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Innovational Analysis in the Knowledge-based Economy in Northwest Minority Region ---- Demand & Supply Analysis of Innovation

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Abstract

With the contest of globalization and knowledge economy, the knowledge and innovation function become more and more important and obvious. The regional innovation capability is becoming a decisive factor in the local areas' economic growth. Northwest minority region, as an underdeveloped area in China, the innovation capability research has been aroused by the government and academe. My aim is to highlight the impact of regional innovation on Northwest region, especially on the minorities. Based on the framework of innovational demand and supply heuristic analysis through the contrast between these areas and developed areas with regard to regional policy and regulations this paper discuss the reasons of backwardness of technological innovation in the northwest minorities region. Finally, the paper presents the results of my research and conclusion to authorities to tackle regional development problems.

Keywords: Knowledge-based economy, Northwest minority region, Innovation

1. Introduction

As the under-developed regions in China, the Northwest Minority Region is really far to the knowledge economy, but this does not mean that it may place itself beyond consideration. In the time of knowledge economy, the technical factor of the economic growth obtains the unprecedented approval and attentions. Disparity between the developed regions with knowledge, skills, intelligence and the thought and the regions with the possessions of traditional resources has been further consolidated and enlarged. This point clearly appears in the comparison of economic data between the Northwest Minority regions and developed regions.

Insert Table 1 Here

We may see from table 1 that although the Northwest Minority region had a certain growth in the past 20 years, it still lag far behind compared to that of national level especially to developed region like Guangdong province. In 1978 the GDP per person between the Northwest Minority regions and Guangdong province was almost the same; it is 1266 Yuan in 1991, 6902 Yuan in 1998, and 13254Yuan in 2002. Under background of the knowledge-based economy, the Northwest Minority regions presently, depending on the advantages of traditional natural resource for economic development, have been selling the raw materials and primary processed products to developed regions, besides, the comparison labor productivity and rate of return of the upstream industry in NW regions is lagging behind that of the downstream industry in developed regions. Insufficiency of the technological factor in industry has caused great disparity to the eastern-developed regions.

The technical innovation is the foundation of the knowledge-based economy, in the contest of globalization, the technical innovation ability of any country becomes the key point of competitive power of the national innovation in the

long run. Therefore, the analysis the assessment of the technical innovation ability in Northwest Minority regions as well as discussing the institutional factor behind it is significantly important. It not only relates to the economic development in minority regions and help making the minorities richer, but also relates to stability of the frontiers, unity of the nationalities, as well as the achievements of the harmonious society.

2. Literature reviews

The research of this paper fills into the realm of the regional innovation. The regional innovation is important classification of the national innovation system. From the collected foreign literatures, it is clear that the research of regional innovation mainly contains the followings: 1, analysis of the regional innovation capability: To establish the degree of innovation capacity through quantitative analysis and contrast represented by the variety of innovational results, and to augment the regional innovation capacity through optimized innovation organizational structure, such as empirical research of Lawson and Lorens (1999) regarding Polis and the Cambridge regions. 2, the regional innovation towards regional development: the main stress regional innovation's contribution to regional economic development, the regional competitive power of economy as well as the aggregate competitive power in regions. 3, relationship between regional innovation and environment: Mr. Malat (1998) and Mr.Damanpour and Copalakrishnan (1998) have studied the influence of the government regional policy, the social environment as well as the environmental variation to the region innovation. 4, the group research of the regional innovation: Mr. Kruqman, Harrison, Meijboom ect have discussed theoretically the reason of the appearance of regional innovation groups as well as the regional characteristics and proposed that participation in the competition was the main reason of the appearance of the high-tech enterprise groups. However the enterprise with small scales, high degree of specialization and flexibility focuses on the concentrations of high-innovations.

