The Lack of Government Support for CEUSRI and Measures to Promote It

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During the 1990s a knowledge economy first began to appear in China, and the links among science, education, and the economy continue to intensify. Economic development depends not only on a state’s science and education, but also upon its universities to train existing talent and to contribute to the knowledge base (Henry and Leydesdorff, 1999). Toward this end, in 1995 the Chinese government made the strategic resolution “to rejuvenate China through science and education.” Soon thereafter, CEUSRI (Cooperation of Enterprises, Universities and Scientific Research Institutions) was proposed.

However, because of the strong influence extended by the traditional planned economy system, there has been little communication among universities, scientific research institutions, and enterprises. This has lead to the separation of economic and social developments and resulted in a failure to prevent a “brain drain.”

On the other hand, enterprises are far from actively engaged in research and development. Therefore, there is not only much need for a coalition such as CEUSRI, but for research on how to make it more effective. Present research in this field focuses on how enterprises cooperate with universities and research institutions (Chen, 1999; Feng, 1997). What is missing from the research is, perhaps, the most important factor — the effect of governmental support on the progress of research. Therefore, it is necessary that government support of research be fully studied in order to promote CEUSRI in China.

Ways in Which the Chinese Government Does Not Support CEUSRI

Insufficient Funding for CEUSRI

First, CEUSRI is generally underfunded. According to a recent survey of more than 170 industrial-educational-research associations in Jiang Su Province, the most serious problem facing 68 percent is funding. According to a follow-up Shanghai CEUSRI survey, seven out of 21 projects did not start because the funding was not available, and the other eight programs made good progress, although they were badly in need of supplementary funding. Therefore, 71 percent of programs were restricted by the funding shortage (Research Team, 1999). Under such circumstances, successful CEUSRI programs typically started by means of raising funding independently or asking for a loan. For example, Stone Company in Beijing built itself up with a start-up loan of 20,000 RMB from Siji Qingxiang, and Jiang Hai Company started with a loan of 10,000 yuan. While quite a few enterprises could

Abstract: CEUSRI (Cooperation of Enterprises, Universities and Scientific Research Institutions) is an important measure for the Chinese government to carry out the strategy of rejuvenating the Chinese nation through improvements in science and education. However, there are a series of obstacles unfavorable to this measure, of which lack of governmental support is the most important one. The present paper addresses this issue and describes strategies for persuading the government to support CEUSRI.
only carry out the programs that called for small investments and quick returns because of the shortage of funding, they have not demonstrated the capability of investing in some promising high-tech achievements at universities and scientific research institutions.

Second, the mid-test phase in particular is badly in need of funding. CEUSRI does not ensure that achievements in scientific research can be directly turned into products. Because achievements in scientific research are only a kind of potential productive force (Hong, *et al.* 1986), they must undergo a mid-test phase to be transformed into actual products. The global sum spent on research and the sum spent mid-test are on the average a ratio of 1 to 10, but only 1 to 1.5 in China (Shunji, 1998). The serious shortage of mid-test funding means that much scientific research is prevented from turning into actual production, not to mention commercialization.

Equally important is the government's lack of speculative funding. One of the advantages of a coalition such as CEUSRI is the cooperation between the means of production and *advanced* (as well as traditional) technology. Risks are necessary both in developing advanced technological products and in marketing them (Quize, *et al.*, 1985). Although market-based risks are lessened, to a great extent, through investigation and research, they can never be eliminated completely, especially when commodities are involved.

Enterprises are incapable of assuming such risks concerning survival or extinction without government support. However, the government lacks this kind of organization for circulating funding. As a result, many promising high-tech projects are neglected.

**Insufficient Support for the Policy of CEUSRI**

The past successes and failures of CEUSRI were closely related to the regulation and organization by the government. Quite a few departments and committees have plans and projects similar to CEUSRI. For example, “the Harvest Program,” “the Spark Program,” and “the Prairie Fire Program” have been carried out in the country respectively by agricultural, scientific, and educational departments. However, as the departments lack communication with each other, it is hard to plan as a whole. Each department does things in its own way. Seen from the perspective of science and technology, we know some significant scientific and technological plans are mainly geared to the needs of scientific research institutions, and few enterprises participate in them (Xiangyang, 2001).

Zhong Guan Village District in Beijing is a typical CEUSRI project. The government has not made sufficient efforts to coordinate and guide CEUSRI, putting the development of education, scientific research and the economy in a vicious cycle. In addition, some significant scientific research programs are redundant, and resources are scattered. Plentiful scientific and technological resources in this district have not been fully exploited, preventing the district from making full use of its industrialization potential.
move from its original location into Zhong Guan Village in order to enjoy the preferential policy on new products.

**Insufficient Effort on Publicizing CEUSRI**

The whole society lacks sufficient understanding of the significance of CEUSRI. Although the government at all levels makes a public show of laws, rules, and regulations on CEUSRI, those laws, rules, and regulations are always merely studied and implemented in the education and scientific research communities. They are not fully publicized in the government at all levels or in industrial departments. Therefore, CEUSRI experiences a waxing of enthusiasm on one side and a waning on the other.

