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Technological Development in Iran Case Study of Pardis Park

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Abstract—*Technological development has changed people's life. It follows sequentially the stage of procurement of technology resources to acquisition of technological skills and lastly utilization of such skills to achieve set goals. Technology Park's success has led other regions to perform their own high-tech transformations. These are sources of entrepreneurship, talent, and economic competitiveness, and they are key elements of the infrastructure supporting the growth of today's global knowledge economy. Silicon Valley provides a location in which government, universities and private companies cooperate and collaborate. Science parks create environments that foster collaboration and innovation. They enhance the development, transfer, and commercialization of technology. It is a place that supports university-industry and government collaboration with the intent of creating high technology economic development and advancing knowledge and invests on science-based companies. Non-tech regions must provide local finance to prevent entrepreneurial relocation and reap spillover benefits for their communities. This paper introduces Pardis Technology Park PTP, and how it influences development of technology in Iran.*

Keywords*: Technology Park, Development, Pardis, India, Iran*

1. INTRODUCTION

Definition of a Science and Technology Park according to the International Association of Science and Technology Parks (IASP): "A Science and Technology Park is an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions." and also Technology Park is an area with a collection of buildings dedicated to scientific research on a business status. There are some approximate synonyms for "Science Park", including Research Park, Technology Park, and so on. The appropriate term typically depends on the type of science and research in which the park's entities engage, but many of these developments are named according to which term gives the park the best profitability and naming advantages. Often, science parks are associated with or operated by institutions of higher education (institutes and universities). These parks differ from typical high-technology business districts in that science parks and the like are more organized, planned, and managed. They differ from science centers in being concerned with future developments in science and technology. Typically businesses and organizations in the parks focus on product advancement and innovation as opposed to industrial parks that focus on manufacturing and business parks that focus on administration. Besides building area, these parks provide a number of shared resources, such as uninterruptible power supply, telecommunications hubs, reception and security, management offices, restaurants, bank offices, convention center, parking, internal transportation, entertainment and sports facilities, and so on. So, the park offers considerable advantages to hosted companies, by reducing overhead costs with these facilities.

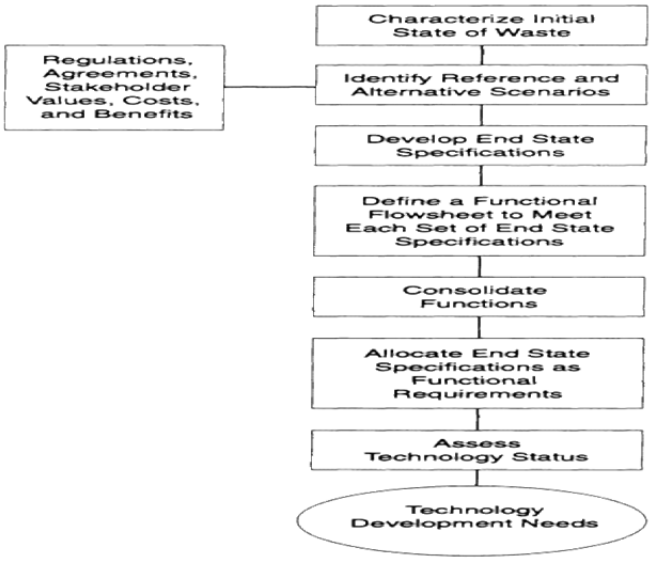
2. BENEFITS OF TECHNOLOGICAL PARK

Technological parks can, and have in the past, played an important role in technological capacity building. They do this by bringing together in the same location, facilities that include, manufacturing, high level training, technology and business incubation, financing institutions, standardization and calibration laboratories, testing and analytical facilities, and industrial services. The advent of science and technology parks in recent decades with the objective to minimize the gap between economic sectors and the academia and research community. The success attributed to these parks in many countries has played a significant role in scientific and economic development in many knowledge based societies and specialized employment. The thinking behind the creation of these parks in many countries has been very similar. The parks were established with the objective to provide a physical environment needed for development and flourishing of scientific innovations, reduce investment in infra-structure, efficient time management and reduced costs associated with communication among participating elements including institutions, companies and organizations and they created synergies. It promotes the technology transfer to those firms established within the park. Convenient and lower cost education for students. Opportunities to obtain technical and scientific degrees on a past time basis. The development of technology parks is needed a wide spread phenomenon in

today's technology - inspired era. This concept and all the issues related to its development assume increasing importance which gives the fact that, it has unique potentials in accelerating the growth of nations' economy. In order to succeed in today's knowledge - based economy and to realize its vision of becoming a developed nation, it must develop the requisite infra-structure and info-structure. It is widely believed that technological parks have an important role in transforming a nation into knowledge-based economic since its establishment align closely with the key drivers of knowledge-based economy i.e. innovation, commercialization of ideas, entrepreneurship and university-industry-government smart partnership.