Nowadays, some scholars have also paid attention on the regional capability in China, such as the research of regional science and technology competitive power made by the Chinese science and technology developmental strategy group in 1999 and the introduction of systematical theory of the regional innovation contributed by Mr. Shang Yong, Zhu Chuanbai (1,999). Mr. Chen Guang, Tang Fuguo (2,001) formulated one index system and analyzed the technical innovation capacity in different region in china. However, the most comprehensive, and dynamic appraisal is the one made by the group member of the Chinese science and technology development strategy in2000 after the research of Chinese regional innovation capacity. The variety of Chinese regional economic growth and the relationship between the region with fast economic growth and the innovation capacity was found thought the appraisal of the provincial and regional innovation capacity. Besides the appraisal of the regional innovation capacity, many provinces especially the developed regions and the capital city developed the local regional innovation capacity. Such as the comparative analysis on technological power and the countermeasure research in Zhejiang, Jiangsu, Shanghai (2005), the analysis of innovational capacity of enterprise in Zusanjiao region, (Zhoaqun 2004), the construction of the regional innovation system in Lanzhou and the research of development programming ect. The above research generally showed the following features: 1, the more analysis from the angle of regional innovation, and the less analysis from the institutional innovation.2, the more research aiming at the developed regions and the less research aiming at the less-developed regions especially the minority regions.

3. Methodology and Data

According to the "The Annual Report of China Regional Innovational Capability in 2003'' compiled by the group of the Chinese Science and Technology Development Strategy, the innovation capacity in Northwest Minorities region was in backward position of the national levels, the situation of insufficient innovation capacity revealed in this region there was yet lack of the innovationist with marketing-consciousness and the entrepreneur with the ability of bearing risk and effectively combining the potential productive factors. On the basis of "the human capital theory" by Schurz, people in the poverty region were not naturally short of marketing-consciousness, as long as they are endowed with the institutional environment and ensured with guarantee of the expected income, their unprompted innovational consciousness will also pull up the economic development and become the engine. Therefore, insufficiency of the innovational capacity's root is due to institutions.

The institution of any region contains the apparent parts, namely the institution prescribed by Law and government, and the recessive parts, namely, conventional habitude and faith descended by the ancestor. Sound institution can inspire the social innovational vigor, purifies the social ethos, increases the social wealth, and promotes the social justices; on the contrary, worse institution will act the opposite. The main data of the paper is adopted from "The Regional Innovation Capacity Report in China 2003'' compiled by the group of the Chinese science and technology development strategy. The report has published annually since 1999 and the index appraisal system of the innovation capacity used is most authoritative and comprehensive in China.

4. Current assessment of the innovation capability in northwest minorities region

According to the research of the group of the Chinese science and technology development strategy, technological innovation capacity refers to the transformation of knowledge into the capacity of new products, new techniques and new serves. The Annual Report of China Regional Innovation Capability in 2003, published by the central Party School, made an analysis and evaluating about the technological capacity of the whole nations, 31 provinces. This evaluating system was consisted with knowledge creativity, knowledge acquisition, and technology innovation of enterprise, innovational environment and performance of innovation. Table 2 shows some indexing ranks of innovation capacity of thirty-one Chinese provinces in 2003.

The main concludes this report show that China regional innovation capability from the east coast city to Middle West inland city is from high to low. The coast region shows the strong innovation capability; the innovation gap between east region and west region is much large. At the same time, the innovation of Middle West province is not clearly. The factor of innovation is not well distributed in different region. From the table, Gansu ranks 27, Xingjian 19, Qinghai 23, and Ningxia 26. The average innovational capability of northwest minorities region ranks 24, which is down level.

5. Demand & Supply analysis of innovation in northwest minorities region

5.1 Innovational demand in northwest minorities region

Innovational demand can be produced when the net income of innovation could be positive for any enterprises. The motivation behind it is that innovation can generate income compared to non- innovation situation. From the demand point of view, the following facts have significant influence on innovation in northwest minorities region.

