

**Full Paper FOR THE 2007 IASP WORLD CONFERENCE –
BARCELONA**

Title of the paper:
**Regional Innovation through Isfahan Technology Corridor
The New Experience of Isfahan Province**

Session for which the paper is intended:

Plenary Session 3

Parallel Session 1

Author's and Paper Presenter's Name:

Mozhgan Yazdianpour

1st Co-authors' Names:

Mehdi Keshmiri

2nd Co-authors' Names: Mohsen Renani

Author's E-mail: international.affairs@istt.org

Organisation: Isfahan Science & Technology Town

Address: ISTT, IUT Blvd, Isfahan, IRAN- P.O.Box: 84155/666

Phone: +98 311 3865355

Fax (optional): +98 311 3871472

I confirm my ability to present my paper in English Yes_____

Date __5th March 2007_____

Signature *M. Yazdian*_____

Regional Innovation through Isfahan Technology Corridor The New Experience of Isfahan Province

Mozhgan Yazdianpour¹, Mehdi Keshmiri², Mohsen Renani³
Isfahan Science and Technology Town, Isfahan, Iran

Executive Summary

Today, there are a wide range of regional programs in the countries including high tech development regions, science & technology corridors and new free zones that all lead to the development of that region. Measures taken by Isfahan science & Technology town (ISTT) during the last years have had a considerable effect on the activities of tenant companies. The effect has been more with regard to disseminating the culture of regional development, so that they have encouraged the managers and decision makers to go from an industrial region and economy toward a knowledge-based and developed region. Isfahan Science & Technology Corridor is a new idea and a new program which is on the agenda of the local and national governments to achieve their objectives and the knowledge based economy. This corridor is going to foster the exchange of information and knowledge and strengthen innovation in the country. This paper elaborates shortly on the indicators of knowledge-based economy, the knowledge-based economy itself and defining technology corridors, it will also explain about the potentials of the city of Isfahan for having a technology corridor. Isfahan technology corridor and the role it can play in regional innovation form a new experience by ISTT which is addressed in the final part of this paper.

Regional Innovation

Today innovation is one of the essential elements of a knowledge-based economy. Innovation refers to creating value out of new ideas, new products, new services or new ways of doing things or even something improved, including research for development of new technologies, refinement of existing technologies, or development of new applications for existing technologies. When all its components are present and while a clear and identifiable set of actions are implemented the innovation in the regions is promoted and the performance of regional innovation systems will be enhanced. A regional innovation scheme, which should already be in the process of implementation and able to demonstrate clear results in the regions, could be related to innovation policy topics, such as entrepreneurship, knowledge transfer, the promotion of an innovation culture, innovative clusters or innovation financing that all lead to promoting the innovation in that region. Management, development/production and marketing/sales must all contribute towards the innovation process and experience it together. This is because innovation is not one single element. It is a combination of several processes get together. Each party or every single element must understand the concerns of the others, while at the same time promote their own.

Creating a regional innovation system should be accorded a very high priority by the regional authorities. It helps public authorities to focus on their industrial and economic strengths and to develop a strategy for the future based on those strengths. Having an innovative region requires an R&D funding, technological assistance, innovation

¹ Director of international affairs, Isfahan Science and Technology Town

² Assistant Professor, Isfahan University of Technology and ISTT advisor

³ Assistant Professor, Faculty of economy and Management, Isfahan University

management, access to venture capital and the R&D results and information on patents and licenses particularly for SMEs.

A strong and centralized innovation system has systematic linkages between external and internal sources of knowledge production including universities, research institutions, and other organizations providing government and private innovation services and firms. Regional innovation mostly depends on the presence of industry clusters which are part of technology corridors. Knowledge and information are exchanged through this cluster and in this way they strengthen innovation.

