



## The Studies on the Reorientation of the Government in the Transformation of Scientific and Technological Achievements<sup>1</sup>

QIN Jie<sup>2</sup>, GAO Meixing<sup>2</sup>, SONG Wei<sup>2</sup>

### ABSTRACT

Nowadays, many researchers focus on the relocation of the government in the transformation of scientific and technological achievements, this paper accomplished the following study: 1. New Public Governance Theory and Complex Adaptive System Theory are applied to the field the transformation of scientific and technological achievements, it is found that the role of the government in the transformation of scientific and technological achievements should transfer from a direct participant to an environment creator. 2. Through the empirical analysis of the relevant laws and policies published by local government in China, we find no significant change in the role of government in the transformation of scientific and technological achievements. 3. Through the above theoretical study and empirical analysis, we put forward two policy advices to help government to make relevant policies, and promote the efficiency and process of the transformation of scientific and technological achievements. One is to finish the transformation of the government role in the transformation of scientific and technological achievements from a macro view. The other is to re-construction of the system of the transformation of scientific and technological achievements.

**Keywords:** Change of orientation, direct participant, environment creator, function of government.

**Available Online:** May 29, 2015.

This is an open access article under Creative Commons Attribution 4.0 License, 2015.

### 1.0 INTRODUCTION

Since the 1996, the implementation of the *Law of the PRC on Promoting the Transformation of Scientific and Technological Achievements*, the government always situated the leading position in the transformation of scientific and technological achievements. This has promoted the transformation of scientific and technological achievements. However, it is also accompanied with many problems which lead a 20% conversion rate for scientific and technological achievements. March of 2014, the opinions of

<sup>1</sup> Supported by National Soft Science Research Project "Research on Intellectual Property Participation, Sharing and Allocation Mechanism in Collaborative innovation" (2013GXSED120)

<sup>2</sup> School of Public Affairs, University of Science and Technology of China, Hefei, China.

the law on improving and promoting financial research project and the management points out that we should change the government's function,. The new policies reflect that the role of the government in the transformation realizes the change from the front stage to the backstage. With such a background, it is a problem that the function of the government in the transformation of scientific and technological achievements should be relocated

The goals of this paper: 1. Applying the "new public management theory" and "complex adaptation system theory" into the transformation of scientific and technological achievements, it is concluded that the theoretical basis of relocation of the government in the transformation of scientific and technological achievements; 2. Analyzing of relevant policies issued by the local government, it is assessed that how big a shift in the relocation of government in the transformation of scientific and technological achievements; 3. Through the above theoretical study and empirical analysis, policy advices will be put forward to help government to make relevant policies, and to promote the efficiency and process of the transformation of scientific and technological achievements.

## 2.0 THE THEORETICAL FOUNDATION OF THE GOVERNMENT PARTICIPATING IN THE TRANSFORMATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS

### 2.01 THE LITERATURE REVIEW

The transformation scientific and technological achievements is a novel project, many domestic scholars adopt the theory of technology innovation and diffusion to analyze the transformation of scientific and technological achievements, embodying the transformation mode, mechanism and evaluation mechanism. The research on the government's role should be more material, and in different times the research of government's function is a key area. When combine the transformation with the relocation, there is not enough relevant researches. The transformation is a systemic engineering, which involving the government, enterprise, research institution, intermediary and so on. Now, there are two directions in recent researches of the relocation of the government. The one is the necessity of government to participate in the transformation of scientific and technological achievements (Liu, 2006), the other is the macroscopic effect (He & Liu, 2005) and the manifestation (Qin, 2014) of the government in the transformation.

On the literature review of the government's function in the transformation, it is obvious that macro-control is the function of the government, which can offset market defects. Since the *Law of the PRC on Promoting the Transformation of Scientific and Technological Achievements* was put into practice, the dominant role of the government is adequately expressed. The existing researches concentrate on the necessity of the transformation, which are lack of the space-time analysis, that is to say, the research on the evolution of the government's function in the transformation is poor.