5.1.1 The shortages of innovational demand by private enterprise

According to the innovation theory of Mr. Peter Bear (1912) enterprise is the main body of the innovational activities; from the standpoint of conventional economics, enterprise is also rational, means to aim at maximization of the profit. As we know that the normal profit can be only obtained under the perfect competition market structure and the excess profit could be acquired through innovational activities. Therefore we can draw the conclusion that the motivation of maximization of the profit constitutes innovational demand of enterprise.

However, in Northwest Minorities region the enterprises in real sense, namely the private enterprise, are deficient severely in development so as to affect innovational demand. In accordance with economic theory the economic micro-body namely the enterprise in the real sense is the private enterprises; On the other hand, the state-owned-enterprises (SOE) is inborn shortage of innovational capacity due to the deformity of property rights, the limitations of motivation mechanism ect, and therefore is not the real enterprises. In Northwest Minorities region there are relatively more industry with intercommunity resources, the state-owned-enterprises (SOE) dominating the most fields, the SOEs and the state holding company become the major executants of R &D in the regions. [The report 280,286,292,298], and that the Non state-owned economy represented by the private economy distinctly lags behind in development than that of the advanced regions.

5.1.2 Information backwardness reduces the preference of enterprise innovational risk.

Many enterprises in Northwest Minorities regions, even if the private enterprises, are poor in innovational consciousness. However, innovational consciousness is the core contents of the entrepreneurial spirit, compared with the advanced region, innovational consciousness of the private enterprises in Northwest Minorities regions is very weak. Let us look at this weakness from the points of setup of R & D department, the proportion of innovational input over sales of enterprises, the proportion of new product's sales over total sales of two regions, namely the advanced regions and Northwest Minorities regions, it is 32.1% and 25%, 5% and 2%--3%, 20% and 5%--10%. Disparity of innovational consciousness in related with the exterior environment of Northwest Minorities regions. We know that northwest Minorities regions are situated in inland with inconvenience of transportation and relative obturation of information. Since the grand development of western china, the information construction has advanced vigorously in various provinces, but compared with the advanced regions, the construction of regional innovation information network severing the local enterprises is quite backward. Information backwardness and uncertainty of risk made many enterprises reduce the preference of innovational risk. Enterprises are in dilemma between less risk and more income, as a result most of them prefer less risk and stable income rather than more risk and more income.

5.1.3 Rent-seeking behavior, the substitutes of innovation

Innovation in essence is a kind if Rent-creating behavior or Profit-seeking behavior. The innovational enterprise can enjoy the excess profit than other enterprises through exploitive of a new technology or new products; it is the result of the normal performance of market competition and therefore promotes the social welfares. Rent-seeking behavior pursues the social economic benefit at hand, when government mechanism exists flaw, enterprises can also obtain the excess profits by Rent-seeking behavior to government officials, this behavior becomes the innovational substitutes. Compared with the government of advanced regions Northwest Minorities regions, especially minority self-governing

regions, governments heavily interfere enterprises (much interference to State-owned economy). As s result of " the Law of Minorities self governing", the minority regions own more power and natural resources, in addition the complicated human relationship network, Rent-seeking behavior in Northwest Minorities regions is even more common under lacking the effective supervising and managing system. When the enterprises could obtain more benefits by Rent-seeking, innovational demand is going down and innovational motivation mechanism is distorted.

5.1.4 Property rights—the complements of innovation

According to the viewpoints of professor North (Douglass North) (North &Thomas, 1973, North, 1981, 1990) and other new institutional economy schools, full and perspicuous limits of property rights can provide the full motivation of innovational behaviors. Through the property rights limits system, it endues people with undertaking and ensures the expected income with guarantee of rights that can stimulate people's innovational consciousness and demand. the property rights limits system and it's protection can be called the complements of innovation and indispensable. Compared with the developed regions, government management in Northwest Minorities regions is low and government malfunctions is even severe (Li jiande 2003). The enterprise has received the right infringements from government, such as repeated charges and multi-departments charges, such situation is at large. One from one department charges and fines the enterprise, the other one from the same department will also charges and fines. After charge and fine from one department the other department of different administrative will also charges and fines the same enterprise (Li jinde, 2003). Lacking of perpetuity rights system and incompletion of own benefits of enterprises receives the containment of innovational demand.

