

Decentralized Local-Actor Cooperation In Querétaro's Aeronautics Industry

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According to Robert Keohane and Joseph Nye, in a context of complex interdependence, new actors, themes, and ways of relating to each other emerge.¹ I will apply this idea to an analysis of the decentralized cooperation promoted by the Mexico's state of Querétaro to strengthen its industry and create the infrastructure and structure needed to develop an aeronautics industry connected to Bombardier's global value chain linking up Toronto, Montreal, and Wichita.

Decentralized cooperation can be more autonomous and focus on developing and improving the quality of life in states or municipalities; I will explain how this works in the case of Querétaro. Administrative decentralization redistributes authority and the responsibility for financial resources among sub-national bodies, thus slimming down the budget in rational managerial terms and facilitating citizens' participation in terms of a participatory democracy.

One important aspect for developing the economy is fostering capabilities in different ways: individual, social, and institutional. The first, individual capabilities, empower people through learning, and acquiring knowledge, techniques, and skills that facilitate their development. Institutional capabilities are created through efforts to strengthen public or



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private institutions by improving management ability, planning, and communications for developing human resources. Social capabilities strengthen society as a whole, by age groups, activities, or specific communities.

In Mexico's case, once the economy opened up and the North American Free Trade Agreement (NAFTA) was signed, legal reforms were made and President Carlos Salinas supported certain sectors like the auto industry, manufacturing, and small and medium-sized businesses; also, several regions of the country, particularly the North and Central Mexico, were given a special place.

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The federal government proposed a more open, competitive form of industrialization internationally that would generate the currency needed by the productive sector and make economic development possible. The goal was to foster the creation of new industries that would incorporate advanced technology.

To adjust domestic legislation to the needs of NAFTA, a new law on international economic treaties was passed and published in the *Diario Oficial de la Federación (DOF)* (Official Federal Gazette) on January 2, 1992. It established two kinds of international commitments: treaties, which must be passed by the Senate; and inter-institutional agreements, arrived at by any federal, state, or municipal authority with foreign governments or international agencies. The law stipulates that when such agreements have been negotiated and signed, they must be reported to Mexico's Ministry of Foreign Relations, which will deliberate and decide on their legitimacy, and, if approved, include them in the register created to this end.

On December 27, 1993, the *DOF* published another law, this time on foreign investment, abrogating its predecessor, the 1973 law. The new legislation defines foreign direct investment (FDI) as foreign ownership of any percentage of the equity of a Mexican company. On September 8, 1998, the Regulatory Law on Foreign Investment was published, removing limitations on investment and creating the National Foreign Investment Registry (NFIR) to monitor participants.²

The NFIR has analyzed reinvestment and identified the most attractive economic sectors and the states that received the most FDI.

In 2002, the Law on Science and Technology was passed, and then amended in 2014. Its Article 1 establishes the law's objectives as follows:

- 1.1 To regulate federal government support for fostering, strengthening, developing, and consolidating scientific research, technological development, and innovation in the country;
- 1.2 To determine the instruments required;

- 1.3 To establish the mechanisms for coordinating government entities and federal public bodies;
- 1.4 To develop mechanisms for the coordination, link-up, and participation of the scientific and academic communities of the institutions of higher learning in the public, social, and private sectors to generate and formulate policies to promote, disseminate, develop, and apply science, technology, and innovation;
- 1.5 To link up educational, productive, and service sectors working in the fields of science, technological development, and innovation.³

National Council for Science and Technology (Conacyt) programs, like AVANCE (a Spanish-language acronym for High Value-Added in Business with Knowledge and Entrepreneurs), Innovation Networks, and Technological Parks, offer tax breaks for companies investing in research, development, and innovation. Several other funds also are in operation, such as the Institutional Fund for Regional Scientific, Technological and Innovative Development (Fordecyt), to support scientific institutions and universities in carrying out activities of technological development, research, and innovation. In the specific case of Querétaro, approximately Mex\$100 million has been apportioned to the state-level Council for Science and Technology, the National Metrological Center (Cenam), the Center for Advanced Technology (Ciateq), and the Center for Engineering and Industrial Development (Cidesi) in recent years.⁴

CASE STUDY: THE AERONAUTICS INDUSTRY IN QUERÉTARO

The state of Querétaro is important for Mexico's industrial development. It has 22 industrial parks, and a large part of manufacturing is concentrated in the cities of Querétaro, San Juan del Río, El Marqués, and Corregidora. The workforce is made up of 772 000 people, 65.9 percent of whom are employed in the manufacturing, aeronautics, auto, electronics, transportation equipment, chemical, metal, rubber, and plastics industries, plus the services to those industries.

