

From the Triple Felix of University-Industry-Academy to the Triple Helix of University-Industry-Government in China

Wang Cheng-jun¹, Yu Xiao-fang², PAN Yan²

(1 School of Administration Management, Anhui University of Finance & Economics,
Bengbu, China

No.962 Caoshan Road, 233030, Bengbu, Anhui, China

<994627740@qq.com; zjuwchj@sina.com> Tel: +86-13695527728

2 Research Center for Entrepreneurship & Business Growth, Anhui University of Finance and
Economics, Bengbu 233041, China)

Abstract

This article studies the TH(Triple Helix) of Chinese university-industry-government relationships. It points out some limitations and flaws of university-industry-academy and brings forward the evolutionary path to Triple Helix of university-industry-government collaboration and development to cope with these practical and theoretical problems. That is to say that we should affirm university-industry-government not university-industry-academy in China for truth, which can dialogue with international academic circles.

Key Words: Triple Helix, University-Industry-Government, University-Industry-Academe, China

1. Introduction

As we know now, TH, Triple Helix(Etzkowitz & Leydesdorff, 1995; 1997; 2000; Leydesdorff & Etzkowitz, 1996; 1997; 1998; 2001; 2002) is the newly excellent configuration and framework of university-industry-government relationships. It is significant for upgrading our world competitiveness that explores the connotation and the essentials of Chinese university-industry-government relationships based on TH. However, there is a strange saying university-industry-academy in red China with a forbidden zone for government as a potential rule. This article will refer to the Gordian knot. Thus we might as well provocatively suggest that one could perhaps call it a Triple Felix model given by Leydesdorff & Etzkowitz(2002) and then offer the core issue showed by the title for convenience.

When we make a comprehensive review of the practices and theories in the TH relationships of some developed countries, we will find they always hunt for their appropriate location along tri-dimensionality coordinates from now to future. These coordinates are self-history traditional culture, foreign experience and theories, dynamic down-to-earth problems in turn. They are enmeshed in the river of time arrow(Figure 1). Certainly, their sizes and scales are different from each other. It is good for China to plan, harmonize, develop, and integrate its' relationships of university-industry-government.

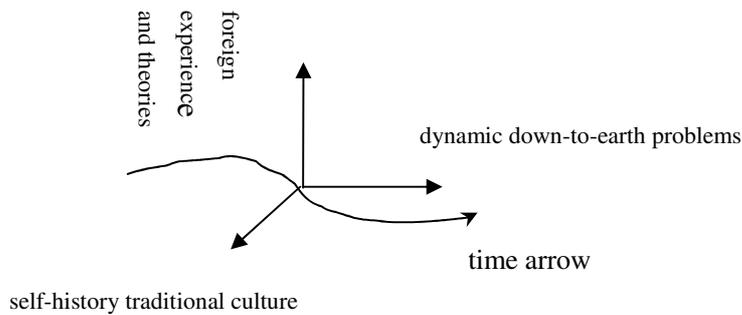


Figure 1 three coordinates in time arrow on the problem of Chinese university-industry-government
 As one of France's greatest writer and philosopher, Voltaire (pen name Voltaire, Francois Marie Arouet de, 1694-1778) said that if a man could not understand the spirit and soul of his times, he would take in all its sorrow and bitterness. Then his words do fit for the situation of a nation or a country, especially for a developing large country.

2. Evolutionary Path to Triple Helix of Chinese

After the foundation of PRC in 1949, China stuck gradually in the mud of »Triple Helix I«——an etatistic model of university-industry-government relations, where the nation state encompasses academia and industry and directs the relations between them (Leydesdorff & Etzkowitz, 2001). The strongest version of this model could be found in 1966-1976' Culture Revolutionary.