3. BACKGROUNDS AND HISTORY OF TECHNOLOGY PARK

This clearly shows that technological parks play a great and important role in the development of a country. The world's first techno-park started in early 1950s. There are over 140 techno-parks in North America. The big North American technological parks have experienced on enormous impact regarding economic growth, qualified jobs creation, exports and modern firms' competitiveness development. Asia is the world's next leading international theme park market. It includes Japan, Korea, Honk Kong, Taiwan and a rapidly changing China. The Research Triangle Park is one of the biggest parks in United Stated which crowds together 130 organizations, 99 of which are directly related to research and development purpose. Its more than 39.500 employers are daily incorporated to their jobs. An area of 8 2 miles and their wages reach the figure of 1-2 thousand million US Dollars. We should create awareness on the potential role that technological parks can play not only in accelerating Iran's industrialization programs but also in transforming the country in knowledge-based economy.



4. BENEFITS AND LIMITATIONS OF THE APPROACH

The primary benefits of an end state based approach as a basis for a technology development program are (1) the technology development needs are specifically tied to a plausible set of end states for the initial wastes by an explicit decision logic, (2) the technology development program is designed to support multiple plausible sets of end states until a final decision on the preferred end state or end states is made, and (3) the technology development program that uses this process properly has the integrity to withstand scrutiny from the research community at large, Congress, stakeholders, and various DOE review committees.

The explicit connection of the technology development program to the desired end states of the initial wastes is intended to impose discipline and efficiency on the technology development program. The need for each technology development project may be derived from a specification of the end state to be achieved and a technology assessment to determine whether additional development is required. A proposed technology development project that cannot lead to achieving a plausible end state should not be funded unless it addresses other technical needs related to implementation of new technology. If technology to achieve the end state already exists, then justification of additional technology development would require that such development lead to increased benefits, such as reduction of implementation cost or risk, that would compensate for the projected cost of the development. In the absence of an end state based approach, there is the risk that some research projects would address inconsequential needs.

Because technology development typically requires years to produce deployable results, whereas knowledge concerning remediation problems and decisions on how to best manage them are changing much more frequently, a technology development program must proceed in the face of considerable uncertainty. As technology development nears completion, its results, when combined with an analysis of relevant externally imposed constraints, will provide decision makers with reliable information to make informed decisions on technology implementation. If technology development supporting only a reference scenario is pursued, changes in externally imposed constraints (such as resource limitations or changes in allowable risks) may inhibit or prevent implementation of the reference approach due to inadequate technology. Without pursuing technology development for the alternative scenarios, the information needed to select the best course of action will not be available and, if the reference approach is even partially deficient, there will be costly delays stemming from the time required to develop additional technology.

The issue of how to allocate technology development resources among reference and alternative scenarios is a

policy decision that should be explicitly addressed by DOE. Investing a significant fraction of technology development resources in functions supporting alternative scenarios and their associated end states is a useful form of technology portfolio management.

Not all remediation problems require technology development or consideration of alternative scenarios. If remediation can be completed in the near term with an acceptable[2] demonstrated technology, then technology development is not required. If remediation is to be completed in the near term, but technology is inadequate, it is likely that only a reference scenario and its associated set of end states need to be addressed. However, the remediation problems in which EM is investing most of its technology development resources involve complex, long-term projects [e.g., high-level waste (HLW) tank remediation, subsurface contamination, facility decontamination and decommissioning] where changes in such external factors as budget, regulations, and stakeholder values are likely to occur. In these cases, an end state based approach that includes reference and alternative scenarios should be used.

The consideration of reference and alternative scenarios and their associated end states as described here is not intended to address the issue of whether redundant technology development should be supported to meet the end state specifications of a specific scenario. That is, the scope of alternatives does not address whether two or more different technology development projects should be pursued to meet a specific functional requirement. Such redundancy is justifiable when the need is critical or the probability for success of a single technology is judged to be low.

