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Southern Connection

Innovation Clusters in Mexico and the Bridge to Silicon Valley

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Acronyms List

ADIP	Agencia Digital de Innovación Pública
AMEXCAP	Asociación Mexicana De Capital Privado
ANUIES	Asociación Nacional de Universidades e Instituciones de Educación Superior
ASELA	Asociación de Emprendedores de Latinoamérica
ASEM	Asociación de Emprendedores de México
CAIINNO	Centro de Análisis para la Investigación en Innovación
CAINTRA	Camara de la Industria de Transformación de Nuevo León
CANACINTRA	Cámara Nacional de la Industria de Transformación
CANIETI	Cámara Nacional de la Industria Electrónica, de Telecomunicaciones y Tecnologías de la Información
CAPA	Centro Autofinanciable de Prototipos y Arquetipos
CCE	Consejo Coordinador Empresarial
CDIT	Centro de Desarrollo e Innovación Tecnológica
CDT	Consejo de Desarrollo de Tijuana
CECyTE	Colegio de Estudios Científicos y Tecnológicos del Estado de Baja California
CEDE	Centro de Emprendimiento y Desarrollo Empresarial
CEI	Centro de Emprendimiento e Innovación
CEID	Centro en Innovación y Diseño
CENACE	Centro Nacional de Control de Energía
Cenapyme	Centro Nacional de Apoyo a la Pequeña y Mediana Empresa
CENICIS	Centro de Ingenieria de Conocimiento e Ingeniería de Software
CETIC	Consejo de Empresarios en Tecnología Innovación y Comunicación
CETYS	Centro de Enseñanza Técnica y Superior
CFE	Comisión Federal de Electricidad
CIATEQ, A.C.	Centro de Tecnología Avanzada
CICESE	Centro de Investigación Científica y de Educación Superior de Ensenada
CICTA	Centro de Investigación en Ciencia y Tecnología Aplicada
CIDER	Centro de Innovación y Desarrollo Económico Regional
CIDETEQ	Centro de Investigación y Desarrollo Tecnológico en Electroquímica
CIG	Centro de Investigación y Geociencia
CIITA	Centro de Innovación e Integración de Tecnologías Avanzadas
CIMAT	Centro de Investigación en Matemáticas
CIMyT	Centro de Innovación en Moldes y Troqueles
CIPAE	Centro de Inteligencia para el Apoyo a Emprendedores
CNyN	Centro de Nanociencias y Nanotecnología
COCITBC	Consejo de Ciencia e Innovación Tecnológica de Baja California
COECYTJAL	Consejo Estatal de Ciencia y Tecnología de Jalisco
COFECE	Comisión Federal de Competencia Económica
CONACYT	Consejo Nacional de Ciencia y Tecnología
CONCAMIN	Confederación de Cámaras Industriales
CUCEI	Centro Universitario de Ciencias Exactas e Ingenierías
DECJ	Desarrollo Económico de Ciudad Juárez
EEI	Estrategia de Especialización Inteligente
FECHAC	Fundación Del Empresariado Chihuahuense
FIDEAPECH	Fideicomiso Estatal para el Fomento de las Actividades Productivas en el Estado de Chihuahua
FINAFIM	Fideicomiso del Programa Nacional de Financiamiento al Microempresario
FNE	Fondo Nacional Emprendedor
FOMIX	Fideicomiso Fondo Mixto CONACyT - Estado de Nuevo León
FOMMUR	Fondo de Microfinanciamiento a Mujeres Rurales
FONLIN	Fondo para la Innovación de Nuevo León
FUMEC	Fundación México-Estados Unidos para la Ciencia
I2C	Instituto de Innovación y Competitividad
I2T2	Instituto de Innovación y Transferencia de Tecnología
IA.Center	Centro de Inteligencia Artificial
IADA	Instituto de Arquitectura, Diseño y Arte

IBERO	Universidad Iberoamericana
IFT	Instituto Federal de Telecomunicaciones
IIMAS	Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas
IIT	Instituto de Ingeniería y Tecnología
IJALTI	Instituto Jalisciense de Tecnologías de la Información
IMCO	Instituto Mexicano para la Competitividad, A.C.
IMMEX	Programa de la Industria Manufacturera, Maquiladora y de Servicios de Exportación
IMP	Instituto Mexicano del Petróleo
IMSS	Instituto Mexicano del Seguro Social
INADEM	Instituto Nacional del Emprendedor
INDEX	Consejo Nacional de La Industria Maquiladora y Manufacturera De Exportación
INEEL	Instituto Nacional de Electricidad y Energías Limpias
INEGI	Instituto Nacional de Estadística y Geografía
INFOTEC	Centro de Investigación e Innovación en Tecnologías de la Información y Comunicación
IPADE	Instituto Panamericano de Alta Dirección de Empresa
IPE	Instituto Promotor para la Educación de Chihuahua
ITAM	Instituto Tecnológico Autónomo de México
ITCJ	Instituto Tecnológico de Ciudad Juárez
ITESM	Instituto Tecnológico y de Estudios Superiores de Monterrey
ITESO	Instituto Tecnológico de Estudios Superiores de Occidente
ITM	Instituto Tecnológico De Mérida
ITQ	Instituto Tecnológico de Querétaro
ITT	Instituto Tecnológico de Tijuana
LaNTI	Laboratorio Nacional de Tecnologías de Información
LEIF	Laboratorio de Ensenada del Instituto de Física
NAFIN–FCE	Nacional Financiera–Fideicomiso de Capital Emprendedor
ONMR	Observatorio Nacional de Mejora Regulatoria
PADCE	Padron de Desarrolladoras de Capacidades Empresariales
PEI	Programa de Estímulos a la Innovación
PEMEX	Petróleos Mexicanos
PIIT	Parque de Investigación y Innovación Tecnológica
PRONAFIM	Programa National de Financiamiento al Microempresarior
PROSOFT	Programa para el Desarrollo de la Industria del Software
RENIECYT	Registro Nacional de Instituciones y Empresas Científicas y Tecnológicas
RISE	Reglamento Interior de la Secretaría de Economía
SADER	Secretaría de Agricultura y Desarrollo Rural
SEDEMA	Secretaría del Medio Ambiente de las Ciudad de México
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales
SENER	Secretaría de Energía
SEPROA	Secretaría para el Manejo, Saneamiento y Protección al Agua
SEST	Secretaría de Economía Sustentable y Turismo
SIDE	Secretaría de Innovación y Desarrollo Económico
SNI	Sistema Nacional de Investigadores
UABC	Universidad Autónoma de Baja California
UACJ	Universidad Autónoma de Ciudad Juárez
UADY	Universidad Autónoma de Yucatán
UAG	Universidad Autónoma de Guadalajara
UANL	Universidad Autónoma de Nuevo León
UAQ	Universidad Autónoma de Querétaro
UDEM	Universidad de Monterrey
UDP	Unidad de Desarrollo Productivo
UMM	Universidad Metropolitana de Monterrey
UNAM	Universidad Nacional Autónoma de México
UNEA	Universidad de Estudios Avanzados
UP	Universidad Panamericana
UPY	Universidad Politécnica de Yucatán
UTCJ	Universidad Tecnológica de Ciudad Juárez
UTEQ	Universidad Tecnológica de Querétaro
UTT	Universidad Tecnológica de Tijuana

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Mexico

Carolina Agurto, Partner, Fundación IDEA (Monterrey)

Laura E. Araujo, Director of Binational Affairs, Tijuana Innovadora

Jose Arreguin, Nearshore Software Development Consultant, ArkusNexus (Baja California)

Tuto Assad, Co-Founder & CEO, Vitau (Monterrey)

Marco Barraza, VP Enterprise Operations, Arkus, Inc. (Baja California)

Lorenzo Berho, Chairman & CEO, Vesta (Mexico City)

Cindy Blanco, CEO & Co-Founder, StartupGDL (Guadalajara)

Alvaro Bustillos, Chairman, Desarrollo Económico de Ciudad Juárez A.C.

Michael Cam-Phung, Chief Strategy Officer, Seisa (El Paso/Juárez)

Gabriel Camarena, President, Consejo Coordinador Empresarial (CCE) de Tijuana (Tijuana)

Andrés Campos, former Executive Director, Ensenada Economic Development Corporation

Jose Antonio Casanueva Perez, Co-Founder, Máquina (Mexico City)

Mario Chacón, Regional Director, New Business, Vesta (Mexico City)

Guillermo Chavez, CFO, Klustera Inc. (Mexico City)

Julio Chiu, Founder & CEO, Seisa (El Paso/Juárez)

Bernardo Cisneros Buenfil, Secretary, Secretaría de Investigación, Innovación y Educación Superior, Yucatán, Gobierno del Estado (Mérida)

Rogelio De los Santos, Co-Founder & Managing Partner, Dalus Capital (Monterrey)

Josué Omar Delgado Gutiérrez, Director, INCmty (Monterrey)

Guillermo Diaz, Chief Investment and Innovation Officer, Vesta (Mexico City)

Alejandro Diez Barroso Lascurain, Co-Founder, Dila Capital (Mexico City)

Adriana Eguia, Vice President, New Business, Vesta (Mexico City)

Carlos Guillermo Elizondo, CEO & Founder, Territorium Life (Monterrey)

Ivan Espadas, Founder & Director General, Blue Ocean (Mérida)

Alejandro Espinosa, Founder, BioLaunch (Guadalajara)

Manuel Familiar, Associate Partner, Anderssen Gauguin (Monterrey)

Miguel Fernandez, CEO, Director & Co-Founder, Transtelco (Juárez)

Luke Finney, Co-Founder and Head of Operations, Terminal (Guadalajara)

Carlos Flores, General Director, Corazón Capital (Mexico City)

Jesus Mauricio Flores, Principal, Hack Fund (Santa Mónica)

Luis Alberto Garcia, General Director, IJALTI (Guadalajara)

Luis Garza Sada, Founder, Kinedu (Monterrey)

Antonio Gonzales, General Director, Instituto Yucateco de Emprendedores (Yucatán)

Bernardo González, President, Amafore (Mexico City)

Miguel Alejandro González, Secretary, Secretaría de Desarrollo Económico, Aguascalientes Gobierno del Estado

Jorge Gorozpe Velazquez, Director of Energy Development, Secretaría de Economía y Trabajo del Estado de Nuevo León

Delfina Guedemin, Business Incubator and Accelerator Manager, tecniA, Universidad Anáhuac Mayab (Yucatán)

David Güemes-Castorena, Professor of Technology and Innovation Management, Tecnológico de Monterrey

Michelle Guerrero, Director, CCE Tijuana

Rodolfo Guzmán, Director General, Jalisco Film Commission (Guadalajara)

Maan Hamadé, CEO, Interdeli (Querétaro)

Guillermo Hernández Duque, Rector, Universidad Tecnológica de Aguascalientes

Claudia B. Hernández Merlo, Director of Technology, Office of Innovation and Development, CONACYT (Baja California)

Martin Herrera, Digital Enablement–Business Consulting Services, CEMEX (Monterrey)

Benjamin Huerta Astrada, President, IJALTI (Guadalajara)

Alberto Ibarrraran, Director of Innovation and Digital Business Development, Bosch México (Guadalajara Connectory)

Eduardo Alberto Infante Priego, Undersecretary for Investment and Development, Secretaría de Desarrollo Económico, Aguascalientes Gobierno del Estado

Patxi Ipiña, Managing Director, Agencia para el Desarrollo de Yucatán (Mérida)

David Jimenez, Managing Director CPG, Softtek (Monterrey)

Mónica Lacavex Berumen, Vice Rector–Ensenada Campus, Universidad Autónoma de Baja California

Martha Leal González, Director of Planning, Postgraduate, Outreach and International Cooperation and Networks, Instituto de Innovación y Transferencia de Tecnología (I2T2) (Monterrey)

José López Castellanos, former Undersecretary for Investment Promotion, Secretaría de Desarrollo Económico de Baja California

Monserrat Magaña Ocaña, General Director for Investment Attraction and Foreign Trade, Secretaría de Desarrollo Económico, Aguascalientes Gobierno del Estado

Guillermo Mejía, VP Program Development, Framework Science and Startup Advocate, Frontera Founders (Baja California)

Raúl Martin Porcel, CEO & Co-Founder, Talent Network International (Guadalajara)

Martín Mathus, Director General, Nextia, Inc.

Hector Mayami-Sugranes, Director General, INCIDES (Baja California)

Francisco Medina, Director General, Consejo Estatal de Ciencia y Tecnología de Jalisco–COECYTJAL (Guadalajara)

Sergio Mendoza, Chairman, Desarrollo Económico de Chihuahua A.C.

Edmundo Montaño Martin Del Campo, Director, Drip Capital Mexico (Mexico City)

Ricardo Mora, CEO & Co-Founder, Technology Hub (Juárez)

Valeria Moy, General Director, IMCO (Mexico City)

Nadia Nieblas, Research and Studies Coordinator, INCIDES (Baja California)

Flavio Olivieri, Institutional Developer, Tijuana Innovadora

David Ortega, Director, CIDESI Nuevo León

Alfredo Pacheco Vásquez, Director General, CANIETI (Mexico City)

Ivonne Padilla, Director of Strategic Alliances, INCmty (Monterrey)

Jesús Palomino, General Director, Intel Design Center (Guadalajara)

Monica Pascua, Director of Research, AMEXCAP (Mexico City)

David Peguero, Co-Founder, GrowthHax (Baja California)

Eric Pérez-Grovas (Mexico City)

Francisco Pérez-González, Professor of Finance and Dean, ITAM (Mexico City)

Octavio Perez, Senior Manager and Site Leader, Thermo Fisher Scientific IT Center of Excellence (Tijuana)

Alfonso Pompa Padilla, Secretary, Secretaría de Innovación Ciencia y Tecnología, Jalisco, Gobierno del Estado (Guadalajara)

Juan Manuel Ponce Díaz, Shareholder Director, Bepensa (Mérida)

Tony Rallo, Co-Founder, KIO Networks (Mexico City)

Iliana Ramirez, Director of Human Capital, Csoftmty (Monterrey)

Gabriel Reyes, CEO, iDigital Groups (Baja California)

Liliana Reyes, General Director, AMEXCAP (Mexico City)

Mark Rinder, Fulbright Grantee & Intelligence Analyst, Endeavor México

Sergio Rios, Director General for Investment Attraction, Secretaría de Desarrollo Económico, Gobierno de Jalisco (Guadalajara)

Iván Rivas Rodríguez, Director General, Coparmex Nuevo León

Enrico Robles, CFO & Intelligence Director, Endeavor México (Mexico City)

Álvaro Rodríguez, Co-Founder & Managing Partner, IGNIA Ventures (Monterrey)

Ivan Rodriguez Jaubert, Founder, Dupla Helica (Monterrey)

Raul Rodriguez, Vice President International Relations, Tecnológico de Monterrey

Sergio Rosengaus, CEO, KIO Networks (Mexico City)

Rob Ryan, Co-Founder, GrowthHax (Baja California)

Juan Saldívar, Managing Partner & Founder, SWS.consulting (Mexico City)

Gildardo Sanchez, Rector, Universidad Politécnica de Yucatán (Mérida)

Ernesto Sanchez Proal, Minister of Economic Development, Jalisco State Government (Guadalajara)

Gary Swedback, CEO, NAI Mexico (Baja California)

Darío Treviño, Vice President, International Relations, Coparmex Nuevo León

Daniel Undurraga, Co-Founder & CTO, Cornershop (Mexico City)

Aaron Victorio, Director, Consejo de Desarrollo de Tijuana (CDT) (Tijuana)

Felipe Vallejo Dabdoub, Head of Risk and Corporate Affairs, Bitso (Mexico City)

Angeles Vela del Río, Director General, Csoftmty (Monterrey)

Cristina Villa Pulido, Energy Promotion Coordinator, Secretaría de Economía y Trabajo del Estado de Nuevo León

Patricio Villalobos Cuevas, Co-Founder, Underdog (Mexico City)

Ivan Villanueva, former Senior Business Development Officer, Secretaría de Desarrollo Económico de Baja California

Bay Area/US

Angel Alban, President, Zvetus

Lynne Bairstow, Founder, MITA and Managing Partner, MITA Ventures

Nicholas Bambos, Chair, Department of Management Science & Engineering, Stanford University

Stefano Bertozzi, Professor of Health Policy and Management, UC Berkeley School of Public Health and former interim director, Alianza UCMX

Soren Bjorn, President, Driscoll's of the Americas

Bruce Cain, Director, Bill Lane Center for the American West, Stanford University

Xochitl Castaneda, Director, Health Initiative of the Americas, UC Berkeley School of Public Health

Amelia Ceja, President Ceja Vineyards

James Clark, Managing Director and Director of Development, California/Bajío Associates

Nikia Clarke, Executive Director, World Trade Center San Diego

Gustavo de la Fuente, Executive Director, San Diego/Tijuana Smart Border Coalition

Luisa M. del Rosal, Executive Director, Mission Foods Texas-Mexico Center at SMU

Bryan Early, Adviser to Commissioner Andrew McAllister, California Energy Commission

Liliana Ferrer, Consul General, Consulate General of Mexico in Sacramento

Melissa Floca, Chief Strategy Officer, Center for U.S.-Mexican Studies, University of California, San Diego

Fernando Franco, Executive Director, Puente Labs

Jesse Gipe, Director, World Trade Center San Diego

Remedios Gómez Arnau, Consul General, Consulate General of Mexico in San Francisco

Rodolfo Gonzalez, Partner, Foundation Capital

Greg Horwitt, Director of Innovation Design, UC San Diego

Ariel Jaduszliwer, Managing Partner, Brainstorm Ventures

Edward Klotzbier, Vice Chancellor, UC Merced

Ernesto Lappe, International Leval Manager, Gruma Corporation

Roman Leal, Managing Partner, LEAP Global Partners

Bismarck Leppe, Founder and CEO, Wizeline

Luisa Levario, Chief of Staff, Alianza UCMX

Helen Lopez, Assistant Director, International Affairs Office, California Governor's Office of Emergency Services

Sergio Monsalve, Founding Partner, Roble Ventures and former General Partner, Norwest Venture Partners

Juan Mora, Founder & CEO, Propeller Strategies

Jonathan Nelson, Founder, Hackers/Founders

Sherri Nordwall, Project Manager, The Empire Group

Hillary Olcott, Associate Curator, Arts of Africa, Oceania and the Americas, de Young Museum

Max Oltersdorf, Deputy Director for International Affairs and Trade, Governor's Office of Business and Economic Development, State of California

Sergio Ortiz Valdés, California Office Director, Tecnológico de Monterrey

Blas L. Pérez Henríquez, Director, Stanford | Mexico Clean Economy 2050

Enrique Perret, Director, U.S.-Mexico Foundation

Juan Puentes, Proprietor, Honrama Cellars

Miriam Puentes, Proprietor, Honrama Cellars

Eduardo Rallo, Co-Founder and Managing Partner, Brainstorm Ventures and Partner, Pacific Community Ventures

Bill Reichert, Partner, Pegasus Tech Ventures

Luis Robledo, Regional Sales Representative, Robledo Family Winery

Cecilia Romero Larroque, Asset Manager, Grupo El Florido (Baja California)

Angel Saad Gómez, Venture Partner, Oak Investment Partners

David Salazar Cavazox, Vice President, Legal Services, Gruma Corporation

Alana Sanchez, International Relations Adviser to California Energy Commission Chairman David Hochschild

Rodrigo Sanchez Servitje, Managing Partner, B37 Ventures

Andrew Selee, President, Migration Policy Institute

Georgina Serrano Romero, President, Raserver Inc.

Susanne Stirling, Vice President, International, California Chamber of Commerce

Isabel Studer, Director, Alianza UCMX

Andy Tsao, Managing Director, Global Gateway, Silicon Valley Bank

Carlos Valderrama, California Trade & Investment Representative–Americas, Governor's Office of Business and Economic Development, State of California

Consuelo Valverde, Founder and Managing Partner, SV Latam Capital

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Cuco Vega, Co-Founder & COO, Bexi

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Executive Summary

Mexico's National Economy

With a GDP of USD 1.2 trillion and a population of almost 130 million, Mexico's economy is the second largest in Latin America and the 15th largest in the world measured by 2019 GDP. In recent decades it has moved from one based heavily on agriculture and manufacturing to being led more by services. Growth, which since 2015 had been in the range of 2.1–3.3%, became negative in 2019 and has remained so due to COVID-19, but has been forecast by the IMF to recover to 4.5% in 2021. Key sectors include manufacturing (led by automobiles, aerospace and medical devices), agriculture, energy, telecommunications, IT, and financial services, with telecom, IT and financial services seeing particularly strong growth.

In global rankings for innovation, ease of doing business, and competitiveness, Mexico falls in the middle, but at or near the top in Latin America. In the mid 2000s, the Mexican government initiated a series of reforms to stimulate competition and open the country's telecommunications and energy markets. As a result, telecommunications costs have dropped dramatically and access to service has increased, laying the foundation for a growing digital economy. The de-nationalization of the energy sector has spurred foreign investment, increased production, and accelerated the shift toward renewable energy. In another initiative, INADEM (the national institute for the entrepreneur), invested government funds to jump-start a venture capital industry.

Lately, under the administration of President Andrés Manuel López Obrador, many of those reforms have been challenged or reversed, as government priorities have shifted toward social services and support for state-owned entities such as PEMEX and CFE. INADEM was dissolved in 2019. As national government policies have become less supportive of business, attention is shifting to Mexico's states and cities, many of which have adopted policies that actively support business development and innovation-led growth.

Entrepreneurs, Startups and Venture Capital

As the economy evolves toward advanced manufacturing, business services, and innovation-led growth, new economic actors are taking the stage as startups with venture capital play a more active role.

Mexico's venture industry is young but has grown significantly since 2016, when infusions of funding from INADEM helped to launch a wave of new venture capital firms. From USD 55 million in 2010, yearly capital investment grew to more than USD 1 billion in 2019. Investment is primarily at seed and early-stage, with most funds concentrated in Mexico City, followed by Jalisco (Guadalajara) and Nuevo León (Monterrey). An

important corner was turned in 2019 with the launch of Softbank's USD 2 billion Innovation Fund to invest in Latin American startups; now a USD 5 billion fund, its entry into the market validated Mexico and Latin America as a field for global venture investment.

Most venture deals are concentrated in the consumer discretionary and financial services sectors, with fintech a major focus. Successful companies such as Cornershop, Clip, Kavak, Konfio, and Jüsto have confirmed the ability of Mexican startups to scale. To scale further, many are expanding into Latin America, particularly Colombia and Chile.

The venture market still faces limitations: conservative investors, a shortage of growth capital, a narrow window for exits, and low visibility for Mexican startups outside Mexico. But investment growth in 2019 and 2020 and the success of a handful of now well-known startups point to continued progress.

Innovation Clusters in Mexico's States and Cities

Key states and cities across Mexico are developing innovation ecosystems, often with the active support of state and local governments and university and business community partners. A number stand out: Tijuana/Mexicali/Ensenada (Baja California), Ciudad Juárez (Chihuahua), Monterrey (Nuevo León), Guadalajara (Jalisco), Mérida (Yucatán), Mexico City, and the Bajío region, an economic grouping of all or part of four states—Aguascalientes, San Luis Potosí, Guanajuato, and Querétaro, known together as El Bajío—along with adjacent portions of the states of Zacatecas and Jalisco.

Tijuana/Mexicali/Ensenada

What makes Baja California unique is the scale of investment in the cities of Tijuana, Ensenada, and Mexicali, which capitalizes on its proximity to San Diego and California. This has enabled a dynamic cross-border economy in what is known locally as the Cali-Baja region.

The San Ysidro Land Port of Entry is the busiest land border crossing in the Western Hemisphere, with an average of 90,000 passengers and pedestrians making the northbound crossing of the Tijuana-San Diego border each day. In 2019, there were more than 36.7 million northbound crossings of vehicle passengers and pedestrians at San Ysidro (which doesn't allow freight crossings) plus 1.7 million northbound truck and full truck container crossings 6 miles away at the Otay Mesa port of entry.

With a population of 2 million and one of the fastest growth rates in Mexico, Tijuana is the country's fifth largest city and concentrates much of the state's economic activity. The region is an important center for binational manufacturing in industries including aerospace, medical devices, biotechnology, automobiles, and electronic equipment, supporting jobs on both sides of the border. Production concentrates in 101 industrial parks, including 65 in Tijuana and more than 25 in Mexicali.

Engineering is a strength. Led by universities such as UNAM (the national autonomous university of Mexico) and UABC (the autonomous university of Baja California), approximately 27% of the students graduating each year from Tijuana's more than 35 universities are engineers. Other noteworthy universities and research institutes include CETYS (the center for technical and higher education), CICESE (the center for higher education and research in Ensenada), and CNyN (the center for nanosciences and nanotechnology).

Baja California is attempting to create an environment that is conducive to startups but faces several challenges, including a shortage of venture capital, the lack of high-profile exits by local startups, and few large companies that are locally based and could support or nurture young companies. Its assets include a large pool of skilled engineers, a sophisticated manufacturing sector that is working to increase its value-added capacity with new technologies and increased R&D, and proximity to California.

Ciudad Juárez (Chihuahua)

On the Texas-US border opposite El Paso, Ciudad Juárez is another major center for manufacturing, hosting 329 maquiladora companies with more than 300,000 employees. The city is a center for binational

production; key sectors include transportation, computer-related equipment, and electrical equipment. Parts and components flow south from the US for sub-assembly in Juárez and are re-exported to the US, often for advanced processing. Because most inputs are imported from the US, the city is seeking to increase the share of local content.

Together with partners at universities and in the business community, Juárez is working with some success to create an innovation ecosystem that will move the city toward higher-value production and new business creation by startups. This includes providing tools and infrastructure to increase R&D by the more than 70 Fortune 500 companies that operate in Juárez. Leading universities—UACJ (the autonomous university of Ciudad Juárez), UTCJ (the technological university of Ciudad Juárez), and ITCJ (the technological institute of Ciudad Juárez)—contribute. Research capacity is growing through centers that include CIITA (the center for innovation and integration of advanced technologies), IA.Center (the artificial intelligence center), and CICTA (the center for research in applied science and technology).

An array of state and local government initiatives focus on entrepreneurial development. University-based and private incubators provide support, including Technology Hub, a 55,000 square foot facility that hosts approximately 100 companies. Three small regionally-based venture funds have also been created.

The startup community in Juárez is small and access to venture capital is very limited. A constrained supply of STEM graduates and low visibility both inside and outside Mexico are also challenges. But the leadership of the city is strategically focused on building its innovation ecosystem. The strong base in Juárez of manufacturing and binational production in particular creates a platform for both investment and the application of innovative and advanced technologies as the city grows its technology and R&D base.

Monterrey (Nuevo León)

The state of Nuevo León has a per capita GDP (USD 17,844 in 2019), which is 88% higher than the national average (USD 9,489), while its capital Monterrey has the highest GDP per capita in Mexico and the second highest in Latin America. Nuevo León leads other states by a significant margin in foreign direct investment, with manufacturing accounting for 58%. Most investment comes from the United States, and manufacturing worker productivity is the highest in Mexico.

A national center of private business, the city is home to a high percentage of Mexico's largest companies and many multinationals. Business connections to Texas are particularly strong and business culture more closely resembles that of the US than most other states in Mexico.

The city and the state are working to move the economy to higher levels of value-added production and nurture an ecosystem that is conducive to innovation and entrepreneurship. Early initiatives include the establishment under the science and technology agency I2T2 of PIIT (the technology research and innovation park), followed more recently by the research and innovation strategy Nuevo León 4.0 that focuses on the adoption of technologies and business processes such as IoT, machine-to-machine communication, AI, digital manufacturing, big data, 3D printing, and advanced design, with the goal of helping Nuevo León's industrial sector compete globally through the development of smart factories.

A strong pipeline of human capital is provided by universities including UANL (the autonomous university of Nuevo León), UDEM (Universidad de Monterrey), UMM (Monterrey metropolitan university), and the private Tecnológico de Monterrey (Mexico's equivalent to MIT). In 2019, 193,000 students were enrolled in undergraduate and graduate programs, of which 82,000 were in science, technology, and engineering fields. Twenty-six thousand were at the graduate level, of which nearly 13,000 were in science and engineering programs. Tecnológico de Monterrey, a globally recognized university, particularly stands out for its orientation toward and programs dedicated to business and entrepreneurs.

The city's startup ecosystem includes an IT sector that is one of Mexico's largest, with more than 400 ICT companies working in software development, e-commerce,

fintech and mobile apps. That includes Softtek, the largest private technology company in Latin America. Approximately 350 of those companies are entrepreneur-led, and serial entrepreneurship is common. Venture capital has been hard to find but this is getting easier.

Founders are supported by angel investors, a venture capital community, and local family offices. The dollar value of angel and venture investment is low by US standards but growing, with nearly half of angel investment coming from the founding families of the city's large companies. Initiatives like the Monterrey Digital Hub link the city's large companies with startups and other sources of digital innovation. INCmty, a major national startup conference associated with Tecnológico de Monterrey, had 8,000 participants from Mexico and around the world in 2019 and 10,000 in 2020 when the conference was virtual. Despite these assets, scaling young companies in Monterrey remains a challenge, with much of its engineering and technology talent drawn to the United States.

Monterrey's unique positioning comes from its large manufacturing base, business community leadership, and the presence of headquarters of many of Mexico's leading companies which serve as both a market and a source of investment for entrepreneurs. Tecnológico de Monterrey (known as Tec de Monterrey) is a critical source for talent development and entrepreneurial support both inside and outside the university.