One can distinguish different phases in the recent history of the political economy of China. Considering Chinese special political economy progress, we may mark off four stages as follows: i) in 1960', sporadic cooperation phase of Chinese university-industry-government relationship; ii) during 1978-1993, gestation and cultivation phase; iii) during 1994-1997, bud and sprout phase; iv) from 1997 to now, growth and development phase.

Actually, Chinese university-industry-government cooperation may trace back to the 1960' sporadically. Based on flimsy conditions and oversimplified units abraded by handcraft little by little, state government, academe circle and military control enterprises ally to manufacture and develop "two bombs & one satellite". However, well begin comes to an untimely end due to ten years catastrophe in Culture Revolutionary.

After the Cultural Revolution, the focus in public policy shifted only gradually away from regarding the "class struggle as the central task" to a program of "modernization" and "economic construction". The reconstruction of an S&T system and a focus on human resource management (e.g., higher education) were accordingly central to this period of institution building (Leydesdorff & Guoping, 2001). Meanwhile the deliberate decision "to rejuvenate the country through science and education" implied the use of evolutionary systems and the restructuring of institutional relations among universities, industry, and government (Zhengfeng & Guoping, 1999). The High-tech Research and Development Program (Program 863) was launched and formulated in terms of "state-dominant, university & academe-undertaken, industry-attended" in 1986. The project of *industry-university-academe unite exploration* was enforced in 1992.

On March 1st, 1994, No.7 documentation about education and technology, i.e. *some opinions on how to make universities develop their high-tech industries* was examined and approved by the State Education Commission, the State S&T Commission and the State System-reform Commission. Thus Chinese universities-industry-government relationship was paid stress and appointed to routine affairs in due form.

While major decision about reform the state-owned enterprises deeply was not taken until the 15th National Conference of the Chinese Communist Party in 1997, the Chinese Academy of Sciences started to put forward its transform from pure research unit to applied company in the constitution of CNIS. On August 20th, 1999, Center of Party and State Department brought forward some decisions on strengthening technology innovation, developing high-tech and promoting it industrialization. The State Education Ministry(2000) offered some corresponding executive proposals for the universities all over the country at middle-level.

As a good incarnate example of tri-lateral networks and hybrid organizations(Leydesdorff & Etzkowitz, 2001), the huge achievements of the Zongguancun Science Park may make know Chinese government' determination to promote the progress of high-tech industries. The total area of the Zongguancun Science Park contains more than 8000 high-tech enterprises from 1988 to 2000. North-east University set up its science park in 1985, so did Tsinghua University, Peking University, Tianjin University, Huazhong S&T University in 1990'. Then a set of vigorous high-tech joint-stock companies was formed with the help of intellect resources of the key universities and the base of financial credits and preferential duties of local governments. These high-tech joint-stock companies were Tsinghua Tongfang, North Chia-Tai, Tianda Tiancai, Huagong S&T, Nankai Gede, Zheda Haina etc. (Jianjun, 2000).

3. University-Industry-Government Not University-Industry-Academe in China

From the point of information quantity on the internet, I carried through a test during 17:40-47, on Dec 12th, in 2003. When I try to input the phrases of “university-industry-government” and “university-industry-academy” and “industry-university-academy”, their information quantities are 3230 and 0 and 3 each other by means of *google* engine. However, when I input the Chinese phrases of “产学研” (“university-industry-academy” in Chinese) and “官产学” (“university-industry-government” in Chinese), their information quantities are 124 000 and 4 410 each other. That is to say, contrary to large quantities of literatures on the “产学研”, there is a little literatures on the “官产学”. This doesn't indicate that China economical society needn't it. By contraries, it does tremendous good for state stratagem and world competition.

3.1 limitations and flaws on University-Industry-Academy

As we know now, the project of *industry-university-academe unite exploration* was enforced by the former State Economy & Trade Commissions(the hodiernal Business Ministries), the former State Education Commissions(the hodiernal State Education Ministry) and Chinese Academy of Sciences in April, 1992. This work rolls out to many branches and nets of its with the aid of the enterprises, universities and academes over the country. Its aim is to form cooperate development system among

universities, industries and academes for exploring the path to foster cooperation between technology and economy and improving the steps of scientific attainments' industrialization and reconstructing sunset industries by the high-tech.