5.2 Innovational supply analysis in northwest minorities region

The innovational supplies in any region depend on the willingness and environmental capability. With certain government willingness, innovational supply depends on cost, namely environmental capability. The more innovational cost the less innovational demand vice visa. From the point of view of environment the following facts impact the innovational supply in northwest minorities region.

5.2.1 Human capital requested by innovations

The creativity and utilization of neo-science and neo-technology require a group of talents with ability. If lacking of human capital then technological transfer may not be accepted, even if it is imported, it still may not be assimilated and say nothing of innovation. So human capital is very important to the innovational activities in any region. In accordance with The Annual Report of China Regional Innovation Capability in 1985-2004, the human resources competitions in Northwest Minorities regions were far away than that of in developed regions. The following table shows the ranks and scores of some top provinces and the Northwest Minorities regions about the human resources competitions:

Insert Table 2 Here

5.2.2 Infrastructures

The construction of infrastructures has direct influence over the such factors as information, the talents, fund and technology ect, which is closely connected to innovations. Good infrastructures condition is the most important link to innovational supply. Before 2000 the infrastructures conditions in northwest minorities region lag behind significantly far from that of in national level, the density of traffic network was only equivalent to one-third of the national level. Since implement of the strategy of Grand Development of West China, the transformational telecommunication structures in four provinces improved at the large scale. In 2000, heavy construction on railway and highway in Qinghai province led the growth rate of investment on fixed asset to 29.01 %, ranked at No 1 in China, the proportion of highway and railway per 10 thousand was 36.06 kilometers and 2.11 kilometers respectively, ranked at No 2 in China. In 2001 the highway construction in Qinghai province was double than that in 2000. There were five high-class highways in Gansu Province put into traffic use, road base and bridge construction of three expressways were basically in completion, four other expressways, one expressway construction linking Jiuquan to Hangtiancheng were formally launched, and at the same time, with the completion of expansion project of the Zhongchuan and Donghuang airport, it has become clear to see that the traffic condition has been ameliorated obviously. But generally speaking, the infrastructure is still backward compared to the national level. In 2002, the infrastructures index of The Annual Report of Regional innovation Capability in China showed that the ranking of the northwest minorities region among the 31 provinces was the following: No: 26 in Gansu; No: 30 in Qinghai; No: 29 in Ninxia; and No: 25 in Xinjiang. So the backwardness of the infrastructure is one of the causes which restricted the innovational supply in northwest minorities region.

5.2.3 Innovation policies of governments

Like other public commodities, technology also has the quality of non-monopoly and being external-oriented; and governments' inference will greatly promote the supply of technology innovation. Chinese governments have made many policies in terms of industrialization of advanced technology and advanced industrial cluster. The local

governments in northwest ethnic regions also made some special policies so as to support local technology innovation, such as Regulations on Developing Private-owned Technology Enterprises in Gansu (May 8th, 2004), Regulations on Investment in Form of New and Advanced Technological Achievements (June 23rd, 2004) and Encouragement Regulations on Attracting Investment into Xining Economic and Technological Development Zone (June 28th, 2004). However, there are still some problems for the northwest ethnic regions so far as innovation policies are concerned: first of all, allocating measures are not good enough. A technological innovation policy covers many factors: finance, tax, legislation, information, procurement, education and management, etc; involves many departments and even lacks necessary policy support; all of these will directly affect the efficiency of the technological innovation policy. Take *Regulations on Developing Private-owned Technology Enterprises in Gansu* as an example, the regulations about innovation fund and credit support are quite unclear and are hard to operate. Secondly, supervision system of policies is not perfect. Such policy supervision is an important measure to check administrative action, correct errors in policy administration and guarantee the effectiveness of policies. But in northwest ethnic regions, there are clear supervision standards during the implementation of technological innovation; there is no special assessment and feedback channel or powerful top-down supervision system, nor series of strict regulations to guarantee supervision and checking.