Mexico City

Besides being the national capital and administrative and cultural center of Mexico, Mexico City (CDMX) is at the heart of the national economy. When combined with the surrounding State of Mexico, CDMX accounts for more than a quarter of the national GDP. The city is also home to twelve of Mexico's fifteen largest companies. In contrast to Monterrey, which is home to the country's leading industrial companies, Mexico City's profile is weighted more toward commerce and state-owned companies. Between 1999 and 2020, Mexico City received the highest amount of foreign direct investment (USD 129.9 billion) in the country, and the surrounding State of Mexico received the third highest amount (USD 56.1 billion).

The city also concentrates scientific research and academic talent. Key institutions include UNAM (the national autonomous university of Mexico) which is Latin America's largest university, UP (pan American university), IPADE (the post-graduate business school of UP), IBERO, Universidad Anáhuac, the Mexico City campus of Tec de Monterrey, and ITAM (the autonomous technology institute of Mexico). All support active startup and entrepreneurial programs.

Venture investment has been growing. Mexico City concentrates most of Mexico's venture funds, and in 2019 it accounted for 75% of all venture transactions and nearly 80% of all invested venture capital in Mexico. The city is also home to leading accelerators such as Endeavor México, and corporate initiatives such as Google's Launchpad Accelerator Mexico and the Latin American headquarters of San Francisco's 500 Startups. Leading startups such as Clip, Konfio, and Kavak call the city home.

At the urban level, the government of Mexico City is working to accelerate digital infrastructure and the digitization of city services through ADIP (the digital agency for public innovation), which has been given responsibility for leading, designing, and monitoring the implementation of data management policies, open government, digital government, and the governance of technological infrastructure.

Guadalajara (Jalisco)

Guadalajara, in the state of Jalisco, is at the heart of Mexico's technology economy. Jalisco itself has the fourth largest economy in Mexico after Mexico City, the State of Mexico, and Nuevo León. Reflecting its technology base, the state ranks near the top in Mexico for innovative companies, trademark and patent applications and registrations, and higher education.

Guadalajara is home to leading universities and a large number of technical universities, technological institutes, and technical colleges. In 2020, 442,000 students were enrolled in Guadalajara higher education institutions. In 2019, the city produced more than 15,000 engineering graduates, of which approximately 6,500 were in high technology fields. Major universities that anchor the

business and technology economy include Universidad de Guadalajara (the leading university in the state, with 260,000 students, and the second largest in the country behind only UNAM), the Guadalajara campus of Tec de Monterrey, ITESO (the technological institute of higher studies of the west), and UAG (the autonomous university of Guadalajara). Together they offer a range of technology and entrepreneurship programs. Universidad de Guadalajara and Tec de Monterrey also host significant research laboratories and have collaborative internship programs with companies such as Intel, IBM, and Oracle.

Anchored by manufacturing, Jalisco is also home to 40% of Mexico's IT companies, with software development, software services, and business process outsourcing (BPO) to top fields. More than 1,000 high technology companies operate in Guadalajara, supporting 150,000 jobs, with large clusters in technology, e-commerce, financial services, health, and transportation. In contrast to other parts of Mexico, Guadalajara also enjoys a well-developed R&D base. In addition to global technology companies such as Flex, Foxconn, Sanmina, AstraZeneca, Tata, and NXP Semiconductors, it is also the Mexico base for an array of Silicon Valley companies including Oracle (which employs 1,500 in the development of core technologies, growing soon to 4,000), HP, and Intel (which employs 1,200 at its Guadalajara Design Center, the company's largest engineering center in Latin America and one of only six global centers that focus on long-term product development). Connection to the Bay Area is supported by three-hour direct flights, enabling the movement of personnel and closer integration of field operations with headquarters than is possible with technology centers in China or India.

Guadalajara's success in attracting global technology companies results in part from a sustained alignment and cooperation between the government, universities and businesses, which has produced initiatives such as IJALTI (the Jalisco institute of information technologies), COECYTJAL (the Jalisco state council of science and technology), and Consejo Jalisco 4.0 (an initiative to strengthen the contribution of higher education to technology innovation).

Growth in technology is mirrored in a growing number of startups, particularly in fintech, some with dual headquarters in Guadalajara and Silicon Valley. While its base in engineering is strong, growth of the startup ecosystem has been limited by a small pool of venture capital compared to Mexico City and Monterrey. Despite this, the system has been growing due to accelerators like StartupGDL and Talent Land, an annual week-long conference that draws 35,000 participants, including students, entrepreneurs, and large and small businesses, for programs around themes of technology and talent development.

El Bajío and Yucatán

Though not as advanced in their efforts to develop startup and innovation ecosystems, the Bajío region in central Mexico and the city of Mérida in the state of Yucatán offer interesting possibilities.

The Bajío region (an economic grouping of all or part of four states—Aguascalientes, San Luis Potosí, Guanajuato, and Querétaro, known together as El Bajío—along with adjacent portions of the states of Zacatecas and Jalisco)– is a major manufacturing center that has enjoyed higher growth than much of Mexico, supported by business-friendly policies. Aguascalientes, Guanajuato, and Querétaro in particular rank high among Mexican states for their economic competitiveness. In recent decades, the region has become a major magnet for foreign investment, particularly in the automotive and aerospace sectors, and is second only to the northern border states as a destination for FDI. With a strong of universities and public technology research centers, a significant IT sector is growing.

Mérida, the capital of the state of Yucatán, is also attracting attention due to its sustained growth, quality of life, appeal to creative industries, and favorable business and security environment. While the state's economy is led by tourism and agribusiness, Mérida is pushing into information technology with the goal of becoming an offshore service center for US companies. That ambition is supported by a higher education base that includes universities such as Anáhuac Mayab and UPY (the Yucatán polytechnic university) which support IT skills and entrepreneurial activity. The city has generated medium-sized IT companies such as

4th Source and Plenumsoft, but venture capital is scarce and it remains difficult for startups in Mérida to scale. However, universities and initiatives like tecniA, a technology park and entrepreneurial center that provides founders with business and incubation services, are supporting the ecosystem's development and helping to expand its international connections.

Mexico in the Bay Area

Out of all its global partnerships, the Bay Area's relationship with Mexico is unique due to its hemispheric setting, differences in economic structure, and shared history dating to the Spanish colonial era. The recent evolution of Mexico's economy—toward one where technology, innovation, and entrepreneurship play a greater role—is adding new depth, opening doors that go well beyond the lens through which US-Mexico economic relations are typically viewed.

Three Mexican consulates serve the region, which is also connected to Mexico by deep university ties. A rich array of Mexican-oriented community and cultural organizations, including major museums, connect to the Bay Area's demographics and history. With his wife Frida Kahlo, famed Mexican muralist Diego Rivera made two highly productive visits to San Francisco, where he produced three powerful murals at locations throughout the city.

Mexico's business footprint can be seen, for example, in organizations such as the Mexican-American Vintners Association (MAVA), which links sixteen Mexican family-owned wineries in Sonoma and Napa Valley. Many were founded by immigrants who came to the region decades ago as contract farm workers.

Investment from the Bay Area and California to Mexico has a growing technology focus. Investment from the state rose significantly in 2018 and dramatically in 2019. The largest category when measured by transactions was by far software and IT services (46), followed by transportation and warehousing (15), business services (14), automotive components (11), communications (10), electronic components (8), food and beverages (7) and real estate (7). In 2020, software and IT services saw the strongest growth. Of 160 investments from California, 72 were made by Bay Area companies, predominantly from Santa Clara County (31) and San Francisco (27), reflecting the strong technology focus of Bay Area investors. Alameda County accounted for 8, while 6 came from San Mateo County. While spread across Mexico, California investment was concentrated in four cities: Mexico City, Tijuana, Guadalajara, and Monterrey.

Bay Area technology companies are expanding their presence in Mexico, often to access engineering talent. Most focus on Guadalajara and Mexico City. Beyond the presence of long-established companies such as Oracle, HP, and Intel in Guadalajara and Plantronics in Tijuana, new companies are tapping into Mexico's markets and human capital resources. In 2020, Lyft established an engineering office in Mexico City. Construction drone startup Skycatch has an engineering team in Guadalajara. In the consumer space, Uber operates in 57 Mexican cities, making Mexico one of its largest global markets. Netflix had more than 8,000,000 subscribers in Mexico in the second quarter of 2020 and is investing to increase production there. Stripe launched in Mexico City in October 2019, its first presence in Latin America.

Bay Area venture capital firms don't yet have a large presence in Mexico but interest is growing, with firms such as Sequoia, Accel, Andreesen Horowitz, Foundation Capital, and other leading firms investing. Bay Area-based VC firms with a core focus on Mexico and Latin America such as LEAP Global Partners, MITA Ventures, B37 Ventures, and SV Latam Capital are also active, as is Silicon Valley Bank through its role as a financial partner for Mexican and Latin American startups and their investors. Accelerators such as 500 Startups and Y Combinator play an important bridging role, as do universities such as Stanford that graduate Mexican founders. A number of Mexican startups such as Platzi, Wizeline, and Nebia are now headquartered in the Bay Area, in some cases with dual headquarters and engineering in Mexico.

Conclusions

As the Bay Area's role as a global technology and innovation center has grown, the scope of its relationship with Mexico has expanded to include technology R&D

and an active connection through startups. This presents opportunities to expand the relationship.

While manufacturing remains the base and Mexico's production has continued to grow in sophistication and efficiency, US companies are also finding a large base of engineering talent that can be harnessed for sales, customer support, and R&D serving the Mexican, Latin American, US and global markets.

The United States-Mexico-Canada Agreement (USMCA) provides an important framework for investment. Its approval ended a period of uncertainty and enables the continued integration of North America's markets. Tensions between the United States and China and regarding over-dependence on China for strategic and other goods have led to a growing interest in resilient and secure global supply chains. With its proximity to the US and economic integration at the hemispheric level already underway, Mexico is in a strong position to benefit from the nearshoring of production by US companies.

Investors from the Bay Area will look to the quality of infrastructure, ease of doing business, a favorable tax environment, security, and labor market flexibility when making location decisions. Technology companies will particularly look to the quality of the local workforce and the access to talent to support R&D and engineering. This makes the role of public and private universities in education and training particularly important in economic development strategies and business attraction plans. The availability of direct air service between the Bay Area and Mexican cities is also a consideration for venture and other investors who travel frequently to engage with partners, customers, and portfolio companies.

Mexico's venture market is maturing, supported by innovation clusters and pockets of startups in cities and states across the country. The potential for venture investment in Latin America is also growing. While Bay Area VCs often look for later-stage companies, growth in startup activity and the increased interest shown by investors such as Softbank suggest that to fully benefit from Mexico's growth they should examine the market more deeply and consider investing earlier.

There are also opportunities to strengthen California's economic ties with Mexico. Climate and renewable energy is one potential area, where despite the reticence of Mexico's national government, many states and cities are actively pursuing renewable projects. The reactivated Commission of the Californias offers a platform for collaboration and deeper ties with Baja California; a focus on border infrastructure and a smart border that makes the most of data and new technology will be important. And the University of California's Alianza UCMX initiative, which links several UC initiatives with Mexico, can support economic ties beyond education by including a stronger focus on entrepreneurship exchanges in its plans.

Diego Rivera, *The Marriage of the Artistic Expression of the North and of the South on This Continent*, also known as *Pan American Unity*, 1940; courtesy City College of San Francisco; Banco de México Diego Rivera and Frida Kahlo Museums Trust, Mexico City / Artists Rights Society (ARS), New York; Image: Cultural Heritage Imaging

Introduction

The roots of Mexico's economic and cultural ties with the Bay Area run exceptionally deep, dating to Spain's settlement of California the 1700s. Also unique is the size and longevity of the Bay Area's Mexican-American community—which is reflected in a depth of social and cultural engagement between Mexico and the Bay Area that endures to the present.

Linked by history, culture, and family, the two economies have grown in parallel but on very different paths. A turning point came in 1994 with the entry into force of the North American Free Trade Agreement (NAFTA), which stimulated a wave of investment in manufacturing by US and California companies in Mexico, primarily in cities along the US-Mexico border. That process forged a more integrated North American economy, linking the United States, Canada, and Mexico through integrated supply chains and production processes. Most of that production was in assembly. Since then, Mexico's image has been primarily associated with basic manufacturing, as well as tourism and issues surrounding immigration.

A quiet revolution has been taking place, however. Mexico has been systemically working to increase the sophistication of its production processes and transition its economy to one where more economic growth is generated through knowledge and innovation. Advanced manufacturing is now the norm, supported by growing R&D. And, while the transition is still in its early stages, Mexico is generating large numbers of highly skilled engineers and a growing cadre of startups focused on markets not only in Mexico but in Latin America and the United States as well. As that occurs, Mexico's ties with the Silicon Valley/San Francisco Bay Area are set to strengthen.

This report examines Mexico's' continuing transition and the issues and opportunities that it presents for Bay Area companies. It particularly does this through the lens of cities and regions that cluster assets that Bay Area/Silicon Valley companies look for: infrastructure, talent, universities, R&D, and entrepreneurs. This defines not just where Bay Area companies are located now but also where they might go in the future. Five city/regions are a particular focus: Tijuana, Ciudad Juárez and Monterrey, all on or near the US border, and Mexico City and Guadalajara to the south. It also looks at two regions that show promise: (1) in central Mexico, El Bajío region (all or part of four states—Aguascalientes, San Luis Potosí, Guanajuato, and Querétaro, known together as El Bajío—along with adjacent portions of the states of Zacatecas and Jalisco, and (2) the city of Mérida in the state of Yucatán. The report concludes with analyses of the engagement of Bay Area companies in Mexico; Mexico's educational, cultural, and business footprint in the Bay Area; and opportunities for expanded cooperation between California, the Silicon Valley/San Francisco Bay Area, and Mexico.

As global supply chains shift and regional relationships such as the US-Mexico-Canada Agreement (USMCA) grow in importance, Mexico will present new opportunities for partnerships that are different from those in the past and are based on a growing alignment around technology and innovation.

1

Mexico's Economy in Transition

A key economic partner of the United States in North America and a leading economy in Latin America, Mexico's economy has evolved in the last decade. Historically looked to by the United States for its natural resources and low costs, Mexico is today leveraging its proximity to US markets and abundance of skilled human capital to position itself as an important node in the global economy.[1] As Mexico continues to transition from its traditional base of industry and agriculture toward one that also builds on advanced manufacturing, innovation and technology, and financial and other services, the opportunities it presents for partners in the Silicon Valley/San Francisco Bay Area in particular can be expected to grow.

Global rankings

Mexico generally falls in the middle rank on global indexes of competitiveness and innovation but ranks near the top in Latin America.

The **Global Innovation Index 2020 (GII)** ranks Mexico #2 in the Latin America and the Caribbean region, after Chile (#1) and followed by Costa Rica (#3). In GII world rankings covering 131 economies, Mexico stands at #55. Scores in the index are based on diverse criteria including political and business environment, education, research and development, information and communication technologies, ecological sustainability, credit, investment, trade, competition, market scale, business sophistication, and knowledge, technology, and creative outputs.[2]

According to the World Economic Forum's **Global Competitiveness Report 2019** (its most recent ranking index),[3] Mexico ranks #2 in Latin America and the Caribbean (after Chile) and #48 worldwide in overall competitiveness. The ranking is composed of 141 countries and examines 103 indicators under 12 themes: institutions, infrastructure, ICT adoption, macroeconomic stability, health, skills, product market, labor market, the financial system, market size, business dynamism, and innovation capability.[4]

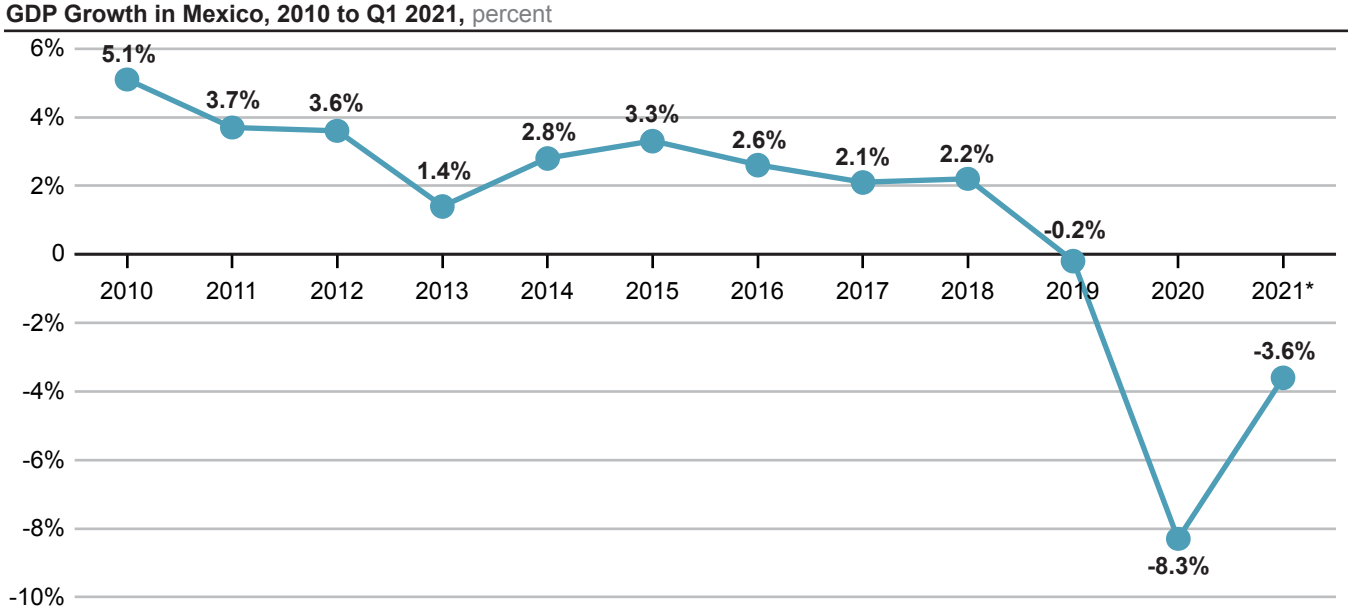
In the World Bank's **Doing Business 2020** study[5] that ranks 190 countries for ease of doing business benchmarked to May 2019, Mexico stands at #60 in the world, a score that places it first among countries in Latin America and the Caribbean. The ranking scores countries according to ten indicators: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency.[6]

Mexico fares less well in the global **2020 Corruption Perceptions Index** compiled by Transparency International, which measures perceptions by experts and businesspeople of public sector corruption. There, Mexico ranks #124 out of 180 countries. On a scale of 0 to 100 where 100 is very clean and 0 is very corrupt, Mexico comes in at 31, well short of the global and Latin American average of 43.[7]

Exhibit 1

Mexico's GDP growth has been slowing since 2015, with 2019 the first year with a negative growth rate since 2009.

GDP Growth in Mexico, 2010 to Q1 2021, percent



Source: INEGI data, June 2021; * Preliminary figure for first quarter 2021

Visualization: Bay Area Council Economic Institute

Macroeconomic Trends

Mexico is the second-largest economy in Latin America[8] and the 15th largest in the world measured by 2019 GDP. Its population of almost 130 million generates a Gross Domestic Product (GDP) of USD 1.2 trillion.[9] Its economic performance can be seen at a high level through macroeconomic indicators: GDP, unemployment, inflation, exchange rates, and interest rates.

GDP

In the five years between 2014 and 2019, Mexico's GDP oscillated between USD 1.07 trillion and USD 1.31 trillion.[10]

Growth has been slowing since 2015, with 2019 the first year with a negative growth rate since 2009.[11] According to INEGI (the national institute of statistics and geography), Mexico's 2020 GDP contracted by 8.3%,[12] the largest annual contraction since the 1930s, although in the last two quarters of 2020 the economy began to show better than expected recovery from the impacts of the COVID-19 pandemic.[13] The ongoing contraction is also attributable in part to the economic and social policies instituted under populist President Andrés Manuel López Obrador, who was elected in 2018 and since coming to office has prioritized social justice and economic redistribution, while emphasizing traditional industries such as oil. For 2021, the IMF estimates a 4.3% increase in GDP.[14] Separately, the OECD raised its estimate for GDP growth in 2021 from 3.6% to 4.5% due to the expected spillover effect in Mexico of the United States Rescue Plan. Those measures, it is believed, could increase US production by 3% to 4% in the first year of the package, boosting demand in other economies.[15]

Unemployment and Inflation

In the global financial crisis of 2009, Mexico experienced a spike in unemployment that reached an annual rate 5.36%, compared to 3.87% in 2008. Beginning in 2010, the unemployment rate showed a steady decrease,[16] reaching a seasonally adjusted rate of 3.3% for the month of March 2020. That trend

was upended by the COVID-19 pandemic, with the unemployment rate rising to a seasonally adjusted rate of 5.0% in July 2020[17] and then recovering slightly to end the year at 4.4%. January 2021 saw a small increase to 4.5%[18] According to the IMSS (the Mexican institute of social security), at the end of 2020 a total of 647,710 jobs had been lost due to the pandemic.[19]

Mexico has experienced single-digit and stable annual inflation rates over the last two decades. Since 2009, the annual average CPI inflation rate has oscillated between 2.82% where it stood in 2016 and 6.04% which it reached in 2017.[20] This stands in comparison to the decade between 1990 and 1999, when the country saw an average inflation rate of 20.5% (compared to 69.9% in the 1980s). The stabilization of inflation coincided with the decision, following the Constitutional Reform of 1993, that made Mexico's central bank (Banco de México, abbreviated as Banxico) more autonomous.[21]

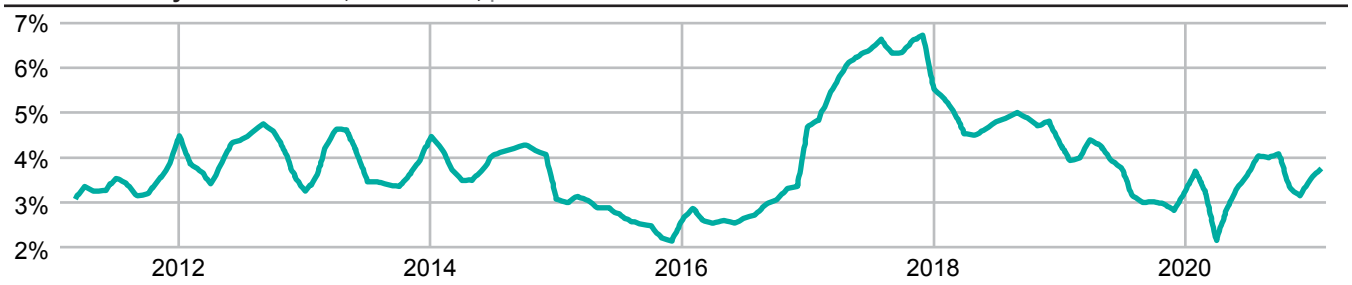
Exchange Rates and Interest Rates

In the last decade, the exchange rate for the US dollar (USD) to Mexican peso (MXN) has increased, almost doubling from 2011 to 2021.[22] In the first quarter of 2020, due to the collapse in oil prices and the COVID-19 pandemic, the Mexican peso experienced a significant depreciation, reaching MXN 25.34 on March 24, 2020.[23] Later in 2020, it made a comeback, ending the day at MXN 20.59 on November 6 and is expected to remain near that level through 2021.[24]

Exhibit 2

Since 2009, the annual average CPI inflation rate has oscillated between 2.82% where it stood in 2016 and 6.04% which it reached in 2017.

Mexico Monthly Inflation Rate, 2011–2021, percent

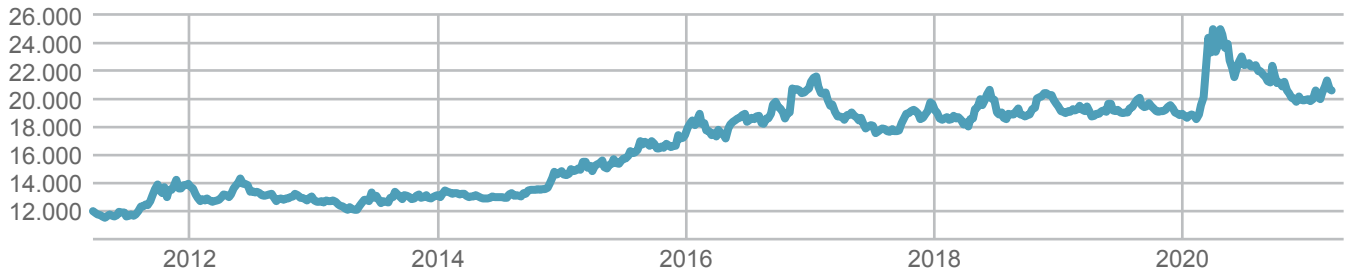


Source: Trading Economics (https://tradingeconomics.com/mexico/inflation-cpi)

Exhibit 3

In the last decade, the exchange rate for the US dollar (USD) to Mexican peso (MXN) has increased, almost doubling from 2011 to 2021.

US Dollar to Mexican Peso Exchange Rate, April 2011–April 2021, MXN value of 1 USD

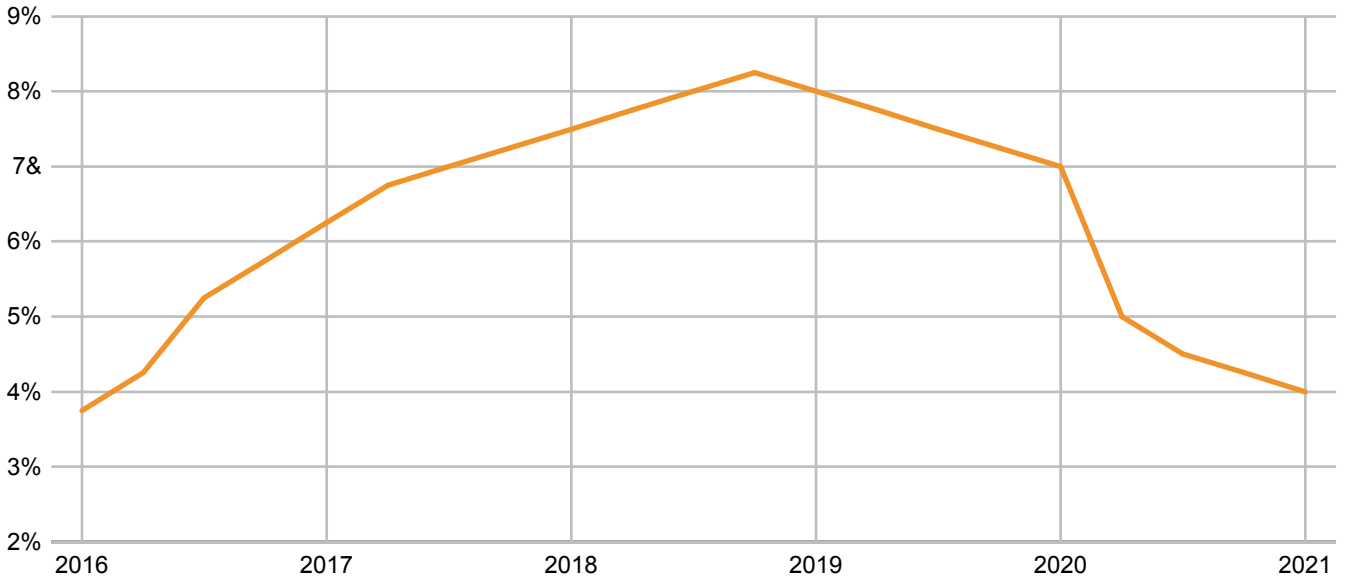


Source: Trading Economics (https://tradingeconomics.com/mexico/currency)

EXHIBIT 4

Interest rates began rising in 2016, peaked at the end of 2018, and then decreased once again, falling to 4.00% at the beginning of 2021.

Mexico Interest Rates, 2016–2021, Selected Key Months in Each Year, percent



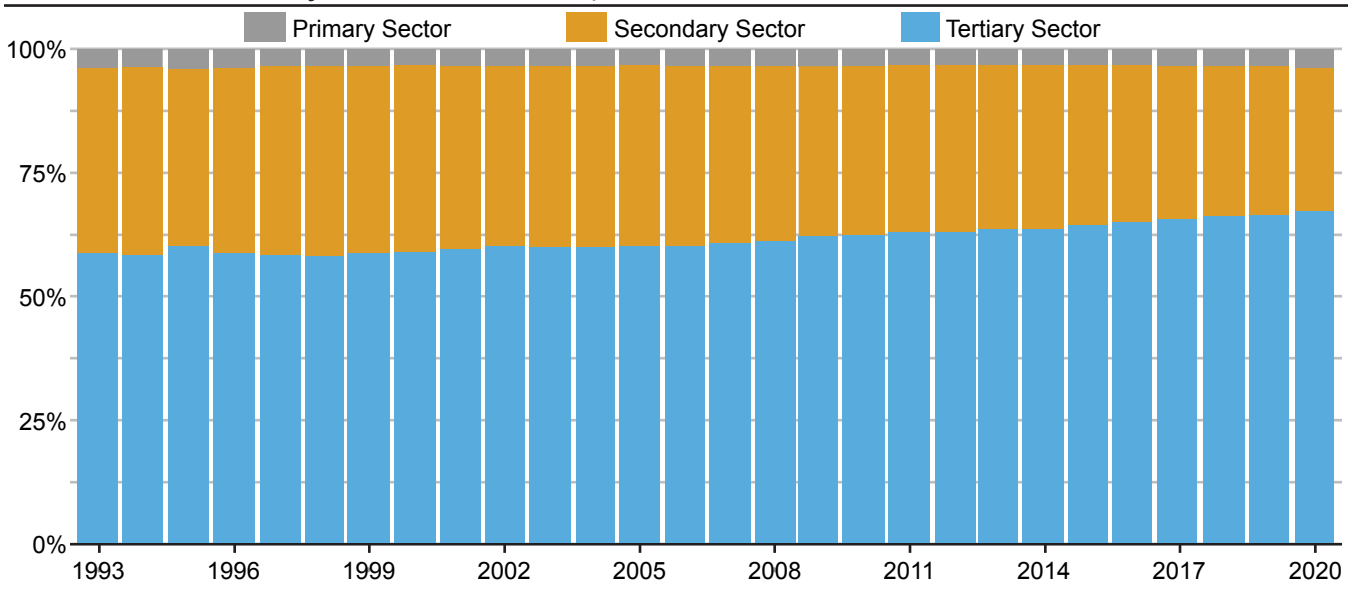
Source: Countryeconomy.com

Visualization: Bay Area Council Economic Institute

EXHIBIT 5

How GDP is distributed between Mexico's three economy sectors reflects the transition to today's more service-based economy.