Recently, the main researchers on the so called industry-university-academe are Zhaohua(1996), Lianshui(1998), Houde(1998), Jingqin(1999a,1999b), Li(2001,2002a,2002b), Kaiyong(2000), Hai(2001), Enhua(2001), Enhua & Xiuli(2002), Dezhi(2001), Yi & Guisheng(2001), Peiguo(2001), Lian(2001), Yichen *etc.*(2001), Dunrong *etc.* (2002), Yamin(2002), Quanli & Enshun(2002) et al. As to its innovation model, Zhaohua(1996) took for ten kinds such as all-in-one model, high-tech yard model, share model, center model, project model, immateriality college model, engineering model, all-embracing model, government plan model, and strategy alliance model. Lianshui(1998) put forward total cooperation model. After Jingqin(1999a,1999b) availed himself of transaction cost which was derived from Coase(1937)' classic *The Nature of The Firm*, he offered three new models such as interior model, exterior model, and half interior model. Dezhi(2001), Peiguo(2001), Enhua & Xiuli(2002) et al analyzed technology demand, technology supply, benefit distribution, risk investment, information communication and outside surroundings in technology innovation of industry-university-academe cooperation. Yi & Guisheng(2001) took the cause and transfer of viscosity knowledge into account. Yamin(2002) & Dunrong *etc.*(2002) focused on bureaucratism phenomena derived from attaching importance to short-term profit and looking down on basic research as also over-arrogation(Peimin *et al*, 1994:439) of academic power and administration power in Chinese higher education. Taking one with another, the most systemic and wonderful research on it is Li(2001, 2002a,2002b). He studies the development stratagem and some interrelated policies on which four state governments such as England, America, Deutschland and Japan want to upgrade their world Competitiveness. Meanwhile Li anatomies some successful experience in the "industry-university-academe" cooperation of several developed countries aided by government' eyes.

As we know from the view of acceptance, the principal part of "industry-university-academe" cooperation is amphibolous. Generally speaking, university-industry collaboration may means some problems about project cooperation, technology transfer and conjunct exploitation as it proved by Jingqin(1999b)' definition of "collective innovation in the industry-university-academe". Furthermore, there is no apropos foreign word or phrase the same with the Chinese characters: "产学研", so is Li(2001) "University-Business Partnership" in his dissertation, UNCUIR(2003) "University-Industry-Research" on its head page, Jingqin(1999b) "University-Industry-Research Institutes" and Yi & Guisheng(2001) "University-Industry Collaboration" in their key words.

Consequently, the phase of "industry-university-academe" can't too express its due meaning to bring on the man-made exquisite separation of learning and research. This will make the universities in the "industry-university-academe" decline to be the skill-training schools or agencies. It will debase the degree of appropriation and contribution for which research universities promote the industrialization of Chinese high-tech achievement. At the same time, it will lead to the forfeiture of exploration in

the “industry-university-academe” field. Such being the case, Kaiyong(2000), Yamin (2002), Dunrong *etc.*(2002), Quanli & Enshun(2002) translated the so-called “industry-university-academe” into “production, teaching and research” directly. As we know now, the amalgamation of learning and research is an enough puzzle in the environment in which world competitiveness is upgraded. That is to say, the successful experience in the developed countries and the classical theories of the triple helix have told us that the learning and the research were impenetrated and interweaved tightly such as learning by doing, cultivating students in the research. There is no doubt that learning has involved so-called research in international academic fields in the contemporary era.