Knowledge-Based Economy

A knowledge-based economy is an economy that its activities are based on production, dissemination and economic use of knowledge. This knowledge focuses on professional manpower, innovation, entrepreneurship and new technologies. In this economy knowledge is recognized as the driver of productivity and economic growth. As a result, there is a new focus on the role of information, technology and learning in economic performance. The term "knowledge-based economy" which stems from this fuller recognition of the place of knowledge and technology was initially introduced by OECD.

The knowledge-based development and knowledge-based economy are the major strategies for development in most countries today. There are some key elements in this strategy including innovation, entrepreneurship, high technologies, entrepreneur and well educated human resource, scientific development infrastructures, R&D units, knowledge-based SMEs and venture capitals.

The Indicators of a Knowledge-based Economy

There are different approaches defining to what extent the economy is knowledge based. The following indicators are presented by OECD in this regard:

- The quality of human resource indicator: This includes the level of education of people in that country such as the literacy rate, the rate of registration in schools and universities, the percent of university students and science and technology subjects and the proficiency of that nation in English language to name only a few elements.
- R&D indicator: how much a country spends in R&D section in both public and private sectors is an important element in its knowledge bases. The number of employees in R&D section and the number of patents registered are also determining factors for this indicator.
- Information infrastructure indicator: the rate of using internet and other communication devices such as mobile phone as well as the rate of access to information and investment in ICT section make this indicator rich for having a knowledge-based economy.
- Economic indicators: The level of knowledge and education of the workers, the rate of the present knowledge-based industries and services, utilization of knowledge in the working and production processes, E-business, high tech exports, venture capital imports and the level of exchanges between the national specialists and foreign experts are the economic indicators of a knowledge economy.

When these indicators are present in a national economy, the economy would be a knowledge-based one and it would be an ideal place for innovators to innovate and promote their region.

Moving from industry-based economy and development strategy to knowledge-based economy and the knowledge-based development strategy resulted in the new sets of infrastructures. In this strategy:

- 1- Science and technology parks and science towns are replaced industrial towns

- 2- Entrepreneur training universities are replaced technical and vocational universities and education centers
- 3- Entrepreneur replace skillful man power
- 4- SMEs and knowledge based companies replace big industries
- 5- Technology development zones or science and technology corridors are replaced industrial regions

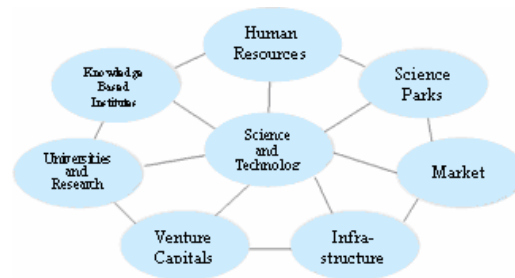
Technology Corridors

One of the means of diversifying regions business base and making them more resilient to changes in the global economy are High Technology Corridors which are also named development zone or technology development zone, etc.

The Technology Corridors usually aim to bring together the innovative activities of universities and research institutions, the health sector and private companies and nurture them by way of incubator and grow-on space – primarily in science parks. Technology corridors are planned to accelerate the modernization and diversification of the region's economy, stimulate new enterprise and attract new investment.

It is said that a technology Corridor is a key delivery mechanism for the Economic Strategy of the region– which itself is key in delivering improved levels of economic prosperity to the region. Mike Norris, the Director of Wolverhampton Telford Technology Corridor defines his aim of establishing the technology corridor as to connect business with the relevant resources to create solutions that deliver economic benefits.

Technology corridors are coordinated combination of universities, technology parks, research centers, high tech companies, venture capitals, physical and basic facilities and infrastructures and human capital in a specific geographic zone which have a concentrated management and legal structure and produce knowledge based goods and services. They are also linked to a market where the products are presented.



There are different elements in technology corridors that all have similar objectives; they complete each other and produce a technological-industrial cluster where the exchange of information and knowledge and strengthening innovation and economy would happen as a result. This cluster is a specialized zone composed of its elements such as Science Park, university, different industries, technological companies, higher education institutes, etc where knowledge-based services are also provided to companies.