**Reasons for the Lack of Chinese Government Support for CEUSRI**

An unrealistic strategy to rejuvenate China through science and education initially shows in the manner of funding scientific research. Chinese government research funding is only 0.7 percent of total GNP, which is not only far lower than the level of 2.5 percent to 3.0 percent for developed countries, but also lower than the average level of 1.5 percent for developing countries. Trends indicate that this amount is actually decreasing year by year.

In 1985, the input of funds for scientific research in China reached a high of 1.3 percent, which was close to the average level of developing countries. The unrealistic implementation also shows in education funding, which in recent years has made up about 2.5 percent of the GNP. It also shows a year by year decrease. There are five main reasons for this.

First, China's reform of superstructure lags behind the economic reform. This directly affects talent selection and utilization, for which presently China is still feeling the negative effects of the planned economy. Because CEOs are often appointed by the government, they are susceptible to government influence or even intervention. This system often politicizes many corporate decisions and in turn nullifies the executives' ability to help transform the government.

Second, the government makes no effort to coordinate the three elements that constitute CEUSRI. Though many of their problems on the micro-level have been solved, there are not so many steps taken for their coordination.

Third, the problem of the government's close association with industry has still not been tackled. As the market rule maker, macro economy manager, as well as proprietor and investor in state property, the government has not found a reasonable mechanism to split roles. Although there are some changes in the "state-owned equals state-run" model, the government's management of enterprises is almost as direct as before.

Fourth, the government's public servants are imprinted with planned-economy thinking. To them, the government's primary function is "to control" rather than "to serve," namely to control humans, enterprises, markets, and society (Wang, 1999).

Finally, the market economy is still immature. Because of the great inertia of the planning system, the immature market still appears incapable of resource allocation, and the appropriate relation between the government and market in the interrelation of CEUSRI has not been established; thus, the government cannot successfully perform its macro-regulating function.

**Measures for the Government to Promote the CEUSRI**

Since China is a developing country whose market system is not perfect and whose legal system needs improving, it is especially important to strengthen the macro-control of the central government. Although the Chinese government has adopted a series of steps, such as "the Torch Plan," "863 Plan," and "the Central Plan of Enterprises' Technology," and has worked out the corresponding laws and regulations, none of these programs are comprehensive enough (Zhao, 1995).

On the basis of the government's positive performance in resource allocation, the government should transform its function and reinforce its macro regulation upon CEUSRI, which is a necessary requirement for CEUSRI's smooth progression (Sheng, 1995). Yet the government should focus its attention on the macro,
Building up the Administrative Organ for the CEUSRI, Overall Planning of CEUSRI in Various Regions

First, it is necessary to set up an administrative organ for CEUSRI consisting of ministries and commissions with a nationwide scope. The more than 50 years’ practice after the foundation of the People’s Republic of China shows that for any plan to be successful it needs to build both trans-departmental and trans-professional steering groups to coordinate it. Many projects being organized and carried out by different governmental departments now, such as “the Torch Plan,” “the Central Plan of Enterprise Technology,” “the Engineering Center of the Enterprise” and “the Project of CEUSRI,” must contend with dispersion of capital and the repetition of research projects, which not only reduce the capital benefit, but also reduce the effectiveness of the CEUSRI.

Second, it is useful to form the coordinated group of CEUSRI in key cities where many institutions of higher education and large- and middle-scale enterprises centralize, to implement the related regulations of the administrative departments at higher levels in specific and to coordinate the relationship of different aspects of local CEUSRI. The city of Nanjing has made successful attempts in this respect.

During March 1995, on the initiative of Nanjing’s municipal government, the technical medium service organization — the Promoting Party for the Development of Nanjing’s Science, Technology, and Industry — was established. Its members come from 31 departments of municipal government, 49 universities and colleges, and more than 10 enterprises. The Promoting Party is popular for its function of highly-efficient service and the ability to coordinate enterprises, universities, and scientific research institutions (Li, 1997). If the government sets up corresponding administrative organs to take charge of coordinating the four forces of local government, scientific research units, institutions for higher learning, and the enterprises, it can be certain to promote forcefully further development of CEUSRI.

Setting Up and Perfecting the Assessment System of CEUSRI

In order to strengthen such work, Japan drew up a program to assess the whole process of research. According to the principles defined in the outline, the main government departments in Japan, such as the scientific and technological departments, educational department and productive department, have all enacted the corresponding specific methods to carry this out (Research Team, 2001). For example, in 1998 the scientific and technical department proposed to set up the assessment committee and invited Nobel winners, famous scholars both at home and abroad, and those directly involved with the enterprises to be the committee members to realize the assessment of the research work. Its significance to China is that during the assessment of the research stage, industrial representatives could attend. China can make use of this experience, setting up an assessment committee attended by the people from industrial circles, to evaluate feasibility and market prospects.

Perfecting the Check-up System

The current check-up system usually takes output, tax, and profit as the most important evaluative criteria. This encourages CEOs to focus only on short-term economic benefit and to ignore the technical reform and the training of the reserve scientific research personnel. Taking into consideration the condition of CEUSRI can minimize the short-term interests of the person in
charge of the enterprise effectively so that the ability of research and development can be improved.