Mexico GDP Distribution by Sector, 1993–2020 Q4, percent of GDP



Source: INEGI data, 2021

Visualization: Fundación IDEA

Interest rates, Banxico's main monetary policy tool,[25] have seen two major changes in recent decades. In 2009, due to the global financial crisis, Banxico began cutting the interest rate, reaching 3.00% in June 2014 (the lowest level on record). In 2016 the interest rate started to rise, peaking at 8.25% at the end of 2018, and then decreasing once again, falling to 4.00% at the beginning of 2021.[26]

Mexico's Evolving Economic Structure

The composition Mexico's economy is broadly split into three sectors. How GDP is distributed between them reflects the transition that Mexico has been experiencing since the early twentieth century, moving from an agrarian to an industrial economy and today to a more service-based economy.

The primary sector includes livestock production, forestry, fishing, agriculture and mining[27] and in 2020 represented 3.5% of GDP and 12.4% of employment.[28] Declining from about 8% of GDP in the 1980s, it hovered at about 4% for the last several decades and is now the smallest of Mexico's economic sectors.[29]

The secondary sector includes construction, manufacturing, and oil and gas-related activities.[30] In 2020, the secondary sector represented 30.1% of GDP and 26.2% of employment.[31] Despite being the second largest sector of the economy, its share of GDP has also been decreasing, dropping from 37.7% of GDP in 1993.

The largest component of the Mexican economy today is the tertiary sector, which includes trade, services, communications and transportation.[32] In 2020, the tertiary/services sector represented 60.5% of GDP and 61.4% of employment.[33] Two of its largest segments are finance and tourism. Since the 1990s, the tertiary sector has grown consistently, having increased from 58.5% of GDP in 1993, as the secondary sector's share of GDP has fallen.[34]

Key Industries

The transformation that the Mexican economy has experienced in recent decades can be seen in developments in three key sectors—manufacturing, agriculture, and telecom—and three of the country's fastest growing industries—IT, financial services, and energy.

Manufacturing

Mexico's highly competitive and productive manufacturing sector[35] is one of the country's main sources of employment. In 2020, manufacturing industries accounted for 17.2% of GDP.[36]

The largest sectors are automotive, where in 2019 Mexico was the 2nd largest producer of commercial vehicles and the 7th largest overall producer of vehicles in the world;[37] aerospace, where Mexico is the 14th largest aerospace supplier globally and the 6th largest exporter of aerospace parts to the United States;[38] and medical devices, where according to ProMéxico in 2014 Mexico exported goods worth USD 7.7 billion, becoming the 9th exporter of medical devices globally and the #1 Medical devices exporter in Latin America.[39] Production in these sectors leverages several strategic advantages: ample human capital, proximity to the US, and low production costs compared to the United States.[40]

Agriculture

Despite contributing less than 4% of the country's GDP for the last two decades, agriculture remains one of Mexico's most important industries. According to the Food and Agriculture Administration of the United Nations (FAO), it is the fundamental activity in rural areas, where almost a quarter of Mexico's population lives; for the poorest segment of that population, agriculture accounts for 42% of income.[41]

According to the secretariat of agriculture and rural development, Mexico is the world's leading exporter of beer, tomatoes, chili peppers, red peppers, berries, avocados, and tequila.[42]

Telecom

As one of the leading industries in the Mexican economy, telecom is fundamental to other industries such as financial services, tourism, and commerce. It is also an industry with high potential for growth. Since passage of telecommunications reform legislation in

2013, the industry has experienced significant growth and a 29% drop in prices between 2013 and 2016 due to increased competition. According to the Instituto Federal de Telecomunicaciones (IFT), while the average annual GDP growth rate in Mexico's economy as a whole was 3.5% between 2011 and 2016, the average annual GDP growth rate in its telecom industry during the same period was 10%—almost three times faster.[43] By opening the door to competition and supporting market growth, the reform has also had a stimulative effect on rapidly emerging digital sectors such as fintech.

Ericsson has projected that by 2025 roughly half of Mexico's telecommunications network will be 5G.[44] According to Ericsson's Mobility Report 2020, Mexico will be one of the first countries in Latin America to adopt this technology at scale, together with Brazil, Colombia, Argentina, and Chile.[45]

Information Technology

The IT industry has also seen strong growth in the recent decades. Between 2002 and 2018, it experienced an average annual growth rate of 10.5%.[46] This was paralleled by a surge in exports,[47] reflecting the sector's close connection to US and global markets.

Financial and Insurance Services

The financial and insurance services industry is one of the most promising in Mexico's economy, particularly when seen in conjunction with development in the IT sector. Growth has been continuous over the last decade, outpacing GDP.[48] And along with telecommunications, financial and insurance services were the most dynamic sectors of the Mexican economy in 2019.[49]

Though the sector is mostly composed of traditional banking, stock market and exchange activities, insurance services, and investment, one of the fastest growing segments is fintech. In 2018 alone, approximately 100 new fintech companies were established in the country, a growth rate of 52%. In 2019, Mexico and Brazil together accounted for 56% of Latin America's total fintech activity.[50] Continued fintech growth is expected as the adoption of IT-related services in Mexico accelerates.

Energy

Despite Mexico's dependence on fossil fuels and oil exports, it benefits from a diversity of energy sources. In particular, its potential to look beyond oil and gas to harness solar, wind, and geothermal energy presents significant opportunities.

Mexico's 2013 Energy Reform made it one of the most attractive emerging markets for foreign investment in energy by 2018.[51] According to a May 2018 report by BMWi (Germany's federal ministry for economic affairs and energy) and SENER (Mexico's secretariat of energy), in the period between 2018 and 2033, Mexico has the potential to attract investment of up to USD 100 billion for infrastructure projects in the electricity sector.[52] In May 2020, Mexico's secretary of energy (head of SENER) stated on Twitter that Mexico has the installed capacity to generate 31% of its total energy through renewable sources that include 1.2% geothermal, 2.0% nuclear, 4.3% solar, 7.5% wind, and 16% hydroelectric.[53]

The Evolution of Mexico's Economic Policies

Building on widespread agreement on the need for change and modernization in the economy, in the period between 2012 and 2014, the Mexican government enacted a series of major economic policies and constitutional reforms that have positively impacted the economy.

Labor Reform

The 2012 reform of the Federal Labor Law addressed three main issues: the informal labor sector, the low level of productivity in the country, and the lack of regulation in the relationship between employers and employees. Changes that were introduced included new forms of contracting and standardized hiring practices to facilitate the formalization of labor relationships. Other reforms strengthened the federal body in charge of conciliation and arbitration to improve the resolution of labor-related disputes and introduced prohibitions of gender discrimination. Productivity and aptitude were established in law as the chief criteria for job advancement.[54]

Competition Reform

The purpose of the economic competition reform, enacted in June 2013 through a new Law on Economic Competition, was to improve the competitiveness of diverse industries including oil, electricity, telecom, media, ground transportation, airlines, construction, and banks. This reform also established COFECE (the federal economic competition commission) and included new tools and concepts attached to international standards for determining lack of economic competition. COFECE's main objective is to enforce economic competition law in all areas of the economy.[55]

Fiscal Reform

Mexico's fiscal reform occurred against the background of the Mexican government's heavy dependence on revenues from the oil industry, which were constituting about 33% of total government revenue. Recognizing the volatility of oil prices, the fiscal reform sought to diversify the government's sources of revenue by increasing non-oil revenues mainly through mechanisms such as increasing consumption taxes, limiting corporate deductions, and closing loopholes and exceptions, establishing excise taxes for sugary drinks and snacks, and imposing additional taxes on the mining industry. The reform also included regulations to assure long-term fiscal balance, requiring the government to have a surplus during periods when GDP growth is above trend, but still allowing the flexibility to have a deficit when GDP growth is below expectations.[56]

Telecommunications Reform

The main goal of telecommunications reform was to address the high level of concentration in the telecom sector and produce a competitive market. In 2011, 70% of the country's mobile telephone services were concentrated in a single company (80% in the case of local telephone services),[57] which resulted in high prices and poor service and made telecommunications services inaccessible to many who could not afford them. The reform modified Article 6 of the Mexican Constitution by recognizing the importance of the telecom sector for the country and the lives of its citizens, making the competitiveness and accessibility of the telecom market a responsibility of the state.[58] It also created the IFT (federal telecommunications institute) as an autonomous body whose purpose is to monitor and regulate the telecom sector to prevent market concentration.

Enacted in 2013, the reform led to tangible changes to prices and concentration in the telecom sector. This was seen in the drop of prices between 2013 and 2016: domestic long distance call charges were completely dropped, international call costs were reduced by more than 40%, and mobile phone costs were reduced by 43%.[59] As a result, telecom consumers saved more than MXN 133.7 billion. Access to services also dramatically increased, as 71.3 million Mexicans utilized internet services in 2017 (compared to 40.9 million internet users in 2012). The reform also opened the door for US-based AT&T to enter the market.[60]

Energy Reform

Oil and gas development, considered part of the national patrimony, has been a sensitive and highly political topic in Mexico since the middle of the last century. With the sector nationalized, two state-owned companies were in exclusive control and management of hydrocarbons and electricity. PEMEX (Mexican Petroleum) and CFE (the federal electricity commission) had the sole ability to import, export, produce, transport, and distribute hydrocarbons in the country. In the previous fifty years, the demand for both fossil fuels and electricity had grown significantly, and by the beginning of the 21st century it was clear that they were unable to adequately develop the country's resources and meet the national demand. In 2013, the energy reform was enacted.[61] Although oil and electricity are still owned by the state, through contractual mechanisms private companies can now access and distribute natural resources in the country.

The energy reform produced a critical transition from a state-owned energy monopoly to an open competition model in which PEMEX and CFE participate along with numerous other companies. By 2018, the hydrocarbon sector was composed of 69 companies from more than 20 countries and the electricity sector of 39 from 12 countries, and investment in infrastructure had significantly increased the production of both hydrocarbons and electricity. Beyond that, the reform

also set the country on course for an accelerated transition towards renewable energy.[62]

Under President Andrés Manuel López Obrador's administration, some of the major changes brought by the energy reform have been revised. The president has expressed the view that PEMEX should be protected by reducing access by private companies for oil and gas development.[63] Mirroring that, the centrality of oil and gas as sources of energy has been re-emphasized.[64] As a result, investor confidence in the energy sector has weakened and the development of renewable energy in the country has been held back. In May 2020, CENACE (the energy control national center) halted grid trials for 28 wind and solar projects coming online, and in the same month the Ministry of Energy issued new regulations giving priority to electricity produced by CFE plants, where priority had been given before that to plants with the lowest production costs.[65] Although the government's stance toward renewable energy is officially one of support, its current policy has mainly focused on the development of hydrocarbon-based energy sources in the country.[66]

In February 2021, President López Obrador proposed an overhaul to the nation's Electricity Industry Law that prioritizes the injection of CFE-generated power to the national grid ahead of that generated by private companies.[67] The amendment was approved by Mexico's House of Representatives and Senate[68] and technically entered into force on March 10, 2021, although it was immediately challenged and was suspended by a federal court injunction. The effects of the injunction and whether it would be upheld by a higher court were still uncertain at the end of that month.[69]

Financial Reform

The purpose of Mexico's financial reform was to increase access to credit for households and small businesses. Before the reform, only five financial institutions accounted for 74% of loans in the country. High interest rates made credit inaccessible for many micro, small, and medium-sized enterprises, which received only 15% of total credit despite the fact that they represented 99.8% of the 4 million economic enterprises in Mexico and generated 74% of employment.[70]

Enacted in 2014,[71] the financial reform increased transparency in the sector and made it easier for banks to offer loans by reducing costs and loosening legal requirements. It also strengthened development banks, encouraging them to provide credit to sectors that had not been able to access them. INADEM (the national institute for the entrepreneur) which had been created in the previous year, allocated resources of more than MXN 19.5 billion between January 2013 and June 2017 to support more than 387,000 entrepreneurs and 566,000 micro, small, and medium-sized enterprises.[72] The World Bank's 2016 "Doing Business" report highlighted the effects of the reform, placing Mexico in 5th place globally on its "getting credit" indicator.[73]

Entrepreneurship and Innovation

Mexico's economic transformation has seen a growing focus on supporting small and medium-sized enterprises (SMEs), startups, and other entrepreneurial ventures. With both government support and private investment, initiatives have been launched across the country to support innovation, stimulate startup activity, and expand the role of technology.

Government Strategies

In the last decade, Mexico's government has launched a series of programs and initiatives.

- **Programa de Estímulos a la Innovación (PEI):** In 2009, CONACYT (the national council for science and technology) introduced the innovation stimulus program PEI with the purpose of incentivizing and enabling businesses to invest in research, technology development and innovation projects aimed at developing new products, processes, or services. With three separate modalities—one focusing on micro, small, and medium-sized companies, one focusing on large companies, and one focusing on research and education institutions—the program promotes investment and provides financial support for the pursuit of innovative research and development.[74]
- **Fondo Nacional Emprendedor (FNE):** For entrepreneurs planning to start new businesses,

the Mexican government, through INADEM (the national institute for the entrepreneur), created the national entrepreneur fund FNE with the purpose of strengthening Mexican small and medium-sized businesses. Entrepreneurs can apply to the fund and register their businesses for support in one of the five main areas that the program encompasses: (1) technical assistance, (2) coaching and supervision, (3) financial support to purchase equipment, (4) certification, and (5) training.[75] In 2019, the internal regulation (RISE) was changed to dissolve INADEM and transfer programs such as the FNE to the UDP (productive development unit) of the secretariat of the economy.[76]

- **PADCE:** Another initiative by the Mexican government to support SMEs is PADCE (the register of business skills developers).[77] Business consulting and advisory firms that wish to provide services to small and medium-sized businesses through government funding must apply to and be approved into the PADCE, which requires that they have at least three years of previous experience and meet methodological and quality standards. Through the PADCE, businesses that are receiving support from the national entrepreneur fund can access professional support to guide their development.[78]
- **PRONAFIM:** Through the PRONAFIM (the national microentrepreneur financing program) initiative led by the secretariat of the economy, the government is providing comprehensive microfinance services to help microentrepreneurs to increase the productivity of their businesses and improve their living conditions.[79] PRONAFIM operates two public trusts—FINAFIM (the trust financing program for microentrepreneurs) and FOMMUR (the microfinance trust fund for rural women)—through which it grants lines of credit as well as various non-credit support such as technical assistance, training, invitations to specialized forums,[80] and support for organizations to promote the incubation of productive activities. Included in PRONAFIM's goal of supporting microentrepreneurs who do not otherwise have access to formal financial services is a strong focus on gender equality along with youth empowerment: 94% of the program's beneficiaries are female, 6% are male, and of the overall total, 25.9% are youth.[81]
- **Estrategia Digital Nacional (EDN):** The EDN (the national digital strategy) was a plan developed under President Enrique Peña Nieto in 2013 to transition the country toward the adoption of information and communication technologies and to "digitalize" the economy. Between 2014 and 2018, the federal government began the process with five key objectives. The first, "government transformation," consisted of digitalizing federal government procedures and enabling citizens to access information and important documentation online rather than having to visit a government office. The second, "digital economy," aimed to grow the digital goods and services market by supporting the development of electronic commerce and fintech. The third objective, "educational transformation," sought to apply information and communication technologies to improve the quality of education and encourage students to develop digital skills. The fourth, "universal and effective health," consolidated and digitalized the national health system, digitized birth certificates and vaccination cards, and expanded health coverage by implementing telemedicine-based programs. Lastly, "public safety" developed digital platforms for handling citizen complaints and violence prevention, promoting civic innovation and citizen participation, and preventing and mitigating damage caused by natural disasters.[82] Together, these initiatives helped accelerate the transition of key sectors from physical to digital systems, making services more efficient and pushing the country forward in the adoption of new technologies.[83]

  The administration of President Andrés Manuel López Obrador has supported the EDN and its goal to provide all Mexicans with an internet connection by the end of 2024. At the same time, under its austerity policy, it has also aimed to monitor and reduce federal expenditures on technology.[84]
- **PROSOFT:** One of the programs resulting from the national digital strategy, PROSOFT (the software industry and innovation development program), aims to promote the development and adoption of information technologies and innovation in strategic economic sectors, with the goal of increasing productivity.[85] A major focus of the program is the creation of CIIs (centers for industrial innovation)

across the country, through which it partners with private technology companies to strengthen the creation and transfer of knowledge for industrial innovation. CIIs are semi-public spaces that advance the training, specialization, and certification of human capital and offer specialized services based on information technology.[86]

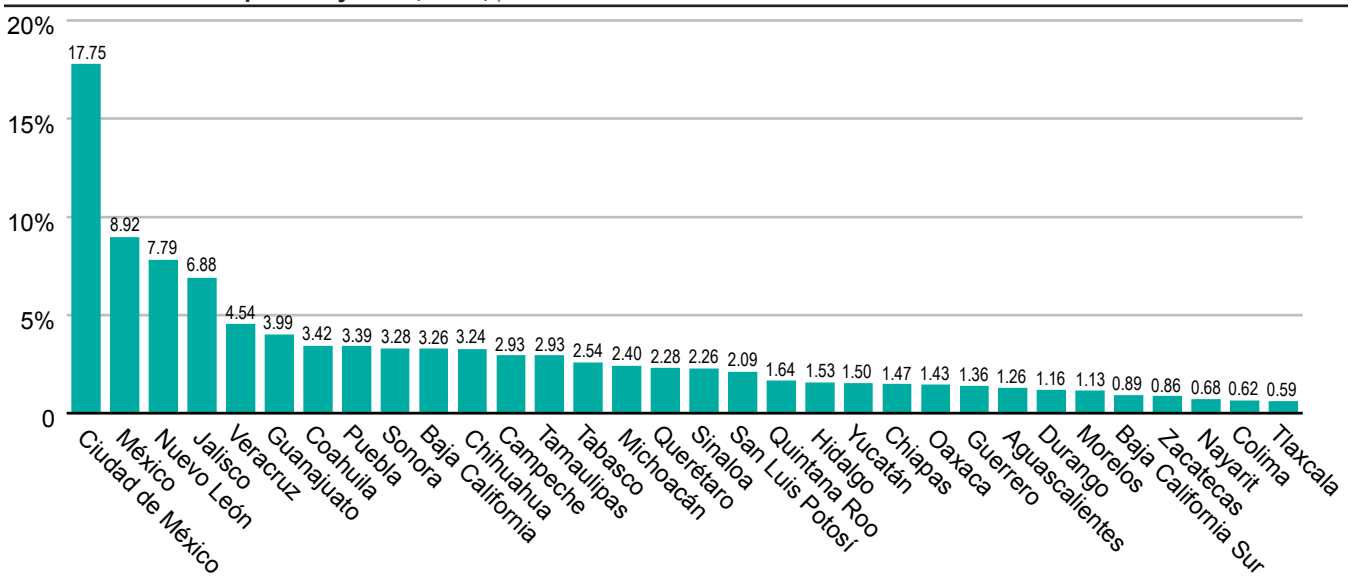
- **Ley de Tecnología Financiera:** In 2018, Mexico approved the "fintech law," becoming the first country in Latin America to regulate the technology-based financial services industry.[87] The law regulates four main areas of the sector: crowdfunding, cryptocurrency, APIs or information exchange between institutions, and sandbox or test regulation. Its coverage includes fintech platforms related to financing and investment, issuance services, administration, redemption, and electronic transmission of payments, with the goals of creating greater legal certainty to users of fintech services and providing the foundation for competition between fintech companies and traditional banking and financial institutions.[88]

While continuing some initiatives, the López Obrador administration has different priorities from its predecessors, placing emphasis on social services while reducing the commitment of the national government to supporting business growth. Innovation and entrepreneurial initiatives have been most affected. In 2019, the administration closed ProMéxico, the national agency that promoted international trade and investment. In the same year, the closing of INADEM, which co-invested with private venture capital firms to support the growth of Mexico's venture industry and channel funds to startups, also undermined promising developments in the sector. In 2020, the Mexican Senate, where President López Obrador's party holds the majority, approved the elimination of 109 trust funds, many of which supported science, technology, innovation, research, and education.[89] While the administration has allowed INADEM funds that were already disbursed to remain invested, new investments have been halted. With innovation, technology, and entrepreneurial support de-prioritized in national policy, the focus of innovation activity has shifted to key states and cities, which are analyzed later in this report.

EXHIBIT 6

In 2019, ten states plus Ciudad de México together contributed 66.46% of the country's total GDP.

Mexico's GDP Participation by State, 2019, percent of GDP



Source: INEGI data, 2019 preliminary

Visualization: Bay Area Council Economic Institute

2

Entrepreneurs, Startups, and Venture Capital

As Mexico's economy evolves toward value-added manufacturing, business services, and innovation-led growth, a new set of economic actors is taking the stage as startups and venture investment play a more active role. This chapter examines key trends at the national level.

National Entrepreneurial Organizations

As entrepreneurship has grown in Mexico, a number of entrepreneur associations have been formed. Their shared purpose is to empower startups in the country by encouraging the exchange of ideas, providing support and guidance to entrepreneurs, and creating a national network. At the national level, several significant organizations that have been created in recent years include the following:

- **ASEM**, the association of entrepreneurs of Mexico, is the Mexican branch of ASELA (the association of entrepreneurs of Latin America), which was formed in 2015. ASEM supports and links entrepreneurs from the early stages of their ventures with access to information, networking, training, and advocates for the interests of entrepreneurs in public policy.[1]
- An initiative of the faculty of accounting and administration of UNAM (the national autonomous university of Mexico), **Cenapyme** (the national center for support to small and medium enterprises) supports the development of small and medium-sized businesses in Mexico. The center offers advisory and consulting services in finance and information technology; supports businesses with market research, strategy and risk planning, business modeling, and other services; and functions as an incubator and accelerator for young companies.[2]
- **Global Shapers** is an initiative of the World Economic Forum that aims to create a global network of young entrepreneurs.[3] The program provides spaces for those entrepreneurs and thinkers to connect and develop social impact-oriented projects and initiatives for the betterment of their societies, and it currently operates in 12 cities: Aguascalientes, Mexico City, Cuernavaca, Culiacán, Ensenada, Guadalajara, León, Morelia, Monterrey, Puebla, Reynosa, and Tijuana.[4]
- **Startup Mexico** provides startups with pre-incubation and incubation programs, bootcamps, weekends for programmers and technologists to collaboratively develop software, and co-working facilities. Campuses currently in operation in Mexico are located in Mexico City, León, Mérida, Nuevo Laredo, Querétaro, Toluca, Oaxaca,[5] Saltillo, and Puebla. Outside of Mexico, campuses have been established in Costa Rica, Guatemala, Curaçao, Colombia, Chile, Argentina, Brazil, and the United States (in Miami). Additional campuses are set to open in 2021 in the Mexican cites of Tapachula, Guadalajara, Mazatlán, Aguascalientes and Monterrey.[6]

- **Victoria147** is a business academy for women that helps women entrepreneurs validate ideas and expand their businesses. Programs include Red Victoria (Victoria Network), which provides supportive courses, webinars, and events and networks female-led businesses in Mexico and Latin America. More than 10,000 trained entrepreneurs are part of the Victoria147 community, supported by more than 350 mentors and advisers. Major events include VictoriaFest, a forum that presents national and international speakers and pitch competitions.[7]

- **Endeavor México**, a support network for high-impact entrepreneurs, has operated in Mexico since 2002 with its principal office in Mexico City. With several hundred mentors, in the past two decades it has provided more than 20,000 hours of support[8] to startup enterprises and is currently working with almost 250 entrepreneurs leading 168 high-growth enterprises. Endeavor-supported companies have generated USD 1.6 billion in revenue and have attracted USD 1.8 billion in capital and debt investment. In partnership with universities and local business leaders, it has also established a national footprint with programs in five additional cities: Puebla, Monterrey, Guadalajara, Querétaro, and Mérida.[9]

Venture Investment

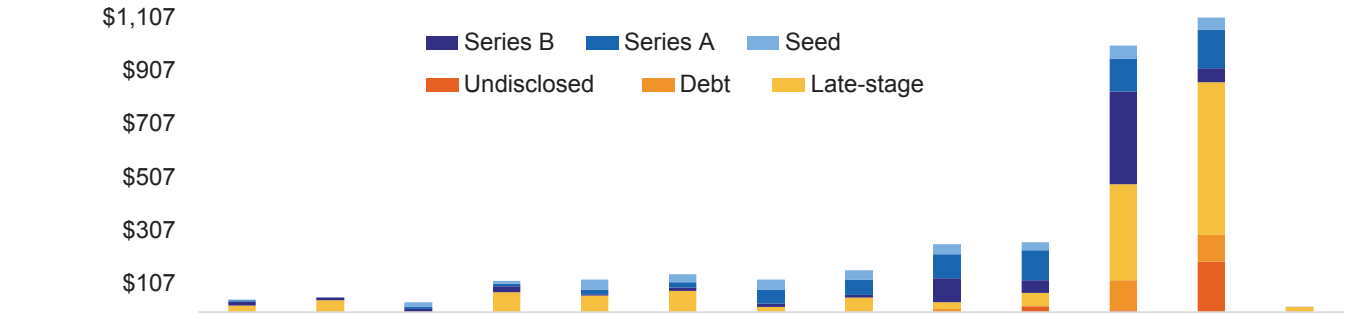
Mexico's venture capital industry is young. While the sector is at an early stage and its starting base was low, investment activity has grown significantly in the last ten years and particularly since 2016. From USD 55 million in 2010, yearly capital investment has grown to more than USD 1 billion in 2019 and USD 1.1 billion in the first three quarters of 2020. The recent surge can be particularly attributed to larger amounts being invested in later-stage rounds and increased activity by international funds in companies that were financed by local firms in their early stages.[10]

That expansion is mirrored in a growing number Mexican venture capital firms. Most are concentrated

Exhibit 7

The recent surge in venture capital activity can be mostly attributed to larger amounts being invested in later stage rounds.

Mexican VC Deal Activity by Stage (USD millions) 1989–2020 Q3



	Up to 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Undis-closed
Seed	$2	$-	$17	$8	$38	$30	$34	$38	$40	$30	$52	$46	$1
Series A	$6	$2	$9	$11	$18	$21	$55	$57	$87	$112	$122	$144	$-
Series B	$14	$9	$11	$22	$3	$12	$11	$9	$92	$49	$347	$52	$-
Late-stage	$25	$45	$-	$75	$63	$79	$20	$55	$24	$48	$360	$573	$19
Debt	$-	$-	$-	$-	$-	$-	$-	$-	$12	$-	$111	$100	$-
Undisclosed	$-	$-	$-	$-	$0	$-	$0	$1	$-	$23	$8	$191	$-
Total	**$47**	**$55**	**$37**	**$117**	**$122**	**$142**	**$121**	**$158**	**$256**	**$261**	**$1,001**	**$1,106**	**$20**

Source: AMEXCAP VC Overview 2020

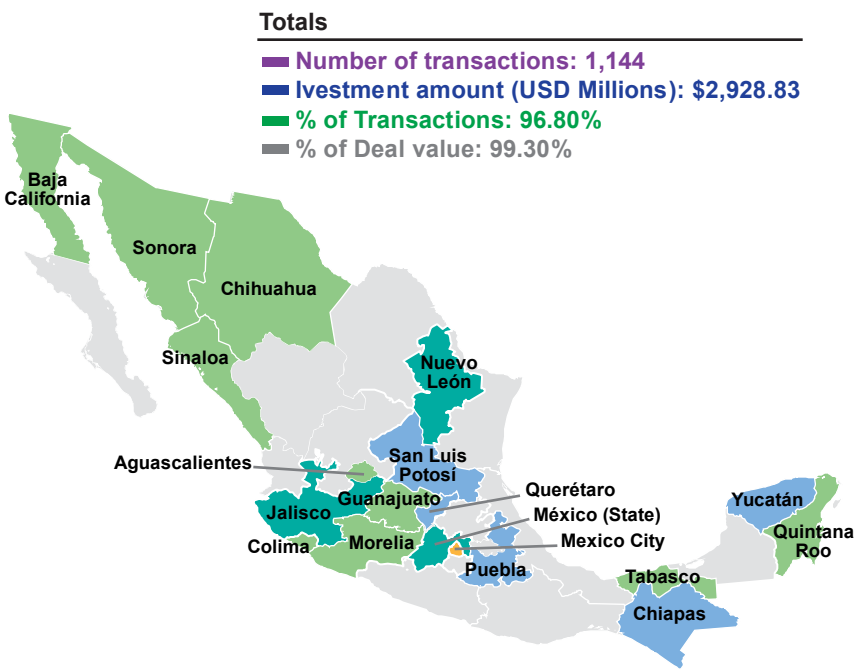
in Mexico City, followed by Nuevo León (Monterrey) and Jalisco (Guadalajara). Industry leaders include Dalus Capital, Dila Capital, IGNIA, Angel Ventures, and Jaguar Ventures. International venture firms with growing activity include SoftBank, Quona Capital, General Atlantic, QED Investors and, from the Bay Area, Salesforce Ventures, Accel, Foundation Capital, Brainstorm Ventures, B37, and Y Combinator. Most recently, the flagship early-stage accelerator and venture investor 500 Startups, based in San Francisco, has gone further by establishing a presence in Mexico City.[11]

Increasingly the focus of this activity extends beyond Mexico to Latin America. SoftBank has been particularly active, with the creation of the SoftBank Innovation Fund, a USD 5 billion fund created specifically for Latin America. The entry of SoftBank into the Mexican and Latin American market was a pivotal event for both investors and startups, demonstrating the potential viability of regional investing at a significant scale. In early 2019 before the announcement of the Innovation Fund, Mexican fintech startup Clip was one of the first Latin American companies to receive SoftBank funding, an investment of close to USD 20 million made in a USD 100 million investment round in which SoftBank participated with another fund and other investors.[12] SoftBank has also created the SoftBank Latin America Local Hub with the purpose of establishing portfolio companies such as Uber, WeWork, and Slack more deeply in the Mexican and regional market.[13] In late 2020, Mexican car purchasing platform Kavak became a unicorn (a tech startup valued at a billion dollars or more) after a large investment from SoftBank.[14]

Exhibit 8

Mirroring the expansion of venture capital investment, a growing number of Mexican VC firms are concentrated in Mexico City, followed by Jalisco (Guadalajara) and Nuevo León (Monterrey).