3.2 Tackles and Missions on University-Industry-Government

Actually, Enhua(2001), Enhua & Xiuli(2002) have uncovered university-industry-government cooperation on the problems and stratagems of “industry-university-academe”. They made a clear distinction of each other’ function and pointed out the new system which is characterized by orientation as market demand, principal parts as enterprises and ligaments as governments, universities and research units. Similarly, Li(2001,2002a, 2002b) divulgated the intention and view on the governments. The title of Chapter 7 in Liu Li’ dissertation(2001:84-105) is *Towards Triple Helix: Chinese Strategy Choice in Industry-University-Academe Cooperation*. After Li (2001:95) analyzed the Zongguancun Science Park, he disclosed that the formation and development of it was not only the result of following Silicon Valley but also the result of government-oriented consonancy, even on the whole, the result of triple helix of university-industry-government cooperation.

To be frank, the research on “industry-university-academe” just means the relation between the two factors and could be expressed by $(U_1, I_1) \rightarrow (U_2, I_2)$ in mathematical language, so does the research on industry-university-government three factors: $(U_1, I_1, G_1) \rightarrow (U_2, I_2, G_2)$. Such being the case, there is only two factors in the “industry-university-academe” not including the governments. It is easy to see that the “industry-university-academe” cooperation is no more than another version of industry-university cooperation seen from their functions. It is not good as a means for us to recommend and learn from the successful experience of some developed countries.

However, the industry-university-government(iug or IUG for short) make up for this edificatory and implemental model convenient for international academic intercommunion. Thus avoids to be caught in the dilemma for translation the Chinese phase “产学研” into English. The last but not the least is that the three principal parts are sharp-cut and accord with the triple helix theory thriving from the whole world, which lead the role of the government from the altar of an etatistic model of university-industry-government relations to the platform of the triple helix model of university-industry-government relations with the tri-lateral networks and hybrid organizations. The sources of innovation in a Triple Helix configuration can no longer be considered as synchronized a priori. The three factors do not fit together in a pregiven order, but they generate puzzles for participants, analysts, and policy-makers to solve. This network of relations generates a feedback among intentions, strategies, and projects that adds surplus value by reorganizing and harmonizing continuously

the underlying infrastructure in order to achieve at least an approximation of the variety of goals. The issue of how much we are in control or non-control of these dynamics specifies a research program on innovation(Leydesdorff & Etzkowitz, 2001). The triple helix model evolving from the industries, the universities and the governments will constitute the prop and framework of the Chinese National Innovation System little by little.

Nevertheless, the literatures about the Chinese university-industry-government are few and scattered in some periodicals and websites sporadically. For example, Zhijun *et al.*(1999) pointed out some scarcity and impotence in Chinese university-industry-government cooperation. Xin(2000) talked of Japanese university-industry-government cooperation system which promote its innovational capability and economical buckjump. Lilan (2000) reckoned the critical innovation model for China as the university-industry-government-academe-finance cooperation not the university-industry-academe cooperation because policy design and system innovation needed government and meanwhile high-tech industry development needed the organic combine of knowledge and capital. Otherwise, Jianjun(2000:71-72) studied the case of Yangpu Center of High-Tech Start-ups & Service in 1997 and then drew a conclusion that its success was due to building bridge jointly by the triple helix of Shanghai Council of Science &Technology, Yangpu Authority, Fudan University, Tongji University and The Second Military Medicine University. Songhua(2002) affirmed three different schemes, i.e. teaching, research and high-tech industrialization should enforce respectively cooperation education, “industry-university-academe” and triple helix structure of university-industry-government formed by the governments, universities and enterprises.