**Improving the Assessment System of Colleges and Universities**

The comprehensive assessment system of colleges and universities should be improved. One step toward such improvement is to give CEUSRI a larger role in the process. At present, the comprehensive assessment system of the colleges and universities has a certain one-sidedness (Rong, 2000), with an overemphasis on the assessment of scientific research and teaching. It pays more attention to the training level of the university personnel, the amount of the Three Index Paper and the funding for scientific research.

The system emphasizes the development of the three prizes instead of considering how the achievements in scientific research of colleges and universities can be transformed to productive forces in the assessment system. Thus, it is necessary to perfect the comprehensive assessment system of colleges and universities and promote the reform of the personnel system. The evaluation of the professional title of the teacher and the reward incentives should fully consider the condition of the transfer of the achievements in scientific research to the industry of high science and technology. A change at the policy level would enable scientific research to develop a much-needed industrial focus.

**Methods to Create Corresponding Public Opinion, Legal and Funding Conditions to Promote CEUSRI**

First, dissemination authority for CEUSRI should be strengthened. Not only the institutions of higher learning but also the government departments at different levels are required to learn and implement the relevant documents, laws and regulations so that CEUSRI is not only the goal pursued by the institutions of higher learning and scientific research colleges, but also the common objective of the whole society.

Second, China should reinforce the construction of the laws and regulations which are bound up with CEUSRI, creating the legal environment for the coaliti-

**Enlarging the Investment for Fundamental Research and Strengthening the Intellectual Innovations**

Innovations include technical and intellectual improvements, among which the latter is the basis for the former (Feng, 1999). After the enterprise becomes the principal part of scientific research development and demand, its main function lies in the technical innovations, not intellectual innovations. To realize the technical innovations, China must reinforce fundamental research, since fundamental research is the source for the intellectual innovations. If fundamental research is too weak, the intellectual innovations are bound to be weak (Qin, 1998; Liu, 1998). As a result, the technical innovations lack the support of knowledge and the economy will not develop continuously. According to official statistics,
funding for fundamental research in China is only six percent of all R&D funding. And according to related reports, setting aside the applied fundamental research, the pure fundamental research only occupies 30 percent. Thus, funding for pure fundamental research funds only constitutes two percent of R&D funding. Regarding this fact (He, 1997), Li Zhengdao, the Nobel prize winner, pointed out that China is neglecting fundamental research (Li, 1992).

Because the investment for fundamental research is too little in China, many promising and creative ideas are forced to remain hypotheses that are never tested. As fundamental research is weak, the scientific and technical achievements in our country are decreasing, especially as they pertain to fundamental research. Important breakthroughs in science are rare; those with economic application are even less common (Yang, 1996).

Although China is the eighth most prolific producer of scientific and technical papers, a large disparity still exists between China and papers produced in developed countries. According to the Index to the Scientific and Technical Papers of 1999, compared with the top three countries, the number of Chinese papers is only one-third that of Japan, one-fourth that of England, and one-thirteenth that of America (China Guangming Daily, 2000).

If China cannot change this situation immediately, from a long-term point of view this will do harm to the vitality of CEUSRI. How can it reinforce fundamental research?

First, China should suit the remedy to the case, that is, to enlarge the government’s investment in fundamental research, or the innovative system of the main carriers of fundamental research — the universities and scientific research institutions — will be hard to maintain (Nelson, 1993).

Second, according to our national conditions, China should do all it can to keep in step with the global development in the main fields of the fundamental subjects, the new and expanding subjects and the interdisciplinary subjects, and China must continue to have achievements and innovations in the fields of subjects on which it has a good base. Meanwhile, China must aim at the important scientific and technical issues that revolve around the national economy and social development, and focus its strength on solving the fundamental theoretical and technical issues that have a close relation to the development of a social economy.

Conclusion

The issues surrounding CEUSRI are large and cross-departmental, but because of the long-term negative influence of a planned economy there has been a serious separation of universities and research institutes from actual production. Thus, in recent years there have been many attempts to figure out how to carry out a strategy of “enlivening China through science and technology” and how to promote CEUSRI. This article is intended to present some research from the perspective of governmental administration.

In order to effectively promote CEUSRI in China and transform the scientific research resources into productive factors, the government should play a more active role. First, it should transform its function and reinforce its regulation on a macro level; second, it should set up corresponding administrative organs for CEUSRI; third, it should build up and perfect an assessment system; fourth, it should create a favorable public opinion, legal and funding environment; fifth, it should increase investment for fundamental research and strengthen intellectual innovations. The above-mentioned five points are intertwined; thus, they should be comprehensively considered in policy making.

CEUSRI is a major concern involving the government, industry, universities, and scientific research institutions. This paper only approaches it from a governmental angle, but as for how to galvanize China through CEUSRI there are still many problems
involved, such as setting up a mechanism in which the three parties may well coordinate with and benefit from one another. These await further studies. Moreover, since China has entered the WTO, a transformation is in order at every level of the government. Under these circumstances, how the government employs the internationally adopted rules and brings domestic practices in line with international conventions need to be studied further.

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References