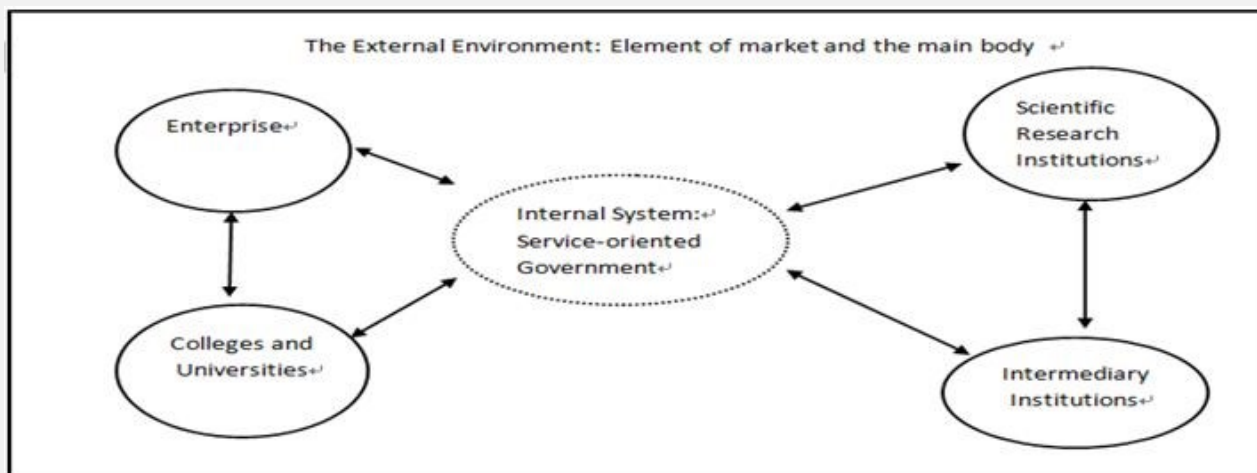
### 2.02 THE REASONABLE ASSUMPTION OF THE RELOCATION OF THE GOVERNMENT ON THE BASIS OF THE MULTIPLE-ASPECT THEORY

There are two main reasons for the government to involve the transformation. The first, during the progress of the transformation, the market is incapable of dealing with information asymmetry, which can cause efficiency loss. At that time, the macro-control is needed to make up the market defects. Second, the function of policy guidance, funding, government procurement and so on, can effectively overcome the external risk of the transformation of the scientific and technology achievements. Therefore, during the process of the transformation, more transparency in the market would help, and the communication platform between the enterprises, universities, and the research institutions and the intermediary should be constructed. Combined with the foreign successful experience, the government's intervention is reasonable and functional.

The intervention of the government which can make up the shortage of the market is based on many academic theories, such as the theory of public goods, the externality theory. With the development of the New Public Governance Theory, the new content of the government's role should be involved. The New Public Governance Theory is rooted in the doctrine "the western political scientists see not only the failure of the market but also the failure of the country in the configuration of social resources" (Yu, 2000). The theory tends to separate decision making and execution, establishing the steering government instead of the rowing one. The market and social forces undertake the production and supply of public services, the government needs to administer public affairs by the market, so as to further improve the public administrative service quality and efficiency. The New Public Governance Theory is based on the redefined function, and reframes the relations between the government and the market. Based on the new administration theory, the longitudinal change of government function in the transformation of scientific and technological achievements is reasonable. The transformation of the scientific and technological achievements is defined as a complicated social undertaking, at first, it is produced to meet the need of the market, and the government is in the leading position. With the transformation of governmental functions, the redefined the relation of the government and the market is needed. The government should be to a steersman in the transformation.