Another benefit of using the end state based approach to define an appropriate technology development program is its clarity (i.e., it can be readily understood). When properly documented, there is a clear path from the problem to the solution through specification of the initial problem, definition of a reference scenario and alternatives to accommodate uncertainty, identification of functional approaches to move from the initial problem to the solution, assessment of the adequacy of existing technology, and support for technology development only in those areas where technology is inadequate. The existence of this traceable path provides clear linkage of the proposed technology development projects to the ultimate desired end state of the waste, which, after appropriate independent reviews, should provide adequate justification to decision makers to support the technology development program. Achieving this linkage requires documentation of the various steps taken to implement the end state based approach. Detailed documentation should be provided to those directly involved in the process (i.e., problem owners, technology providers, reviewers). The committee notes that this documentation tends to be voluminous and frequently incomprehensible to decision makers, who need summary formats that focus on the relationship of technology development projects to bridging the gap between the initial and end states.

5. PARDIS PARK

Pardis Technology Park (PTP) as the region's paradise of technology, under supervision of Presidency Deputy for science and technology and a fourteen-entity Board of Trustees comprising of corporate and real bodies from ministries, science centers and academies, headed by the First Vice President, pursuing the goals of commercialization of the research results and, establishing sustainable ties between University and Industry, is located in a now 38 hectares area, in two phases, (expandable to 1000 hectares) at 20 km distance to the northeast vicinity of Tehran.

5.1 Preliminary studies, localization and provision of a national model for PTP

The attempts comprised, visiting foreign science and technology parks, resources study, comparative study and model definition

5.2 Survey on the location of PTP

Studies to specify a location for PTP began from December, 2000, with the cooperation of I.R of Iran Presidential Center for Innovation and Technology Cooperation (CITC) and finally an area was chosen in Pardis region, 20 km far from east of Tehran Islamic Republic of Iran, in 2001.

After a long observation on various locations in Tehran and its suburbs such as the new town of Parand, the new town of Hashtgerd and the new town of Pardis, it was finally decided to choose an area close to the Boomehen satellite site for the park location. This area was chosen mainly for its closeness and vicinity to,

-Pardis new town to derive a benefit its urban facilities and residential areas

-The satellite site as a center for communication and research

-A university currently under construction

-Khorram Dasht industrial zone and the industrial town of Firouz Kooh

Plus to its suitable distance from Tehran.

Other conditions are also included namely, proper topographic conditions of the area, the price of the land and other suitable conditions that all add to its privileges. On the other hand, there is Tehran-Pardis express way in this area, which provides convenient access to the capital.

5.3 Achievement of relevant ratifications

1-Based on circular of board of ministers and supreme council of urbanization, the new town of Pardis must allocate 800 hectares of its land area to educational and research usages. The PTP land is located in this region. In order to provide

infrastructural facilities, according to the regulations, the new town of Pardis issued the needed authorizations and declared the required commitments between two parties of the contract, i.e. presidential Center for Innovation and Technology Cooperation (CITC) and Civil Company of Pardis new town.

2-Having anticipated and provided preliminary conditions and infrastructures, PTP commenced its activities as a subdivision of CITC in 2001. The PTP negotiating team could achieve governmental authorizations to establish a technology park in 2003

3-The statute of PTP was ratified in 2005

4-The required credit for civil projects and other expenses targeted for PTP strategic management was assigned and estimated in the annual budget regulations of the country in 2004 and 2005

6. ORGANIZATIONAL FORMATION

6. 1- Administrative team

The initial core members of PTP administrative team started their activities for PTP studies and its launching in 2000 in CITC office in Tehran. After PTP statute ratification in 2005 and selection of the PTP president by vice president of I.R. Iran in 2006, the aforesaid team was transferred to the current PTP location (Damavand road 20th km) so that they could directly manage the activities of around 60 member companies up to then.

6. 2- Board of trustees

According to the statute of PTP, the I.R Iran Presidency office is determined as PTP founder and PTP board of trustees consists of 14 real and legal members from scientific, technological, economic and social characters. After establishing Presidency deputy for science and technology in 2007, the deputy became another member of the PTP board of trustees. The Presidential Decree for the members was issued in 2010 by Dr. Mahmoud Ahmadinejad, the President. The first meeting of the board was held in 2010 and the first meeting of the PTP council in 2011.