5.2.4 Funds environment for innovative activities

Funds environment is an important part of the macro environment of innovation; sound funds environment will greatly promote innovative supply. According to the standards of innovative funds and financial environment for enterprises' technological development listed in The Annual Report of China Regional Innovation Capability (2003), among 31 provinces, municipal cities and autonomous regions Gansu ranks 15th and 6th respectively, Xinjiang 25th and 25th, Qinghai 27th and 27th, and Ningxia 26th and 31st. Except Gansu, all the other three are on lower level. The first reason is that northwest ethnic regions are inferior to developed regions in terms of quantity and degree of financial network and products. Secondly, less profit is made by enterprises in northwest ethnic regions, their overall capacity of loan-returning is under average, moreover, due to old-fashioned systems of state-owned enterprises, they are just waiting for national favored policies, treat loans as compensation to their previous sacrifice and are reluctant to pay off their loans. These result in bad credit environment and reduced the banks zeal to offer loans to them. All the above-mentioned points cased unsound funds environment in northwest ethnic regions.

5.2.5 Humane environment of innovation and progress

As the soul of entrepreneur, innovation is internally produced. Ideal soil for entrepreneurs is humane environment of innovation, progress and toleration. Governments' relief aid to poverty-stricken area does not solve the problem for good, otherwise, to some extent, it leads to the idea of " waiting for, relying on and asking for (relief fund)". Northwest ethnic regions have their own geographical features: being rather closed, high latitude, cold climate, and underdeveloped transportation. Under such closed natural and economic conditions, local people formed such cultural psyche: being satisfied with status quo, equalitarianism, being conservative and drawback, being satisfied with minor wealth, nostalgia to hometown, etc. This negative psyche confines people's ideas, refrains the full play of innovative spirits and restricts the local economic development.

The characteristics of human capital, infrastructure, innovation policies, funds environment, humane environment etc in Northwest Minorities regions determine high cost and less quantity of innovational supply, it shows that insufficiency of demand and supply in Northwest Minorities regions cause less innovation and innovational capacity.

6. Conclusion and Implications

From the above analysis, there are two thoughts in stimulating regional innovation vigor and improving innovational capacity in Northwest Minorities regions.

1). To secure effective performance of innovation mechanism, it contains (1) to enhance market mechanism, and to activate the development of private enterprise; (2) to quicken reform of research system of higher academy, and to enlarge proportion on market allocation of scientific resources; (3) to strengthen the construction information; (4) to deepen administrative management reform of government, promoting government efficiency; (5) to reduce Rent-seeking behaviors; (6) to perfect property-rights system.

2). To low cost of innovational supply and creates better innovational. It includes (1) optimizing the environment for talents and attacking them; (2) reinforcing infrastructures and funs environment; (3) formulating various policies for encouraging innovations and building operational consciousness & business spirit which is relatively in low level in Northwest Minorities regions; (4) creating the human environment for encouraging innovation.

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Table 1. GDP per capita in different regions in China

	1978	1991	1998	2002
The GDP per capita northwest minorities region	362	1557	4282	6064
The GDP per capita in national level	375	1758	6078	8300
The GDP per capita of Guangdong province	367	2823	11184	19318

Source: China Statistical Yearbook (in 1978, 1991, 1998, 2002)

Table 2. The ranks and scores of human resources competitions (2003)

Province	Beijing	Shanghai	Guangdong	jiangsu	tianjin	zhejiang	gansu	xinjiang	qinhai	ninxia
Rank	99.96	91.70	75.42	58.76	69.49	81.01	33.45	32.34	27.33	36.56
score	1	2	3	4	5	6	7	8	9	10

Source: The Annual Report of China Regional Innovation Capability in 2003, published by the Central Party School