and commerce into universities, participate in university management, and strengthen cooperation with enterprises.

## 5.2 Production and Education Integration Practice Exploration Module

The practice and exploration modules of the integration of production and education include the lack of university funds, the promotion of government production and education policy, the driving of market technology demand, the construction of the platform of production and education, the guarantee of the school system and the establishment of enterprises. Figure 2 shows the practice and exploration module of the integration of production and education.

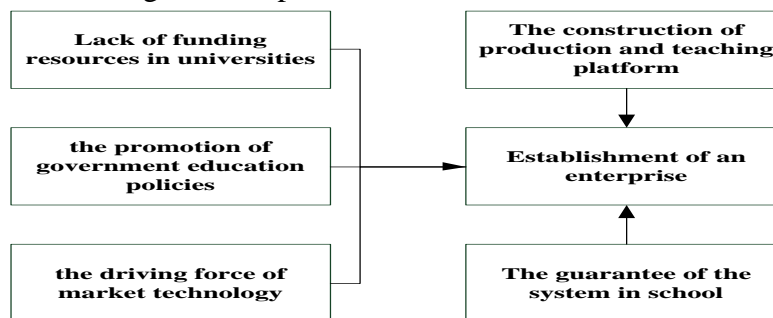


Figure 1 Production and Education Integration Practice Exploration Module

(1) The inducements of integration of production and education in universities are the lack of funds in universities, the promotion of government education policies and the driving force of market technology. The lack of funding resources in Colleges and universities refers to the government's reduction of educational funds and the pressure of lack of funds for colleges and universities to force colleges and universities to make an attempt to integrate production and education. Perhaps, our colleges and universities lack the pressure of life and death crisis, and rely too much on state subsidies to lead to the integration of production and education. The government's policy of producing education mainly refers to the government's promulgation of the incentive policies related to the integration of teaching and education in colleges and universities, and in general, through the form of government subsidies and decrees, it promotes the exploration of the practice of integration of production and education in Colleges and universities. The lack of funding resources in Colleges and universities is the internal driving force for the exploration of the integration of production and education in Colleges and universities.

(2) The successful integration of production and education in Colleges and universities is inseparable from the guarantee of school policies and the establishment of off campus platforms. In order to ensure the successful implementation of entrepreneurship, colleges and universities change the evaluation system of traditional colleges and universities, encourage innovative talents to carry out innovation in commercial technology, and formulate relevant internal policies. The construction of production and teaching platform refers to the establishment of a scientific and technological park by universities, enterprises and the government to attract enterprises to enter and provide transformation platform for scientific research achievements in universities. The platform is not only the rapid transformation of scientific and technological achievements into economic resources, but also the market demand in time to reflect the University, so that the scientific research of colleges and universities close to the market, real-time attention to market changes.

## 5.3 Production and Education Integration capability upgrading module

The upgrading module of production and teaching integration ability includes the formation of business endowments, the cultivation of business ability and the realization of commercial value. There are obvious causal chain relations between them, that is, the formation of business endowment promotes and supports the cultivation of commercial ability, and commercial ability training leads to

the realization of commercial value. Figure 3 shows the module for improving the integration capability of production and education.

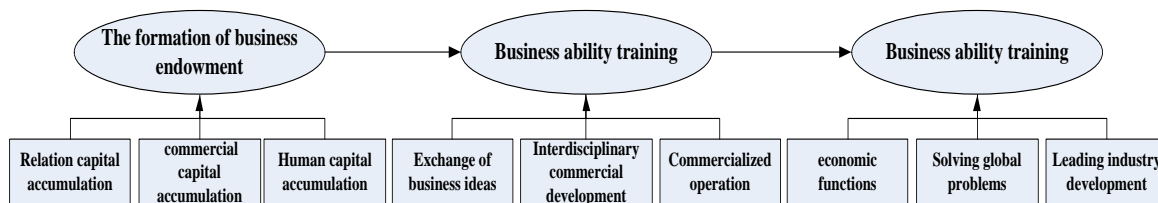


Figure 3 teaching fusion capability upgrading module

(1) The formation of business endowments mainly includes relationship capital accumulation, commercial capital accumulation and human capital accumulation. The accumulation of relation capital refers to the gradual formation of the cooperative development model between school and enterprise in the process of the practice and exploration of the integration of production and education, widening the organizational boundary of the University and establishing a good partnership with the external stakeholders. This kind of good partnership helps universities understand the market in depth, reduce transaction costs in universities, and create a good entrepreneurial environment for the formation of University Business endowments. Human capital is the most fundamental source of knowledge achievement and the basis for the formation of business endowments.

(2) Business ability training mainly includes business thought exchange, interdisciplinary commercial technology development and commercial operation. First of all, through the formation of commercial endowment, teachers and students in Colleges and universities have more opportunities to contact the business community and accumulate a large amount of business knowledge, so as to exchange business ideas to tap the commercial value. Secondly, the transformation of commercial value into scientific research results needs to carry out commercial technology development, and in the process of development, it often needs interdisciplinary knowledge between different disciplines, so it needs interdisciplinary commercial technology development.

(3) the realization of business value in Colleges and universities mainly manifests in giving full play to economic functions, solving global problems and leading industrial development. Giving full play to the economic function means that colleges and universities undertake the important task of regional economic development, and make due contribution to local development by virtue of the powerful ability of commercial technology development and innovation and entrepreneurship. Solving the global problem is that after the integration of production and education, colleges and universities get a large number of economic resources, should take due social responsibility, and pay attention to the key issues of the world in real time, and provide their own R & D forces.

## 6. Conclusion

Through the longitudinal case study of the development history of Warwick University in the UK, this paper conducts multi-level coding analysis on the collected case materials, and finally constructs the overall model of the production and education integration of entrepreneurial universities. The main findings are as follows.

(1) The cultivation of willingness to integrate production and education requires three foundations. First, the social environment in which universities are located needs to break the traditional thinking of education; second, the government needs to strengthen the public's recognition of the value of knowledge; third, as the leaders of the University, it is necessary to implement the measures to promote the integration of production and education, and to cultivate the will of the integration of production and Education

(2) The lack of financial resources in colleges and universities, the promotion of government production and education policies and the driving of market technology demand are important incentives for the exploration of the integration of production and education, which encourages colleges and universities to break the boundaries of traditional organizations and establish enterprises,

while the institutional guarantee of the school and the establishment of the production and education platform are guaranteed.

(3) The improvement of the ability of production and education mainly includes three parts: “commercial endowment formation”, “commercial ability training” and “commercial value realization”. Among them, the formation of commercial endowment promotes and supports the cultivation of commercial ability, and the cultivation of commercial ability leads to the realization of commercial value.

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