Venture capitals are considered as one of the major elements of technology corridors. This factor exists normally in free economies but in governmental economies it forms with the use of public resources. Involvement of specialist investors in venture capital industry, private ownership structures, differences in investment strategies after their benefits stage, high risk and mutual investment structures are some of the features of venture capital element in corridors.

Another major element is the support by governments. The success or failure of technology corridors is largely dependent on the supports provided by national or local governments especially in the governmental economy. The more active role governments play in economy, the more are the supports to corridors. The kinds of supports governments make to corridors include: defining some operational rules for companies, supporting the performance of scientific and prior research, exempting companies from paying registration fees, tax and customs exemptions, providing necessary conditions for supporting innovations of companies, etc.

There are therefore, some prerequisites for technology corridors which should be taken into consideration in their planning stage or in their development plan and they include:

- ✓ Science & Technology parks
- ✓ Universities and research centers
- ✓ Venture capitals
- ✓ New products and new production methods
- ✓ Having links with the owners of science & technology in knowledge frontiers
- ✓ National and international higher institutions
- ✓ Infrastructures and soft and hard structures
- ✓ An ideal and conducive Market
- ✓ Special management
- ✓ General supportive organizations
- ✓ Facilitative rules and regulations and public support
- ✓ Being located in an urban area

The economic strength and fostering economic development and regional innovation is the major goal of these corridors. Through collaboration among their different components they make innovations and create technologies which lead to economic development and innovation in that region.

The differences between Technology Corridors and Industrial Regions

As we said earlier, industrial regions have been replaced by technology corridors where instead of common industrial clusters and industries there are high tech industrial clusters and industries. Highlighting the differences between these two regions helps in introducing the idea of technology corridors. Here are some of them

- ✓ It is not necessary for industrial region to be located in urban areas and they can be established in the suburb of the cities.
- ✓ It is not necessary to establish universities and research centers in industrial regions
- ✓ There is a great demand in the market for the products produced in industrial regions so there is no high risk for investment here
- ✓ Industrial regions should not necessarily have links with the international technology institutions and these institutes can act in a less competitive environment
- ✓ They are not obliged to produce high tech products (although they can do that)
- ✓ Moving toward science and technology frontiers is not a must in industrial regions. They can enjoy different levels of technologies which are not necessarily high tech.
- ✓ They do not necessarily employ highly skillful and highly educated with high wage human resource.
- ✓ While in technology corridors all these elements exist.

Some examples

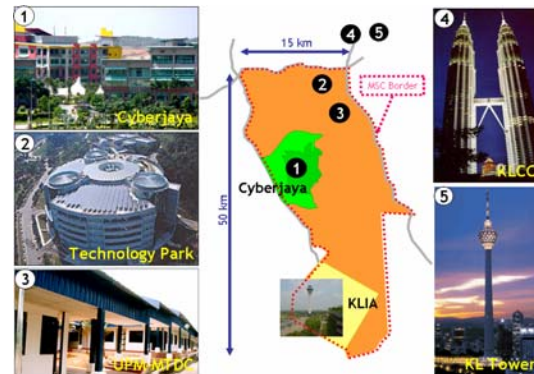
Shannon Region in Ireland: Ireland has moved from an agriculture-based economy to an industrial and service providing stage and then to a knowledge-based economy during 4 decades. With a population of 4 million (i.e. 1% of the population of Europe), this country produces 60% of the software consumed in Europe. It has attracted 40% of the international investments in Europe and has enjoyed the highest growth rate of GDP among European Union counties during 1990s. The first free zone in the world was

established in Shennon Port, west of Ireland after the World War II. After 5 decades, today this port together with the National Technology Park, Birr Technology Park, Kerry Technology Park, Tapirrey Technology Park and Ennis city have formed a knowledge-based socio-economic and cultural region that acts as the growing pole of Ireland economy. The activities in this region are mainly focused on pharmaceuticals, information technologies and banking services.