Geographical Distribution of Investments, 1989–2020 Q3



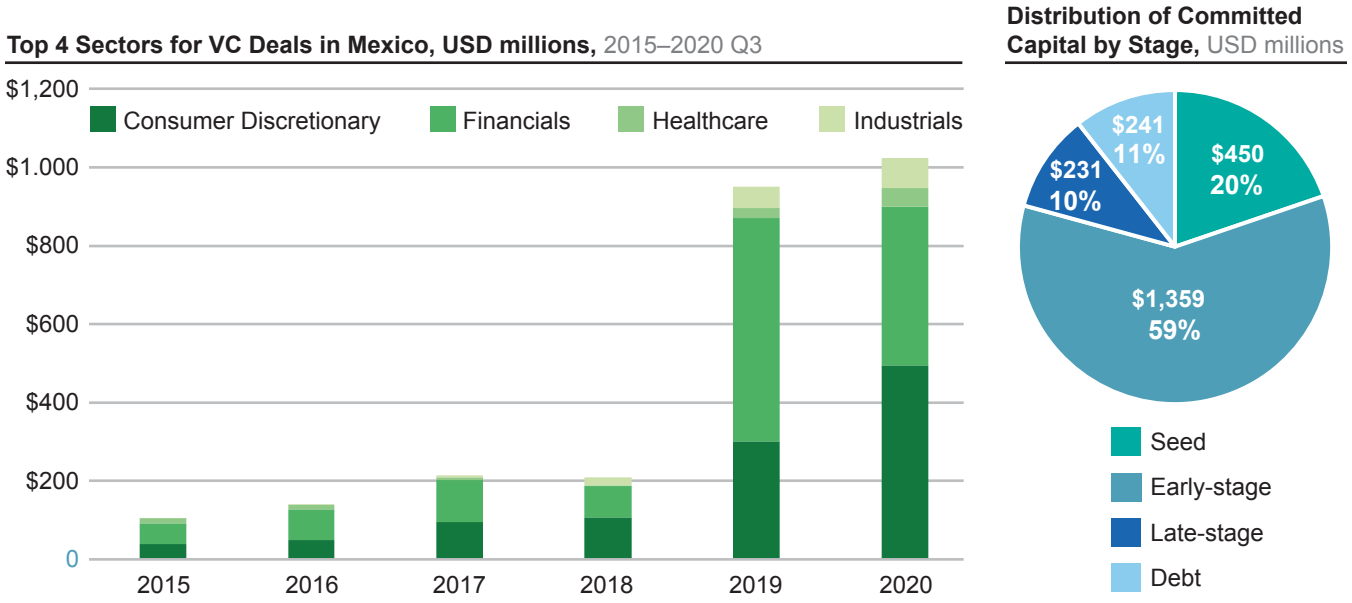
	No.	Amount	Trans.	Value
Mexico City	891	$2,067.19	75.3%	70.2%
Jalisco	75	$106.75	6.3%	3.6%
Nuevo León	52	$68.23	4.4%	2.3%
México (State)	15	$575.33	1.3%	19.5%
Querétaro	23	$21.12	1.9%	0.7%
Yucatán	17	$2.95	1.4%	0.1%
Puebla	11	$17.26	0.9%	0.6%
San Luis Potosí	9	$15.26	0.8%	0.5%
Chiapas	8	$21.61	0.7%	0.7%
Sinaloa	7	$5.17	0.6%	0.2%
Quintana Roo	6	$4.88	0.5%	0.2%
Morelia	6	$0.32	0.5%	0.0%
Guanajuato	5	$0.15	0.4%	0.0%
Chihuahua	4	$1.30	0.3%	0.0%
Sonora	3	$6.83	0.3%	0.2%
Baja California	3	$5.74	0.3%	0.2%
Colima	3	$3.79	0.3%	0.1%
Aguascalientes	3	$3.13	0.3%	0.1%
Tabasco	3	$1.81	0.3%	0.1%

Source: AMEXCAP VC Overview 2020

Visualization: Bay Area Council Economic Institute

EXHIBIT 9

In 2019 and 2020, venture capital deals have been concentrated in the consumer discretionary and financial sectors, with 79% of committed capital in early-stage funds.



Source: AMEXCAP VC Overview 2020

Building a Mexican Startup Ecosystem

Mexico's startup environment is also at an early stage but developing quickly. Both startup activity and venture investment were nascent until the mid-2000s and the 2013 launch of the national government's innovation agency INADEM (the national institute for the entrepreneur), an arm of the secretariat of the economy. At that time, the accumulated capital raised for venture investment in Mexico—USD 757 million[15]—was equivalent in size to a single medium-large-sized Silicon Valley venture fund, and wealth available for investment was heavily concentrated in more conservative private equity firms and family funds.

Designed to support technology startups and medium-sized enterprises and jumpstart a venture capital industry, INADEM inserted fresh capital into Mexico's venture capital sector, enabling the creation of new funds and through them a larger flow of funds to startups. With private investors required to contribute at least half the funding, INADEM contributed up to USD 2.5 million (50 million pesos) per fund. With that infusion, the capital in the system grew dramatically. In all, 42 funds benefitted from co-investment;[16] today AMEXCAP (the Mexican Association of Private Capital, A.C.) includes in its membership 31 venture funds, 33 private equity firms, and 10 corporate venture capital funds, in addition to family offices and institutional investors. Other federally sponsored programs supported entrepreneurs with soft-landing and cross-border platforms, including seven Mexico VC Days organized between 2013 and 2018 for investors and startups in San Francisco.[17]

INADEM was closed by the incoming administration of Andrés Manuel López Obrador in 2019, but not before it had catalyzed a wave of entrepreneurial activity. In that process, Mexico's venture and entrepreneurial

ecosystem has matured, producing better-prepared entrepreneurs with stronger founding teams. Having more money in the system has helped produce a virtuous circle for emerging enterprises; 2019 and 2020 have been the strongest years to date for the venture sector, with more than USD 1 billion invested in each of those two years. Most committed capital (79%) is concentrated in early-stage funds; of that 59% is going to Series A and B rounds and 20% to seed-stage financing. Deals are concentrated in four sectors, with consumer discretionary and finance sectors dominating, followed by health care and industrials; more than 85% of all companies receiving investment fall into these top sectors. Exits doubled from 2019 to 2020, with 35.7% (the largest share) in 2020 occurring through M&A as well as partial sales to other investment firms with expertise to help the companies grow.[18]

Combined with growing interest on the part of states, cities, and universities in promoting entrepreneur-led growth and a new generation of founders inspired by Silicon Valley, the greater amount of money in the system is helping to produce successful startups. Many are in fintech, e-commerce, and e-commerce logistics, as well as SaaS and ICT. Founders often have personal connections to the Bay Area and other US technology centers, having studied at universities such as Stanford. Many of the companies founded are "me too" businesses, taking solutions that have worked well in the United States and applying them in Mexico. But because the Mexican market has distinctive characteristics and drivers, many are addressing unmet needs—seen, for example, in the growing ability of fintech payments companies to meet the needs of lower-income and unbanked customers who are not served well by the traditional banking system. A growing number are seeing opportunities not only in Mexico's markets but also in Latin America and in the potential of Mexico as a startup bridge from Latin America to the United States.

Four companies have seen particular success:

- A grocery delivery company, founded in 2015 in both Mexico and Chile, **Cornershop** has grown to more than 1,000 employees[19] and currently operates in eight Western Hemisphere countries: Chile, Mexico, Brazil, Peru, Colombia, Costa Rica, Canada and the United States. Uber acquired a majority stake in 2020.[20]
- A mobile electronic payments company that enables small and medium-sized companies to accept credit card payments, **Clip** was founded in 2012 by former PayPal Mexico manager[21] and Endeavor graduate Adolfo Babatz and his former PayPal colleague Vilash Poovala.[22] By 2019, the company had attracted USD 101 million in venture investment from firms including SoftBank, General Atlantic, and Alta Ventures Mexico.[23] Now headquartered in Berkeley, most of Clip's employees remain in the Mexico City area.[24]
- **Kavak**, a used car buying and selling platform that facilitates processing documentation and personal financing, became Mexico's first unicorn in October 2020 with a valuation of USD 1.1 billion. With 700 employees in dozens of branches nationwide and operations now in Argentina, Kavak has raised USD 393.8 million as of September 2020[25] from investors including SoftBank, QED Investors, DST Global, General Atlantic, and San Francisco-based Greenoaks Capital.[26]
- **Konfio**, a Mexico City fintech that provides quick, small loans to small and medium enterprises using data-based credit assessments,[27] has attracted USD 461 million in funding[28] including USD 100 million from SoftBank.[29]
- **Jüsto**, a an online supermarket launched in 2019, delivers groceries to customers homes from its own warehouses (as opposed to delivering food from other brick-and-mortar providers), with an emphasis on fresh produce and local suppliers.[30] Currently operating in Mexico City and Querétaro, it plans to expand to other major cities in Mexico and later to other countries in Latin America (Colombia, Brazil and Chile).[31] A USD 10 million seed round led by Foundation Capital, that also included 500 Startups, was raised in 2019.[32] That was followed in February 2021 by a USD 65 million Series A round that included Foundation Capital and was led by General Atlantic.[33]

Venture Capital Perspectives

Several of Mexico's leading venture capitalists shared their perspectives on the country's investment environment for this report.

Spotlight

An Investor Perspective on Founders and Markets

Investor and entrepreneur Eric Pérez-Grovas was a student at Stanford at the same time as the founder of Mercado Libre, one of the largest e-commerce companies in Latin America. From there he became the head of Mexico for Mercado Libre and later head of the Mexican e-commerce association AMVO (Asociación Mexicana de Venta Online). That contact with a growing number of e-commerce startups led him to the venture capital industry as a way to support Mexico's digital transformation. Pérez-Grovas notes that the digital economy in Mexico was slow to take off for several reasons. One was a lack of access to inexpensive broadband, which ties back to the fact that until recently telecom in Mexico was a monopoly and Mexico City was served by copper rather than fiber. The second major barrier was the lack of digital payments, as credit card penetration was low and banks were slow to digitalize. That situation changed in 2013 with the passage of the national telecommunications reform law that introduced competition from new market entrants such as AT&T and Telefónica and stimulated new investment. With that, the cost of data plans dropped by as much as 90% and the use of cell phones sharply increased, enabling digital companies to emerge.

E-commerce and fintech both present major opportunities, Pérez-Grovas believes. Banks had been very profitable so hadn't pushed into new areas, deriving revenue instead from traditional and relatively simple services. That has created an opening for digital banking services. As an early-stage investor, he also sees opportunity in the B2C space. Another growth area is logistics relating to e-commerce, which includes supply chain applications, Uber-type services that connect trucks with large shippers, delivery within large cities, and supply chain security. The consumer space, where Mexico offers a large market, presents more opportunities, as seen in the success of companies like Uber, Spotify, and Netflix. Though not on a large scale yet, Silicon Valley investors such as Propel Venture Partners and Sequoia Capital are starting to take notice. Pérez-Grovas notes that the founders of his best-performing portfolio companies were educated in the United States or Canada, reflecting a pattern among startups across Mexico. Many have had prior experience working in consulting firms and larger organizations such as McKinsey, BCG, and Goldman Sachs, something that improved their companies' efficiency and gave them skills in management and talent acquisition.[34]

Spotlight

Dila Capital

An entrepreneur from an early age, Dila Capital founder Alejandro Diez Barroso started a business soon after high school and ran another company while studying economics in college. Looking at Mexico's landscape in 2004, he was surprised to find that the country didn't have a venture capital industry: from an entrepreneur's perspective, banks weren't leading, private equity would take too much control, and angel investors were few in number and generally unsophisticated. In 2005, he sold his business and set out to create Mexico's first venture capital fund. One immediate challenge was that it was difficult to legally protect minority stakeholders in Mexico in the same way they are protected in Silicon Valley, so he used the capital to launch a retail company that was later sold to a private equity fund. That was followed by earning an MBA at the Kellogg School of Management at Northwestern University, where he took all the venture and entrepreneurship classes that were offered. On returning to Mexico, he found that the legal environment for venture had changed for the better: the government was supporting entrepreneurship, legal entities had been created and laws were being changed to protect minority investors, and development banks had begun to invest in technology and in venture funds.

Diez Barroso's first fund, raised in 2012, invested in ten companies, of which by 2020 three have been sold, three were written off and four are still held. The investments were small (USD 500,000) and focused on growing, revenue-positive companies. In 2018, with Mexico's venture environment heating up, firms from Silicon Valley and other international investors such as Japan's SoftBank and Singapore's sovereign wealth fund Temasek Holdings started to appear. Dila Capital's investment rose too—from USD 5 million in 2012, to USD 15 million in Dila's second fund in 2015, and to USD 50 million in 2018, with the average investment doubling in size to USD 1 million. With that, the firm has expanded its focus from Series A and pre-Series A to Series B. Its main focus is on consumer, fintech, and SaaS, as well as internet and media. Ninety-five percent of Dila's investors are family offices and high-net-worth individuals. The firm actively co-invests with other Mexican VCs and generally leads the deals where it participates.

Dila's investment strategy also has a strong Latin American component. In its first fund, DILA 1, only one portfolio company had a presence outside Mexico; in DILA 2, six of twelve did; and in its latest fund, DILA 3, 80% (16 of 20) had footprints outside Mexico. Countries such as Colombia, Peru, and Chile are considered particularly promising due to their economic size, favorable demographics and risk profiles, and smart phone penetration.

Diez Barroso notes that there's still not enough capital available to invest at the growth stage, and while Silicon Valley investors are showing more interest in Mexico than in the past, only a few are active. One reason, he believes, has been the lack of exits, since Mexico lacks an IPO market. That is changing, however. In recent years, Cornershop has been acquired, Clip received investment from General Atlantic, and Kavak received investment from SoftBank, all showing that Mexico could compete for capital and produce unicorns. "I truly believe the time is now," he says. Another development, he believes, that could help attract attention from Silicon Valley VCs is the potential to expand from Mexico into Latin America: "The Mexican market isn't small, but it starts to look really interesting if you can also scale into Colombia, Chile, and the rest of Latin America."

Commenting on Mexican entrepreneurs, Diez Barroso is positive about the future: "It's amazing to see what's going on. For five years, I've taught an entrepreneurship course twice a year, so ten times now, at my university in Mexico. In the first year only one student said they'd want to start a company. Last year more than half said they would. We're seeing a huge change."[35]

Spotlight
IGNIA

Mexico's largest venture firm,[36] IGNIA was founded in 2007 to invest in world-class tech entrepreneurs who are addressing pain points faced by the emerging middle class in Latin America, and it has become a cross-border multi-stage venture capital firm based in the US and Mexico.

Co-founder and Managing Partner Álvaro Rodríguez believes that US and Silicon Valley companies need to update their view of Mexico if they want to capture its opportunities: "The traditional view of Mexico revolves around the question what can Mexico bring to my business as an input—for example through engineering talent or lower cost manufacturing. That's fine, of course, but it's not the whole story. Yes, there's great engineering talent in Mexico that is loyal, reliable, and inexpensive. But Americans also need to get excited about Mexico's potential as a market. Mexico is a leading market for companies like Google and Netflix. Once you think about Mexico through that lens, you'll be surprised."[37]

Rodríguez describes Mexico's connection to Silicon Valley as "spotty," with venture firms visiting but not actively scouting for deals, in part because they wonder about the potential of this market. As a result, Mexico isn't yet part of their strategy. Up to now, it has been hard for Mexico to compete for attention since "in the US you have to convince the investor only about the deal but in Mexico you have to also convince them about the market." Funding in Mexico presents its own challenges, as most investors

are family funds or wealthy individuals, and support from pension funds (which tend to be conservative) is very limited. This has kept the venture capital space still as a buyers market.

But the opportunities are there. Mexico, Rodríguez points out, came late to the digital economy but did so with a vengeance, becoming the fastest growing digital economy in the world in 2019, with an ecommerce sales growth rate of 35.0%, exceeding India's 31.9% and the 20.7% worldwide average rate for ecommerce growth.[38] Since the telecommunications market reform of 2013, broadband service is as good or better than in the US and is also cheaper. One result is that while five years ago it was difficult to make a payment in Mexico online, today service is frictionless and there are many alternatives. More than 90 million Mexicans are now digitally connected,[39] creating strong opportunities in the B2C space in a national market that's still underserved. The share of consumers buying at least one product or service on the internet annually is 85%, and Amazon is the biggest online retailer in Mexico,[40] where it now runs five fulfillment centers, two support buildings, and two sorting centers.[41]

Asked about Latin America, Rodríguez thinks Silicon Valley makes the mistake of seeing all of the region as one market, when in fact every country is different. With Mexico at the heart of its strategy, IGNIA invests in cross-border startups and supports high-growth Latin American based startups in sectors ranging from fintech, SaaS, marketplaces, edtech, retail transformation, and industry 4.0. Portfolio companies include Rapyd and fintech Fondeadora, whose August 2020 Series A round was led by Gradient Ventures, Google's early-stage venture fund. Operating as a bank with a broad range of services, Fondeadora currently has 150,000 active deposit accounts, processes monthly transactions of more the MXN 400 million, and has been experiencing 40% month-on-month growth. The new round is expected to enable the company to expand its reach to 500,000 users in 2021.[42]

Spotlight

Dalus Capital

A serial entrepreneur, Dalus co-founder Rogelio De los Santos started seven companies and sold three before launching the VC firm. Based in Monterrey, he became a trustee and later chairman of the board of Tec de Monterrey's Eugenio Garza Lagüera institute for entrepreneurship and has subsequently been instrumental in the launch of digital and startup initiatives in Monterrey including INCmty, a major entrepreneurship conference. His first USD 70 million fund was launched in 2010 with 32 primarily Monterrey families and family offices as LPs; for most, it was their first time investing in startups. One of the fund's first nine portfolio companies was Clip, now a fintech giant and the go-to payment acceptance platform for SMBs in Mexico.[43]

Today, Dalus Capital's investments are categorized around four themes: inclusion, climate innovation, business productivity, and the digital consumer. Its portfolio includes companies that operate in Latin America or are strongly connected to Latin America, companies that have more than USD 1 million in sales, and investments in the USD 1–10 million range.[44] De los Santos believes that family offices, an important source of capital for venture firms, are becoming less conservative in their investments and more comfortable as investors in entrepreneur-led startups. Deeply connected to Monterrey's ecosystem, and with a Mexico City office, he sees Monterrey's wealth as an important ingredient in building Mexican startup companies: "If you put together corporate venture capital (CVC), venture capital, and family offices, Monterrey has more capital to invest than Mexico City."[45]

Startup Perspectives

Perspectives from interviews with Mexican founders and executives in a range of sectors can be found throughout this report. This section presents views from startups in the fast-growing fintech sector and the emerging biotech sector.

Fintech

One of a new wave of fintech startups, **Bitso** is a Mexico City-based cryptocurrency exchange and payments platform serving the Mexican and Latin American markets. Founded in 2014, the company received early investment from friends and family; today the company employs 200[46] and has expanded into Argentina, and raised USD 62 million in a Series B funding round in December 2020 with its next expansion plans focusing on Brazil.[47] Originally, Bitso was only a place to trade, but it soon partnered with the Ripple gateway platform to enable its users to make cross-border transfers of pesos, US dollars, and bitcoin[48] and then created the Bitso Transfer platform that includes a wallet that allows users to store, send, and receive money,[49] including transfers and remittances. In mid-2020 the number of users passed one million,[50] with 900,000 based in Mexico and approximately 100,000 in Argentina. Bay Area-based Coinbase Ventures was among Bitso's Series A investors,[51] and its gateway partner Ripple is a San Francisco-based unicorn using blockchain and cryptocurrency for global remittances.[52] The company's team includes a six-person engineering staff in San Francisco.

The company was influential in crafting Mexico's new fintech law, which its Risk and Corporate Affairs Specialist Emilio Rivero Coello describes as positive for fintech (e.g., crowdfunding and payments) but less so for cryptocurrency, due to the way that the law constrains the number of licenses granted. For fintech, an underdeveloped digital identity system remains a barrier for people who are unbanked, as is the prescriptive, code-based nature of Mexico's civil law system that contains detailed requirements—putting more authority in the hands of regulators. He points to other barriers for startups of all kinds, such as difficulty in providing stock options and a low appetite for risk in venture firms (something he thinks is changing). Rivero describes the quality of engineers in Mexico as good, particularly for basic work, but thinks the higher-level skills required to compete in global markets are harder to find. Bitso's response is to do its basic engineering in Mexico and engage engineers in the Bay Area, India, and elsewhere for the most advanced work. By working together, those engineers can help their Mexican counterparts to grow their skills.[53]

Biotech and Life Sciences

Besides fintech and other digital technologies, biotech is another emerging—if less developed—field. ProMéxico's profile on the state of Biotechnology in Mexico in 2017 portrays the sector as including 553 businesses,106 universities, 20 laboratories, and 39 R&D centers. The profile also reports 3,163 researchers working in the field, primarily in 7 biotechnology industry clusters located in Mexico City and the states of Mexico, Morelos, Nuevo León, Jalisco Guanajuato, and Baja California.[54] The quality of biotech and life sciences in Mexico is exemplified in the career of Dr. Francisco Gonzalo Bolivar-Zapata, who was on the team at Genentech in 1977 that was the first to successfully produce human proteins in bacteria, effectively launching the field of genetic engineering. Dr. Bolivar later returned to Mexico to serve as the founding director of the UNAM center for research on genetic engineering (established in 1982 and later turned into the UNAM institute for biotechnology), as dean of scientific research at UNAM, and as vice president and president of the Mexican academy of sciences from 1996 to 2000. He also served as a member of the UNAM governing board from 2002 to 2012.[55]

In general, lower costs for R&D, clinical trials, product testing, and pharmaceutical manufacturing make Mexico highly cost-competitive for US partners compared to Canada, Japan, and Western Europe. Despite its promise, however, the biotech and life sciences sector is less developed as a field for entrepreneurs than tech. The major challenge that biotech startups face is the relative weakness of Mexico's supporting ecosystem.

Lab space and research funding are concentrated in academia, but without supporting pathways for commercialization. The research infrastructure outside of academia is concentrated in big pharma. Within universities (as in many other countries) academic incentives (measured by patents and journal publications) predominate over entrepreneurial

incentives. Where early-stage funding is generally available for startups in fields like e-commerce or fintech, it is more difficult to find in biotech, as few investors in Mexico understand the field, making them reluctant to invest in technologies that are unproven, science-based, or have long time horizons. Finally, finding a product-market fit can be difficult, with shortages of both R&D buyers and chemical or pharma companies looking for partnerships and acquisitions. Lacking a deeper ecosystem, most biotech graduates take jobs in academia or in alternative industries (as business consultants or in operational roles in non-biotech companies), while others leave Mexico for better opportunities.

Still, biotech entrepreneurs are emerging across Mexico with solutions aimed at local as well as external markets. One example is **Dupla Helica**, a Monterrey-based startup founded by Ivan Rodriguez-Jaubert, a graduate of Tec de Monterrey. His first job after graduating was at ATCAE, a biotech spinout from UANL (the autonomous university of Nuevo León), where his role was to find paths for commercialization. Seeing growth in synthetic biology, he created Dupla Helica to address the gap between the small supply of lab space available in Mexico and the high demand for it. The company is focusing on the development of customized mobile labs that are available on demand. With lab space in short supply in the Bay Area due to growth in the sector, Northern California is also being targeted for a pilot rollout of the company's mobile labs.[56]

Other biotech startups emerging from Monterrey include **Delee**, which produces an automated device to quickly isolate and analyze circulating tumor cells.[57] Operating in the cancer management field for several years, Delee has ties to Stanford University and Y Combinator. Another deep tech startup with ties to Tec de Monterrey, **Nitrocel Technologies** develops technologies to accelerate cell therapy manufacturing.[58]

Besides Monterrey, small biotech clusters have developed in Mexico City, Guadalajara (Jalisco), and Ensenada (Baja California). All face similar challenges. In response, Nitrocel founder Alejandro Espinosa and others have created **Biolaunch**, a community of Mexican bioentrepreneurs which held its first summit for approximately 100 participants in 2019. With roughly 40 active participants in the organization and 1,400 in its extended community, its goal is to generate a biotech ecosystem and speed technology transfer, as well as influence policy. A related network with approximately 1,500 members, Allbiotech, links biotech researchers, founders and technicians in Mexico and Latin America through social media and virtual events.[59]

Future opportunities for biotech startups in Mexico could come through closer ties with industrial companies, particularly in the food sector (agritech) and in biology-based production such as fermentation.

Leveraging Latin America

As already noted, a growing number of Mexican startups are looking for accelerated growth by scaling from Mexico into Spanish-speaking Latin America. The market appears ripe for disruption. In a poll conducted for the Latin American innovation alliance Somos Innovación in the last two months of 2019 in Argentina, Brazil, Chile, Colombia, and Mexico, 87% of respondents believed that encouraging innovation is crucial for future economic growth and 84% said they like to use products and services that make use of innovative ideas. In addition, 74% of respondents considered it important that governments not stop innovation in its early stages by regulating a new product or service before they understand it. Services such as Airbnb, Uber, Cabify and on-demand food delivery company Rappi were specifically embraced as providing more consumer choice and new sources of income for participants.[60]

Achieving innovation at scale will be critical to growth as digital technologies are adopted at an accelerating pace, but Latin America still lacks a robust cohort of modern, competitive, mid-sized companies. A 2019 study by McKinsey Global Institute found that while Latin America is home to highly competitive multinationals, the relatively small number of large and mid-sized

companies with more than USD 50 million in revenue inhibits competition and the growth of well-paid jobs. Explanatory factors include a legacy of trade protection, compliance-heavy regulation that favors either large scale or informality, and unequal access to finance. McKinsey identifies digital technologies as one way to address this challenge of the "missing middle" of dynamic mid-sized companies—by making it easier for companies to open and run businesses, by facilitating more efficient markets, and by making it possible for small and mid-sized companies to become "micromultinationals" and compete with larger companies through goods and services offered in online marketplaces.[61]

Those mid-sized digital companies are now emerging across the continent—in Mexico, Colombia, Brazil, Chile, and Argentina—and are successfully attracting capital. A March 2021 CB Insights analysis found that since 2009 more than USD 16 billion has been invested across 2,800 deals in tech startups in Latin America and the Caribbean.[62] In 2020, a record year for Latin American startup venture capital deals, tech companies raised USD 4.1 billion across 488 deals, topping the previous deal number high set in 2018.[63] The most well-funded startup in Latin America is food delivery company Rappi (with more than USD 1.7 billion in disclosed equity funding), followed by Brazilian fintech Nubank (with USD 1.5 billion). Among the 12 best funded startups in the region is Mexican mobile payments company Clip, taking fifth place with USD 147 million in total equity funding.[64] Fintechs in particular have been finding success. In a six-year period, Latin America fintech funding grew from USD 44 million across 25 deals in 2013 to USD 2.1 billion across 139 deals in 2019.[65]

The Focus Shifts: Looking to Mexico's Regions

AMEXCAP president Liliana Reyes points to persistent challenges in the funding environment. One is the narrow window in Mexico for exits, as Mexico's stock exchange is designed for more traditional companies and M&A activity is constrained by a lack of international connections. While ample money is available, many LPs and angel investors lack experience in how to invest compared to their counterparts in Silicon Valley, often preferring real estate or other conservative investments. Another challenge is the absence of a strong brand for Mexican startups and investors outside of Mexico, and a perception among US investors that the scale of deals available in Mexico can't compete with the larger returns available elsewhere.[66] As already indicated, however, the value being created by successful startups in Mexico and Latin America is starting to be recognized.