7. DESIGN AND IMPLEMENTATION OF PTP URBAN AND COMPREHENSIVE PLAN

After accomplishing the preliminary studies, PTP comprehensive plan with an area of 38 hectares was designed. At the moment, design, preparation and provision of innovation Pardis with the area of 20 hectares regarding high metropolitan standards is being completed and the knowledge Pardis with the area of 18 hectares is also in its first steps of construction. Physical components of the innovation Pardis include the followings:

7. 1- Companies region

It includes 14 hectares which is allocated for R&D centers of companies. Based on the plans, the region is divided into five categories:

-Electronics and informatics

-Mechanics and automation

-New chemical materials

-New pharmaceutical materials

-New biotechnological materials

Applicant companies to join the Park can buy land in one of above mentioned categories according to their field of activity if they are confirmed and accepted. Their ownership is conditional to:

-Not changing first-considered land application

-Completing site-construction prior to the deadline and beginning activity therein

-Obeying the internal regulations of the Park

The member companies in PTP are investing, constructing and equipping in over 160,000 Square meter technological and research area which is approved by the PTP Architecture Committee. It is predicted that over 5500 job opportunities will be created for experts in PTP by starting the activity in the mentioned area.

8. MISSION

Pardis Technology Park has the mission of the motivating and supporting the technological companies to increase their ability to

To become the most important technology zone in west of Asia

9. GOALS

(Based on the PTP's statute, article num.2, adopted by Council of Higher Education)

To help to increase wealth via development of knowledge-based economy

To commercialize the results of researches so that the relationship between different parts of researching, producing and servicing come true

To increase comparativeness and development of knowledge-based companies

To help to absorb technical science and also local and international assets

To increase the specialized presence and partnership of local technological companies at international levels

To support and develop Small and Medium Enterprises (SME) and also to support R&D and innovative companies and institutes, in order to develop technology and entrepreneurship

To create an environment to identify and present country's technological capabilities

Strategies

10. FUTURE FIVE YEAR (2013-2017) POLICIES AND STRATEGIES OF THE PARK ARE AS FOLLOW:

10.1 1 Strategy 1:

To support establishment of start-up companies and empowerment of knowledge-based member companies

***Implementation* policy1:** To support companies' establishment and development in the event of country's needs

***Implementation policy 2*:** To observe innovations and to help knowledge- based exchange and to commercialize the technology and innovation in the technological products

***Implementation policy 3*:** To help to competitiveness ability among companies to take part at international market

10.2- Strategy 2:

To play an effective role and to help to create, expand and improve the platform development of technology at national level

***Implementation policy 1*:** To identify technical needs and to help to introduce technological abilities of country

***Implementation policy 2*:** To facilitate technological business in order to strengthen knowledge-based companies

***Implementation policy 3*:** To help to develop the diplomacy of technology

10.3- Strategy 3:

To promote the Park to a smart, dynamic, functional, innovative and effective sets having active interaction with national, provincial and regional organizations

***Implementation policy 1*:** To improve and modify Park's development patterns

***Implementation policy 2*:** Improve and modify Park's hardware and infrastructures

11. SUMMARY

It is possible to specify a generic approach to determine waste-related technology development needs based primarily on consideration of the end state to be achieved for the waste. This approach consists of (1) characterizing the initial state or condition of the wastes or waste site to be remediated, (2) identifying reference of Technology Park to accomplish a general remediation objective, (3) specifying the product forms and requirements of the desired end states PTP, (4) defining the functional flow sheets required to transform the initial waste or waste site into the desired end states, (5) combining essentially identical functions in the flow sheets into a unique set of functions, (6) allocation of end state specifications to each processing function as functional requirements, and (7) comparatively assessing the respective development or deployment status of the technology required for each function to yield technology development needs. The end state based approach incorporates key elements of the widely used systems engineering process. A difference between the traditional systems engineering approach and the end state based approach is that the portions of the systems engineering process related to definition of a technology development program, such as the use of alternative PTP, are specifically focused for explication in the end state approach.

PTP typically requires years to produce deployable results, whereas regulations and stakeholder values concerning remediation problems and decisions on how to best manage them change more frequently. This uncertainty requires that an appropriate technology development program be based on a range of plausible PTP.

In particular, short-term problems with well-defined solutions should not require the end state based approach. Consideration of reference and alternative end states does not address the issue of whether multiple technology development projects should be supported to meet a specific processing functional requirement. That is, the scope of *alternatives* does not address whether two or more different technology development projects should be pursued to meet a specific technology development need. Development of multiple processes is justifiable when the need is critical to implementing the scenario and the probability of success of a single technology development project is judged to be low.

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