Multi Media Super Corridor (MSC) in Malaysia is another example. The MSC is Malaysia's most exciting initiative for the global information and communication technology (ICT) industry. MSC is located in an area of 50*15 Km in south of Kuala Lumpur with five significant elements: KLCC, Cyber Jaya, Technology Park Malaysia, KL Tower, UPM MPDC.

The MSC Malaysia that was conceptualized in 1996 has since grown into a thriving dynamic ICT hub, hosting more than 900 multinationals, foreign-owned and home-grown Malaysian companies focused on multimedia and communications products, solutions, services and; research and development. With this unique corridor, Malaysia continues to attract leading ICT companies of the world to locate their industries in the MSC Malaysia and undertake research, develop new products



and technologies and export from this base. The MSC Malaysia is also an ideal growth environment for Malaysian ICT SMEs to transform themselves into world-class companies. Furthermore, the MSC Malaysia welcomes countries to use its highly advanced infrastructural facilities as a global test bed for ICT applications and a hub for their regional operations in Asia. It has been a major specialized zone for developing the economy of Malaysia.

Walverhampton Telford Technology Corridor (WTTC) acts as a catalyst and plays a transformative role in the area exploiting knowledge, technology and resources. WTTC's long-term aim is to create and sustain a high value-added, technology-led economy that will lead to a higher skilled, more diverse and dynamic business base. The 20 year vision is to create a recognized Technology Hub which is attractive to companies, residents, employees, investors and developers.

Knowledge-Based Economy, a New Movement in Iran

With its vast human resources, large industries and the natural resources, Iran has started a fast movement in creating the necessary infrastructures for developing knowledge-based economy. Knowledge-based economy is a new movement toward economic development in Iran. It has been set as one of the major elements in Iran 20 year development vision. Articles like the following are good examples supporting the objectives of this document that emphasizes more on this trend:

- Preparing necessary conditions for promoting scientific approaches and admitting the change, creativity and innovation to foster human resources capital
- The continuous promotion of knowledge and technology and reducing the gap existing between Iran and the world

- Establishing an effective system of invention, creativity, innovation, creativity and entrepreneurship
- Creating a dynamic social and economic system to promote incentives and beliefs for the development of human resources and social capitals and the knowledge based economy
- Creating a dynamic system of production and dissemination of information and promoting technology to make communication and transactions effective
- Creating an effective system of training and research that relies on creativity and innovation needed in knowledge economy which is also in transaction with global knowledge and technology
- Creating a system which is suitable for settling intellectual property rights to form a knowledge market and to strengthen scientific exchanges in the national, regional and international levels
- Promoting new technologies and increasing productivity

The new movement can be understood if one compare the 3rd and the 4th development plans of the country where a great attention has been paid to the science and technology issue in the latter one. During the last 5 years 12 science parks and 42 incubators have been established in Iran and they have received great concern in the 4th development plan. Enjoying all rules and regulations of free trade zones are examples of these benefits for STPs.

Isfahan Science and Technology Corridor

Isfahan Province has been one of the pioneering provinces in the country in the process of economic growth and development. Different factors have made this province a unique and a pioneering one which include some general indicators, economic, socio-cultural, science and research, communication and transportation priorities. The experience of Isfahan in establishing science parks and incubators and the role of Isfahan Science & Technology Town (ISTT) in promoting this idea on one hand, and the necessity of having an executive measure in the fulfillment of the anticipated goals in the development plans of the country on the other motivated the local and national managers to define a new mission and responsibility for Isfahan Province. In this new mission based on the approval of the board of ministers the Isfahan macro city will be changed into a science and technology corridor in a long term plan.