A final challenge, shared with many other countries that are seeking to build innovation ecosystems, is that while seed and very early-stage funding is generally available, Series B and growth funding is difficult to find from either domestic or overseas VCs. This too is starting to change, but the gap remains wide. Access to Silicon Valley and other outside investors is therefore critical for Mexican startups that are successful and need to scale.

With the current national government's weak support for business, entrepreneurs, and startups, activity and attention are shifting to key states and cities across Mexico that are developing their own innovation ecosystems and are generating startups with local roots—often with the active support of state and local governments and university and business partners. The chapters that follow discuss several of those key city/regions—Tijuana/Mexicali/Ensenada (Baja California), Ciudad Juárez (Chihuahua), Monterrey (Nuevo León), Guadalajara (Jalisco), Mérida (Yucatán), Mexico City, and the Bajío region, an economic grouping of all or part of four states—Aguascalientes, San Luis Potosí, Guanajuato, and Querétaro, known together as El Bajío—along with adjacent portions of the states of Zacatecas and Jalisco.

3

Baja California (Tijuana-Ensenada-Mexicali)

Business and Industry

Bordering California's San Diego and Imperial counties, Baja California is most often thought of as a tourist destination and a site for cross-border manufacturing assembly. Like several other Mexican states, however, the state's environment is changing based on a growing orientation toward advanced manufacturing, research, higher education, and entrepreneurship. That transformation is still a work in progress. What makes the state of Baja California unique is the scale of investment in the cities of Tijuana, Ensenada, and Mexicali, that capitalizes on the region's proximity to San Diego and California. This is enabling a dynamic cross-border economy in what is known locally as the Cali-Baja region.

The San Ysidro Land Port of Entry is the busiest land border crossing in the Western Hemisphere, with an average of 90,000 bus passengers, pedestrians, and personal vehicle passengers making the northbound crossing of the Tijuana-San Diego border each day.[1] In 2019, there were more than 36.7 million northbound crossings of vehicle passengers and pedestrians at San Ysidro (which doesn't allow freight crossings) plus 1.7 million northbound truck and full truck container crossings 6 miles away at the Otay Mesa port of entry. In 2020, during the COVID-19 pandemic, San Ysidro's northbound passenger and pedestrian crossings fell by 54.1% to 16.8 million, while Otay Mesa's northbound truck and full truck container crossings fell by just 3.99% to 1.6 million, indicating strong cross-border commercial activity despite the pandemic.[2] Northbound truck crossings in 2019 at the two other California freight crossings with Mexico totaled 104,080 for Tecate and 647,273 for the Calexico East crossing from Mexicali.[3]

With a population of 2 million and one of the fastest growth rates in Mexico, Tijuana is the country's fifth largest city[4] and concentrates most of the region's economic activity. Other key cities are the state capital Mexicali (with a population of more than 1 million[5]) and the port city of Ensenada (with a population of 443.8 thousand[6]).

The region is an important manufacturing center for industries including aerospace, medical devices, biotechnology, automobiles, and electronic equipment. Agro-industry (wine and berries) is another important sector. Most manufacturing companies are concentrated in 101 industrial parks close to the border,[7] including 65 in Tijuana[8] and more than 25 in Mexicali.[9]

- The *medical devices* sector benefits from proximity to industry clusters in Southern California. More than 70 medical technology companies are engaged in design, assembly, manufacture, sterilization, and other processes, with a workforce of 61,000.
- *Aerospace* activity focuses principally on components, with 94 companies supporting more than 35,000 employees, composing the largest

concentration of aerospace companies in Mexico (21%) and more than half of Mexico's aerospace workforce. Over half of the aerospace companies in Tijuana have more than 500 employees, operating in fields ranging from commercial aviation to defense, space (satellites), and drones. Beyond assembly and subsystems manufacturing, locally-based activities include design, R&D, and advanced materials development, with production for global companies such as Boeing and Airbus.

- *Biotech* activity is concentrated in Ensenada and in 37 research laboratories across the state.
- The *automotive* sector is anchored by two assembly plants operated by Kenworth (PACCAR Group), which produces heavy trucks for global markets, and Toyota, which assembles the Tacoma truck. Altogether, 80 automotive companies, including parts suppliers, operate in the state.
- The *electronics* sector, long the region's anchor, comprises more than 200 companies producing products including circuit boards, flat screen televisions, cellular phones, home appliances, computers, and semiconductors, with a workforce of 92,000.[10]

Outside of manufacturing, medical tourism—offering advanced procedures in fields such as cancer treatment, dentistry, and ophthalmology—is growing rapidly. Feature film production is another sector with an established base and potential for growth. Wine production, centered in the Guadalupe Valley, includes more than 100 wineries[11] and related restaurants, inns, and event spaces in what has become Mexico's equivalent to Napa Valley.

The state of Baja California ranks third in Mexico in the value of total international exports (USD 36 billion in 2017), accounting for 10.4% of national exports. Forty percent comes from manufacturing.[12] The region's production is overwhelmingly destined for US markets, followed by Canada. The US is the source of 80.7% of foreign direct investment (FDI), followed by South Korea (3%), Japan (1.9%), Canada (1.9%), Spain (1.4%), and China (1.3%), with other sources accounting for 9.8%.[13]

The region's development as a global business center is rooted in the maquiladora program known as IMMEX, which enables contract manufacturers in Mexico to defer taxes on imported components, raw materials and manufacturing equipment, and to pay lower taxes on finished products exported to the US. According to CANACINTRA (the national council for industry transformation), 98% of inputs for Tijuana's maquiladoras are imported.[14] One of CANACINTRA's goals is to increase purchasing by maquiladoras from local suppliers. To further that objective, in 2018 the state government passed the Ley de Fomento a la Proveeduría Local (Law for the Promotion of Local Suppliers), which offers fiscal incentives for maquiladoras to increase their procurement from local suppliers and creates a fund to support local SMEs through trade fairs, training, and certifications.[15] Reflecting the concentration of maquiladora facilities along the US border, more than half of the chapters of INDEX (the maquiladora industry's national council) are in Northern Mexico.[16]

Some of the earliest international companies came to Tijuana and Mexicali from Japan, with most clustered in the electronics sector. In the early 2000s, Tijuana was the world's top production site for television sets, led by companies such as Sony. As the industry and technology changed, Japan's presence receded and South Korea's grew, joined later by companies from Canada, China, and Europe.

SPOTLIGHT

Honeywell

Honeywell International, a Fortune 500 company producing commercial and consumer products, engineering services, and aerospace systems, has had a manufacturing presence in Baja California since 1979 and today employs more than 2,000 people at its Mexicali sites. Since 2007, it has supported a center for engineering and design that employs 350 Mexican engineers. In 2017, the company added a wind tunnel (an investment of 300 million pesos) to enable the testing of aircraft turbines for companies such as Boeing, Airbus, and Embraer. According to Luis Sanchez, the president of Honeywell Mexico, the company has grown in Mexicali primarily due to its capable labor force and an educational infrastructure that includes quality universities.[17]

While still anchored in assembly, production in Baja California has been moving to higher value-added levels and more complex products. In recent years, that shift has included integrated solutions built on software and local R&D.

In the automotive sector, prior to the 2010 closing of Toyota's joint venture in Fremont with General Motors—New United Motor Manufacturing Inc. (NUMMI)—there had been close collaboration with Toyota's facility in Tijuana. With NUMMI's demise, parts of Toyota's Fremont activity moved south. Training today is continuous, with Mexican engineers regularly traveling to Japan and Japanese engineers traveling to Tijuana. Work performed in Tijuana includes the development of automated equipment and applications software, both for global markets.

Though still small, service trade is also growing based on computer systems design, software publishing, data processing, and other professional, scientific, and technical services.[18] US-based biotechnology company Thermo Fisher Scientific, for example, has more than 200 software developers working at its IT Center of Excellence in Tijuana.[19]

SPOTLIGHT

Thermo Fisher Scientific

Since 2015, Thermo Fisher Scientific, a leading scientific products company with a large presence in the Bay Area, has operated an IT Center of Excellence in Tijuana, with 166 on-site staff doing software development and support. Of those, 77% come from Baja California, 12% from other parts of Mexico, and 9% from other countries (Venezuela, France, India, and the United States). Activity is built around twenty scrum teams (which develop software from the ground up), three R&D teams, one UX team, and nine IT support teams focusing on data science, user experience, VR, AR and IoT. Professional staff includes software engineers, UX designers, data scientists, VR and AR specialists, IT specialty positions, and engineering managers. Onsite R&D includes the design of protocols for linking to the cloud, extracting value from internally generated data, and pushing ecommerce solutions out to the company.

Asked why Thermo Fisher located a Center of IT Excellence—one of three operated by the company around the world, joining Bangalore and Budapest—in Tijuana, Senior Manager and Site Leader Octavio Perez first cites good universities that generate graduates with the skills the company needs, including data science and UX design. UABC and CETYS are the leading partners. The Center actively works with those universities to understand their programs and help train the faculty to produce graduates with the skills needed to be hired; it also provides on-the-job training experience as students end their programs.

Perez notes that Tijuana has a strong talent base of people who are early in their careers with 2–3 years of experience, but that at higher levels (5–10 years of experience) the talent is harder to find. One factor is that, being so close to the US, it's easy for top talent to move there. The solution for the company is to train and grow senior architects and other senior personnel internally. Thermo Fisher also benefits from having a sister facility with 1,500 employees 80 miles away in Carlsbad, California. That facility works with Tijuana as a single site, linked by regular shuttles. The linkage with Carlsbad also enables engineers in Tijuana who want to grow in the US to work in California.

Links between the Tijuana Center of Excellence and the other Thermo Fisher centers in Bangalore and Budapest support a "follow the sun" strategy that enables continuous collaboration. Perez also points to a growing IT community in Tijuana, enabled in part by Thermo Fisher alumni who have left the company to start their own enterprises. This is producing competition for talent, with companies such as Samsung also in the market, but the growth of IT in the city is creating a critical mass that supports its goal of becoming an important nearshore IT center linked to Silicon Valley.[20]

SPOTLIGHT

Film and Animation

In the last two decades, Baja California has developed a substantial base for film production centered on Baja Studios, a facility located on the coast south of Tijuana and Rosarito Beach.

Originally built by Twentieth Century Fox for the filming of *Titanic* in 1997, the campus is home to the world's largest water tanks and stages designed for filming. Subsequent productions have included MGM's *Tomorrow Never Dies,* Warner Brothers' *Deep Blue Sea*, Disney's *Pearl Harbor*, and Fox's *Master and Commander: The Far Side of the World.* More recent production has focused on television series such as *Fear the Walking Dead* and streaming films for Amazon, HBO, and Netflix. That activity has enabled the accumulation of localized experience and expertise. Lower costs, more flexible unions, proximity to Hollywood, and access to a complete pipeline of pre- to post-production services are also supporting growth. Where visual effects artists were once brought in from Santa Monica and Canada, for example, today most work in the field is done locally.

Feature film production has generated a supporting ecosystem of digital content studios such as iDigital Group, which has both advertising and film divisions. Starting with production services, the company is generating its own IP and supports a post-production and animation unit focusing on virtual reality and augmented reality. iDigital founder Gabriel Reyes, a systems engineer, wants to improve the efficiency of filmmaking by applying industrial engineering methods. As he explains, "There's nothing in film production like ISO 9000, Six Sigma, or other certifications that ensure efficiency and quality in the production process. The industry should be more efficient in how it works, which the engineering discipline can address." The company is currently working with partners at Stanford to establish XR Cinema Lab, a software-based "extended reality center" that builds on the experience of digital designers in "world building" for films and will be housed at Baja Studios. The Lab will also test new ideas applicable to social and economic issues as well as entertainment.

Other Baja California companies in the industry include Boxel Studio, a 13-year-old visual content studio employing more than 40 artists and technicians. Focusing on visual effects (VFX) and animation, Boxel has worked with US companies such as the History Channel, Nickelodeon, Hulu, and Netflix (*Medal of Honor* docudrama). The state's pipeline of media designers and technicians is supported by degree programs in animation and filmmaking at regional universities.[21]

University and Research Environment

Much of this activity builds on a growing base of engineers and an active developer community; of the more than 2,500 students graduating each year from Tijuana's more than 35 universities, approximately 27% are engineers.[22] In addition to hardware and software engineering, fields of study include computer systems, multimedia design, digital graphic design, and animation and visual effects. Tijuana is also home to 186 technical and high schools that offer accredited programs in engineering, sciences, IT, business, and other areas.[23] Universities are working to develop new degrees and programs to provide the technical skills that companies require. Leading institutions include the following:

- **UNAM** (the national autonomous university of Mexico) is a public research university[24] based in Mexico City, with satellite campuses in almost every Mexican state.[25] Its Baja California campus in Ensenada is home to the Centro de Nanociencias y Nanotecnología (see below).
- **UABC** (the autonomous university of Baja California) is the fifth largest public university in Mexico. With 68,000 undergraduate and 3,500 graduate students spread across its three main campuses—Mexicali, Tijuana, and Ensenada—educational priorities focus on key sectors of the state's economy including agriculture, fisheries, tourism, commerce, and industry, and support partnerships with the business community.[26] Included in the university's 134 undergraduate and 64 graduate programs are 15 in engineering (including computer systems, bioengineering, aerospace, civil engineering, electronics, renewable energy, robotics, mechanical engineering, nanotechnology, and chemistry). In 2019, it supported 8 research institutes and 670 funded research and technology development projects.[27] International agreements are in place with 140 universities,[28] with joint degrees offered with universities in Spain, Chile, Colombia, and two

universities in California (UCSD and UCLA).[29] Other joint research, teaching, and exchange programs are in place with San Diego State University, UC Irvine, and Scripps Institution of Oceanography, as well as MIT and with projects funded by NASA, the National Science Foundation (NSF), and UNESCO.

One distinctive program is UABC's school of enology and gastronomy, which supports the state's growing food and wine sector. Research on the properties of Baja California wines, consumer preferences, and soil and water technical analysis supports viticulture companies, while collaborations with wineries and restaurants deliver a professional practicum for students. In addition to collaboration agreements with the Universidad de la Rioja in Spain, the school recently signed a letter of intent to collaborate on enology research with California State University, Fresno.[30]

- **CETYS** (the center for technical and higher education) is a private university with 500 academic staff and approximately 7,700 students. The university has three regional campuses—in Tijuana, Mexicali, and Ensenada.[31] While its laboratory space is limited and most of its entrepreneurs are young, the school has developed a significant focus on innovation and entrepreneurship, including a nationally accredited business incubator.[32]

Noteworthy research institutes are growing in Ensenada, a city that has been better known for its port and tourism:

- **CICESE** (the center for scientific research and higher education in Ensenada) is the largest institution of the 27 that make up CONACYT (the national council for science and technology). Currently it supports 530 research staff and technicians, working on almost 400 research projects across Mexico. Its center in Ensenada supports 113 laboratories in four academic divisions: experimental and applied biology, earth sciences, applied physics, and oceanography. Leading research fields include marine ecology, environmental geosciences, marine biotechnology, computer science, optics, geothermal energy, seismic engineering, and aquaculture. A number of research projects are being developed with business and government counterparts; corporate partners from the United States include Bay Area companies Chevron, Plantronics, and Intel, as well as IBM. Products and applications range from fish farming to antibodies derived from sharks, diagnostics for trichinosis, oil spill remediation, and nanosatellites developed for the Mexican army.

  While for most of its 40 years CICESE has focused on academic research (and generated few patents), it has recently shifted toward applied research—with the goal of identifying projects with commercial potential that can be moved to market, in the process supporting students and post-graduates who could be entrepreneurs. Eight years ago, an office of technology transfer was created, and research collaboration with industry expanded. Under an agreement with the National Science Foundation in the United States, the center uses the I-Corps entrepreneurial support method adopted by Bay Area universities such as Stanford and Berkeley to orient scientific researchers toward entrepreneurial opportunities. University research partners in California include the Scripps Institution of Oceanography (San Diego), UC San Diego, UC Riverside, UC Irvine, and UC Davis.[33]

- **CNyN** (the center for nanosciences and nanotechnology) started in 1983 as LEIF, UNAM's Ensenada physics laboratory.[34] Today, its specialists in nanomaterials, bionanotechnology, nanocatalysis, nanostructures, microelectronics, and nanofabrication focus on medicine, energy and the environment.[35] Each year, CNyN graduates approximately 10 students with bachelor's degrees in nanotechnology, 10 with master's degrees, and 5 with doctorates in materials engineering and physical sciences. Industry research partners include CIDETEQ (the center for research and technological development in electrochemistry), Honeywell, and PEMEX. Collaborations in bionanotechnology and physics are also underway with UC San Diego.[36]

- The **Centro de Estudios Vitivinícolas** (center for wine studies), a degree-granting program at CETYS, provides research laboratories and training to support Baja California's burgeoning wine industry.[37] The center is located close to the Guadalupe Valley, a fast-growing viticultural region that is home to more than 100 wineries.[38]

Collaborative research between universities and with industry is encouraged by PEI, the national innovation research program run by CONACYT. Analysis suggests that the program is finding success, most often with UABC at the center.[39]

Technology and Innovation Environment

Overall, Baja California presents a mixed picture when it comes to science and innovation. Rankings in 2018 of the 32 Mexican federal entities (31 states plus the Mexico City federal district) by CAIINNO (the analysis center for research in innovation) showed Baja California near the top in science (#8 in Public and Private Investment in Science, Technology and Innovation; #2 in Higher Education; #6 in Scientific Output; and #2 in Information Technology), but lagging at the private sector level (#32 in Innovative Companies and #28 in Entrepreneurship and Business.)[40] Startup activity in Baja California is still in the early stage, with risk capital—angel investment and public or private venture capital—extremely limited. Approximately 90% of the startup funding that does exist comes from outside Mexico, and startups that get traction usually raise capital in California.[41]

A range of facilities and initiatives have been developed to accelerate development of an innovation ecosystem and support entrepreneurial growth:

- **COCITBC** (the Baja California science and technological innovation council), part of the state government's secretariat of economic development, is trying to address these shortcomings.[42] Among other initiatives, it has created a fund to which companies can apply for research funding. To be eligible, projects must either be large (to advance growth) or address a significant problem in the community.
- The **BIT Center**, also developed with support from the state's government, is housed in a former supermarket in Tijuana's city center, providing co-working space, private offices, and conference and training rooms for use by entrepreneurs, schools, universities, and freelancers.[43]
- The **CDT** (the Tijuana development board) is a key private initiative supporting entrepreneurship programs.[44]
- **MIND Hub** (Mexico Innovation and Development Hub), co-founded in 2011 by Ángel Sánchez and Jorge Arroyo of Arkus, Inc., is a collaborative tech innovation space in Tijuana's financial district. With a focus on enabling technology on both sides of the US/Mexico border, it houses tech and related services companies. Current occupants include the software consultancy Arkus Nexus and several graduates of MIND Hub's incubation program. Its incubation/acceleration program has been suspended, however, and has stopped accepting startups.[45]
- **BlueBox**, a Latin American accelerator offering training for entrepreneurs, innovation workshops, office space, and an incubation program, operates one of its three Mexican programs in Tijuana.[46]
- The accelerator program **Endeavor** operated in Tijuana from 2008 to 2019, when it consolidated its Mexican operations in Mexico City. While the reorganization allowed Endeavor to focus on regions with higher flows of entrepreneurs, it continues to maintain a network of local contacts and mentors and holds local events. Its Baja California "community leader" is based in Mexico City.[47]
- Positioning the university to better connect with private sector companies conducting R&D in Mexicali, **CEID** (the center for innovation and design) opened in 2018 on the CETYS campus in Mexicali. CEID sponsors ten projects each year to support innovation in the aerospace, automotive, electronics, medical manufacturing, IT, and renewable energy sectors.[48]
- **Global Shapers**, an initiative of the World Economic Forum that mobilizes young people to address civic challenges, has a hub in Ensenada.[49]

The region's large industrial base is now starting to become a source of tech company founders—typically engineers who at one time worked at large companies such as Sony, in some cases went to large or small consulting firms, and eventually started their own companies. One noteworthy entrepreneur is CETYS graduate Jordi Muñoz who, after moving to San Diego,

co-founded **3D Robotics** in 2009.[50] Until it shifted away from manufacturing and consumer markets to focus on enterprise software, 3D Robotics was the largest producer of consumer drones in the US. The company attracted close to USD 100 million in venture funding, based its manufacturing in Tijuana, and was led from offices in both Berkeley and Mexico, with additional footprints in San Diego and Austin.[51]

Building on the region's engineering base, Mexico's leading software company **Softtek** supports a digital services center in Ensenada.[52]

Opportunities and Challenges

What uniquely distinguishes Baja California from other Mexican regions is its physical proximity to California, which offers advantages in time, access, and operational efficiency. The Cali-Baja region presents a range of opportunities for Mexican and California companies, as well as challenges. One issue impacting trade is cross-border infrastructure, where manufacturing and the movement of goods are outpacing goods movement carrying capacity. A project currently underway to upgrade the existing crossing at Otay Mesa is expected to be completed in the spring of 2023.[53]

Other proposals include a strategic rail crossing through Tecate using the existing but unused "Desert Line" to enable exporters to ship directly to Midwest and Northeast US markets. The region also needs to improve mobility and freight efficiency by harnessing data on cross-border movement in fields such as logistics, trade, security, and pollution monitoring. Tools that do not exist today but could add value include the creation of formal border indicators, indexes, or reports for industry and government, and applications that capture and measure data to guide cross-border shippers and travelers. This presents an opportunity for Silicon Valley technology companies, which if successful could be extended to other US-Mexico border crossings.[54]

Another opportunity that connects to the Bay Area is the production and use of renewable energy (particularly wind and solar), where capacity is underdeveloped but demand is growing on both sides of the border. Mexico's Secretaría de Energía (secretariat of energy) has predicted that Baja California will need an additional 67,000 MW of electrical power by 2032.[55] Despite the region's abundant land and sun (Baja California has some of the highest levels of solar radiation in Mexico), only 21% of total power generation in Baja California is produced from renewable sources, including geothermal.[56] IEnova, a subsidiary of San Diego-based Sempra Energy with a presence in 17 Mexican states, operates the Energía Sierra Juárez wind farm close to Mexicali, with 47 turbines and long-term plans for up to seven times more. Since it began operations in 2015, Energía Sierra Juárez has been sending 100% of its production to the United States, helping California meet its renewable energy goals.[57] IEnova also operates the 41 MW Rumorosa solar facility close to Mexicali.[58] Transmission lines in two main border-crossing areas are managed by the Western Electricity Coordinating Council (WECC),[59] Mexico's CFE (the federal electricity commission), and the California Independent Systems Operator (CAISO). These facilities suggest a model for how renewable energy can grow to support more production inside Mexico and stronger connections between the California and Baja California grids.[60]

On the production side, the Bay Area's Sun Power has manufactured and assembled solar panels in Mexicali since 2011, and in 2019 donated 10% of the 3,000 panels going into two new solar arrays being built on the Mexicali and Tijuana campuses of CETYS. At 1.2 MW, the project represents the largest university-based renewable energy project in Mexico and builds on CETYS's well-established renewable energy engineering track.[61] A related area for cooperation is clean energy research and policy collaboration with the state of California, which leads the United States in the field of renewal energy research and in policies to enable both energy efficiency and clean energy adoption. The Mexico Clean Economy 2050 project, a development alliance launched by Stanford University's California Global Energy, Water and Infrastructure Innovation Initiative with support from the US Agency for International Development (USAID), is exploring opportunities to expand the production and use of renewable energy in Baja California and greater energy cooperation in the Cali-Baja region.

The state of California can play an expanded role through an MOU between the California Energy Commission (CEC) and its counterpart in Baja California to cooperate in fields relating to the shared grid, including building efficiency (shared codes and standards), industrial efficiency (of value to maquiladoras), and renewable energy. The MOU and the activity it generates are among the deliverables of the revived Commission of the Californias (see below).[62]

In the innovation space, the presence of industrial clusters hosting large US and international companies presents an opportunity to engage more deeply with entrepreneurs to generate technologies and services to help manufacturers advance to higher levels of value-added production.

The region's established industrial base presents similar opportunities for Silicon Valley technology companies and entrepreneurs. From an industrial perspective, the extension of NAFTA through the US-Mexico-Canada Trade Agreement (USMCA), which entered into force in July 2020, allows Baja California to benefit from repositioning by US companies that are looking to reduce political vulnerability in China or shorten their global supply chains by returning production to North America. With no time difference with California, and Tijuana being as little as two hours away from the Bay Area (by air to San Diego and car across the border), proximity gives Baja California a unique advantage as a site for near-shore business.

Spotlight

El Florido

El Florido, a large development in southeast Tijuana, is an example of the new business and production model that Tijuana is endeavoring to embrace. Within its scope is Los Nogales, a master-planned, mixed-use community that includes future housing and commercial, hotel, residential, healthcare, sports, cultural, educational, and research facilities such as ITT (the Tijuana technology institute). Also present in Los Nogales is the Consorcio Tecnológico de CONACYT, which houses not only SEPROA (the newly created secretariat for water management, sanitation and protection) but also SEST (the sustainable economy and tourism secretariat).

Elsewhere in El Florido, the new Los Olivas Logistics and Industrial Park includes 2,372,000 square feet of production space, joining an existing industrial park, La Encantada, which has 2.3 million square feet of built-out space and is home to 16 companies producing electronic parts, aerospace components, and healthcare and industrial products. Growing interest is being reported by US companies, as well as others from Korea and elsewhere in Asia, in opening new facilities. According to Cecilia Romero Larroque, Asset Manager with the El Florido Group, "their goal is to be closer to the US market, not offshore in Asia."

Higher education facilities located in El Florido include UTT (the Tijuana technological university), a public university with 5,000 students that offers technical and engineering degrees; ITT, a public university currently building a 3,000-student campus that will offer majors in engineering as well as master's and doctorate degrees; UNEA (the university of advanced studies), a private university with 800 students that offers majors including systems engineering, industrial engineering, business administration, and international trade; and CECyTE Baja California (the state scientific and technological college), a technical college that trains approximately 2,300 students. With proximity between industrial facilities and technology-oriented educational and research institutions, strengthening the links between research, workforce development, and production is a major focus.[63]

Underlying the potential for more advanced production as well as R&D, Baja California's universities are generating large numbers of engineers, with skills needed by Bay Area and California companies, who can be hired at a fragment of the cost of comparable engineers in Southern California or Silicon Valley. A similar pool of creative talent with industry experience can also be found in the film sector. Proximity to the border, low costs and an active food, wine, and craft beer scene make Baja California a potentially attractive site for Bay Area companies looking to site production or source engineering talent, an opportunity increased by the post-COVID trend toward remote work.

For Tijuana, leveraging this talent pool to support home-grown innovation and startup activity presents

a challenge. Entrepreneurial activity in the region remains constrained compared to other parts of Mexico, and there are no large, home-grown companies to spin out new startups—though as mentioned earlier, engineers do leave maquiladoras to start their own companies. MIND Hub shuttered its startup incubation activity primarily due a shortage of investment capital, and companies that successfully raise funds often do so in California, operating as California entities. A related challenge for startups looking for venture capital is the absence of successful IPOs, acquisitions, or breakthrough companies that serve to attract venture investors.

This points to another challenge as Baja California attempts to build an innovation economy: the need to transition its manufacturing economy toward higher value-added production through a deeper connection to R&D. Production processes have been perfected over the years, making the Tijuana-Mexicali region a highly efficient place to manufacture. The level of new value creation, however, is comparatively low. To date, innovation is primarily reflected in efficiency gains that have progressively lowered costs, but most R&D continues to be done in places like the Bay Area or Boston—or overseas. With many large US and global companies active in the region, a large opportunity exists for industrial innovation, with more products designed and engineered locally and deeper integration of local firms into global supply chains.

Large international companies are starting to play a greater role in R&D; for example, Samsung does this through its Tijuana software development center. Other companies, such as Honeywell, Plantronics, Thermo Fisher, Skyworks, Solar Turbines, and Japan's SMK, are starting to produce locally generated IP, with new design centers being established. Across multiple sectors, expansion of its R&D base will be central to Baja California's ability to support higher value-added production and innovation-based growth.

Baja California's connection to California has a significant state-to-state dimension. Agency level agreements are in place between the state governments, such as the MOU signed in November 2019 (reconfirming a relationship that began in 2008) with California's Office of Emergency Services (OES) to share information and cooperate on best practices and training.[64]

In December 2019, California's Governor Gavin Newsom and the Governors of Baja California Norte and Baja California Sur signed another MOU that re-established the **Commission of the Californias**, a forum for sharing ideas around common challenges and devising shared solutions.[65] Topics that have been identified for cooperation and are engaging multiple California agencies include energy management and grid resilience, water resources and quality, transportation infrastructure, cross-border trade and investment, agriculture, public health (cross-border disease management, a particularly salient topic in the wake of COVID-19), and emergency preparedness.[66] Moribund for many years, the revived Commission offers a systemic vehicle to strengthen the three states as a binational economic region.

The economy of northern Baja California has evolved dramatically from the days when Tijuana was largely a destination for day-tripping tourists from San Diego. High-rise towers now dot the landscape, a gastronomic district has developed, the region hosts a growing pool of engineers, binational production is increasingly sophisticated, and R&D is playing a larger role. Tijuana and Mexicali now serve as significant nodes on a West Coast IT chain of research, engineering, and production that extends from Guadalajara to Seattle. Economic synergy, cross-border university programs, and transportation infrastructure enable complementary activity that can bind the Cali-Baja region together more deeply as a binational economy and support deeper ties with the Bay Area as well.

