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The Growth of Knowledge-Based Small Firms in Monterrey, Mexico

by
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Monterrey, in the Mexican state of Nuevo León, long has been known for its large industrial enterprises and heavy industry. Today, however, the city is transitioning to a more knowledge-based economy marked by tech startups and innovation. This article, based on interviews and data collected in Monterrey by IC² Institute researchers, looks at the roots of the changes underway in Monterrey and identifies some of the keys to the city's transformation.

Monterrey's industrial growth started around the end of nineteenth century, when large companies in the textile (e.g., La Fama, El Porvenir, La Leona), brewing (e.g., Cervecería Cuauhtémoc), glass (e.g., Vidriera Monterrey-VITRO), and cement (Cementos Hidalgo) sectors were created in the city. While the growth of the large (and in many instances family-owned) companies in Monterrey is well documented, there is scarce information on the growth of small technology-based companies in the city.¹

Today, there is an important cluster of technology-based small firms in Monterrey, mainly in the information technology (IT) sector. This cluster emerged as the result of "business incubation" services provided by the large, family-owned firms in the city during the transition period from protectionism to free trade (1982-2000). More recently, the processes of creation and growth of small technology firms have been accelerated as a result of specific policies implemented by federal and state governments and high tech business incubators developed within the largest local universities, in particular, Monterrey Tech and Universidad Autónoma de Nuevo León (UANL). Evidence of these twin processes, elaborated below, emerged from interviews conducted during the summer

of 2007 in Monterrey with knowledge-based small firms, faculty and administrators from local universities (Monterrey Tech, UANL, and Universidad de Monterrey), local government officials, and representatives from CANIETI (the National Chamber of the Electronics Industry).

Small Firm Creation in Monterrey in the Transition Period: 1982-2000

Starting in December 1982, with Mexican President Miguel de la Madrid's administration, Mexico gradually abandoned the import substitution model adopted in 1940 and began to liberalize the economy. Trade liberalization accelerated in 1985 when Mexico became a member of the General Agreement on Tariffs and Trade (GATT), and again in 1995, when Mexico joined the North American Free Trade Agreement (NAFTA). This Agreement lowered tariffs, opened up the country to foreign capital, and reduced the role of state-owned enterprises. A more open economy increased pressure for firms across Mexico to become more efficient, reduce costs, increase quality, and implement product and process innovations. The "Regiomontanos" (as people from Monterrey are called in Spanish), known for their entrepreneurial spirit, were at the vanguard of these changes.

According to our interviews, many large firms in Monterrey adopted several strategies to respond to increasing competition from foreign manufacturers during the transition period from the import substitution model to free trade. One strategy was to concentrate their activities in "core competencies" (vertical disintegration), creating an opportunity for some skilled workers to create their own small startup companies.² The large firms not only served as business incubators, (cont'd on p. 3)

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The Monterrey International City of Knowledge: The Vision

by
Jaime Parada

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City of Knowledge*

Twelve years have passed since the launch of the North American Free Trade Agreement (NAFTA). NAFTA raised expectations for accelerated economic growth in Mexico, but the general feeling in our country is that the anticipated sustainable development has not occurred at the rate we had hoped.

Manufacturing plants hiring cheap labor (“maquiladoras”) in proximity to the world’s largest economy raised the quality of life for Mexicans near the border in the mid-1990s, but some of the gains were short lived. Other nations, with considerably cheaper labor costs, eroded Mexico’s relative advantage in some low-cost manufacturing sectors and took away market share. It quickly became apparent that Mexico needed a parallel vision or model with which to build stable, long-term economic growth.

To address this situation, the Governor of Nuevo León, México, initiated the Monterrey International City of Knowledge Program (MICK) in November 2004. The program’s strategic goal is to build a knowledge-based economy for the region based on innovation, using the talent and creativity of the region’s more than four million citizens. Other regions, notably in Korea, Spain, and Ireland, have undertaken similar aggressive programs with startling success. There is a clear relationship between economic growth and the investment made in research and development and innovation (R&D+i). South Korea, for example, invested an average of about 0.4 percent of its GDP annually into R&D in the 1970s and had a GDP per capita of \$500 (USD). Thirty-five years later, after committing to growing its knowledge economy, South Korea today invests 2.8 percent of its GDP in R&D, and its per capita GDP is almost \$20,000 (USD).

The Monterrey International City of Knowledge Program

Understanding that there are several possible definitions of what a “Knowledge City” could be, the government of the state of Nuevo León visualizes the MICK as a grand alliance among universities, companies, and government in a “triple helix” whose main purpose is to generate economic growth via innovation. The MICK represents not just constant improvement but disruptive change that imposes a new standard for which everyone in the community strives.