Industry accounted for 47 percent of the gross domestic product (GDP) in 2014, and in 2010, unemployment was 6.3 percent. The human development index is 0.8, 93.2 percent of the population is literate, and the average amount of schooling includes at least a technical high school certificate.⁵

The priority for Governor Ignacio Loyola Vera (1997-2003) was to encourage foreign assembly plants to set up shop in his state, particularly in depressed areas like the Sierra Gorda mountains, and to support the auto-parts and metallurgy sectors. To broaden out technical and professional training, he signed an agreement with the National College of Technical Professional Education (Conalep) to train technicians according to the needs of the state's industry. In 1999, Industria de Turbo Propulsores (ITP), the beginnings of aeronautics, set up shop in the state, and in 2004, construction began on the intercontinental airport.⁶

The 2004-2009 Querétaro Development Plan, established by Governor Francisco Garrido Patrón, sought to encourage emerging industrial sectors, like software, logistics, and aeronautics, and promote training of technicians and professionals for the industries that would be established in the state. Tax exemptions on imports of inputs and machinery were instituted to attract business.⁷

In 2004, Garrido Patrón promoted state government participation in trade missions to attract foreign investment from North American and take advantage of NAFTA; supported the development of industrial parks; and negotiated financing for the acquisition of machinery and technology through the World Bank or the Inter-American Development Bank. As a result, Bombardier, General Electric IQ, Carpenter Technology, Hyrsa, and Daewood Electronics, among others, announced they would open manufacturing plants in the state starting in 2005. In 2006, the Querétaro Aeronautical Industrial Plant was built in the municipality of Colón, and in 2007, the Querétaro National Aeronautical University was created.⁸

Governor José Calzada Roviroso (2009-2015) created a solid foundation for comprehensive, sustainable development. He put forward goals and strategies like improving people's well-being; promoting the development of regions, currently divided into urban, industrial center, South, semi-desert, and mountainous; consolidating the state's educational, cultural, and research centers; attracting more Mexican and foreign visitors and businesspeople; improving infrastructure, roads, and highways; deregulating to attract capital for investment in high-tech products; consolidating local supply of small and medium-sized businesses so they could begin to export; fostering productive chains; creating incentives for companies' greater competitiveness so they could benefit from globalization; and generating spaces for international cooperation that facilitate Querétaro's positioning and its production facilities globally.⁹

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Governor Calzada promoted the state's participation in national and international fairs in the framework of both NAFTA and the Free Trade Agreement between Mexico and the European Union, with support from the Coordinating Committee of International Relations and Government Innovation, created by him.¹⁰ Government officials and businesspersons also took part in trade missions to promote products from Querétaro and draft trade and local agreements with global partners. In addition, financing was obtained from the World Bank, the European Investment Bank, and the Inter-American Development Bank for training human resources, research, and generating technology and innovation in local businesses. Negotiations came to a felicitous end in 2014 for Mex\$1.2 billion in FDI, 400 percent more than the average for previous years.¹¹

The state boasts 126 institutions of higher learning to train qualified professionals and technicians. Among them are the Autonomous University of Querétaro, the Querétaro Aeronautics University, the Polytechnic University, the Technological Institute of Querétaro, and the Querétaro campus of the Technological Institute of Monterrey. They offer different options in the fields of industrial engineering, aeronautics of technology and innovation, materials, electricity, and electronics, which provide professionals and specialized technicians to more than 600 foreign companies.

The Querétaro campus of the Technological Institute of Monterrey and the Corcordia University of Montreal offer master's degrees in innovation in advanced manufacturing and have research centers for innovation with solutions for the aeronautics and auto industries.

The Querétaro Council for Science and Technology coordinates the activities of research centers in technological development and innovation such as the Center for Industrial Development, which supports students studying master's degrees in mechatronics. It is also building the National Center for Aeronautical Technology on land owned by the Querétaro Intercontinental Airport to solve problems and propose innovations for the country's aeronautics industry.¹² The state has U.S., Canadian, Japanese, and European companies that

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use cutting-edge technology in their products and employ more than 50 000 people.

BIRTH OF AERONAUTICS IN QUERÉTARO

In 2005, Bombardier Aerospace announced it was going to begin manufacturing in Querétaro with an initial US\$200 million investment. In 2006, the manufacturing center began operating in the El Marqués Industrial Park, building fuselages, assembling horizontal and vertical stabilizers, and making and installing electronic cable harnesses for the Lear Jet 85.

The 18 851-square-meter Lear Jet 85 plant was built between 2009 and 2010. In 2011, Bombardier announced it was increasing its investment by US\$50 million to be able to manufacture the rear fuselage for its new business planes, the Global 7000 and Global 8000. One thousand eight hundred workers make these structural components, plus those of the Q400 Next Generation turbo helicopter, the Challenger 605 aircraft, and the fuselage and other components of the Lear Jet 85.¹³

The Center for the Development of the Aeronautics Industry (Cedia) promotes the development of Mexico's aerospace cluster by analyzing data and proposing technical solutions for aerospace engineering. The Querétaro Research and Innovation Network (RIIAQ) was set up to bring together research centers and institutions of higher learning in aeronautics to foster high-level research, training of specialists, and certification of facilities for the aeronautics industry. Members of this network include the Querétaro Aeronautics University (UNAQ), the Center for the Development of the Aeronautics Industry, the Center for Advanced Technology, the Polytechnic University, the Center for Research and Technological Development in Electrochemistry (Cideteq), the Industry of Turbo Reactors (ITR), Solutions in Energy Savings Mexico (Saemex), and the Monterrey Technological Institute/Concordia University partnership.

