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Innovation District at PIIT: The synergy between high tech incubators, SMEs, RD centers, large companies and Universities to accelerate the adoption of new technologies

Parallel Session 1 :

The impact of technology - Embracing innovation

Author :

Jaime Parada-Avila
Institute for Innovation and
Technology Transferof Nuevo Leon, Mexico

co-author:

Dra. Martha S. Leal-Gonzalez
Institute for Innovation and
Technology Transfer of Nuevo Leon, Mexico

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EXECUTIVE SUMMARY

The public and private centers at the Research and Innovation Technology Park (PIIT) in Mexico must dedicate their infrastructure and personnel only to research activities. There is no manufacturing allowed in the premises of any of the 34 research centers. The park has a mix of R&D centers from public and private sectors, some belonging to large corporations or transnationals such as Schneider Electric, PepsiCo, Navistar, and Arris (Motorola) that have opened facilities ranging from engineering design centers to R&D centers including pilot plant facilities. The support mechanisms developed at PIIT work to create value to these large companies, but also to develop the new breed of small and medium enterprises that can develop or adopt new technologies and products that will help in the industrial reconversion of the region. Both type of companies benefit from the linkage with the Universities and other public R&D centers present in the park.

I. INTRODUCTION

Science parks were established to stimulate the formation and development of new technology based firms[1]. When combined effectively with various institutions (e.g. government, research institutions and universities), science parks have played an important role in promoting innovation, entrepreneurship, growth of knowledge-based companies and in turn economic growth within their regions[2].

The success of science parks in promoting technology transfer and attracting clusters of highly innovative firms has motivated countries from around the world to implement this type of scientific infrastructure in an attempt to promote regional development[3].

The merging of the knowledge economy and knowledge-based innovation is increasingly referred to a three-dimensional knowledge based not only in science and technology but in natural, social and humanistic sciences. Many new concepts, e.g. cross-disciplinary and multi-disciplinary knowledge systems, systematic innovation, Living Labs, open innovation, science and technology parks (STPs) and the triple helix innovation model, have revealed the complexity of innovation processes and space[4]. From the point of view of the innovation space, such as in the case of STPs, many of them have followed the urban model of suburban corridors of spatially isolated campuses, accessible only by car, with little emphasis on the quality of life or on integrating work, housing, and recreation.

A new complementary urban model is now emerging, giving rise to the “innovation districts.” These districts, by definition, are geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also areas physically compact, transit-accessible, and technically-wired that offer mixed use housing, office, and retail. Innovation districts are the manifestation of mega-trends altering the location preferences of people and firms and, in the process, re-conceiving the very link between economy shaping, place making and social networking[5].

As we can infer from this definition, Innovation districts could be an upgrade or have a core of one or more STPs. These STPs have key facilities close to other firms, research labs, and universities so that they can share ideas and practice “open innovation”, and they usually are surrounded by land that could be designated for housing, education, retail and recreational purposes. In the United States, the transformation of traditional exurban science parks like Research Triangle Park in Raleigh-Durham, is in process, to meet demand for more urbanized, vibrant work and living environments. According to Katz and Wagner, other science parks actively engaged in urbanization efforts include the University Research Park at the University of Wisconsin-Madison, the University of Virginia Research Park in Charlottesville and the University of Arizona Tech Park in Tucson[5].

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1. Siegel, D. S.; Westhead, P.; Wright, M. 2003. Science parks and the performance of new technology-based firms: A review of recent evidence and agenda for future research, Small Business Economics 20(2): 177–184. doi:10.1023/A:1022268100133
2. Adekola, A.; Korsakienė, R.; Tvaronavičienė, M. 2008. Approach to innovative activities by Lithuanian companies in the current conditions of development, Technological and Economic Development of Economy 14(4): 595–611. doi:10.3846/1392-8619.2008.14.595-611
3. Tan, J. 2006. Growth of industry clusters and innovation: Lessons from Beijing Zhongguancun Science Park, Journal of Business Venturing 21(6): 827–850. doi:10.1016/j.jbusvent.2005.06.006
4. Lundström, A.; Zhou, Ch. 2011. Promoting innovation based on social sciences and technologies: the prospect of a social innovation park, Innovation, The European Journal of Social Science Research Vol. 24, Nos. 1-2, March-June 2011, 133-149
5. Katz, B; Wagner, J. 2014. The Rise of Innovation Districts: A New Geography of Innovation in America, Metropolitan Policy Program at Brookings , Brookings 2014

Innovation districts represent an intentional effort to create new products, technologies and market solutions through the convergence of multi-disciplinary knowledge systems, (e.g., information technology and bioscience, energy, nanotechnology) and accelerate their entrance to the market. All innovation districts contain economic, physical, and networking assets. When these three assets combine with a supportive, risk-taking culture they create an innovation ecosystem, defined as a synergistic relationship between people, firms, universities, research centers and incubators that facilitates idea generation and accelerates commercialization.