Another important theory, Complex Adaptive System (CAS) from the scientific complexity perspective provides theoretical support for the change of government orientation. CAS is a deep thinking of system evolution, the central idea is "adaptability makes complexity". CAS theory is applied to the government function, the modern government is considered as a complex adaptive system, the change of government function will be understand as the life adapting to the external environment. The government function is a dynamic system, and is the result of the double selection of the government culture system and the external environment. The change of the government functions is a process of double selection (Zhang, 2010). The transformation of scientific and technological achievements is a complicated process, from the market forecast stage, the product, transfer and use of scientific and technological achievements are constrained by the technical and non-technical factors. If CAS is adopted to the system of transformation of scientific and technological achievements, as shown in the follow figure, the change of the government orientation must be due to the update of the internal concept of "service-oriented government", the government as the main element of the system of scientific and technological achievements, is contacted closely with enterprises, universities, research institutions, intermediaries and other subjects, so when the subjects change, the role of government make adjustments, the change of market environment is also an important factor of the change of government functions.

**Figure 1:** The scientific and technological achievements transformation system

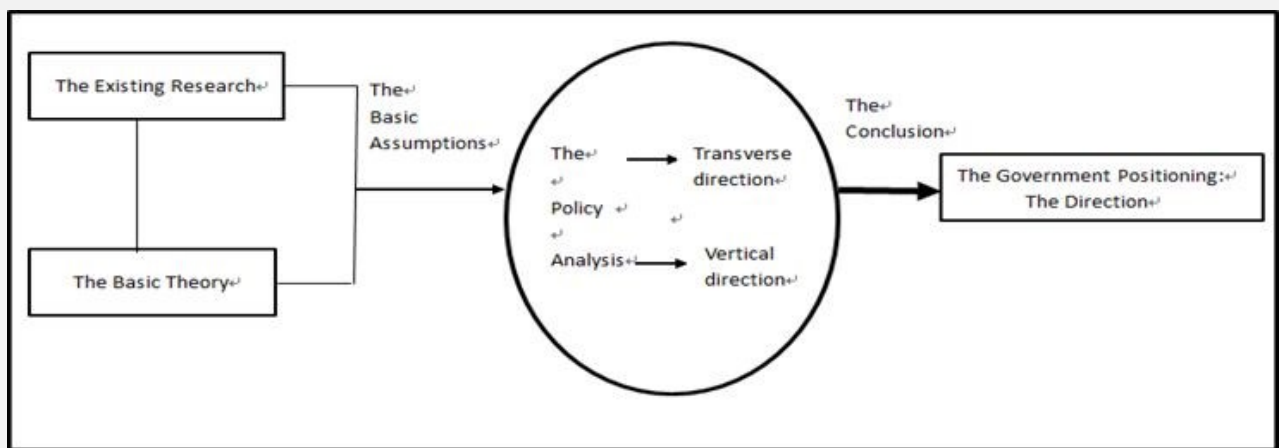


Therefore, based on the current research and the theory, we can make the followings assumption: since the government intervenes the transformation, due to the change of the market and the more subject elements, the function of the government in the transformation turns to a dynamic and

complicated system, at the same time, the concept of governance also varies. Under the internal and external influence, the role of government should be changed to adjust the new choices, that is to say, the relocation is a necessity.

Based on the assumption, we reframe the function of government in the transformation by analyzing the local policies since 2000. If the assumption is right, we can know the direction during the transformation and provide new ideas for further transformation.

**Figure 2:** The research framework



### 3.0 REPOSITIONING OF GOVERNMENT ORIENTATION IN THE TRANSFORMATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS

#### 3.01 THE SPATIAL ANALYSIS OF THE POLICIES OF LOCAL GOVERNMENTS.

The Law of the PRC on Promoting the Transformation of Scientific and Technological Achievements formulates that the government is in charge of management, guidance, and coordination in the process of transformation. On the macro-scale, the government is relocated as the leader. Since 2000, there are more 20 provincial regulations and nearly 300 local governments’ policies.