The aeronautics cluster in Querétaro is made up of the following Mexican and foreign institutions:

- a) Engineering and design: Bombardier, Aernnova, Kio Aerospace, Messier Services;
- b) Manufacturing of fuselages, wings, harnesses, complex components, and engines: Bombardier, General Electric-IQ; Engineering and engines: SAFRAN; Advanced technology for the aerospace industry: ITR, Carpenter Technology, and Southwest United Canada.
- c) Special processes and parts and spare parts suppliers: Hyrsa, Daewood Electronics, Delphi, and Galnik; metal processing: CRIO; engine parts: Elimco Prettl.
- d) Universities: the National Autonomous University of Mexico in Querétaro, the Autonomous University of Querétaro; the Querétaro Aeronautics University, the Polytechnic University, the Technological Institute of Querétaro, the Technological Institute of Monterrey, Concordia University, Conalep, and the School of Engineers.
- e) The Querétaro Research and Innovation Network (RIIAQ): Bombardier; Safran; ITR; Galnik; Hyrsa; Carpenter Technology; Navair; the global corporation LABTA with its high-tech laboratories; the research and development centers supported by Conacyt, CIDESI, CIATEQ, and CIDETEQ; and the Concordia Institute of Design and Innovation.

With the support of the Querétaro state government, which participated in meetings with U.S. and Canadian entrepreneurs in the framework of NAFTA, the investment begun by Bombardier in 2005 has given rise to that company's value chain. This includes research, design, and engineering in Montreal; engine manufacture in Toronto; making the fuselage, wings, and cable harnesses in Querétaro; and the final assembly in the Wichita, Kansas factory. The fact that it is assembled in the U.S. makes it a U.S. export, but clearly, the participation of Canadians and Mexicans in manufacturing Bombardier aircraft actually make them a NAFTA product.

The global companies and sophisticated components suppliers have matured their manufacturing processes; they have an enormous capability for job creation and the training needed to have an above-average work force. This will benefit other branches of industry and will allow them to be multipliers of economic development.

These productive chains organized in bordering countries with trade liberalization agreements become global value chains for high-tech, advanced industries supported by universities and research centers, and labor-intensive manufacturing like the aeronautics industry. They require a technically trained

work force with special skills that boosts the competitiveness of participating nations and raises the living standards of their populations. Today, Canadian, U.S., and Mexican experts are saying that the material, financial, and human resources exist for building an aircraft in Mexico. We will soon see.

This is how U.S. investors recognize the opportunities for doing business that Querétaro offers, and in their meetings with local businesspersons, in the NAFTA framework, they show interest in investing there. ■■■

NOTES

¹ Robert Keohane and Joseph Nye, *Power and Interdependence* (New York: Harper Collins, 1989).

² Ley de Inversión Extranjera y su Reglamento, www.diputados.gob.mx/Leyesbiblio/regley/Reglie, accessed in May 2015.

³ Ley de Ciencia y Tecnología, Cámara de Diputados, www.diputadosgob.mx/leyesbiblio/, accessed in August 2015.

⁴ For more on Conacyt programs, see <http://www.conacyt.mx/index.php/fondos-y-apoyos>.

⁵ INEGI, "Bienestar por entidad federativa: Querétaro," www.inegi.org.mx/estadisticas, accessed in June 2015.

⁶ See www.turbopropulsores.mexico, accessed in July 2015.

⁷ *Plan de Desarrollo de Querétaro 2004-2009*, www.queretaro.gob.mx, accessed in June 2015.

⁸ "Arranca construcción de Parque Industrial de Aeronáutica," *El rotativo* (Querétaro), February 1, 2006, www.rotativo.com.mx/noticias/metropoli/Queretaro, accessed in June 2015.

⁹ *Plan Querétaro 2010-2015*, www.queretaro.gob.mx/documentos, accessed in August 2015.

¹⁰ This committee was set up to aid in linking up local government and community international activities and facilitating their comprehensive development. It works in conjunction with Mexico's Foreign Relations Ministry. See Asociación Mexicana de Oficinas de Asuntos Internacionales de los Estados, <https://coordinacionpolitica.SRE.gob.mx/index.php/>.

¹¹ "Financiamiento Internacional a Tecnología e Innovación en Querétaro," *El rotativo* (Querétaro), May 24, 2014, see www.rotativo.com.mx/noticias/me_tropoli/Queretaro.

¹² See cidesi.com/wsite/nosotros, accessed in August 2015.

¹³ See www.bombardier.femia.info, accessed in May 2015.