In Monterrey, we are striving to convert PIIT into an Innovation District so the institutions, incubators and firms located at the Park join forces in designing products and processes with new materials and technologies, optimizing their investment in infrastructure and software licensing by using the facilities in the public research centers and Universities. We are also in the process of consolidating the Master Plan for Ciudad Innova, a new urban development around the park, where other knowledge intensive industries and firms can be located, and facilities for housing, retail, education and recreational activities are incorporated to attract the new breed of entrepreneurs and knowledge workers required to spur new businesses based on innovation.

II. KEY STRATEGIES TO SPUR INNOVATION AT PIIT

To fulfill the goal and mission of the Park as the core of the Innovation District PIIT, we have designed the model for an innovation ecosystem around the building of four capabilities:

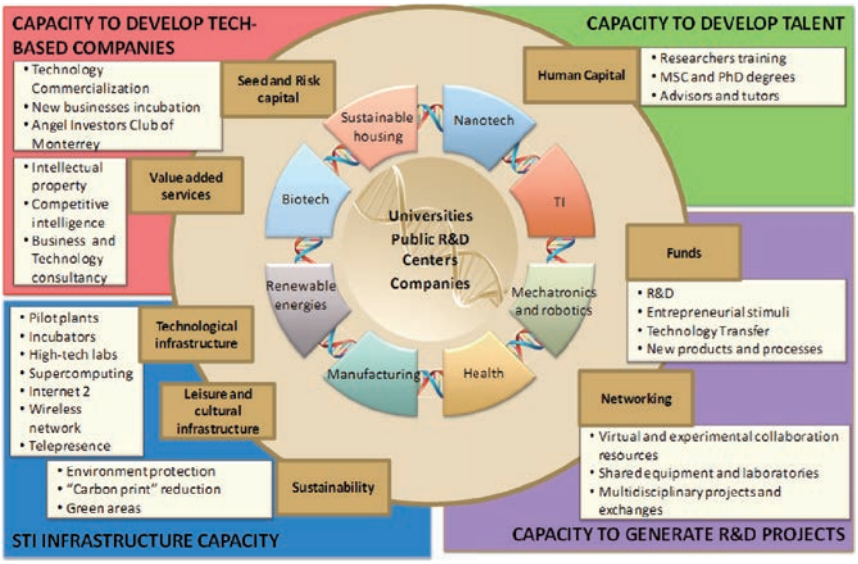


Figure 1. PIIT Innovation Ecosystem Model

1.The capacity to develop and retain talent.
2.The capacity to generate knowledge through R&D Projects linked with Industry
3.The capability to develop and grow entrepreneurship and Technology-based companies
4.The capacity to build and maintain a State of the art Science, Technology and Innovation Infrastructure.

The building of these four capabilities in the Park imply that, to be successful, PIIT must share a common vision for growth, funded under a triple helix model, which will help to build a collaborative network, enhance access to capital and pursue the relentless attraction of talent and technology. Moreover, the Innovation Model must focus on knowledge areas of the strategic clusters relevant to the State. For Nuevo Leon, those strategic sectors are: IT & Software, Automotive, Home Appliances, Biotechnology, Health Sciences, Agribusinesses, Nanotechnology, Aeronautics and Aerospace, Creative Industries and Media, Sustainable Housing and more recently, Transport and Logistics. This specialization emphasizes the structural change needed through investing in Science, Technology and Innovation to propel the knowledge economy and society, and for transforming it in positive outcomes.

1.Capacity to Develop Talent. It's the Park capacity of strengthen and reviewing its higher education institutions for masters and doctorates in several knowledge fields adjusted in order to educate the scientists and technicians for the strategic economic and social development of the region. The PIIT contributes to this capability with more than 10 MSc and Ph. D courses given in the premises by the different universities and public research centers in its premises.

One of them in association with the University of Texas at Austin and CIMAV (Advanced Materials Research Center), is a MSc in Technology Commercialization, which has been critical to spread the culture of innovation and tech based entrepreneurship. It has already graduated 158 students coming from over 18 states of Mexico, 45% from universities and technological institutes, 25 % researchers from public research centers and 25 % is personnel from private companies and entrepreneurs. Students develop commercial projects for graduating and obtaining the MSc.