**Table 1:** The regulations of the provincial science and technology achievements transformation laws and regulations of government functions

The Time	The principle of transformation of scientific and technological achievements and The functions of the government in the general provincial regulations	
In 2000	Jiangsu Province: The principles	Three: Management, Guidance, Coordination
	Fujian Province: The principles	Three: Leadership: Management, Guidance, Coordination: Services, supervision
In 2001	Sichuan Province: The Four principles: The market as the guidance and The Enterprises as the main body	Six: Leadership
	Shandong Province: The principles	Four: Organization, Coordination, Guidance and Service
In 2003	Anhui Province: The Seven principles: Combining Government Support and Market Guidance	Six: Management, Guidance, Coordination
	Shandong Province: The principles	Five: Management, Guidance, Coordination
In 2005	Shaanxi Province: The Four principles: Combining Government Support and Market Guidance	Six: Management, Guidance, Coordination
In 2010	Jiangsu Province(The Revision): The principles	Three: Management, Guidance, Coordination

By analyzing the content of the provincial regulations on the transformation since 2000, we can find that when the local government implements the law, they all define the government's function as "management, guidance, and coordinate". However, in the general provisions, the subtle change lies in the words "government leading" and "government supporting", and the word "leader" is deleted. Although the change appears in different regions, it can still reflect the change. That is because when the transformation develops to a certain level, the power of market will become stronger, and the function of the government makes a subtle change.

On a micro level, we can contrast the local government's specific policies, which is to promote the transformation. For the local government, the specific policies concentrated on the rewarding mechanism and management of special fund project.

**Table 2:** The manifestation of policy of the government functions in the transformation of scientific and technological achievements

The Time	The importance Measures of Transformation of Scientific and Technological Achievements of Local Government
In 2000	Fujian Province: The Enterprises shall be the main body
In 2008	Jincheng: The market shall play a role of orientation and The enterprises should be guided to increase investment in research and development
In 2009	Jilin Province: The guidance of the Special funds and The enterprises play the main body role of the Market.
In 2010	Huaian: Enhancing the main body role of the enterprises
In 2011	Beijing: Pay attention to the way of the market Wuxi: Adhere to the innovation main body status of the enterprises and Encourage technology innovation of the enterprises
In 2012	Sichuan Province: Adhere to the guidance of the government and the operation of the market
In 2013	Binzhou: Allowance and Encouragement
In 2014	Qingdao: Strengthen the technology innovation main body status of the enterprise; Reform the technology management services of the market Xiamen: The fund of Achievements transformation : The guidance of government, The regulatory management, The Operation of the Market, The sharing of the Benefit

By analyzing the local government's policies on the transformation in recent 10 years, we can find the government has given way to the market by gradually. Since 2000, Fujian province firstly put forward that the enterprises should become the main body in the public document. Afterwards, although only a few governments list it in the guidance documents, more governments put the market on the main-body position in practice. For instance, Qingdao city in 2014 promulgated the *Opinions of accelerating the reform of science and technology development*, putting forward 32 reform measures, which is mainly about the transition of the government in the transformation of technological achievement. The key reform measures mainly focus on changing management of the technological market. What's more, in the policies about promoting the transformation by the local government, the words of "guidance" "encouragement" are mainly be used. The management of funds, which is to promote the transformation of technological achievement in the city of Xiamen, is used by the model of "the government guides, and the market operates". The government's intervention has a subtle change in the specific policies, but this doesn't change the direction. It tends to "transform the function of the government, and consolidate the role of enterprises".

Therefore, by reframing government's function in the transformation, we can make the following conclusion: in the process, the government's location has no significant change. But on a micro level, it stresses the enterprise's leading position, and exposes the possibility of the relocation of the

government in the future. The direction is that the enterprises will be on a leading position instead of the government, and the government will become the helmsman in the transformation.

### 3.02 THE NEGATIVE INFLUENCE OF GOVERNMENT'S LOCATION WITH SUBTLE CHANGE

The transformation develops for a dozen years, which is facing to a more complicated social environment and become a unstable system. With the promotion of the concept of service oriented government, the function of the government should have a obvious change. By analyzing regulations and policies issued by the local government, we can find that the government is still the leader in the transformation. One reason is that *Law of the PRC on Promoting the Transformation of Scientific and Technological Achievements* defines the government's function as "management, guidance, coordination". The law is superior, and guarantees the leading position of the government. Another reason, the government interposes so much on the micro level, which stress too much on the construction of the scientific and technological services institute and neglect the demand of the market.