It is not manufacturing, it is “mindfacturing.” It is not fundamentally a real estate project, but it is very important to have technology parks where researchers and private companies can collaborate. It is not a single university campus but broad connections among many universities, each with a wide range of talent. Finally, the MICK is not a short-term project but a new way of life. It is not “made in Mexico,” but “created in Mexico.” The state government’s long-term vision is to increase Nuevo León’s per capita GDP by growing and attracting knowledge industries and activities and to promote an innovation culture throughout the state.

There are six basic strategies for the program:

1. To redesign the curricula of the education system
2. To attract new research centers and investment in technology-based companies to Monterrey
3. To promote innovation in existing companies
4. To promote entrepreneurship and new company formation
5. To increase urban infrastructure improvements
6. To promote a culture of innovation and technology

For example, in education, the state has redesigned the academic agenda of high school and college institutions to emphasize five strategic technology areas (Biotechnology, Health Sciences, Nanotechnology, Mechatronics, and Information Technology). In coordination with the State Ministry of Education, it has launched an initiative called “Innovec” to teach basic sciences in real-world situations at the elementary school level, simultaneously fostering an interest in sciences and innovation.

To attract new research centers and innovative technology companies, the state has begun constructing the Research and Innovation Technology Park (PIIT), close to Monterrey in the town of Apodaca. The main purpose of the PIIT is to integrate innovation, research, and development through the linkage of universities, companies, and R&D centers. The first phase of the PIIT consists of nine centers. Three of them are from universities: Monterrey Tech, the State University of Nuevo León, and the University of Monterrey. Two more are centers

from the National Science and Technology Council (CONACYT): the Engineering and Industrial Development Center (CIDESI) and the Advanced Materials Research Center (CIMAV). Also committed to locating in the PIIT are the Research and Advanced Studies Center (CINVESTAV), the Monterrey IT Cluster (a group of 42 small and medium-sized software enterprises), the Mexican RFID company IDZ, and the State of Nuevo León's Institute of Water.

The attraction of research centers and the creation of new companies in Monterrey is not limited to the PIIT but has spread to other local and regional institutions over the past 18 months. Local universities recently have

established 15 more R&D centers as well as three high technology business incubators. Local manufacturing firms in Monterrey have launched at least three product design centers as well.

The state understands that the Monterrey International City of Knowledge program is a long-term strategy that will take years to develop, but the rewards—a diversified economy with a strong base of homegrown technology firms thriving on innovative ideas—are very much worth the risks.

Webpage address:

Monterrey International City of Knowledge Program:
http://www.mtycic.com.mx/html_eng/index.html

...today in Monterrey, there is a new “business philosophy” whereby large companies have multiple suppliers for different parts of their production systems, and their relationships with suppliers are mainly short-term, only for the duration of a specific project.

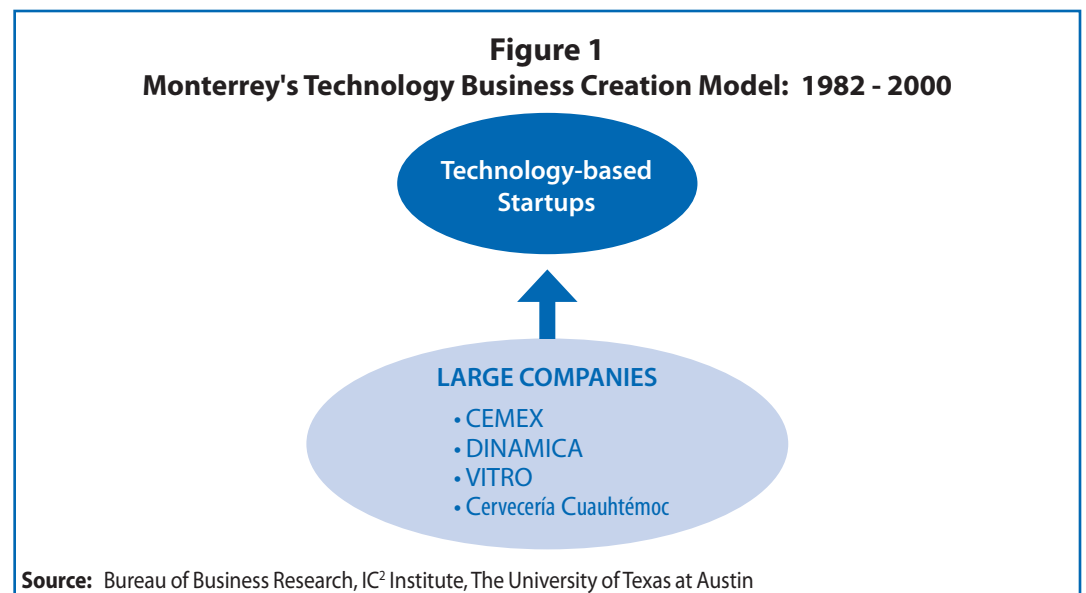
The Growth of Knowledge-Based Small Firms in Monterrey, Mexico (cont'd from p. 1)