Chinese universities-industry-government relationship was stressed and appointed to routine affairs in macrocosmic by three ministries and commissions' collective opinions on March 1st, 1994. As a milestone of No.7 documentation in 1994, it contributed tremendous buttress to Chinese TH and transfer the high-tech achievements to the market. Lu Yongxiang figured that the universities, enterprises, governments each should undertake their duties in future innovation and the governments might be in charge of macro, foresight and instructional work, when he met Koji Omi on Sep 23rd, 2002, who was Japanese Chief of Science & Technology Committee. Especially, Lu said some shortcomings in the Chinese “university-industry-academe” cooperation (CAS, 2002). Jiangang(2003) introduced the university-industry-government cooperation from the aspect of government regularization experience in Japan and South Korea. Terbin & Jones(1996) studied the phenomena of disintegration and recompose of academic organization in Australian and Chinese innovational network in their paper submitted to International Conference of Triple Helix I in Amsterdam. Leydesdorff & Guoping(2001) identified that a new Chinese innovation system had been emerging in terms of university-industry-government relations since 1992. As a whole, Leydesdorff & Guoping(2001) is the better research on the Chinese university- industry-government relationships than the others.

However, the term of universities-industry-government was applied in mainland

context in small scale erenow above all. The first concept of the Chinese university-industry-government was given in *China and Foreign Countries Talkfest on Management in University-Industry-Government* in Peking in the autumn of 1993(SFE, 2003). Leded by mercantile elite and Sponsored by the magazine of *Chinese and Foreign Management*, the talkfest has been held for 12 times, which foci on the thoughts transition, the adaptability strategy for the Chinese enterprises and their prospects for commercial circumstance next year. The participants increase year by year, with the number of 400 in 2000 and each more than 600 in 2001 and 2002. Encircled with some problems such as “how about 2003?”, “what would be 2004?” and “how about 2004?”, the 12th talkfest was come off at Diaoyutai Hotel in Peking on Oct 25-27th, 2003. The headers of administration, the manager of agency, the successful enterprisers and the famous scholars together focalize the topic of 2004 — *sustained upgrowth under the fluctuate and changeful circumstances*. On Jan 9th, 2002, Wuhan Technology Center of Manufacturing Informatization was formed by the government: Wuhan Bureau of Science and Technology, the industry: Kaimu Corp., Jindie Corp., Wuhan Torch S&T Investment Ltd., and the university: Intelligence Making & Control Institute co-owned by Huazhong University of Science and Technology and Wuhan University of Technology. On Feb 22nd, 2003, the conference about competition advantage of leading enterprises were convened in Peking, in which the delegates from the university, the industries and the governments lodge for professional manager some problems such as how to define the enterprise competitiveness, how to appraise it, how to grasp the dynamic information about it. On Oct 14th, 2003, Shenzhen University-Industry-Government Base of Wuhan University was set up formally at Futian District. On Oct 31st-Nov 3rd, 2003, Westlake Expo, *the forum for 2003' Chinese Private S&T Promotion & Innovation* was held for building a platform for the university-industry-government-academe- finance cooperation and attention to Zhejiang economical phenomena, with more than 500 persons attending the meeting.

4. Conclusions

This article studies the TH of university-industry-government relationships. It points out some limitations and flaws of university-industry-academy and brings forward the evolutionary path to Triple Helix of university-industry-government collaboration and development, which can dialogue with international academic circles. That is to say that we should claim university-industry-government not university-industry-academy in China for truth.

From the research above, we can see that these growing enterprises are hunting for the niche market in high-tech zone. They are inducting some new development policies into not only collaboration relation to industry partners but also R&D in universities and state-owned research units. This lead to increase some probability that tendon compages(Chengjun, 2003:94-103), which were abstracted and summarized by the advanced practices and successful experiences of the United States, Japanese and EU, may come into realism with more kinds and sorts in China. At the same time, it needs some relevant capital support and a dyed-in-the-wool transition from a dualistic-

opposite-typed society to a multiplex-opening-typed society, i.e. a transition from a non-static-state-typed society to a static-state-typed society or a transition from a dumbbell-typed society(Figure 3(a)) to a spindle-typed society (Figure 7.3(b)).