To date, PIIT has employed over 2300 researchers, technical and support personnel with salaries higher than the average wages paid in the state. It is expected that, by the end of 2015, more than 6500 researchers, technicians and support personnel will be working in its premises.

2.Capacity to generate knowledge. This component is referred to the duty of structuring a portfolio of R&D projects which should be: relevant, high quality, feasible and value generating for the economy and society of that region. The intimate knowledge of their strategic lines of research and core competences of the centers at PIIT have led to the use of the pool of researchers, graduate and undergraduate students from different centers to develop joint projects, optimizing their investment in infrastructure for rapid prototyping and software licensing using the facilities installed by the public research centers and Universities. Being some of the private R&D centers in disciplines complementary to one another or in the same technology area, the Institute for Innovation and Technology Transfer (I2T2), the State Government agency in charge of operating the park encourages and supports them to apply in trans-disciplinary projects where it can be shown the advantage of working together academy-industry and to form consortia to address the adoption of new technologies, such in the case of nanotechnology and biotechnology.

These projects are supported with innovation funds from the federal and state government, which are better evaluated due to these linkages. The Institutions and research centers at PIIT have generated more than 150 R&D projects linked with industries, attracting more than USD $25 million in federal research funds in innovation projects. Some success stories are from

· CIMAV. A public center with a total number of clients (contracts for services & projects): 182 and auto generated Revenues in R&D projects: Average of USD 2.0 Million per year

· CIDESI. Public research center in design and engineering with a total number of clients: 81 and a revenue for the linked projects from 2007 to date: USD $ 7 million

· Schneider- Electric MDIC (Monterrey Design and Innovation Center). R&D joint projects (2014): USD $ 265 - $ 375 K with CIMAV, CIDESI, UANL (State University) and UdeM (Private University of Monterrey), 9 patent applications, 6 application draftings. In 2015 has finished the construction of the Experimental Solar Field as a result of a joint financial fund between the State Government of Nuevo Leon and Schneider Electric.The solar field has a generation capacity of approximately 480,000 KWh per year. From the technological perspective, this technology and infrastructure project located at the PIIT, is intended to create a suitable innovation environment that will foster the generation of new products for the renewable energy market (e.g. solar inverters, power electronics, DC electrical protection & distribution equipment, solar panels, etc.), breakthrough technologies on the field of materials (nanomaterials, smart materials, battery efficiency, etc.), and state of the art energy management techniques (monitoring, metering, control, data analytics, mobile apps, etc).

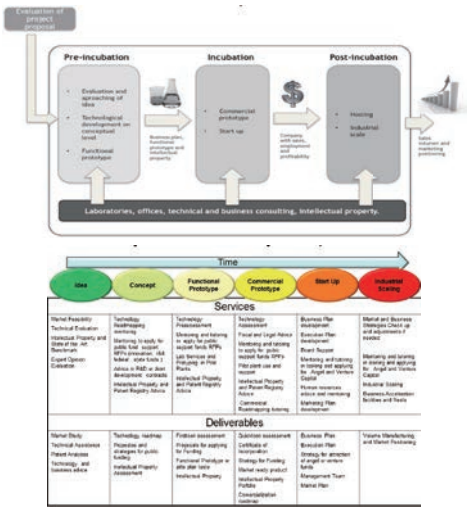
· Technological Liaison Center, CAINTRA. This center was established by the Chamber of the Transformation Industry to serve as the connection between the technological demands and needs of SME, and companies belonging to CAINTRA and the research centers at the PIIT. More than 350 companies have visited the research centers at PIIT and so far, there has been 21 agreements signed for technology development alliances and more than 125 training courses given.

3.Entrepreneurship capacity. It's the ability to transform the scientific-technological knowledge in new businesses generating jobs, goods and high value services.

· At PIIT, there are already two high tech incubators in operation, the Nanotechnology Incubator and the Biotechnology Incubator. Both have the support of federal and state funds for the companies incubated in them, and they can get advice on angel or venture capital opportunities. The installed capacity is twofold: it can serve to incubate new companies and help entrepreneurs to develop the products and processes giving technical and business advice and consultancy, or it can be used by established companies to develop new products or a new line of products using the platforms and technical advice infrastructure. Results to date:

4 biotech companies in incubation and 2 nanotech companies already graduated from the Nanotechnology incubator selling to global markets.