Isfahan Potentials and capacities

With an area of 107044.3 SqK in the central Iran, Isfahan province has more than 6.6% of the total area of the country. The population of the province in 2003 has been 4393252 persons which is 6.6% of the total population of Iran. 83% of this population lives in urban areas and 17% in rural areas. Isfahan Province ranks first in the country in terms of having the most number of cities. It is also host to major industrial units including Mobarakeh Steel Complex, Isfahan Steel Mill, Poly acrylic Complex, plane manufacturing factory, nuclear technology units, etc. Due to its cultural, artistic and historic values it is the cultural and artistic capital of Iran and therefore, it is famous for the international tourists as well. In general there are four different elements necessary for establishing a science and technology corridor and Isfahan Province has them in common. We will go through them in brief:

7% of the active population of the country and 6.2 of the unemployed population live in Isfahan Province and it ranks 3rd in this regard in the country. The largest numbers of industrial workshops in the country after Tehran are located in Isfahan and it ranks first in the country in terms of industrial cities in Iran. Isfahan has the most industrial towns. High tax revenues, mines, producing oil products, high number of NGOs, etc are also among other distinctive economic features of Isfahan Province making it an ideal place and ready for establishing a science and technology corridor

Having 7.7% of the student population of the country, Isfahan Province ranks second in Iran after the capital Tehran in terms of having the largest number of university students. Isfahan also has 8% of the university graduates in the country (second rank), and university graduates are the main potential source for corridors. Therefore, Isfahan has a great potential in this regard. It has the largest number of technical and vocational education centers in the country and ranks first in this regard. The number of faculty members in universities is another significant feature. 10.1% of R&D units in Iran are located in Isfahan. This means that this province is the second largest province in Iran in terms of R&D centers. 70% of these units belong to private and 11.6% to NGOs. 4.7% of full time researchers and 9% of part time researchers are in Isfahan.

Isfahan Province has the most number of libraries in Iran. It is also one of the most important tourist attraction cities in the country. The beautiful monuments some of which dating back to more than 1500 years ago and its life giving river crossing through the city have created great attractions to the visitors. Among other cities in Iran, Isfahan has the most number of international tourists and it has a large potential for more foreign visitors. This Province has been selected as one of the eco-tourism poles in the country. Science and technology corridors are usually established in regions where there are sufficient attractions for elites and talents. Therefore, due to the existence of these potentials and the ecotourism environment where talents are interested in it is an ideal place for establishing a corridor and attracting talents in science and technology fields. Isfahan also has 8.5% of health care and medical centers and medical laboratories in Iran.

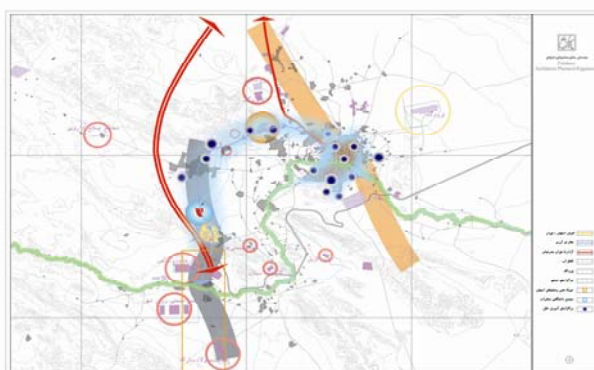
Isfahan ranks first in the country in terms of having the most number of high ways. Its location in the heart of Iran has changed it in to a center of communication network in Iran. Isfahan has a domestic and international flight airport which makes communication easier for travelers. Five and more star hotels in Isfahan are other potentials of this province. Telephone lines, internet and E-communication exist in Isfahan in the best possible way and with high quality services.

Despite all these potentials, Isfahan also suffers from some serious problems. Pollution in different forms and the low water resources and low precipitation are among the major problems that people and authorities are dealing with. Those potentials in one hand and these social problems in the other made it necessary to review the development plan of the Province. Based on the studies done in this regard the only way to save Isfahan was to change the technological approach toward clean and new technologies approach. It was approved by the board of government.