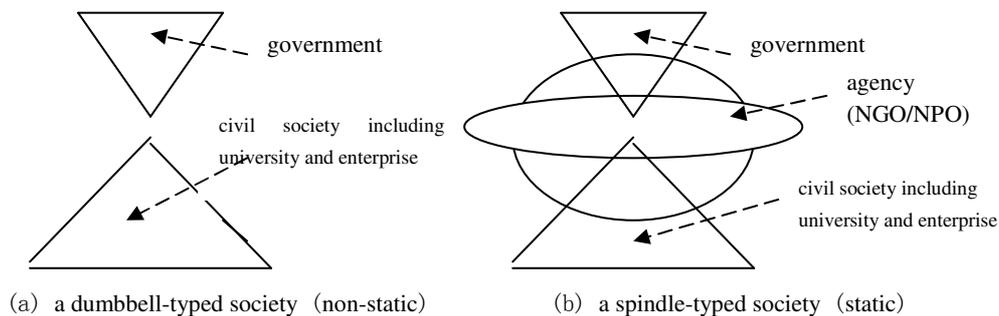


Figure 3 two kinds of society configuration

It is no wonder that this static-state-typed or spindle-typed society is made up of lots of perfect and developed market agencies such as law office, accountant office, profession qualification attestation institution, labor arbitration institution, finance agency and all sorts of guilds etc. Though *the law on promoting middle and small enterprises* was put into practice on Jan 1st, 2003, the last formation of a static-state-typed society has to fall back on the advanced practices and successful experiences of some developed countries and further implantation and incubate of market economy, democracy society and nomocracy institutional.

As we know now, Chinese reform and opening spreads out bit by bit from the rural to the urban, from economy field to culture, society and politics field. Every step means to liberate and spur for all labor, knowledge, technology, management, capital and make the wealth springs effuse and flow enough(Jiabao, 2003). In comparison with universities and governments participating in the roundtable forum of university-industry-government, the industries walk ahead aggressively. Beyond dispute, all these will increase energy and livingness for appearance of coordination relationships of Chinese university-industry-government. It is no doubt that they are reflecting inherent demand derived from the rush transition in industrial organization.

We have to pay attention to the gap of thinking pattern between the orient and the occident. The Chinese approach is always systemic. The function of the national government remains central, even in the process of devolution. The transition is considered to require political intervention and new legislation continuously, for the old institutions cannot be expected to change their functions without resistance. Thus, the state remains an important agent of change. However, the mode of operation has changed from a top-down and *ex ante* planning to a bottom-up receiving of signals from the market forces and an *ex post* regulation whenever government intervention seems necessary. (Leydesdorff & Guoping, 2001)

The last but not the least is that when analyzing the literature and comparing the practice, we find something as follows. The TH of university-industry-government of some developed countries or the state union spirals up along the principal axis of the world competitiveness on purpose at a high acceleration. It is a pity that as a large developing country, the Chinese TH has yet assorted with each other's factor.

Especially in some key fields and outstanding forelands, the Chinese TH of university-industry-government is still going round and round at a low layer. It means that the rise acceleration tends to zero in Chinese TH. Some decades ago, a famous Chinese thinker called Shuming Liang alleged that China does not belong to a progressive history, but belong to a dead-cycled history. Obviously, here his word “dead-cycled” means to entwine at a low layer or within a primary degree. Certainly, the problem is influenced by historical tradition and cognition scarcity. Peyrefitte (1992) applied a typical pyramid to describing social structure in China as an immobile empire where George Lord Macartney’ diplomatic corps visited in 1792. All these are waiting for further research and better settlement in the near future.

However, what does this mean from the change of relative curtail which government foundations to the universities and sustentation funds from other avenues and forms? It is a good question for Chinese university-industry-government relationships in a circumstance of face-to-face WTO commitments and in a society of multiplexing transition such economy, culture, politics and etc. Beyond all doubt, it still needs a great deal of time to observe, to analyze, to explore and to study.

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