BIOINFO Business Management
ISSN: 2249-1791 & E-ISSN: 2249-1805, Volume 4, Issue 1, 2014, pp.-058-060.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000192

ANALYZING INNOVATION SYSTEM IN MIDDLE EAST: THE CASE OF IRAN

DEHKORDI M.A.*

Graduate School of Commerce and Management, Hitotsubashi University, Japan.
*Corresponding Author: Email- Dehkordi@ut.ac.ir

Received: January 02, 2014; Accepted: April 24, 2014

Abstract- The importance of innovation in developing countries competitiveness is an undeniable fact. This paper shows the lag of innovation is the reason of uncompetitive nature of Iranian economy. It can be concluded that in order to reshaping the developing countries' innovation systems, there is necessary to put a greater emphasis on developing a strong interaction between three main backbone actors of the country's innovation system.

Keywords- Iranian economy, Innovation, Small and Medium sized enterprises

Introduction

Technological change can lead to productivity growth by either expanding the total output or increasing application of the relatively cheap inputs and trimming down use of the more or less expensive inputs. The importance of innovation in organizations' competitiveness is an undeniable fact. Innovation is a new idea or object and is by an individual or unit of adoption. Innovations reflect a critical way in which organizations respond to either technological or market challenges [1]. Innovation is not completely about the development of new products or services. Companies can also take advantage of administrative innovation (improving internal control, coordination, and structure), and technical innovations (changes to technology or work processes). An interesting point about innovation was found in Windrum, et al. [2] "Innovation begets further innovation".

Steve Jobs defined Innovation has nothing to do with how many R&D dollars you have. It is not about money. It's about the people you have, how you're led, and how much you get it. He argued that there are no definitive metrics for innovation. Measures of innovative success vary by company and industry. He defined R&D and patent creation as the most common metrics of innovation:

R&D: This metric assumes that the amount of money spent on research and development directly correlates to the amount of innovative products, processes and services that get to the public.

Patent Creation: Some companies create patent after patent and boast of their innovative capabilities. While this may be well and true for a few, if the numbers of patented products, processes, and services are now making it to the marketplace, then their relevance diminishes. Along with input data such as R&D expenditures and the human capital employed in research, patents have become the most important measure of innovation output. A convenient feature of patents is that they resemble invention counts. Moreover, they have been well documented, especially in recent years thanks to the extensive online info that can be organized into databases. Another advantage of patents is that they can combine different indicators. Patents citations have been used to measure their importance and economic value. Patents also have shortcomings. They relate only to certain types of innovation, and there are cast differences across firms, industries and countries in the precision with which patents measure innovation output. Moreover, there is still ambiguity about what exactly patent indicators measure. Some studies have shown that patent citations are a noisy measure of information flows [3].

Innovation in Iran

Developing countries have designed their industrial and technological programs in line with the rapid technological changes that have been taking place in the developed countries. With abundant oil and natural gas resources, Iran adopted an import substitution policy and used its oil revenues to acquire foreign technologies to industrialize. Iran is today a middle-income developing country, with a significant industrial base, a relatively well-developed science and technology infrastructure and good human development.

Based on Kamalian, et al [4], Small and Medium sized enterprises (SMEs) constitute 94 percent of Iranian firms. According to Iran statistic website the value added of 94 percent of Iranian firms is just about 10 percent of the whole value added in country. The survey results show that Iranian SMSs are not collaborating with universities and higher education institutions; they do not see university as a main source of information. Here in the [Table-1], the methods of innovation protection between Iranian SMEs are presented.

Table 1- The mean and standard deviation of methods to protect the value of innovation

Protection method	n	Mean	S.D.
Registration of design	50	2.88	1.547
Trademarks	50	3.2	1.309
Patents	50	2.92	1.51
Copyrights	50	2.44	1.593
Secrecy	50	2.28	1.679
Complexity of design	50	2.44	1.514

Based on Kamalian, et al [4], client or customers are the most important source of information by Iranian SMEs and it is followed by suppliers of equipment. Universities and other higher education institutes were seen as the least important source of information. This suggests that enterprises tend to rely on their own experience and knowledge coupled with information from customers and clients, suppliers.

Iran's National Innovation System

Evaluating the process of creation and use of knowledge at the national level is not possible without considering a proper framework at the national level. Today, the national innovation system framework is used as a conceptual tool to analyze and evaluate the knowledge-based economy at the national level, because this framework explain the elements and relationships that lead to the creation, dissemination and utilization of knowledge at the national level [5]. The traditional Innovation System approaches (The first approach), such as Lundvall [6] and Nelson [7], focused mainly on the components within the systems. Since the late 1990s the second approach emerged and some authors have addressed issues related to the specification of activities influencing the overall function of IS [8].

Based on Edquist's paper, the main function of innovation system is to pursue innovation processes or to develop and utilize innovations, and the "activities" in Innovation System are those factors that influence the development and use of innovations. Policies of the government have very important impacts on the formation of in Iranian Innovation system. Therefore, the functions and activities that have done by the government were the main drivers of formation and development of nanotechnology. NIS is the system of existing institutions, universities and government agencies, private and public firms (either large or small), aiming at the production of Science and Technology within national borders.