4

Ciudad Juárez, Chihuahua

Located in Northwestern Mexico, the state of Chihuahua shares an extensive border with the states of New Mexico and Texas. Its three most important economic centers are Ciudad Juárez, an international manufacturing center; Chihuahua, the state capital; and Cuauhtémoc, the state's agricultural hub. Since the inception of NAFTA, now USMCA, Chihuahua has developed as a key state for manufacturing and US-Mexico binational production.

A Cross-Border Manufacturing Center

According to INEGI, Chihuahua had the eleventh largest GDP among federal entities in 2019,[1] concentrated primarily in Ciudad Juárez and the city of Chihuahua.[2] Consistent with the region's longstanding role as a cross-border production center, the economy in both the State of Chihuahua and Ciudad Juárez is led by manufacturing, which accounted for an estimated 26% of the state's GDP in the third quarter of 2020.[3] With 329 companies in the maquiladora (IMMEX) sector, Ciudad Juárez ranks first for the number of employees engaged in maquiladora-based industrial production (303,573 according to INEGI data reported in January 2021).[4] Ninety-three percent of the inputs for that production come from international companies with only 2.4% being domestic.[5]

Manufacturing activity, while diverse, is concentrated in communications equipment (radio, television, wireless, aeronautical and nautical signaling); disposable medical materials; electrical and electronic equipment for motor vehicles; measuring and control instruments; interior accessories for motor vehicles; computers; electrical and electronic components; and non-electronic medical equipment. Areas where the city is looking to expand production include pharmaceuticals and renewable energy.[6]

This activity is concentrated in 25 industrial parks and 15 industrial zones, in which 19% of activity is focused on transportation,14% on computer-related equipment, and 12% on electrical equipment. Together these sectors account for nearly half (45%) of production within the parks.[7]

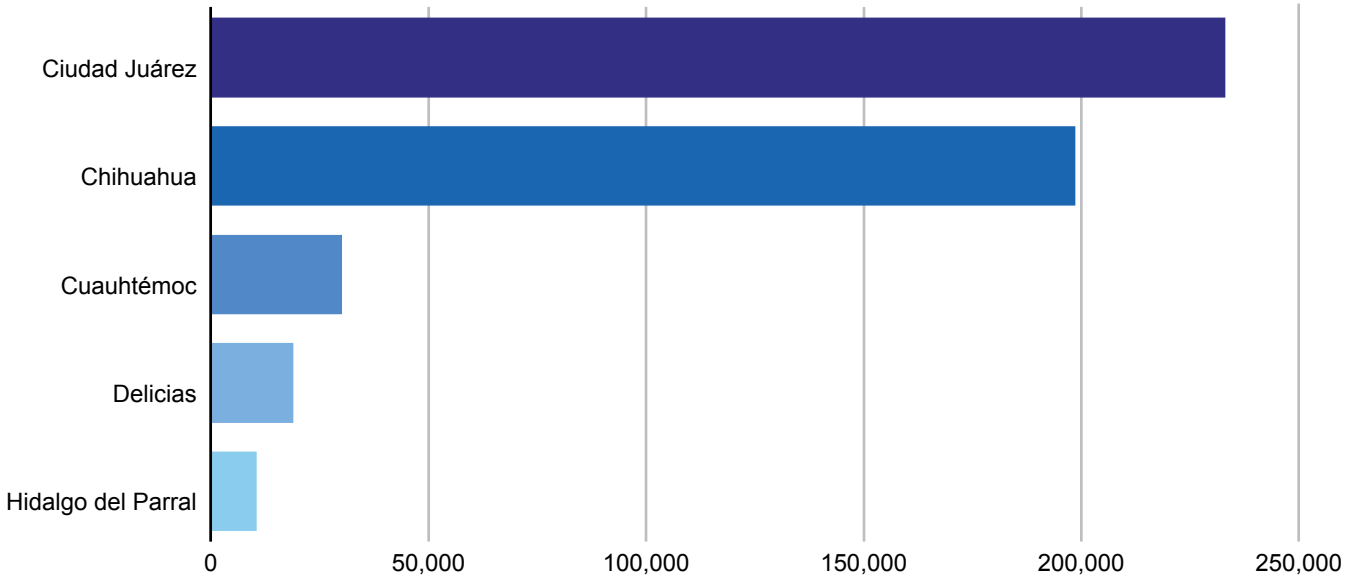
Trade and Integrated National Production

Juárez's position adjacent to El Paso on the Texas border has shaped its economy and industrial structure. Seventy-three percent of commercial activity between the United States and Mexico passes through Texas. On the US side, more than half (51%) flows through Laredo and 17.5% through El Paso.[8] More than 245,000 employees in Juárez are engaged in binational production activities that send products to the US, mirroring approximately 175,000 employees who support binational production in El Paso.[9] The two-way flow largely involves the export of parts and components from the United States that are sub-assembled in Mexico, then re-exported to the United States where higher value assembly occurs.[10]

EXHIBIT 10

According to INEGI, Chihuahua had the ninth largest GDP among federal entities in 2019, concentrated primarily in Ciudad Juárez and the city of Chihuahua.

GDP of the Main Municipalities of the State of Chihuahua, 2019, millions of pesos



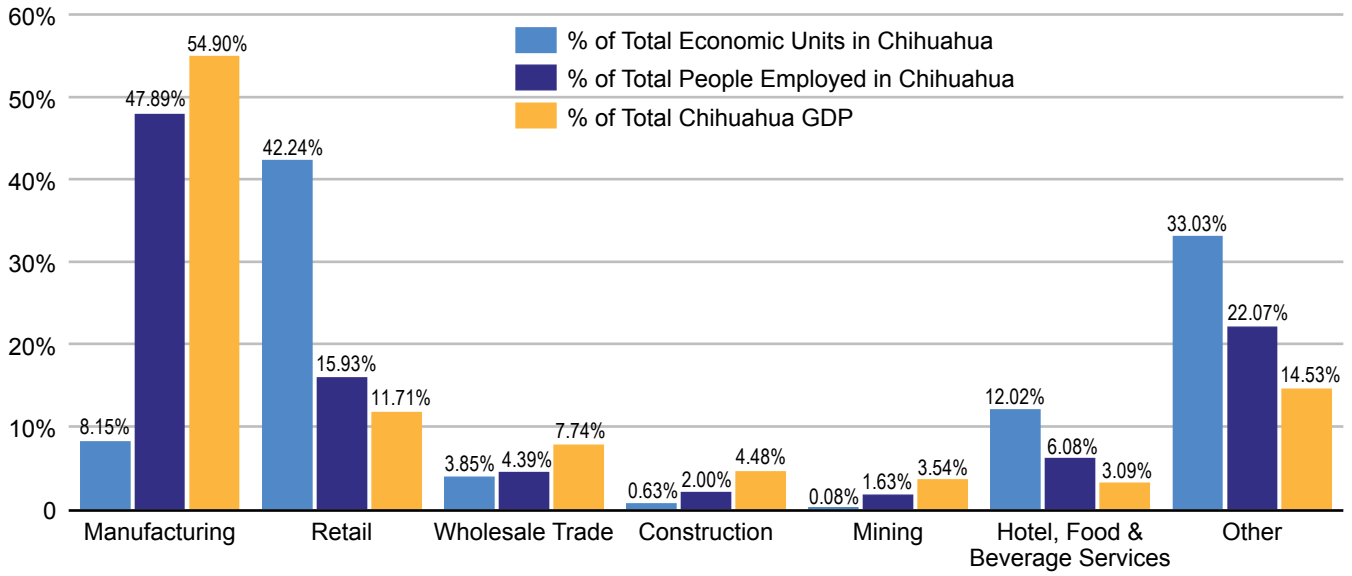
Source: "Prontuario Estadístico, Centro de Information Económica y Social: Enero 2021," Secretaría de Innovación y Desarrollo Económico, Chihuahua Gobierno del Estado

Visualization: Bay Area Council Economic Institute

EXHIBIT 11

Chihuahua's economy is led by manufacturing.

Chihuahua Industry Sectors Shares of State Totals, 2018, percent



Source: INEGI Censos Económicos, 2018 data

Visualization: Bay Area Council Economic Institute

University and Research Infrastructure

Juárez is working to upgrade its innovation capacity by supporting R&D and encouraging locally-based entrepreneurs. The city's supporting infrastructure includes three universities that stand out for their academic offerings and capacity to develop human capital:

- **UACJ** (the autonomous university of Ciudad Juárez);
- **UTCJ** (the technological university of Ciudad Juárez); and
- **ITCJ** (the technological institute of Ciudad Juárez).

The three universities are the only institutions of higher learning in the city (out of nine total) to have researchers enrolled in SNI (the national researchers registry). Of the three, UACJ stands out as the leading research institution, accounting for 97.6% of SNI-enrolled researchers in the city in 2018. UACJ's IIT (institute of engineering and technology) hosts four R&D centers: CICTA (the center for research in applied science and technology), CENICIS (the center for knowledge engineering and software engineering), LaNTI (the national information technologies lab), and CIG (the geoscience research center).[11] In addition, CAPA, the rapid prototyping laboratory on the campus shared by IIT and UACJ's institute of architecture, design and art (IADA) provides additive manufacturing (3D printing) capabilities to support advanced manufacturing researchers from both the campus and the industrial community.[12]

Profiles of Leading Universities in Ciudad Juárez, 2019

	STEM academic programs	STEM first enrollment	STEM total students	STEM graduates	STEM degrees obtained
UACJ	21	1,915	7,808	675	661
UTCJ	11	727	3,660	648	458
ITCJ	6	820	3,549	294	164

Source: Analysis of data from ANUIES produced by IDOM Consulting, Engineering, Architecture, S.A.U. for DECJ

Number of SNI-enrolled Researchers at Leading Universities in Ciudad Juárez, 2018

	Level 1	Level 2	Level 3	Candidates	Total by Institution
UACJ	151	16	1	76	**244**
UTCJ	–	–	–	2	**2**
ITCJ	2	1	1	–	**4**
Total	**153**	**17**	**2**	**78**	**250**

Source: Analysis of data from CONACYT produced by IDOM Consulting, Engineering, Architecture, S.A.U. for DECJ

Providing tools and infrastructure to increase R&D and training by the more than 70 Fortune 500 companies that operate in Juárez is a key goal. The city's capacity to deliver advanced R&D is growing, sometimes in collaboration with universities and research centers in El Paso. Collaborative relationships are supported by the Binational Tech Council, an organization of business leaders on both sides of the border. Four centers stand out due to their recent creation and/or their potential to impact regional industry:

- **CIITA** (the center for innovation and integration of advanced technologies) will focus on six areas—metal mechanics and molds, talent training and development, metrology and materials, software and IoT, electronic design and EMC (electromagnetic compatibility), and competitiveness and business—with a primary focus on supporting the automotive, logistics, appliance, and biomedical sectors.
- **IA.Center** (the artificial intelligence center) aims to develop innovative products and services involving AI, Industry 4.0, IDA (intelligent data analysis), and blockchain technology. Already built, it will also house collaborative advanced computing training spaces and laboratories with access to cutting-edge technology and development tools. AI opportunities and strategies for the border region, particularly relating to workforce skills, are discussed in a 2020 report "Leveraging the Power of Artificial Intelligence for the Borderplex Region."[13]

- **CIMyT** (the molds and dies innovation center) is designed to support small and medium-sized companies with specialized training in molds and dies and in advanced manufacturing. In the past, work on production molds and dies needed to be performed in China. CIMyT's goal is to enable that work to be performed in Juárez.
- **CICTA** (the center for research in applied science and technology) is part of UACJ, focuses on training and technological innovation in the MEMS (micro electromechanical systems) field, and also aims to advance multidisciplinary projects in micro and nanotechnology.

Government-Supported Entrepreneurial Initiatives

The government is focusing on entrepreneurial development and startup activity through a range of initiatives, including incubators and accelerators. Some are connected to the Ciudad Juárez office of **CIDER** (the regional innovation and economic development center), while others operate under the auspices of the Chihuahua state agencies **SIDE** (the secretariat of innovation and economic development) and **FIDEAPECH** (the Chihuahua state trust for the promotion of productive activities).

CIDER programs include[14]

- CIDERECOSYSTEM, which promotes regional entrepreneurship and innovation ecosystems, particularly through events;
- CIDERTALKS, which presents talks on topics of interest to entrepreneurs and MSMEs (micro, small and medium enterprises);
- CIDERDISCOVERY, which supports entrepreneurs by validating business ideas using methodologies such as Lean Startup and Design Thinking;
- CIDERMVP, which provides advisory and technical support to advance the development of commercially viable, market ready products;
- CIDEREMPRENDE, which supports entrepreneurs from smaller cities in the state of Chihuahua with validation and business model advice;
- CIDERINCUBA, a business incubation program which provides grants for entrepreneurs through its incubation fund;
- CIDERSTARTUPS, which offers grants for the international acceleration of startups that are engaged with SIDE;
- CIDERACCELERATION, which supports the accelerated growth of small and medium sized enterprises in the state of Chihuahua; and
- CIDERLEGAL, which provides consulting services to support the development of startups' legal skills.

SIDE programs include the following:

- Chihuahua Innova, a SIDE umbrella program coordinated by I2C (the innovation and competitiveness institute), integrates the entrepreneurship ecosystem, connecting forums, educational programs, funds, networks, and other activities across the state.[15]
- SIDE Startups, a program of the SIDE Joven (SIDE youth) group, provides quarterly training for entrepreneurs between 18 and 30 in developing new ventures. Services include training on Facebook and Instagram Ads, business models, finance**,** innovation, leadership, legal issues, and design thinking.[16]
- SIDE Challenges: Eco-version, another SIDE Joven program, is a challenge initiative that seeks to establish a platform through which young entrepreneurs can launch projects that address critical social issues in the state of Chihuahua, in this first case specifically focused on environmental issues.[17]

FIDEAPECH encompasses a number of financing programs for micro, small, and medium enterprises (MSMEs) and entrepreneurs, including

- FIDEINNOVA, the investment fund for the development of innovation in the state of Chihuahua, which provides public-private co-investment financing to support entrepreneurs with high-impact innovation business projects that focus on developing more efficient solutions to social, technological, and economic problems;[18]
- FIDEJRZ Emprende, which provides financing for economic development in Ciudad Juárez, specifically

promoting the development of entrepreneurs who seek to implement their business plans;[19] and

- FIDECHIH Emprende, which provides financing for economic development in the state of Chihuahua, specifically promoting the development of entrepreneurs who seek to implement their business plans.[20]

The municipal government of Ciudad Juárez[21] also focuses on supporting the entrepreneurial ecosystem through coordination with state and regional agencies and local organizations such as Red Juárez Emprende, a community network of entrepreneurs that supports people who want to open businesses and works to promote an entrepreneurial culture in the city.[22]

As a broader strategy to support higher value-added economic activity, Ciudad Juárez has developed, under the banner **Frente Norte**, an EEI (smart specialization strategy) to focus resources on key priorities that relate to competitiveness, sustainability and broader well-being of the region.[23] The Frente Norte strategy prioritizes four smart specialization areas (SSAs) in which to support the city's competitive advantages:

- Smart Manufacturing, including digitalization of data from production lines in real time, to improve the performance of the manufacturing sector and its local suppliers through design, engineering and the integration of new technologies that will advance the region in global supply chains;
- Cross Border Hub to develop a robust logistics platform based on automation and the analysis, planning, prediction, and real-time monitoring of flows of people, goods, services, and data across the border;
- Continuous Care to position the region as an international leader in the design and application of integrated health care protocols that allow health care services, ICT developers, and medical teams to collaborate on solutions focused on continuous care (e.g., e-health platforms); and
- Smart City to accelerate the development and adoption of new technologies that can enhance security, transparency, participation, inclusion, efficiency, comfort, sustainability, culture, and entertainment and leisure for the city's residents and visitors by allowing better decision-making and solutions based on real-time information obtained from technological convergence in both public and private spaces.

Each SSA is seen as a linked set of productive activities that can enable the development of a critical mass of businesses and innovative environments and the advancement of key enabling technologies that collectively can differentiate Juárez from other cities. Cross-sectoral themes linked to the implementation are (1) Circular, Resilient and Sustainable Juárez, (2) Talent and Leadership, and (3) Culture of Innovation and Entrepreneurship.

Incubators, Accelerators and Venture Capital

The city benefits from an expanding network of incubators and accelerators supporting startups.

Four university-sponsored accelerators are particularly active:

- the business incubator of **UTCJ**,[24] which provides entrepreneurs access to information and tools, including where to find training and advice for preparing a business plan as well as public and private financing sources;
- the business incubator of the **Tecnológico de Monterrey, Ciudad Juárez Campus**, which provides a comprehensive platform for the creation and development of new companies with a focus on technology startups;
- the incubator of **UACJ**,[25] which is focused on the biomedical, science, engineering, and software sectors and provides support services covering marketing, finance and accounting, production processes, graphic and industrial design, legal and administrative needs, business models, and psychology applied to entrepreneurship; and
- the business incubation and innovation center at **ITCJ**,[26] which has the mission to foster the necessary conditions so that ideas, talent, knowledge, technology and education converge in the generation of technology-based, innovative, competitive and

sustainable companies that root wealth and jobs in the region.

In 2012, the four campuses formed the "Northern Chihuahua Incubator Network" (Red de Incubadoras del Norte de Chihuahua) for mutual support and collaboration. The thrust of the network is increasingly practical, reflecting the growing desire of the city's universities to, as expressed by Oscar Monteil of the incubator at UACJ, "stop generating only business plans and become business seedbeds."[27]

Three private incubators and accelerators are important contributors to the ecosystem:

- **Technology Hub**[28] is a binational business accelerator/incubator providing office space and support for entrepreneurs in Juárez, El Paso, and New Mexico. Tech Hub occupies a 55,000 square foot building close to the border that formerly served as the US Consulate in Juárez and will grow its footprint by an additional 70,000 square feet when it expands into a former hotel located across the street that will be linked by an air bridge. The investment has enabled the development of a contained ecosystem of approximately 100 companies. Besides startups, established technology companies such as binational telecom services provider Transtelco have located their innovation activity at Technology Hub; other residents include the economic development nonprofit Desarrollo Económico de Ciudad Juárez and Microsoft's TechSpark program (see below). Major programs include 1–3 day hackathons and RESET, the largest binational innovation and entrepreneurship summit on the US-Mexico border. Regional innovation strategies are being developed in cooperation with San Francisco-based advisory organization Startup Genome.
- **Fundación Axcel**[29] serves as the nonprofit educational arm of Technology Hub, supporting entrepreneurs in the Juárez/El Paso border region with digital tools and technology skills development. It operates two Fab Lab maker spaces as well as a mobile Fab Lab and is part of the Fab Foundation (launched from the Bits and Atoms Fab Lab Program at the Massachusetts Institute of Technology), which encompasses 1,750 Fab Labs in more than 100 countries.
- **The Bridge Accelerator** is a binational supplier development training program for small and medium-sized companies in El Paso/Juárez that aims to expand the role of local companies as suppliers to large manufacturers and maquiladoras operating in the region (with commercial trade passing through the El Paso Port of Entry amounting to USD 107 billion[30] in 2019). Launched as a collaboration between Technology Hub and the entrepreneur support group Pioneers21 in El Paso, the first twelve-week pilot cohort in the summer of 2019 included five companies from Juárez and six from El Paso, followed by a second cohort in the spring of 2020 and a third cohort in the fall of 2020. In October 2019, Microsoft announced an investment of USD 1.5 million in the accelerator. After completing the Bridge Accelerator program, alumni founders join the Binational Founders Network (BFN), a peer mentorship and support network in El Paso, Ciudad Juárez, and the Paso del Norte region.[31]

Other incubation and acceleration programs in the region are associated with universities and other entities in Texas and New Mexico:

- The **Center for Research Entrepreneurship and Innovative Enterprises (CREIE)** at UTEP (University of Texas at El Paso) was created to stimulate innovation and unify campus initiatives in technology transfer, entrepreneurship, and commercialization.[32] With a focus on implementation and product launch, CREIE guides students through the innovation process from concept through commercialization.[33]
- **Pioneers 21** supports entrepreneurs, startups, and small businesses, from ideation and business start to acceleration and growth, through innovation training, entrepreneurship education, targeted networking, and coaching and mentoring. It builds communities of innovation and entrepreneurs, connecting them with advisors, investors, business services, and technical assistance in both established and emerging industries in the El Paso region.[34]
- The **Arrowhead Center** at New Mexico State University (NMSU) in Las Cruces offers acceleration program services, resources, expertise, and connections to help innovators, entrepreneurs, and small businesses at any stage start and grow. It is

also the technology transfer and commercialization arm of NMSU and works with people across the state, providing advice, mentorship, education, and hands-on experiences to pioneer new technologies, businesses, and partnerships.[35]

Three regionally-oriented venture funds are also active:

- **Zuma Capital** is an innovation and technology oriented private equity fund based in the city of Chihuahua.[36]
- **Saba Investments** is an early-stage venture fund that focuses on investment in the Rio Grande Innovation Corridor between Albuquerque and El Paso-Ciudad Juárez. Founded in 2015, the fund limits its investments to USD 200,000 per company. By 2020, the fund had raised USD 2.37 million from 66 investors, mostly from Juárez and El Paso, and had in its portfolio eight companies representing a range of tech sectors.[37]
- **Arrowhead Innovation Fund** is a venture capital fund focused on seed and early-stage investments to commercialize promising technologies developed and/or licensed by New Mexico start-up companies. Founded in 2017, the fund has a portfolio of 15 companies in sectors ranging from event management to therapeutic devices to solar energy technology.[38]

Another private sector initiative that indirectly supports entrepreneurs is **TechSpark**,[39] a program created by Microsoft that supports local partnerships to ensure that the benefits of the digital economy extend broadly to the community. Ciudad Juárez hosts the only TechSpark outside the United States. Offerings include a partnership with IPE (the institute for the promotion of education in Chihuahua) to train teachers in 21st century learning design, enabling the capacity to provide digital skills training to approximately 1,500 young people in Juárez. Together with Chihuahua's entrepreneurship foundation FECHAC, Fundación Axcel, and USAID, TechSpark has also helped to create the city's Fab Lab digital manufacturing laboratory.[40]

Chihuahua's startup community is still small and access to venture capital is extremely limited. As in many Mexican cities, this makes it a work in progress. Exhibit 12 lists some of Chihuahua's leading startups by total funding.

EXHIBIT 12

Chihuahua's startup community is still small and access to venture capital is extremely limited.

Leading Startups in the Chihuahua Startup Ecosystem by Total Funding Amount (USD), 2020

Company Name	Industry Sector	Ttl. Funding Amt. (USD)	Last Funding Date	Description
MIDAS Solutions	Automotive, Software	$66,000	Sept. 2013	Smart diagnosis systems for industrial software development, mobile applications, and automation
Reply'em	Internet, SaaS, Software	$50,000	Nov. 2017	SaaS for small businesses, to enable leveraging of social media and the internet to increase sales
Diagtech, Inc.	Biotech, Medical Diagnostics	$46,810	March 2020	Medical device R&D and the rental of specialized medical equipment
Alex	AI, Big Data, Market Research	$30,000	June 2018	AI using big data to quickly locate businesses in any part of the world
Locki	IoT, Mobile Apps, Smart Home	$30,000	March 2020	Security and management platform for cohabited spaces
KeyA	Enterprise Resource Planning (ERP), Software	$30,000	May 2019	ERP systems for the administration of SMEs and industry
Savefruit	Biotechnology	$30,000	Sept. 2018	Biotechnology
GreenBTS	Agriculture	$30,000	April 2017	High-tech solutions for agriculture
Treitus	Internet, Manufacturing	$30,000	Sept. 2016	Third-party manufacturing services
Emonitech	Consumer Electronics	$30,000	April 2017	Cost-reduction technology for the automation and control of intelligent buildings

Data Sources: Crunchbase.com, Hyper Noir

Looking ahead, the large industrial base in Juárez and the area's growing focus on high-value production suggest cross-border opportunities.

Spotlight

Seisa

Seisa is a 2,500-employee medical devices contract manufacturer started in Juárez in 1983. Operations today continue to be based in Juárez, while the company headquarters is across the border in El Paso. Founder Julio Chiu notes that "like many operations in our area, for us the border is just something that's there. We look at the Borderplex as one place, with opportunities on both sides." Seisa, which participates in the El Paso-Juárez Biomed Cluster of regional medical manufacturing companies, performs a broad spectrum of operations ranging from the design and development of new products in its vertically integrated facilities to producing components and finished devices and supporting customers in their regulatory submissions and in securing FDA filings.

Customers are primarily OEMs from mid-sized medical device companies as well as large multinationals. Other Seisa manufacturing facilities are in Eatontown, New Jersey and the Slovak Republic. In December 2020, another site was added to the list with the acquisition of ProtoQuick, a San Leandro (Bay Area) company producing rapid response prototypes, high-precision prototype molds, and machine tool solutions. The acquisition expands the ability of the combined company to scale both injection molding production and manufacturing, particularly for medical startups and mid-sized medical device companies. Seisa plans to apply innovative technologies developed in the Bay Area by ProtoQuick with its high-volume manufacturing capability in the El Paso-Juárez Borderplex to service new and existing clients.[41]

In February 2020, Seisa closed a second Bay Area acquisition, of Peridot Corporation, a Pleasanton-based supplier of complex metals-based components for R&D prototyping and production across a variety of industries, but with a particular focus on the medical device sector. ProtoQuick and Peridot together give Seisa enhanced capabilities across both plastics and metals, while giving the Bay Area companies' customers the opportunity to leverage Seisa's global infrastructure for high-volume production of FDA Class II and Class III devices.[42]

An Evolving Ecosystem for Innovation

To gain a broad measurement of the city's innovation ecosystem, a comparison was made between Ciudad Juárez and the regions of the country that are leaders in nine relevant "pillars": human capital and talent, scientific research capacity, quality of life, socio-economic conditions, business finance and venture capital, economic structure (employment, value-added and sectoral specialization), entrepreneurship (creation and survival of new companies), public policy and regulation (policies and institutions focusing on science, technology, and innovation), and business culture. The results were compiled into a Regional Innovation Environment Sensitivity Radar (RIESR) index, standardized on a comparative scale of zero to ten.[43] The average value of the nine pillars for Ciudad Juárez falls near the middle at 4.5.

The area in which Ciudad Juárez scores most highly in the index is socio-economic conditions (6.8), based principally on high employment levels in the formal sector and high GDP per capita. It scores lowest (3.7) in science, technology, and innovation, due mainly to the city's limited research infrastructure and its relatively low concentration of human capital (graduate students and research professionals) devoted to research activity. The city also scores comparatively low in economic structure, due to the limited local contribution to manufacturing value chains and the higher industrial growth in comparison cities in the El Bajío region (such as Aguascalientes and Puebla). It also suffers in the Quality of Life category (3.9) due to infrastructure, public security, and environmental challenges.

Operational challenges include a shortage of experienced middle managers. The supply of STEM graduates is also constrained, and even as university graduates in engineering and computer science increase in numbers, many are recruited by companies

like Facebook and Google for positions in the US, making Ciudad Juárez a net exporter of human capital. Attracting Bay Area and other technology companies to open development centers in Ciudad Juárez has been difficult due to quality-of-life concerns. A venture pipeline with the Bay Area has yet to be established, due in part to the smaller size, youth, and relative lack of sophistication of local startups.

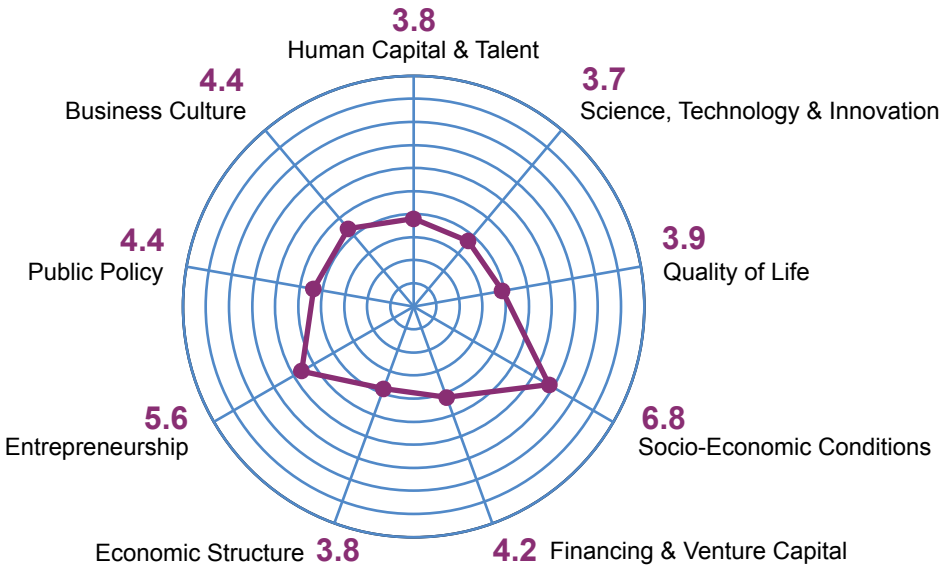
While that environment is nascent and the R&D base limited, Ciudad Juárez also presents considerable opportunities. Its large manufacturing sector offers both an efficient base for cross-border production and a potential market for the application of innovative technologies, such as IoT and AI, to manufacturing and logistics. The extension of NAFTA through USMCA provides a long-term foundation for binational production and investment.