The rate of the transformation of science and technology in China is much lower than that in the developed countries, which is due to that the leader is the enterprises in the developed countries but in our country is the government, and the relocation of the government in the transformation is deviant. When the transformation develops into a new stage, it should be that the market is the center and the enterprise is the leader. On the macro level, without any change of the government's relocation, the government devotion cannot meet the market's demand, and also can limit the power of the market and the ability of enterprise's innovation, which will affect the efficiency of the transformation at last.

## 4.0 REFLECTIONS ON THE REORIENTATION OF THE GOVERNMENT IN THE TRANSFORMATION OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS

### 4.01 THE ORIENTATION SHOULD BE CHANGED FROM A MACROSCOPIC VIEW

Although there is no obvious change on the macro level of the government's orientation in the transformation of scientific and technological achievements, slight change could be found in specific functions. This change can reflect the direction of the government's orientation. The dominant position of the government will give way to the enterprise in the transformation of scientific and technological achievements. *On deepening the reform of the central government science and technology plan management scheme* aims to release the government from the specific project management and specific allocation of funds. By changing the government's management function of science and technology, clear the relationship of the government and the market, and support enterprise's technological innovation activities and achievements. The new rule points out the direction of the change of the role of government in transformation of scientific and technological achievements. The government is no longer a "leader", but a "helmsman". Although the position of the government has no obvious change, the trend of development implied in the micro functions is consistent with the direction of reform of the policy.

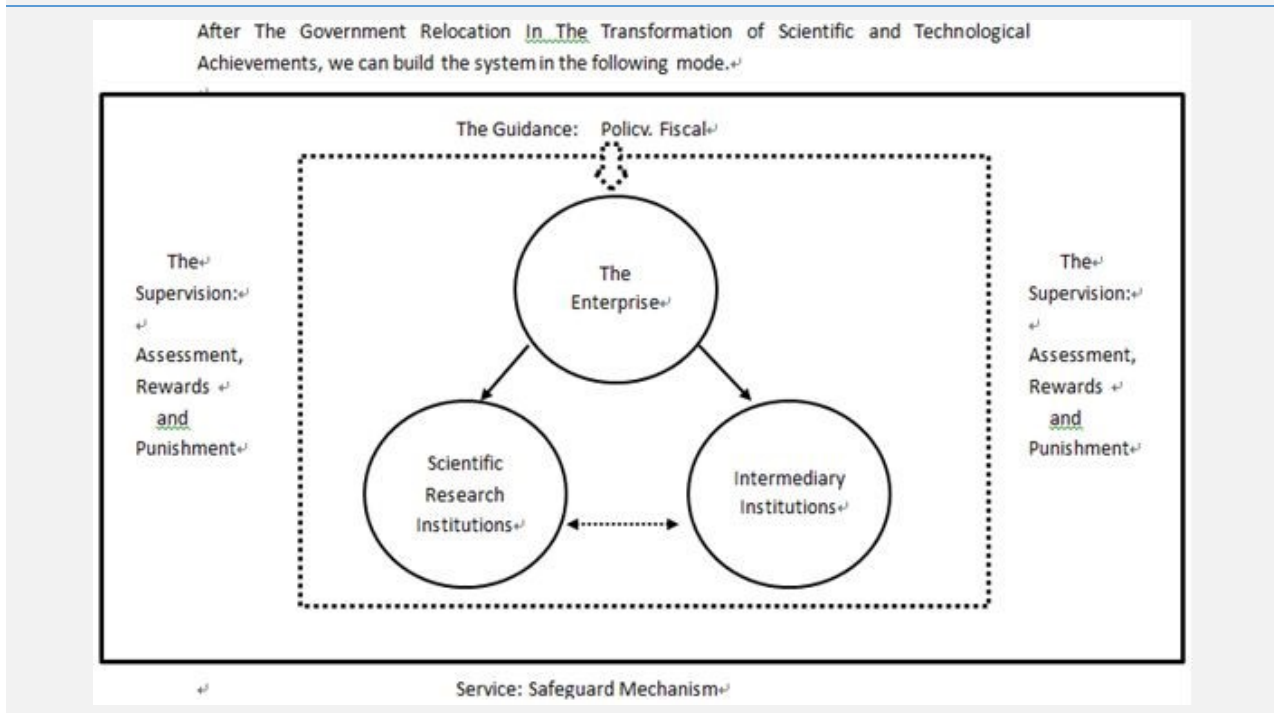
As for the orientation of government in the transformation of science and technology achievements, first, we should be explicit on the macro level. The changed function reflected on the micro level cannot implement effectively. So, when amending the *Law of the PRC on Promoting the Transformation of Scientific and Technological Achievements*, turn the role of the government from "management guidance, coordination" into "lead, service, supervision", which designs government orientation from the top-level of the law. On the macro level, define the role of the government involved in transformation of scientific and technological achievements as the "helmsman". In practice, the possibility of regressing to "paddler" will be greatly reduced. Next, make sure the dominant position of enterprises in the law. In expressing the main elements of the transformation of scientific and technological achievements, we can use the logical order as "enterprises, scientific research