providing experience and knowledge to the new entrepreneurs, but in many instances they were the new firms' only customers. The relationships between the large companies and the new startups were informal. Trust (built on previous familiarity with the large firm's managers) was the basis of this relationship. Figure 1 illustrates this process of technology firm creation, where individuals acquired technical and business skills at large local firms before creating many of the small innovative firms in Monterrey.

A manager at IEBSA, an electronics firm founded in 1981, mentioned in our interview that twenty years ago his firm was the only IT supplier for one particular large company. The long-term relationship with its customer

allowed IEBSA to have deep knowledge of its client's production system and to make solid recommendations about new technologies. The manager noted that today in Monterrey, there is a new “business philosophy” whereby large companies have multiple suppliers for different parts of their production systems, and their relationships with suppliers are mainly short-term, only for the duration of a specific project. Whether the small company is the low-cost supplier is the key criterion in winning contracts with large firms now, not long-term relationships between managers.

Not all large firms in Monterrey were successful in overcoming the challenges posed by the economic transition; some of them were forced



The local universities also promote knowledge-based economic development through their high-tech business incubators. We interviewed several companies at the high-tech business incubators of the Monterrey Tech and the UANL. Most incubated companies are developing new products and new business models that help them penetrate the U.S. market.

to close operations. Often cited in our interviews was the case of Dinámica, a subsidiary of the Alfa Group (a holding company). Employees of Dinámica, for instance, left to create Softteck and Expertec, two of Monterrey's most successful IT companies. Softteck, founded in 1982, today has 6,000 employees and competes with Tata, Infosys, and Wipro, the three top Indian providers of software services. Blanca Treviño, Softteck's CEO, describes Dinámica during our interview in the following way: "Dinámica was such a marvelous school for some of today's more successful local entrepreneurs and managers."

The close relationships among different groups in the community and their positive effects on the growth of the city earned Monterrey the title "Best Place to do Business in Latin America" by Fortune magazine in 1992. Some of the successful outcomes of these relationships are well known. The Instituto Tecnológico de Estudios Superiores de Monterrey (Monterrey Tech) was begun by a group of local entrepreneurs in 1943 to supply high-quality engineers for their firms. Other outcomes, such as the creation of technology-based startups in Monterrey that resulted from the linkages between large and small firms, are often overlooked by business magazine's rankings.

Small Firm Creation in Monterrey in an Open Economy: 2000 to present

Mexico is now one of the most open of the medium-sized economies in the world. The movement of goods, services, and capital is practically free. As shown in Figure 2 (p. 6), in the new economy, the catalysts for entrepreneurial activity are more diversified than during the transition period. In particular, we identified three sources of new business creation: traditional large companies, university-owned high-tech business incubators, and R&D centers at the local universities and CONACYT (The National Council for Science and Technology).

As competition from foreign companies increased, large firms decided aggressively to penetrate the U.S. market, not only through exports, but also through investments in branch firms in the United States. They also broadened their relationships with suppliers around the world. As a result, although large, family-owned firms continue to be important customers for small technology companies in Monterrey, in the context of globalization, these small firms must

compete with international (not just local) firms to supply the large local companies. Moreover, in certain cases, large and small IT firms compete in the same local market. Such is the case of Neoris, which started as an IT department within CEMEX but is now an independent company partially owned by CEMEX and one of the largest IT services providers in Latin America. Although its main line of business is outside Monterrey, Neoris competes with smaller IT firms in Monterrey for a share of the local market.

In addition to faculty research and teaching, local universities in Monterrey have adopted a third mission: to promote knowledge-based economic development. UANL, for instance, opened the Center for Business Incubation and Technology Transfer (CIETT) in 2001 and the High-Tech Business Incubator in 2005 to commercialize its faculty's R&D. G.A. Musik analyzed the link in Mexico between public R&D and the private sector. Mexico has a public scientific research system that is large in terms of basic research produced and resources spent. He pointed out that in an index created by RAND Corporation to rank countries on Science and Technology capability, Mexico ranks number 50 among 150 countries.³ Despite its relative strength by world standards, research in Mexico is public and supply driven, and scientists rarely establish any relationship with industry. This model has resulted in research that, although publishable, rarely addresses any clear short- or long-term need of society or firms. Overall, the interests of innovating firms are not well matched with the specialties of its research centers.⁴ In line with previous analyses, we found that the commercialization of university R&D as a source of creation of new businesses in Monterrey is still in its infancy.