Business and government leaders in the city and the state recognize these challenges and are investing in strategies and initiatives to strengthen its innovation landscape. Ricardo Mora, CEO of Technology Hub, describes the direction: "We want people to become entrepreneurs; we also want them to become providers to the large companies, drawing in particular on innovation and technology." Increasing local R&D and moving production higher up the manufacturing value chain are priorities, as is building the city's small but growing startup community.[44]

EXHIBIT 13

The average value of the nine innovation ecosystem pillars for Ciudad Juárez falls near the middle at 4.5.

Values for Ciudad Juárez on the Regional Innovation Environment Sensitivity Radar, 2019



Source: Frente Norte

Visualization: Bay Area Council Economic Institute

SPOTLIGHT

Chihuahua City

Chihuahua City Skyline

Photo by JP on Wikimedia Commonsl

The city of Chihuahua, the capital of the state of Chihuahua, is at the center of the state approximately 240 miles from the US border. Like Juárez, its economy is based heavily on manufacturing, which accounts for nearly 50% of GDP. Nearly all of its enterprises are small businesses, accounting for 60% of employment. Of the close to 4,000 manufacturing companies in the city, 109 have foreign direct investment—including maquiladoras and export service establishments—with 13 strategic clusters spanning a range of sectors including automobiles and automotive parts, ICT, aerospace, automation, and agroindustry. Most are located in ten industrial parks.

With this orientation, education focuses particularly on engineering. Of approximately 10,000 graduates of technical and non-technical universities and institutions each year, 27% are in fields relating to engineering, manufacturing, and construction. Major universities include the Universidad Autónoma de Chihuahua, Universidad La Salle Chihuahua, and a campus of Tecnológico de Monterrey. The city ranks high nationally (number 8 of 88 Mexican cities studied in 2019) for its favorable business regulatory climate.

Like Juárez, Chihuahua is working to upgrade its technological base and grow an innovation economy. In the industrial space, research and design centers such as **FABLAB Chihuahua** support the manufacturing sector with facilities, tools and software to enable the design, digitizing and prototyping of new products. Entrepreneurs are also a growing focus. The city is home to the newly opened **SPARK Innovation and Technological Development Campus**, a science and technology facility designed to support technology-based companies at different growth stages. **Chihuahua Innova**, a program of the secretariat of innovation and economic development coordinated by I2C (the innovation and competitiveness institute), links the key entities in the state's innovation ecosystem and hosts events such as Innovation Week, a week-long program of speakers, forums, and hackathons engaging entrepreneurs. A key asset for the city is the Chihuahua campus of Tecnológico de Monterrey, which offers a range of entrepreneurial support and development programs through its Eugenio Garza Lagüera institute for entrepreneurship and connects to international partners such as Techstars and Draper University. **Orion Startups**, an accelerator associated with Tecnológico de Monterrey's Innovation Hub and based at the university's Orion Technology Park, has incubated 25 companies since its launch in 2014, concentrated in agtech, edtech, health, and Industry 4.0 (IoT).

Chihuahua Futura, an initiative launched by Desarrollo Económico de Chihuahua, promotes sustainable growth and an improved quality of life of the city through innovation and technology. Its strategic plan for the long-term economic development of Chihuahua focuses on three major fields—smart industry, electromobility, and agribusiness and advanced food—and includes an entrepreneurial ecosystem initiative led by Luis Almanza, the head of innovation and tech startups at the Tecnológico de Monterrey campus.[45]

5

Monterrey, Nuevo León

Business and Industry

The state of Nuevo León enjoys a per capita GDP (USD 17,844 in 2019) that is 88% higher than the national average (USD 9,489).[1] Monterrey, its capital and most populous city, has the highest GDP per capita in Mexico and the second highest in Latin America.[2] Nuevo León leads other states by a significant margin in foreign direct investment (drawing 11% of the nation's total in the first quarter of 2020),[3] and accounts for more than 9% of Mexico's manufacturing exports.[4] Manufacturing accounts for 58% of Nuevo León's FDI, followed by commerce (16%) and financial services (9%). Most investment comes from the United States.[5] Manufacturing worker productivity is the highest in Mexico. Nuevo León's GDP growth has historically outpaced Mexico's national economic growth. In 2018, the state saw 4.2% economic growth compared to the national average of 2%,[6] while in 2019, Nuevo León's economy grew by 1.8% as the national GDP fell by 0.1%.[7]

A center of private business and home to a high percentage of Mexico's largest companies, the Monterrey metropolitan area is headquarters to leading corporations including CEMEX, Banorte, Banregio, FEMSA, Gamesa and OXXO. Large multinationals such as Boeing, Caterpillar, Dell, GE, Mercedes-Benz, Philips, and Siemens also have major presences.[8]

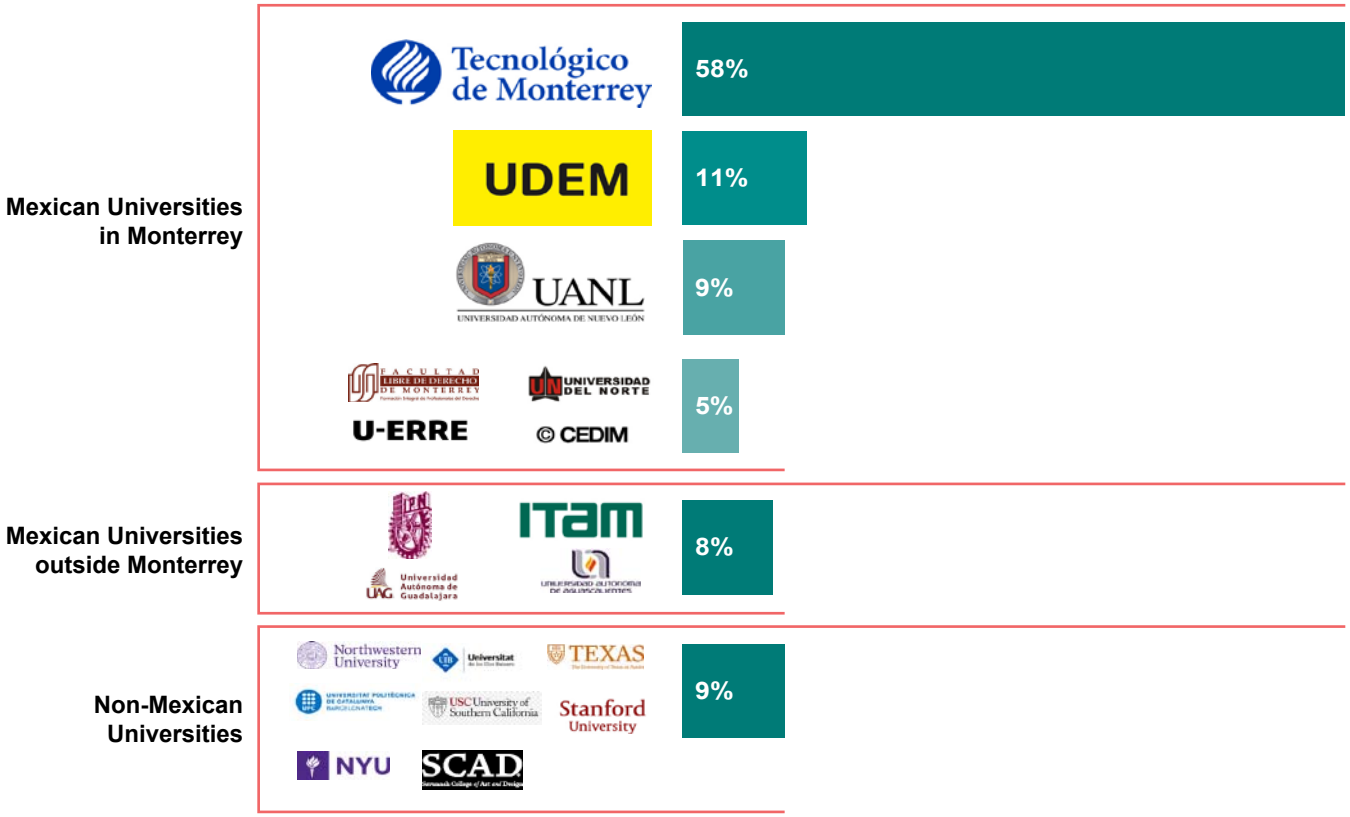
With close proximity to Texas and the US border, commerce builds on transportation infrastructure that includes direct air service to twelve US cities (including Los Angeles) and regional hubs for DHL, FedEx, UPS, and Estafeta. The Laredo-Colombia Solidarity International Bridge sees approximately 1,000 northbound truck crossings per day between the United States and Mexico.[9] Business connections to Texas are particularly strong, and business culture more closely resembles that of the United States than most other states in Mexico.

Like other cities featured in this report, the city of Monterrey is actively working to move its economy to progressively higher value-added levels, and to nurture an ecosystem that is conducive to innovation and entrepreneurship. In doing so, the city draws on considerable assets. Its efforts to attract R&D talent and investment in infrastructure led to the establishment under its science and technology agency I2T2 (the innovation and technology transfer institute) of PIIT (the technology research and innovation park), which has attracted both research institutions and private businesses. Universities and national research organizations have a presence, while companies that are engaged in product design include CEMEX, Schneider Electric, and Pepsico. PIIT also hosts two incubators—for nanotechnology and biotechnology.[10]

Exhibit 14

Most tech founders in a recent Monterrey survey had obtained their undergraduate degrees from local universities, particularly Tec de Monterrey.

Undergraduate Degrees of 153 Monterrey Tech Founders Surveyed, 2018



Full List of Universities Included in Each Category

Mexican Universities in Monterey:
Tecnológico de Monterrey
UDEM
UANL
Cedim
Facultad Libre de Derecho de Monterrey
U-ERRE
Universidad del Norte
Universidad Metropolitana de Monterrey

Mexican Universities outside Monterrey:
Instituto Politécnico Nacional
Instituto Tecnológico Autónomo de México
Tecnológico Nacional de México
Universidad Autónoma de Aguascalientes
Universidad Autónoma de Guadalajara
Universidad Centroccidental Lisandro Alvarado
Universidad Mexicana del Noreste, Universidad Tecmilenio
Universidad Valle del Fuerte

Non-Mexican Universities:
Northwestern University
New York University
Savannah College Art and Design
Stanford University
Universidad Austral
Universidad Nacional del Rosario
Universidad Politécnica de Cataluña
Universidad Pontífica Bolivariana
Universitat de les Illes Balears
University of Waterloo
University of Southern California
University of Texas.

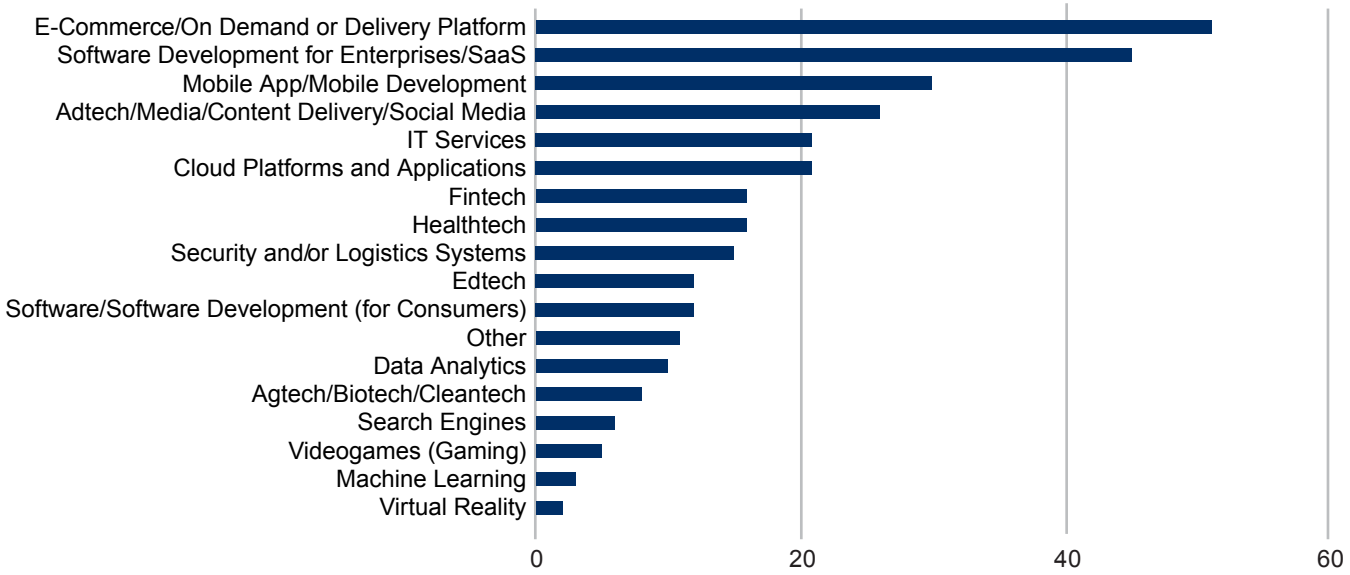
Source: Endeavor Insight

Visualization: Bay Area Council Economic Institute

EXHIBIT 15

In 2018, Monterrey's tech sector included between 300 and 350 entrepreneur-led ICT companies working primarily in fields such as software development/ SaaS, e-commerce, fintech, and mobile apps/mobile development.

Breakdown of Industries Within the Monterrey Tech Sector, Number of Companies, 2018



Source: Endeavor Insight analysis

More recently, Monterrey's strategic focus on R&D and innovation is leveraging a state government initiative, **Nuevo León 4.0**, that emphasizes digital transformation. Launched in 2017, it focuses on technologies and business processes such as IoT, machine-to-machine communication, AI, digital manufacturing, big data, 3D printing, and advanced design, with the goal of helping Nuevo León's industrial sector compete globally through the development of smart factories. Developing high value-added labor skills is a closely related focus. Though led by the government, the initiative's board is made up of the state's four leading universities, the state's secretaries of education and economy, the head of CONACYT (the national science and technology council), and the head of CAINTRA (the industrial transformation chamber of Nuevo León). Implementation is assigned to private industry, and its chair is reserved for the CEO of an industrial firm rather than a state official. Dedicated task forces coordinate activity between manufacturing heavyweights in key sectors such as steel, building materials, automobiles, aircraft, electricity, food, and infrastructure.[11]

Universities and Research

Corporate investment draws on a pipeline of human capital provided by leading universities including **UANL** (the autonomous university of Nuevo León), **UDEM** (Universidad de Monterrey), **UMM** (Monterrey metropolitan university), and the private **Tecnológico de Monterrey** (known as Tec de Monterrey), Mexico's equivalent to MIT. Residents of Nuevo León pursue higher education at a higher rate than elsewhere in Mexico; although Nuevo León is the 8th most populous state in Mexico,[12] it has the 4th highest number of undergraduate university students and the 5th highest number of graduate students.[13] In 2019, 193,000 students were enrolled in undergraduate and graduate programs, of which 82,000 were in science, technology, and engineering fields. Twenty-six thousand were at the graduate level, of which nearly 13,000 were in science and engineering programs. Six thousand were at the post-graduate level, of which 2,000 were in science and engineering.[14]

This educational infrastructure serves as an important base for company formation. Each year on average, Nuevo León's universities and technical schools collectively graduate more than 11,000 technicians and 7,500 engineers and grant more than 1,000 master's degrees and PhDs. They also participate in Nuevo León 4.0.[15] Tecnológico de Monterrey and UANL host particularly strong computer science programs.

SPOTLIGHT

Tecnológico de Monterrey

Tecnológico de Monterrey plays a central role in fostering innovation and entrepreneurial development in the city and the state, as well as nationally. A private institution, the university was founded in 1943 by business leaders concerned with the shortage of engineers and middle managers needed to support Mexico's incipient industrial expansion. In 1950, it was the first foreign institution to receive accreditation from a US body. In the 1990s, it was the first university in Latin America to connect to the internet and was also among the first in the hemisphere to create a virtual university. By 2000, Tec de Monterrey had grown to 26 campuses in 20 Mexican states that today serve more than 93,000 high school, undergraduate, and graduate students.

Approximately 88% of Tec's board of trustees (450 out of 510) are business leaders, and 41% of its alumni have gone on to start businesses, generating economic value equivalent to 19% of Mexico's annual GDP. Reflecting this, The Princeton Review and *Entrepreneur* magazine rank Tec de Monterrey #5 in the Top Schools for Entrepreneurship Studies 2020 survey, making it the only university outside the United States to be listed. Tec graduates account for 27% of Mexico's top 100 CEOs.

Through Tec de Monterrey's Instituto de Emprendimiento Eugenio Garza Lagüera, students are exposed to and trained in entrepreneurial processes. By participating in an "entrepreneurial challenge," every undergraduate student is required to create a company at some point in their academic career, with more than 12,000 participating in a challenge in their first semester. Students are grouped into approximately 2,300 teams and given a small amount of money (approximately USD 500) to devise a solution to a problem and monetize it; not every company is legally incorporated, but everyone participates in a project that generates revenues, with return on investment averaging three times the seed funding that was received.[16]

In addition to its academic programs, Tec de Monterrey supports innovation hubs and incubators throughout the country, which in the last 14 years have graduated more than 4,000 companies. Approximately 20% of alumni establish a company or go to work at a newly created company within three months of graduation. An independent survey of alumni by university ranking firm QS suggests that 41% of those alumni have started for-profit businesses (compared to 15% for universities as a whole in Mexico and 25% at MIT), and of those 65% are still in operation. Entrepreneur-related partnerships and alliances are in place with leading universities in the United States, including Stanford and UC Berkeley.[17]

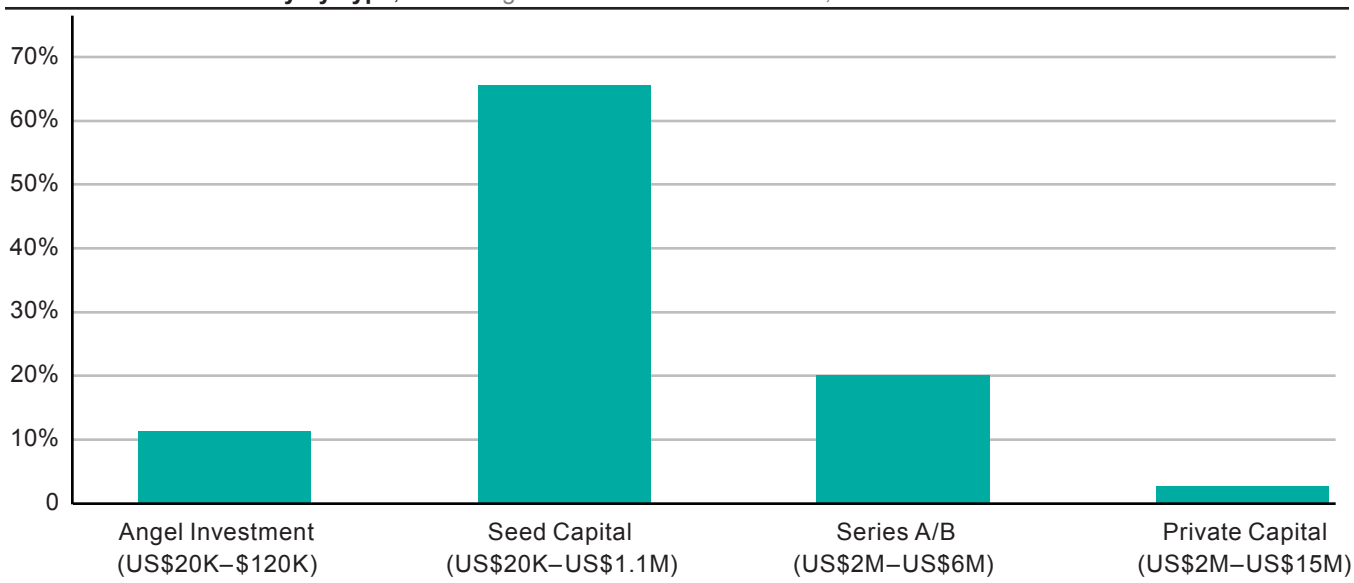
A 2018 Endeavor Insight survey of 153 founders of entrepreneurial companies in the Monterrey tech sector found that the primary undergraduate major of those founders was engineering (46%), followed by business and computer science (13% each). The majority had obtained their undergraduate degrees from local universities, and more than half studied at Tecnológico de Monterrey. Less than half of the interviewed founders had obtained graduate degrees; of those, 55% had MBAs.[18]

Reflecting the strength of Tec de Monterrey's engineering and computer science programs, technology companies from the United States regularly come to recruit talent through "Microsoft Week," "Google Week," and other outreach programs. Approximately of 70% of those hired eventually work in the United States—in San Francisco, Seattle, and other technology centers. In addition to a continuous calendar of entrepreneur-focused programs, each year since 2013 the university has hosted INCmty, a major startup event discussed in more detail below. In 2015, Tec established a Silicon Valley International Office at Plug and Play, sending entrepreneurship students each summer. In 2019, the Silicon Valley Office moved to San Jose State University.[19]

EXHIBIT 16

Investment in Monterrey companies is concentrated at the seed stage.

Investments in Monterrey by Type, Percentage of Total Investment Amount, 2018



Source: Confidential data collected by Endeavor Mexico; Endeavor Insight analysis

Technology and Innovation

Key clusters in Monterrey include nanotechnology, biotechnology, aeronautics, medical services, automobiles, home appliances, IT and software, multimedia, transport and logistics, agribusiness, energy, and tourism. They build on varying degrees of R&D intensity and are supported by a structured state system that links government with universities and businesses. Several state funds also provide targeted support for entrepreneurs and technology commercialization. **FONLIN** (the Nuevo León innovation fund) supports science and technology research-based projects with funding of up to USD 200,000, specifically targeting entrepreneurs. **FOMIX** (the Nuevo León joint fund supported by the state government and CONACYT) also provides capital for emerging technology businesses but with a focus on university partnerships and the active engagement of the state's official technology clusters. A third fund, **PROSOFT**, also administered jointly by the state and federal governments, was originally established to support competitiveness in the software and IT sector but has been opened to other fields.[20]

With its university base, business orientation, and major corporate headquarters, the Monterrey metropolitan area is home to a growing startup ecosystem. This builds on an IT sector that is one of Mexico's largest—Nuevo León accounts for 9.8% of Mexico's IT companies (with Nuevo León, Mexico City, Jalisco, and the state of Mexico together accounting for more than 55% of the sector nationally). Collectively, the state's ICT industry includes approximately 400 companies, more than 100 university programs that relate to the sector, and USD 1.9 billion in sales.[21]

A 2018 analysis by Endeavor Insight found that Monterrey's tech sector included between 300 and 350 entrepreneur-led ICT companies working in fields such as software development (SaaS), e-commerce, fintech, and mobile apps/mobile development. Serial entrepreneurship is common. More than half of SaaS and e-commerce founders have experience working at large international tech companies such as Microsoft or Yahoo.[22]

Entrepreneurs are supported by angel investors, a venture capital community, and local family offices. The dollar value of angel and venture investment is low by US

standards but growing; nearly half of angel investment comes from the founders of the city's largest companies.

Venture investment has historically been hard to find but has become easier to secure in the last several years. Early investors included Rogelio De los Santos, co-founder of Dalus Capital and a first mover in the city's venture capital community. Large corporations headquartered in Monterrey, such as CEMEX, have also established corporate venture funds. Other venture firms that have a presence in Monterrey include IGNIA, Stella Maris Partners,[23] Toro Ventures,[24] Alta Ventures Mexico,[25] Proeza Ventures,[26] and Xtraordinary Venture Partners.[27] Monterrey venture firms primarily invest locally but also have national portfolios. Investment levels tend to be small, with a median of USD 110,000 invested in local companies and USD 457,500 in national companies, with the local investment concentrated mostly at the seed stage.[28] In 2019, Nuevo León had 33 venture transactions with USD 40 million invested (an increase of 6.5% over 2018)—the third highest level in Mexico after Mexico City (which had 640 transactions and USD 1,044 million invested) and Jalisco (40 transactions, USD 70 million invested).[29]

Monterrey's entrepreneurial support infrastructure also includes a range of networking, incubation and funding initiatives:

- Founded in association with Tecnológico de Monterrey with the purpose of promoting business growth in Mexico by supporting startups, **Enlance+** is a network of more than 395 entrepreneurship counselors and mentors, which now has 11 branches throughout Mexico. Through its Advisory Councils of leading entrepreneurs, Enlance+ provides mentoring, networking connections, and access to Tec de Monterrey facilities and annually awards to qualifying companies a 100% scholarship in its professionalization program.[30]
- **Endeavor** is a worldwide NGO founded in 1997 that supports entrepreneurial activity globally. After opening offices in Chile, Argentina, Brazil, and Uruguay, Endeavor launched in México in 2002 with an office in Mexico City. Since then, it has opened nine more regional offices across the country, including one in Monterrey. Endeavor connects entrepreneurs with mentoring, strategic advice, introductions, and talent development programs, including programs at universities and an Endeavor MBA fellows program that connects MBA student teams with startups and growing companies to help them solve business problems.[31]
- **Monterrey Digital Hub** is an innovation community designed to help companies bring digital transformation to their industry sectors. It primarily connects member companies through open innovation and corporate entrepreneurial networking programs and offers digital training programs for upskilling and reskilling their workforces.[32] In 2018, Mexico-founded global digital consulting services company NEORIS chose Monterrey Digital Hub as its base for the first in a network of Innovation Labs created to support digital innovation in the manufacturing, financial services, and telecommunications sectors around the world.[33] The Hub's focus has since expanded to engage startups that can help large companies accelerate their innovation and digital processes.[34]
- **Csoftmty**, which is Nuevo León's information and communication technology cluster, has for the last six years hosted an entrepreneur showcase and competition covering health, industry 4.0, lifestyle, fintech, and e-commerce. It also organizes entrepreneur and innovation tech tours to IT companies and innovation spaces (universities and accelerators) in Monterrey and Silicon Valley and offers an innovation training program and diploma.[35]

Spotlight
INCmty

INCmty, a major national startup conference, had its origins in 2013 with the recognition in the business community that entrepreneurship should be celebrated and entrepreneurs needed to engage different stakeholders to access resources and opportunities. Inspiration came from Austin's South by Southwest. Seeing few participants from Mexico or Latin America, INCmty founder Rogelio De los Santos saw a need to embed entrepreneurship more deeply in the Mexican ecosystem. Tec de Monterrey and leading local entrepreneurs including De los Santos came together

to create the Instituto de Emprendimiento Eugenio Garza Lagüera at the university, with the objective of engaging students, alumni, faculty, and national ecosystem leaders. The institute serves as the platform for INCmty, which was also launched in 2013.

INCmty has the goal of empowering entrepreneurs at all levels—engaging students, alumni, investors, large companies, and stakeholders—to enable them to advance to the next level. Its broad agenda focuses on emerging trends, organized around verticals. A parallel corporate forum focuses on corporate innovation and corporate venture capital; corporations also sponsor startup challenges. The first conference had 4,000 participants, including 230 local ecosystem players. More than 8,000 participants from Mexico and around the world attended in the five-day event in 2019; in 2020, when the conference was virtual, more than 10,000 attended.

The event has extended its reach beyond Monterrey, hosting partner programs such as the global Startup Nation Summit in 2015 and the Mexico Venture Capital Conference in 2016. Other entrepreneurial programs have been organized in different Mexican states such as Yucatán. In 2020, a virtual conference was organized in Querétaro with support from the state's government. Organized with the objective of accelerating ecosystem development, the event was considered a success and will now be repeated every year.[36]

SPOTLIGHT

An Ecosystem Perspective

Dalus Capital co-founder and managing partner Rogelio De los Santos, who has been instrumental in many of Monterrey's startup initiatives, has been a serial entrepreneur all his life. From that experience, he started in the mid 2000s to promote the idea that entrepreneurs from Monterrey could grow in the Mexican market as well as globally. With Tec de Monterrey, he organized Mexico's first venture capital conference in 2010, with approximately 300 invited participants, and he later became a trustee of Tec de Monterrey and chairman of the board of its entrepreneurship institute (Instituto de Emprendimiento Eugenio Garza Lagüera). De los Santos points to entrepreneurial initiatives at Tec and the establishment of the Monterrey Digital Hub as important milestones.

With the encouragement of the CEO of CEMEX, the Monterrey Digital Hub was launched by twelve local conglomerates with an initial purpose to help executives better understand digitalization and how they would be impacted. It later evolved, however, to embrace startups and help them network. Initiatives include RFIs (requests for innovation) designed to attract and support innovative ideas from startups. Most recently, using the market offered by large conglomerates as the draw, the Hub is working to attract scaleups to locate in Monterrey. Approximately 30 companies from the United States, Europe, India, and across Mexico are participating.