institutions, government, universities, intermediaries, etc.”, which can strengthen the enterprise’s main body status in visual form.

#### 4.02 THE CONSTRUCTION OF THE TRANSFORMATION SYSTEM OF SCIENTIFIC AND TECHNOLOGICAL ACHIEVEMENTS UNDER THE GOVERNMENT’S ORIENTATION

From the aforementioned hypothesis, we can conclude that the orientation of the government is reasonable and inevitable in the transformation of scientific and technological achievements, and this has a positive meaning for the construction of the transformation system of scientific and technological achievements. Under the new public governing theory, the government should use the way of market to govern the public affairs. The transformation as a social undertaking cannot lack the macro control. With the construction of a service oriented government and the development of market economy, the orientation of the government is to be a true helmsman.

**Figure 3:** The platform of trust and communication of transformation of scientific and technological achievements



As shown in the figure, the orientation of the government in the transformation needs build a communication and trust platform which can promote the transformation of scientific and technological achievements, and it makes the transformation come true basing on the lead of enterprise, and the help of scientific research institution and intermediary. It can promote the transformation, by the help of the government’s guidance, service and supervision from the macro aspect, and with the help of guidance of policies, the support of tax, perfection of the rewards and punishments, and construction of protection mechanism from the micro aspect.

#### 5.0 CONCLUSION

Applying the "new public management theory" and "complex adaptation system theory" into the field of the transformation of scientific and technological achievements, it is concluded that the location of the government in the transformation of scientific and technological achievements should change. The development of regulations and policies is the beginning to implement the relocation of the government in transformation of scientific and technological achievements, from a direct participant to a environment creator. When drafting relevant regulations and policies, the location of the government

should be shifted from the front stage to the backstage. Only in this way the government will give way to market, the conversion rate for scientific and technological achievements will be promoted.

## REFERENCES

- He, T.T., Liu, Z. Y. (2005). Summary of the Fundamental Theories Related to the Transformation of Scientific Research Achievements. *Sci/Tech Information Development & Economy* (4), 180-201.
- Liu, Z.H., Tang, W. X. (2006). The Roles of Government in the Transformation of Science and Technology Achievements. *Science of Science and Management of S.& T.* (3), 28-31.
- Qin, J. (2014). Reorientation of the Role of Government in the Law of Promoting the Transformation of Scientific and Technological Achievements. *Science and Technology Management Research*, (21), pp46-49.
- Yu, K.P. (2000). *Governance and Good Governance* (P5). Beijing: Social Science Academic Press.
- Zhang, J.H. (2010). *Study of Government Function for Higher Institutions Sci-tech Achievement Transformation* (P5). Tianjin: NanKai University.