Planning the Isfahan Science and Technology Corridor

The idea of establishing the first technology corridor in Isfahan was placed on the agenda of the authorities and planners to perform the mission defined in the national development plan and also to be an engine to change the development process of the Province toward the clean development and to disseminate the idea in the whole country.

Isfahan Science & Technology Corridor will be established in Isfahan



considering urban planning and environmental factors. This special geographic zone covers an area of 1800 square kilometers which is almost 3% of total area of Isfahan Province. This area has three focal points where the project starts from.

These focal points which include many educational, research and technological potentials of the province are:

- Isfahan Science & Technology Town and Isfahan University of Technology
- Isfahan University of Medical Sciences and Isfahan University
- Najaf abad University and Telecommunications Academic Complex

The proposed plan also includes IT service and industrial clusters, biotechnology, manufacturing advanced parts, aerospace and defense industries and advanced materials. These clusters begin from the focal points and develop gradually to the inner part of the triangle made by the focal points. After covering the inside section, the corridor will develop to the outside section.

Different measures will be taken through this plan including: developing infrastructures in a 5 year period, approving special rules for this region, performing R&D activities for the large industries adjacent to this region and also for the medium sized industries inside the region, necessity to take care of environmental regulations and special financial supports to target industries. All these activities will be supported by a ministry and administrative organizations.

This project aims at changing the structure of the population of the region from a worker population in to a talent and entrepreneur one as well as changing the industrial and economic structure of the region. All these are expected to be operational during a 10 year period.

Conclusion

Science and technology corridors are considered as infrastructures to achieve a knowledge-based economy. In some cases several science and technology parks have changed into a technology corridor. Usually corridors are located in areas adjacent to the most important industrial and trade centers in each country. Venture capitals and human resources are playing a major role in corridors and the financial and non-financial incentives and facilities are so important for the corridors especially for the new ones.

There is not a single model for the planning and establishment of corridors. They differ in some features from one region to another. There is a clear relationship between economic characteristics and the future performance of the corridors in each country. Corridors have been placed in the science and technology prior policies and the industrial policies of the national development plans. In the new models special attention has been paid to tourism and international regulations.

Based on the experiences of developed and developing countries in the field of developing science and technology corridors, Iran has also planned for developing its first corridor in the city of Isfahan. Isfahan Technology Corridor aims at changing the geography and the local economy of the region from an industrial region in to a knowledge-based region. It is considered as an administrative infrastructure for the fulfillment of the programs of the 20 year vision and the national development program of the country. It is hoped that establishing Isfahan Science & Technology Corridor, which is also the only way of saving Isfahan could be successful in performing its mission. Through establishing this corridor, the potentials of the province will be used in the best possible ways and Isfahan will be changed in to an innovative region.

Acknowledgment

The authors would like to express their sincere thanks and appreciations to all those who have had contributions with implementing this project, especially Isfahan Science & Technology Corridor project team.

References:

- OECD Report, “ Knowledge based economy”, 2003
- United Nations Conference on Trade and Development, “Science, Technology and Innovation Policy Review”, The Islamic Republic of Iran, February 2005
- UNIDO, Strategic Research and Economics Branch, Philip Cook, “ Strategies for regional innovation system”, Vienna 2003
- 315 Research + Technology Corridor Planning Sub Committee, Vicki Butland
- David Powell et al, August 2006
- Freeman, C. “ Technology and economic performance: Lessons from Japan” 1987
- Lundvall, B. “ National Systems of Innovation ; Toward a theory of Innovation and interasctive learning” 1992
- OECD Reports, 1999, 2003 and 2004
- WTTC, Mike Norris, the Director of Wolverhampton Telford Technology Corridor
- Malaysia Super Corridor, Internet
- Ministry of SRT and MPO, “Knowledge-based development”, The plan for Isfahan Technology Corridor
- Prof. Dr. Anton Gunzinger, Owner of Supercomputing Systems AG;
www.scs.ch