In Iran, the establishment as well as the reforming of national innovation system has been among the most important policies and the focal point for the policy makers in recent years. The third and fourth Five Year Development Plan of the country emphasized the promotion of invention and innovation activities in the country in order to move toward knowledge-based society. The technology policy of the country is contained in these successive five year plans. The [Table-2] shows the degree to which policymakers concerned toward moving toward generating knowledge based society.

Table 2- Technology policy of Iran development plan (1995 - 2009)

2nd Five Year plan (1995-1999)	3rd Five Year plan (2000-2004)	4th Five Year plan (2005-2009)
Creating quality systems to improve the quality of products through the cooperation between research centers and higher education centers	Promoting the dynamic linkages between Scientific institutions, Industrial organizations, State owned enterprises and universities and higher education centers	Acceleration of privatization process of State-owned companies through promotion of Stock Market
Assisting the creation of endogenous R&D units in large and medium factories as well as R & D centers for specific industries	Prioritizing research activities based on overall macro technology policy of the country	More reliance on market forces for encouraging innovative efforts in manufacturing enterprises
Providing financial support for doing all kinds of research (Basic, Applied, Developmental)	Stimulation of a creative and entrepreneurial activities by creating new industrial and S & T parks	Modifying and reforming national innovation system in a proper and cohesive manner to move toward creation of knowledge-based nation

Over the years, R&D investment in the industrial sector has achieved little attention due to the assembly nature of the imported technologies. There was scarcely any demand for R&D because the income received from oil exports made it possible for existing industries to attain ready made-technologies and spare parts from abroad. The number of university students has become seven fold since two decades ago. There are currently about 53 public universities as well as 23 private universities and 165 university 7 research centers. There are also 29 national research centers which are mostly affiliated to the Ministry of Science, Research and Technology and 99 research centers affiliated to the Ministry of Health & Medical Education and more than 69 research centers attached to the other ministries. There are already 113 private research centers and approximately 925 R&D units performing in industrial sector.

As can be seen in [Fig-1], the government has played a critical role in the country's innovation system. Government controls over 80 percent of the economy. However, there is a relatively weak linkage existed between Iran's R&D institutes, universities, and universities in one hand and with the government in another. The link between research institutes/universities and large enterprises is strong. Many large enterprises in Iran do not have in-house R&D capacity and they tend to rely on research institutes for product development and process innovation.

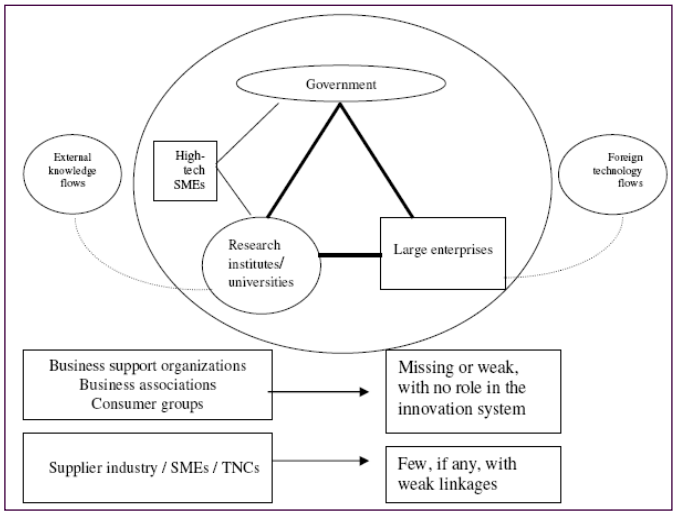

Fig. 1- Iranian national Innovation system (STIP, 2006)

Innovation Barriers in Iran

Due to the great contribution of the innovative activities to the firms' competitiveness and success, it is of great interest to identify the barriers and obstacles that limit the development of innovative activ-

ities in firms. Palmer-Noone [9] discussed that Most of these leaders believed that their greatest challenges to innovation were to be found inside their institution (cost, institutional constraints, human resources, organizational culture, flow of information, and government policy).

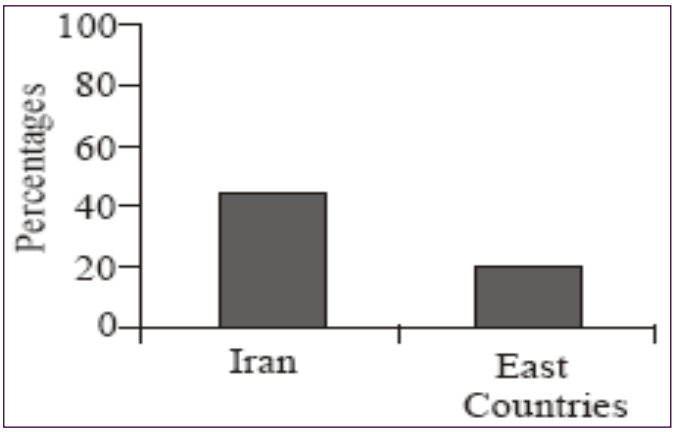

Fig. 2- Innovation breakdown

Cost has been mentioned as one of the most important barriers to innovation. High innovation costs have a negative and significant effect on the innovation propensity [10]. The company culture and leadership as two prominent barriers to innovation. if the company's culture isn't set-up to accept new ideas and creative contributions from its staff then inventions will be unable to break through to the marketplace. Employee commitment and effort is required in adaption of innovation [11]. Lack of information about market opportunities, changes in technology, and government policy, affect managers' adoption of innovation [Fig-2].