· PIIT has developed a proprietary high tech model for the incubators installed at PIIT and administered by I2T2 (Institute for Innovation and Technology Transfer) that helps into the adoption of new technologies by existing companies.



Figu2. Incubation Process at PIIT Incubators

In this model, the incubators are not only for entrepreneurs, startups or spin-offs, but offer technical assistance and an R&D portfolio (products and technologies developed by universities and research centers at the Park) to existing companies. Established companies in traditional industrial sectors can partner with universities and centers that are critical for development of new products or services with the new technologies and can schedule and design trial runs, or manufacture enough product for pilot scale trials and get help applying for research funds. The incubators at PIIT are recognized by the Mexican Ministry of Economy as the only high tech incubators with skilled human capital to operate and advise SMEs, entrepreneurs and existing companies in the application of new technologies. I.E., the

consultants at the Nanotech (INANO) and Biotech incubators are already engaged in more than 50 research projects with local companies, mostly large national corporations such as VITRO, METALSA, XIGNUX, LAMOSA, SIGMA etc. We have to mention that the technical infrastructure of the incubators has been planned to complement existing equipment in the other research centers residing at the PIIT. For example, the Nanotech Incubator has a characterization laboratory at the service of the industry, not to compete but to allow fast testing of pilot plant products to adjust manufacturing conditions.

· UT at Austin CGIE. (Center for Global Innovation and Entrepreneurship). This Center has been a great generator of new companies. Between 2008 and 2012, 14 of the 29 projects develop in the MSc Technology Commercialization program have continued to give birth to companies valued at around $ 67 million USD. 50% of projects underway stem from research done at R&D centers and universities while the other 50 %, 4 are starting companies and SMEs and 3 are from large companies.

4.Physical infrastructure capacity. It includes the physical resources such as laboratories, equipment, pilot plants and experimentation facilities, which are critical for the R&D projects.

Regarding this last capacity, PIIT's first 70 hectares are already assigned to 34 research centers from private and public institutions. From those, 24 of those centers are currently operating: 10 from universities, 10 public and 14 private centers. To date, PIIT is housing two of the four planned high tech incubators, one in Nanotechnology and the other one, in Biotechnology.

PIIT has contributed to the transformation of the regional culture into one of innovation and a flourishing academic-industry partnership. To date, it has accumulated an investment of nearly $520 Million from federal and state governments, and from third parties.

The success of the triple helix model and the benefits of using nearby public R&D facilities to work on linked projects, has resulted in an open innovation space to be develop at PIIT and more centers from public and private sectors have approached the Institute to apply for a space. This fact has prompted the extension of the park on 40 hectares more, for a total research park of 110 hectares, to accommodate another 20-30 research centers concentrating more than 60 research centers, public and private, by the end of 2020 (Figure 3).

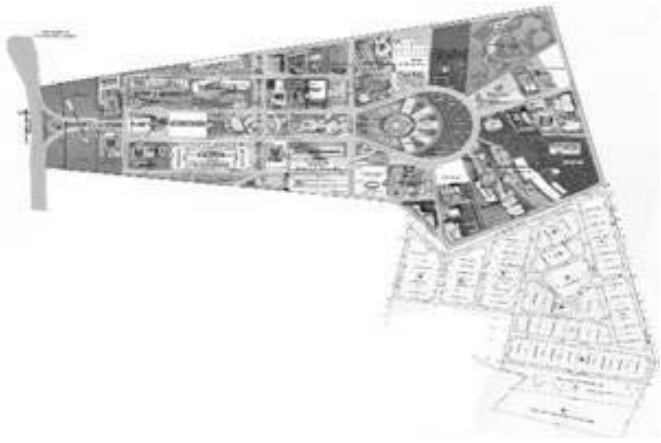


Figure 3. PIIT map

III. KEY STRATEGIES TO BUILD THE INNOVATION DISTRICT AT PIIT

To achieve the economic development of the space around PIIT, it is crucial not only to enhance the linkages and cooperation among universities, research institutions and industry inside the park so as to promote a sustainable development and continuous innovation in the regional economy. It is necessary to provide for the means to consolidate an attractive urban development that will foster the establishment of high-tech companies that may have access to the facilities, technologies and human resources already installed at PIIT. It is important to point out that at PIIT, there is no manufacture allowed, so it will be favorable to establish a high tech corridor for the industries of the new economy nearby.