The local universities also promote knowledge-based economic development through their high-tech business incubators. We interviewed several companies at the high-tech business incubators of the Monterrey Tech and the UANL. Most incubated companies are developing new products and new business models that help them penetrate the U.S. market. Moreover, the common goal of reaching a large pool of international customers is creating incentives for alliances among small local firms. This is a step up from a traditional business culture where small firms compete (rather than develop

alliances) to supply products and services to a relatively small pool of large local firms.

The Secretary of Economy created the TechBA program to promote business accelerators in other countries (e.g., the United States, Spain, and Canada) that help Mexican companies penetrate the global market. We interviewed some of the TechBA companies located in Austin, Texas. These small companies are finding that the process of marketing their products in the U.S. is challenging but very rewarding. Eduspark, a Monterrey firm in the TechBA program, creates educational software. In the words of its CEO, “TechBA has been an important program that provides office space, credibility, coaching, and contacts in the United States.”

The TechBA program is just one of many other government-supported initiatives to accelerate innovation in the country. Both the federal government and the state of Nuevo León have recently introduced new policies to promote innovations at small firms. The federal government, through the Secretary of Economy, created the Mixed Funds to finance innovation projects at small firms. Another important initiative from the same Secretary is PROSOFT, which promotes the software industry in Mexico. Many of the small companies that we interviewed noted that these two programs have benefited their innovation activities.

The State of Nuevo León has invested significant resources in the expansion of a high-tech entrepreneurial base, including the Monterrey International Knowledge City Program (see article on p. 2), the creation of the Institute of Innovation and Technology Transfer (I²T²), and the launch of the Research and Innovation Technology Park in Monterrey (PIIT). While space limitations prevent a longer description and analysis of these initiatives, it is clear that these programs seek to create a future in which economic growth is the result of innovation, supported by an alliance among local residents, businesses, academic institutions, and the government.

Conclusions

Regions with large concentrations of high-tech industries (such as San Francisco, San Jose, and

Austin) place emphasis on the entrepreneurship rate—the percentage of the population of non-business owners that start a business each month.⁵ Although the economic development of high-tech regions is associated with the continuous growth of large firms, what interests policymakers is the high rate of technology-based business creation in these cities. We contend here that there is an important cluster of new knowledge-based firms in Monterrey. The roots of this cluster can be found in the organic entrepreneurship process incubated by the family-owned firms as the economy transitioned from protectionism to free trade and, more recently, the aggressive policies of the state of Nuevo León and the federal government to promote knowledge-based entrepreneurship.

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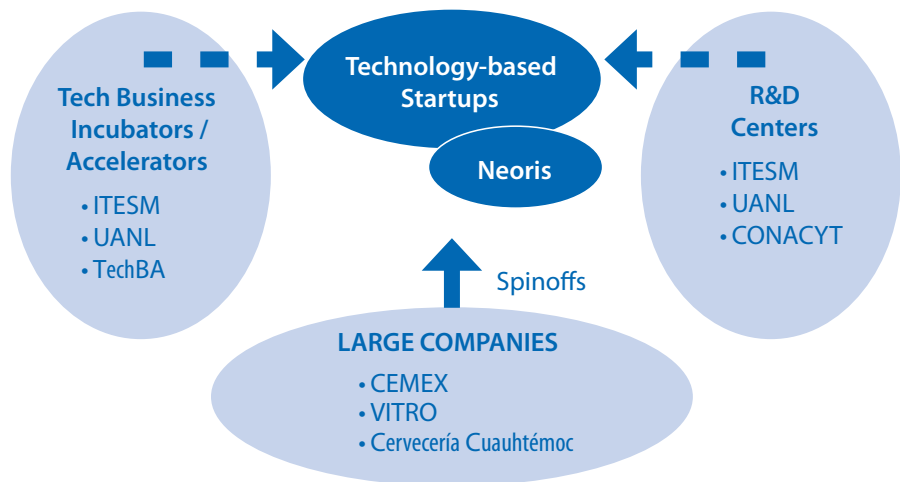
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Figure 2
Monterrey's New Business Model for Startup Creation



Source: Bureau of Business Research, IC² Institute, The University of Texas at Austin

Announcement

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