For its turn, the lack of qualified personnel restrains the propensity of the firm for innovating and also for developing the innovation process. The lack of customers' responsiveness to new products has also a negative and significant impact on the propensity for innovating. Broadly, the main barriers to innovation in Iranian SMEs are economic factors namely, excessive economic risk, lack of financing, cost of financing and high cost to innovation. Among all obstacles, The Excessive perceived economic risk is of 'high' importance by 75 percent of the SMEs. Also, 'Lack of appropriate sources of finance' is of high importance by about 66.7 percent of the SMEs.

The lack of qualified personnel was viewed as one of the most important constraining factor by about half of the SMEs. The study of Tiwari & Buse [12] indicated two reasons for scarcity of skilled labor: (a) Demographic developments "aging population", and (b) Lack of student interest in engineering and natural sciences. But the condition is different in Iran. Unemployment rate was reported 13.8 percent in spring 2009, and 12.3 percent in spring 2012 [13].

Discussion and Implications

There exist at least two types of innovation systems, receiver-active and supplier active. The effectiveness of both systems highly depends on the country's industrial structure, economical orientation (resource-based, manufacturing-based, service-based, a weighted combination), management styles (top-down or bottom-up), and social-academic structure to support the system. Iranian government recently has tried to strengthen the country's innovation system through the empowering academic asset. Entrepreneurial revolution (a name that Iranian government put on this new wave) started from 2007, with the connecting academic programs to the industry, especially oil and manufacturing industries. In this regard, Ministry of Science established the Entrepreneurship courses in the most renowned universities, and Ministry of Labor and Ministry of Public Welfare are paving the way for connecting the educated entrepreneurs to the industrial sectors. Iranian governments 20 years vision is focusing on the knowledge creating activities, which will become more in need for the sixth development plan in the country. Some national experts believe that it is still very early to judge the current on going plans, but so far the economic outcomes have been satisfying.

For further research it would be interesting to examine why Lack of labor is an important barrier to innovation; however the unemployment rate of the nation is reported 12.3 percent [13]. It would be also helpful to conduct researches which examine and compare barriers to innovation in other developing countries and Iran. It would also be interesting to pay attention to the patent protection patterns in the middle-east countries.

References

[1] Gomes-Casseres B. (1994) *Harvard Bus. Rev*., 92, 62-66.

[2] Windrum P., Reinstaller A., & Hölzl W. (2006) *Short-Term Gain, Long-Term Pain? The Long-Run Implications of Outsourcing for Organizational Innovation and Productivity*, Manchester Metropolitan University Business School Working Paper 06-02.

[3] Giuri P., Mariani M., Brusoni S., Crespi G., Francoz D., Gambardella A., Garcia-Fontes W., Geuna A., Gonzales R., Harhoff D., Hoisl K., Le Bas C., Luzzi A., Magazzini L., Nesta L., Nomaler O., Palomeras N., Patel P., Romanelli M. & Verspagen B. (2007) *Research Policy*, 36(8), 1107-1127.

[4] Kamalian A.R., Rashki D.M. & Arbabi M.L. (2011) *Asian Journal of Development Matters*, 5(2), 251-265.

[5] OECD (1999) *Managing National Innovation Systems*, OECD.

[6] Lundvall B.Å. (1992) *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter Publishers, London.

[7] Nelson R.R. (1993) *National Systems of Innovation: A comparative Study*, Oxford, Oxford University Press.

[8] Liu X. & White S. (2001) *Res. Policy*, 30(7), 1091-1114.

[9] Palmer-Noone L. (2000) *Perceived Barriers to Innovation: First Report from a Study on Innovation in Higher Education Assessment and Accountability Forum*.

[10] Lim E.S. & Shyamala N. (2007) *Obstacles to Innovation: Evidence from Malaysian Manufacturing*, 18077/MPRA Paper No. 18077.

[11] Acemoglu D. & Pishke J. (1999) *Econ. J*., 109, 12-143.

[12] Tiwari R. & Buse S. (2007) *Barriers to innovation In SMEs: Can the internationalization of R&D Mitigate their Effects?*, Proceedings of the First European Conference on Knowledge for Growth: Role and Dynamics of Corporate R&D, Seville, Spain.

[13] Mehr Agency (2012) *Unemployment rate details*.