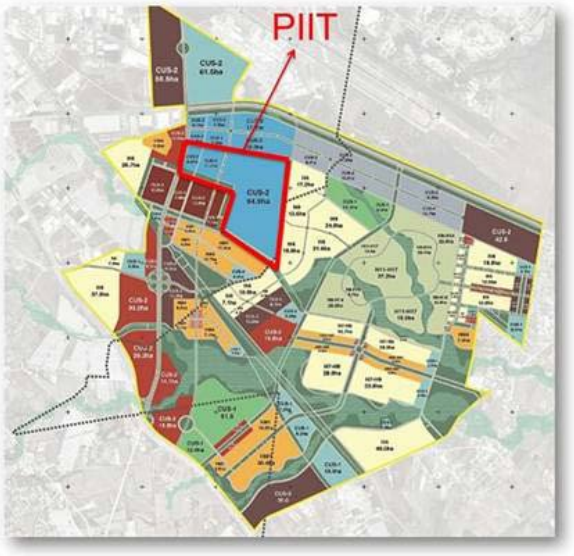
PIIT, the State and federal Governments need to work together to foster a culture that encourages innovation, entrepreneurship and a proper environment conducive to the free flow of innovation ideas and know-how (e.g. talents, technology, information and knowledge, etc.) not only inside the tenants at the Park, but with the companies and other research centers outside the Park. The use of telecomm and IT is indispensable to connect the park with the region, so it is imperative that the best infrastructure is put to serve this purpose of communication and collaboration. The PIIT is already part of the network of “Mexico Conectado”, an initiative from the federal government to provide high speed internet to schools, hospitals, universities, public spaces and key buildings and initiatives in the state. The public centers at PIIT are also networked through and optical fiber channel, that allows them to process and exchange big data from joint research projects.

The land and the companies that can be established around the park will benefit from this infrastructure already installed. There is already a master plan paid by the state government that will allow the transformation of the land to lure leading edge technology and pharmaceutical companies, private and public universities, and even medical campuses to move to those locations, creating a new location for the development of a new urban pole, INNOVA CITY.

INNOVA CITY: CREATIVE AND KNOWLEDGE CITY. Today, the master plan for INNOVA CITY focuses on its physical development: specific urban nodes allowing greater density and amenities, the development of a vibrant central district with more retail, convention center, hospital, and building housing units from single homes to multifamily.

- 2 500 Ha adjacent to PIIT
- Master Plan
- Urban sustainable development surrounding the Innovation Park, among other:
- High tech businesses
- Colleges
- Hospitals
- Convention Centers
- Golf Course
- Led by private initiative
- 25 years’ estimated investment: $2 500 – $5 000 millions USD

The last components of the strategy to build an Innovation District must focus on measuring the impact and the results of investing in science, technology and innovation. There should be accurate indicators such as new products and services, sales, new processes and technologies, new innovation-based businesses, resolution of common interest problems such as in health, education, safety and urban development among others. The expected outcomes of these results are the increase of the GDP per capita, the improvement on the inequity index, economic growth, jobs, social welfare (health, safety, education, etc.), and a new sustainable urban development node.



IV. Conclusion

The current success of the research park PIIT in Technology Transfer and generation of new technology businesses for the State of Nuevo Leon is based onto a comprehensive understanding of the key factors that create an innovation ecosystem. The model focus in strengthening the strategic clusters in the state by developing capabilities in human talent, knowledge generation, science, technology and innovation infrastructure (PIIT and high- tech incubators) and entrepreneurship. The research park has to act as an open innovation network, where companies in and outside the park can access the infrastructure of the public research centers and incubators to develop new products and new businesses.

PIIT has already achieved the status of a strategic investment for the country and it is a model for the development of other research parks in Mexico and Latin America. The state is starting to reap the benefits of the model for the innovation ecosystem implemented in 2004, and there has been a shift in the culture of the companies and universities to look for ways to collaborate and accelerate the time to market of new products and services. The state and federal government intervention to promote strategic partnerships through funding programs has accumulated enough evidence that the private sector investment in Science and technology is on the rise, and the Park it is expected to increase the adoption of new technologies and spin outs as successful new businesses.

To continue fostering and benefiting from the program that created PIIT, the knowledge economy and society, the State of Nuevo Leon must expand the strategy to develop the Innovation Park into an Innovation District. This strategy will take advantage of the infrastructure already developed for the centers at PIIT, and it will serve to promote INNOVA City as a global hub for Innovation. To attract and to achieve the establishment of high tech companies in the innovation district, a set of winning strategies must be established to compete against other countries' similar offers. The most important one must be centred in the offer of human talent, the availability of highly qualified people that will suit the present and future requirements of the companies and the ability to grow entrepreneurial capacity, catalysing spin offs and start-ups.