De los Santos's first fund of USD 70 million was launched in Monterrey in 2011 with support from three institutional investors and 32 families, 29 of which were local. De los Santos, with assets under management of more than USD 150 million, describes Monterrey as the national epicenter for family offices, with an entrepreneurial ecosystem that is still developing. Venture investment has grown as more funds get started and family offices become more comfortable investing in startups as an asset class. The establishment of corporate venture funds is happening as the ecosystem develops. Traditionally very conservative in their investment focus, "They recognize that market opportunities are changing, and they need to explore new areas for growth both in the core and at the edge of what they do." Seeing people coming from around the world for INCmty has increased local investor confidence in the model.[37]

SPOTLIGHT

CEMEX

CEMEX**,** an international cement and building materials company headquartered in Monterrey and one of Mexico's largest companies, exemplifies the role that major corporations are playing in the entrepreneurial system. Launched in 2017, the firm's corporate venture arm, CEMEX Ventures, operates as a strategic investment vehicle and also provides a collaborative platform for engaging startups, entrepreneurs,

universities, and other stakeholders in the development of sustainable solutions in the construction sector. The fund invests in startups and scaleups globally, including the US, with a focus on complementary businesses and solutions. A young fund, it has approximately ten companies in its portfolio.[38]

The fund also conducts an annual Construction Startup Competition aimed at entrepreneurs and startups looking to innovate in the fields of smart cities and buildings; project design and engineering; supply chain management; project and jobsite management; innovative building materials and construction methods; and investment and financing.[39] Winners of the competition are invited to a pitch day and may become part of the CEMEX Ventures portfolio. Companies in the portfolio receive not only investment capital, but also commercialization and expansion assistance through access to industry decision makers, feedback from an industry expert network, and support from an R&D and marketing team.[40]

One example of a portfolio company is StructionSite Inc., an Oakland, California-based intelligent construction management tracking software provider, which received USD 1.5 million in a seed investment round led by CEMEX Ventures in January 2019.[41]

CEMEX also pursues innovation in the field of sustainability through a range of collaborative efforts. In addition to evaluating its suppliers' compliance with sustainability best practices, it has created an INTEGRATE Your Ideas Innovation Program that encourages suppliers to share creative ideas for products, processes, and services that can improve practices across the CEMEX value chain. One such improvement introduced by Volvo (Sweden) is the use of simulators to increase the capabilities of machine operators. CEMEX's R&D group also works with customers to co-create building solutions, such as a concrete facade capable of reducing the temperature of currents traversing it. The firm's CEMEX-Tec Center for Sustainable Communities was founded in 2010 to promote sustainable urban and rural communities through applied research, innovation, and entrepreneurship programs operated in collaboration with academia and the public and private sectors.[42] The company is also a co-founder of the Monterrey Digital Hub and an active participant in Nuevo León 4.0.[43]

Significant IT and digital firms in Monterrey include NEORIS, Infosel, Naranya, and Softtek:

- Founded in 2000 when a technology solutions group was spun off from CEMEX's IT department, **NEORIS** now operates as a Miami-based global business and IT consulting company[44] with approximately 4,000 employees,[45] including many in Monterrey. As employees have left the firm over time to start their own companies, NEORIS has become one of the largest generators of spin-off startups.

- **Infosel**, founded (as Información Selectiva, SA de CV) in 1988, is one of Mexico's pioneer IT companies. In the 1990s it became the largest internet services company in Mexico, and its co-founder, Arturo Galván, is among the most influential entrepreneurs in the Mexican ecosystem. An engineering graduate of Tecnológico de Monterrey and an MBA graduate of Stanford, Galván co-founded Infosel while working at the local newspaper El Norte, where he saw specific challenges faced by the publishing industry.[46] Infosel was launched as a spinoff of the newspaper group, becoming the first online services company in Mexico, and grew into the country's largest internet service provider (ISP) and internet portal. In October 1999, Infosel was acquired by Terra Networks, an internet access and local language content provider for the Spanish and Portuguese-speaking world;[47] Terra became the largest internet company in Latin America following its IPO on the Nasdaq the following month.[48] In January 2010, Terra sold its shares in the company, which emerged as Infoselective SA de CV, where Infosel's operations focusing on IT for the financial information services market in Mexico are now based.[49]

- In 2002, Arturo Galván, together with his brothers (Ernesto and Carlos) and Javier Salinas Maldonado, launched **Naranya**,[50] Latin America's first digital innovation studio.[51] Naranya works with media, telecommunications, retail, and consumer brands to leverage the digital economy, employing over 200 people[52] in 17 Latin American markets[53] with a focus

on e-commerce, digital marketing, advertising, and content. It also supports Naranya Labs, one of the first corporate accelerators in Mexico working to help startups scale.

- **Softtek**, an IT services company, is the largest private technology company in Latin America, with 15,000 employees worldwide,[54] activity in 20 countries, and operations in 30 cities in Latin America, the United States, Europe, and Asia.[55] Global Delivery Centers operate in Mexico, the US, Brazil, Costa Rica, Argentina, Spain, China, India, and Hungary. In Mexico, the company provides digital services from centers in Ensenada, Monterrey, Aguascalientes, Guadalajara, and Mexico City.[56]

  Founded in 1982 with the goal of being a global pioneer in the concept of "near shoring," Softtek's growth accelerated in the 2000's as confidence among US companies in services provided from Mexico grew and its client base in the US expanded. For the last fifteen years, the US has been Softtek's largest market. American clients include several Fortune 500 companies; European clients include large banks and major corporations operating both inside and outside of Europe; Mexican clients include more than half of the country's top 60 companies.

  David Jimenez Santos, Managing Director of the company's Consumer Products Group, explains the strategy of using Mexico as a base for service delivery: "There's enormous talent in Mexico. Productivity is very high due to the talent and the methodologies and technologies we have developed. There's also cultural affinity and proximity with the US."[57] Softtek is a significant anchor for Monterrey's entrepreneurial sector, both as an investor and through the employee spinouts and mentors that it generates.

Monterrey's environment for startups is nascent but promising, with retail, e-commerce, fintech, and healthcare the most active verticals. New companies that are finding success include EnviaFlores.com, a leader in flower delivery, ePesos, which provides financial services for the unbanked and underbanked in Mexico, logistics company Nowports, and edtech provider Kinedu.

Monterrey Companies Significant Recent Funding Rounds

Startup	Sector	Funding Amount	Announced Date	Lead Investors
ePesos	Fintech	USD 6 million	2017	Santander InnoVentures
Nowports	Shipping & logistics	USD 8.5 million	2019	Monashees, Base10 Partners
Skydrop	Shipping & logistics	USD 5 million	2018	Dynamo, Sierra Ventures, Sinai Ventures, Soma Capital, VARIV
Kinedu	Edtech	USD 3.7 million	2018	IGNIA

Source: Endeavor México and Crunchbase

Several case studies exemplify the city's entrepreneurial growth as well as the challenges that emerging companies face:

- **Kinedu**, which focuses on early childhood development, was founded in 2013 by Luis Garza Sada as a mobile app and web platform to provide parents with personalized development roadmaps that encourage early growth and learning. Garza Sada, a graduate of Stanford, was mentored by successful entrepreneurs Arturo Galván of Naranya and Armando Badillo of Eduexperts, received angel investment from Softbank, and has subsequently become an angel investor in his own right, leveraging the Tecnológico de Monterrey ecosystem. Asked about Monterey's environment for startups, he says the main advantage to starting a company in Monterrey is access to the well-trained, English-speaking talent that comes from local universities. The main disadvantage he sees is competition for young professionals from the city's abundance of corporate jobs at large national and multinational firms.[58]

- **Vitau**, co-founded in 2019 by Tuto Assad and Alejandro Lozano, is an online pharmacy that allows patients with chronic illnesses like diabetes to receive subscriptions for medications at their homes without having to visit a pharmacy. Mexico has four large pharmacy chains, of which two have online

services, but Assad believed their websites didn't work well and that their business models focused on inventory management more than patient support, with patients needing to drive to get prescriptions due to poor delivery. Vitau instead offers subscribers a full range of services, using technology to track their needs for medications and ensure that those medications are always available. New platforms enable delivery and automated reimbursement by insurance companies; plans are also underway for a "smart pillbox" that uses hardware to monitor whether subscribers are taking their medications. Vitau currently has twenty-five investors, ten of whom are Mexican; Bay Area investors include Y Combinator, Cann Brothers, Liquid 2 Capital, and Streamline Ventures.

Vitau's roots are in both Mexico and Silicon Valley. An entrepreneur from an early age, Assad developed a network as an angel investor but soon realized that with its small base, his fund wasn't big enough and the capital and experts were in Silicon Valley. His entry point came through Tec de Monterrey, which wanted to connect to the Valley's ecosystem and appointed him to represent the university. His personal goal was to get as connected as possible and start a seed fund. Based in Palo Alto, he was quickly introduced to others in the community. Reflecting on his experience, he says "Everyone has a great approach, is very open, and looking to learn. As long as you're authentic, you can be part of the system."

The experience also told him that with valuations running high, it wasn't the best time to have a fund. He had invested in some Y Combinator alumni, and in his role for Tec had helped entrants from the university apply to the program—which led him to believe that he could found a company himself. He liquidated the fund, returning the uninvested balance to its investors, and launched Vitau in Monterrey. In the summer of 2019 he participated in Y Combinator and received its backing. Today, Vitau is scaling in Monterrey, and Assad has launched the private equity fund Toro Ventures through which he invests internationally in other startups.

As Assad sees it, Monterrey still lacks a strong culture of risk taking and collaboration and the robust entrepreneurial ecosystem that Silicon Valley's culture enables. Large corporations dominate the economy, which can divert attention from entrepreneurship: "You're better off going to complete strangers in San Francisco than looking for support in Monterrey. There's money, but the interest is more in real estate than entrepreneurs." But he also sees an upside to the large corporate presence and an environment that is changing in a city which is home to a large number of family offices that over time are becoming more experienced in working with startups.[59]

- **Territorium Life**, co-founded by Carlos Guillermo Elizondo in 2013, develops software that helps job seekers identify and develop the skills they need to be hired by linking job postings with educational service providers. Companies also use its services, provided on a SaaS model, to better understand what kind of training they should invest in. In 2019, the company, with 65 employees, had 3.9 million users in the United States, Mexico, Colombia, and the Dominican Republic. Commenting on the environment for entrepreneurs in Monterrey, Elizondo observes that "Monterrey is a city built by entrepreneurs; it's a city of entrepreneurs, where entrepreneurs are respected. Tecnológico de Monterrey was founded by an entrepreneur and the universities here are oriented in that direction." The city is dominated by large industrial companies, he notes, that are looking to invest in new products and services. This is producing a shift of focus from manufacturing toward creative and other services. Having access to large headquarters companies and their employees can help young companies grow: "In Monterrey it's easier than in other places to get to the president or other top executives of the big companies. They go to Tecnológico de Monterrey and other startup events."[60]

The city also has a small biotech sector that is looking to become more established. The founders of early cancer diagnosis blood testing device company **Delee** took classes at ITESM (the Monterrey technology and higher studies institute)[61] before founding the company in 2016, nurturing it at Y Combinator,[62] and ultimately incorporating in the US.[63] **Nitrocel Technologies**, a deep tech startup with ties to Tec de Monterrey, develops better manufacturing processes for T cell

therapies.[64] UANL is also generating biotech startups. Alejandro Espinosa, Nitrocel's founder, cites low visibility and a lack of angel and venture capital as perhaps the biggest challenges that biotech startups face in Monterrey and elsewhere in Mexico. Where funding is generally available for companies in tech, fintech, AI and similar fields, the resources available for biotech are very lean. Lack of exits is a factor, but so is a lack of federal infrastructure for biotech, which is oriented toward established companies but not startups.

As one response, Espinosa and others have recently created **BioLaunch,** a community of Mexican bioentrepreneurs which held its first summit with approximately 100 participants in 2019, and a second online summit in 2020. With roughly 40 active participants and 3,200 in the extended community, its goal is to generate a biotech ecosystem, speed technology transfer, and influence policy.[65]

Opportunities and Challenges

Monterrey stands out in Mexico for its concentration of industry and large corporations. It is also the most business-oriented city in Mexico, with the strongest private sector. Large companies, while based in traditional sectors such as glass, cement, and banking, are accelerating their adoption of technology, creating new opportunities for partnerships with overseas companies as well as startups. For California and Bay Area companies, the city offers a production base, a market, and investment opportunities with some of Mexico's major industrial enterprises.

One sector showing opportunity for further development and binational cooperation is energy—and renewable energy in particular. By the end of 2018, Nuevo León had 301 MW of installed clean energy generating capacity, and state leaders see potential for the development of greatly increased production from solar, wind, biomass, and geothermal sources.[66] Stanford University is collaborating with university, NGO, government, and industry partners to identify and catalyze these opportunities through its Mexico Clean Economy 2050 project, launched with the support of the United States Agency for International Development (USAID). It should be noted, however, that energy policy changes proposed by the López Obrador administration that would tilt toward fossil fuels could negatively impact these and other state and local initiatives.

US technology companies look to Monterrey as a source of engineering talent. Local entrepreneurs say that reasons for starting their companies in Monterrey include the city's talent base but also its networks of major businesses and their suppliers and the access to customers that they provide. The city's large industrial base and cross-border trade with the US is an important asset that can be leveraged to support startups and applications in fields such as manufacturing (IoT and Industry 4.0) and logistics.

With this promise, the city's technology and startup ecosystem also faces challenges.

Despite the growing number of tech companies based there, reaching scale is difficult and tech employment is concentrated in the city's three leading tech companies. Fewer than 20 entrepreneur-led companies (which together account for 80% of the sector's employment) have more than 100 employees. This points to the related challenge that as it seeks to grow larger technology companies, Monterrey needs to hold more entrepreneurs and engineers in the region. Founders point to human capital as their most serious challenge, as they compete for technical talent with both local companies and companies in the US that pay higher salaries.[67]

Closer collaboration between universities, corporations, and venture capitalists can help to address this challenge, as would an upward shift of venture activity toward later-stage investment.

Despite its economic importance in Mexico and its pool of engineering and entrepreneurial talent, Monterrey has yet to attract significant attention from Bay Area and California companies or Silicon Valley venture investors, who focus primarily on opportunities in Guadalajara and Mexico City. One limiting factor is the lack of direct flights between the Bay Area and Monterrey. In the longer term, deeper and more sustained connections between universities and organizations in Monterrey with Bay Area counterparts can help to increase Monterrey's visibility and enable stronger ties to grow organically.

6

Mexico City and the State of Mexico

Macroeconomic Overview

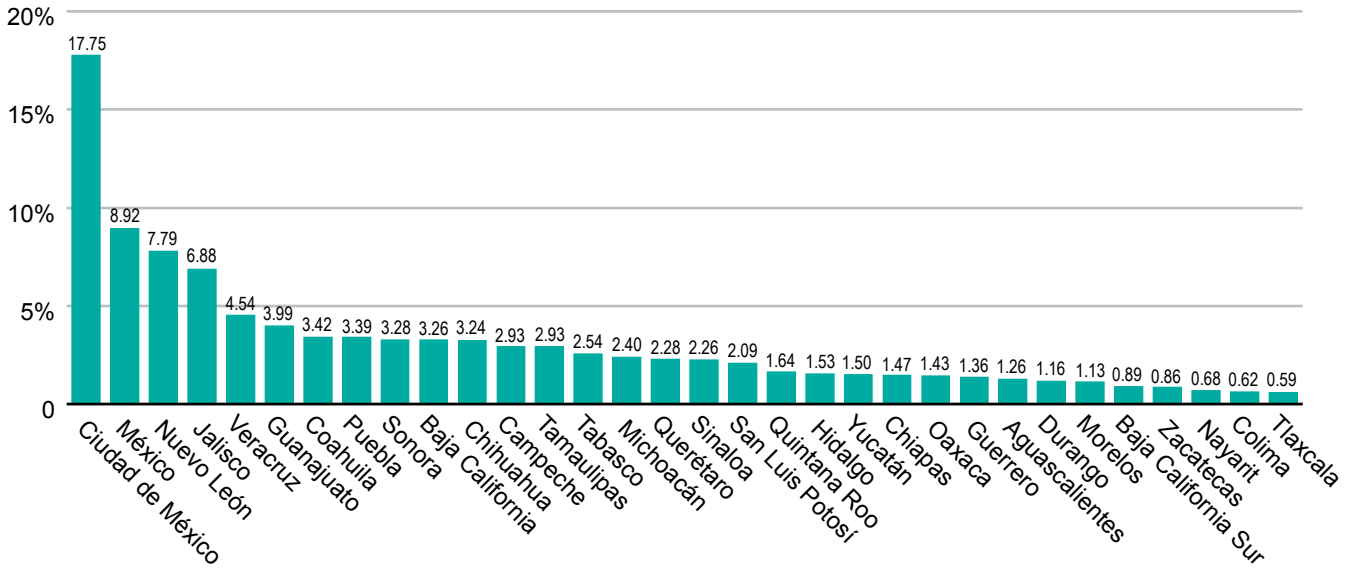
Besides being the capital and administrative and cultural center of Mexico, Mexico City (Cuidad de México or CDMX) is at the heart of the national economy. When combined with the surrounding State of Mexico, CDMX accounts for more than a quarter of the national GDP.[1]

Business activity is led by financial and business services, information and media, and manufacturing.[2]

Exhibit 17

Mexico City and the surrounding State of Mexico account for more than a quarter of the national GDP.

Mexico's GDP Participation by State, 2019, percent of GDP



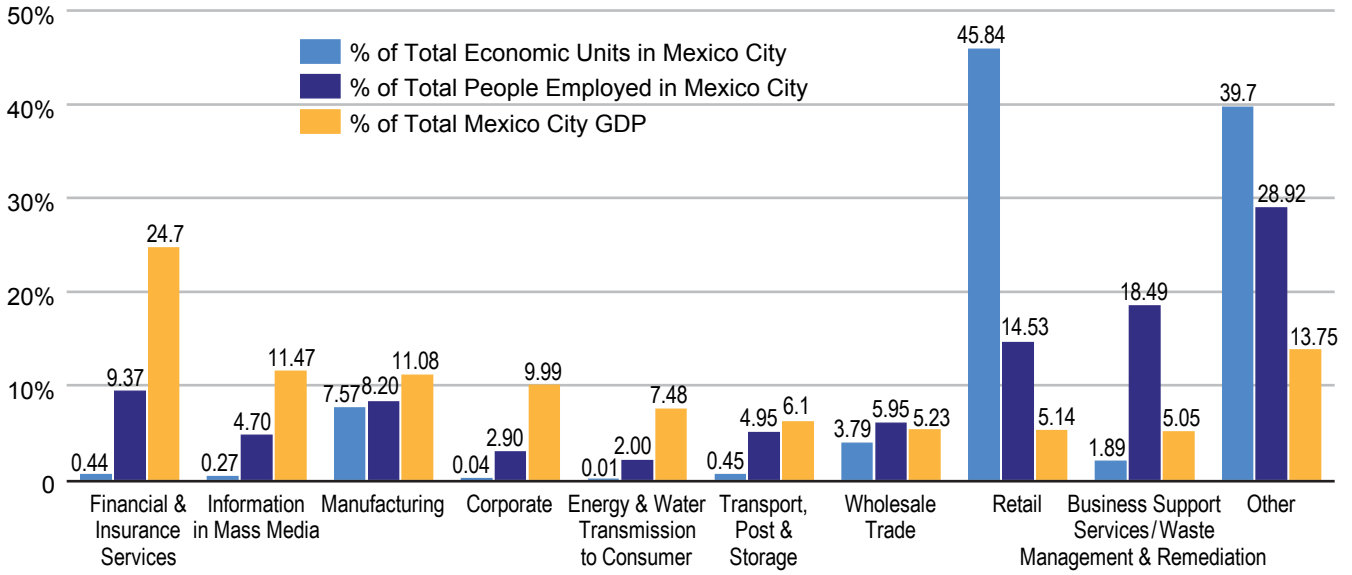
Source: INEGI data, 2019 preliminary

Visualization: Bay Area Economic Institute

EXHIBIT 18

Mexico City's economy is led by business services.

Mexico City Industry Sectors Shares of CDMX Totals, 2018, percent



Source: INEGI Censos Económicos, 2018 data

Visualization: Bay Area Council Economic Institute

The city is home to twelve of Mexico's fifteen largest companies. In contrast to Monterrey, which is home to the country's leading industrial companies, Mexico City's profile is weighted more toward commerce and state-owned enterprises. The first fifteen entries in Expansión magazine's 2020 list of leading companies in Mexico, in descending order of size (by sales), are shown in the table to the right.[3]

Mexico City and the State of Mexico benefit from a strategic location, with the densest road network in the country and a central location that links to eight adjacent states and national distribution centers. Rail networks link the city with ports on both coasts and the northern border. Sheer size is another advantage, with Mexico City together with the State of Mexico claiming the largest labor force in the country with more than 6.8 million people employed in 2018.[4] Between 1999 and 2020, Mexico City received the highest amount of foreign direct investment (USD 129.9 billion) in the country, and the State of Mexico received the third highest amount (USD 56.1 billion).[5]

2020 Rank	Company	Location
1	PEMEX	CDMX
2	América Móvil	CDMX
3	Walmart México	CDMX
4	Comisión Federal de Electricidad	CDMX
5	FEMSA	CDMX
6	General Motors de México	CDMX
7	FCA México	CDMX
8	Alfa	Monterrey, NL
9	Nissan Mexicana	CDMX
10	Grupo Financiero BBVA Bancomer	CDMX
11	Grupo Bimbo	CDMX
12	CEMEX	Monterrey, NL
13	Volkswagen de México	Puebla, Puebla
14	Grupo Financiero Citibanamex	CDMX
15	Grupo BAL	CDMX

University and Research Environment

In 2018, Mexico City ranked first in the country for the number of companies registered in RENIECYT (the national science and technology institutions registry).[6] The 2018 Índice Nacional de Ciencia, Tecnología e Innovación (national science, technology and innovation index), developed by CAIINNO (the analysis center for research in innovation), ranks Mexico City #1 among Mexico's 32 federal entities (31 states and the Mexico City federal district) for nine out of twelve science, technology and innovation index "pillars":[7]

Index Pillar	Mexico City Rank
General Context (GDP per capita, unemployment, poverty)	1
Public and Private Investment in Science, Technology, and Innovation (STI)	1
Higher Education	1
Basic education	1
Inclusion (allowing access to all including those with disabilities)	22
Scientific Output	1
Innovative companies	1
Entrepreneurship and Business	32*
Material and intellectual infrastructure	1
Industrial property (trademark and patent applications and registrations)	1
Gender (participation and division by gender in areas directly related to STI)	17
Information and Communication Technologies	1

*One of the variables in the Entrepreneurship and Business category is the survival rate of startups after their first 5 years of operation. The higher volume of CDMX startup activity and the inclusion of this variable explains the relatively low ranking in this category.

With a high concentration of academic talent, Mexico City and the State of Mexico were the #1 and #3 federal entities in 2019 for the number of researchers registered[8] in the Sistema Nacional de Investigadores (national system of researchers) administered by CONACYT (the national council of science and technology).[9]

This dense concentration of universities is at the root of the city's research and innovation capacity and its talent base. Key institutions include the following:

- **UNAM** (the national autonomous university of Mexico), a public university, is the largest university in Latin America. Startup initiatives include InnovaUNAM, which supports entrepreneurship and company formation in the university community with two major incubators: the Unidad Base Tecnológica (technological base unit) provides up to 2 years of incubation for companies focused on goods and services derived from new knowledge, usually generated UNAM, and the Unidad Social (social unit) provides up to 15 months of incubation time for companies and organizations focused on social needs solutions in areas such as health, education, housing, food, sustainable development, and rights.[10]
- **UP** (pan American university) is a private university based in Mexico City, with four campuses across the country. Student startups as well as entrepreneurs outside the university are supported by its entrepreneurship initiative, CEI (the center for entrepreneurship and innovation).[11]
- **IPADE** is the postgraduate business school of UP. Several research centers within the school anchor activity related to Mexican and global business: the Research Center for Women in Senior Management; the Research Center for Family Businesses–BBVA; and the Research Center for Philosophy and Management.[12]
- **IBERO** is a private university[13] located in the west of Mexico City in the Santa Fe area.[14] It supports the creation and acceleration of high-impact startups through its entrepreneurship and business development center CEDE,[15] and through its program for social entrepreneurship which twice a year offers a four-month program designed to support entrepreneurs who have projects with a social or environmental impact by providing to tools and knowledge necessary for creating a strategic plan and taking their first startup steps.[16]
- **Universidad Anáhuac**, a private university network started in Mexico City, has nine campuses across the country with an active roster of student-oriented

entrepreneurship programs: Emprende Anáhuac, an initiative that includes courses, extracurricular bootcamps and workshops, and startup competitions and prizes; IDEARSE Anáhuac, a business accelerator; Innova Anáhuac, a high-impact technology incubator; Programa de Liderazgo Empresarial, offering seminars with leaders focused on social well-being projects;[17] and a suite of leadership development programs that includes Genera, a program to develop entrepreneurial potential.[18]

- **Tecnológico de Monterrey**, described in more detail in the Monterrey chapter of this report and a globally recognized private institution, has campuses in 27 cities across the nation, including the Ciudad de México Campus and the Estado de México Campus. Tec de Monterrey is widely recognized for its orientation to entrepreneurs, led by its Eugenio Garza Lagüera entrepreneurship institute.[19]

- **ITAM** (the autonomous technology institute of Mexico), is a private PhD-granting research university and one of Mexico's key institutions of higher learning. Its EPIC Lab supports entrepreneurship in its student and alumni community.[20]

Spotlight
ITAM

Until the 1940s, all universities in Mexico were public. The founding of Tecnológico de Monterrey in Monterrey and Institute Tecnológico Autónomo de Mexico (ITAM) in Mexico City launched a new generation of private institutions that have changed the face of higher education, particularly with regard to business, technology, and entrepreneurship. ITAM's founders, business leaders who saw that existing university programs were focused on central planning but not macroeconomics, set out to create an institution that would educate future leaders with business skills and a grounding in modern economics. Building on a core of tenured faculty, most of the instruction today is by practitioners in fields such as economics, finance, law, actuarial science, computer science, and most recently in data science. With approximately 5,000 undergraduates and a small number of graduate students, all activity is concentrated at ITAM's campus in Mexico City.

ITAM's graduates populate the top tiers of Mexico's business and financial leadership, with half working for multinationals. Approximately one-third of graduates are employed at consulting firms such as Bain and McKinsey or in other professional services. In recent years, the university has also started to play a larger role in Mexico City's entrepreneurial ecosystem. Francisco Pérez González, ITAM's dean, describes the reasoning: "The environment for starting a company in Mexico has improved dramatically. There's more money available and pension funds have more resources to invest, some of which are being used to finance new ideas. The technological environment for the creation of new firms is also growing." Several years ago in cooperation with MIT's Entrepreneurship Center, ITAM established an entrepreneurship center which has since become a startup bootcamp leveraging MIT expertise. Reflecting this strategic shift, ITAM has become the leading source of CEOs of new companies receiving funding through member funds of AMEXCAP, Mexico's private equity and venture capital association; many of Mexico's venture and private equity firms are also led by ITAM alumni.[21]

Entrepreneurial Environment

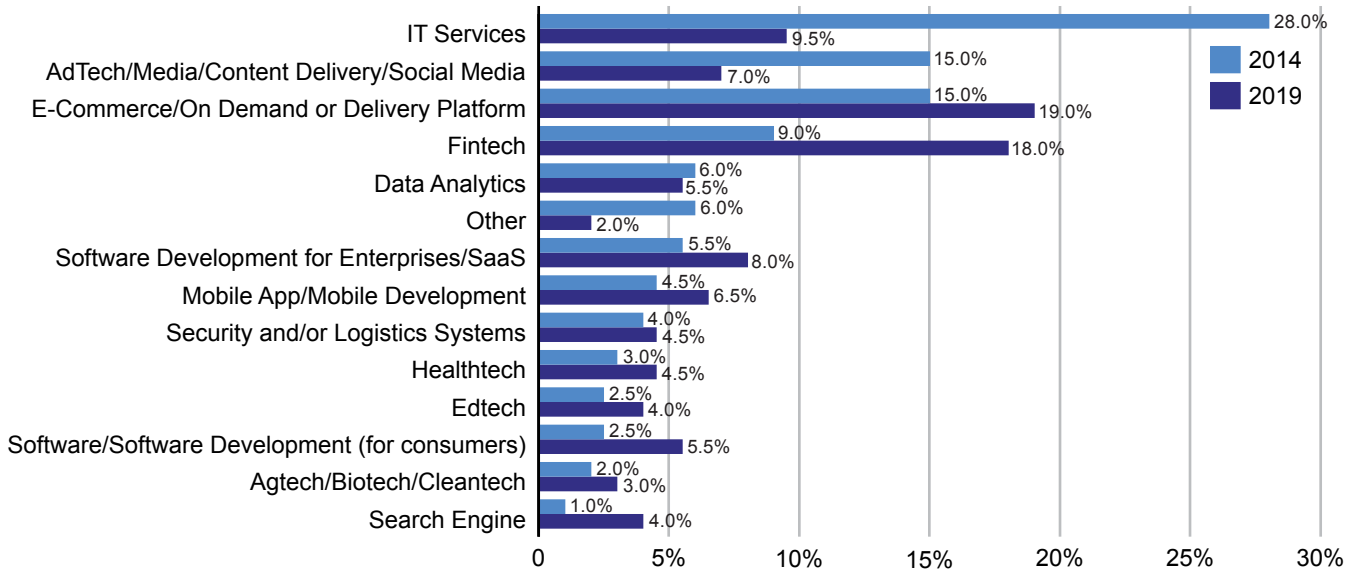
Startup activity in Mexico City experienced major growth from 2014 to 2019. In that period, the number of entrepreneur-led technology enterprises almost quadrupled, rising from 164 to more than 632 active companies. The majority of these new companies were in e-commerce, fintech, IT services, and SaaS. Measured by job creation, fintech outperformed all other sub-sectors. Exhibit 19 indicates the percentage breakdown of companies by sector in 2019 compared to 2014.

Employment growth in the startup sector between 2014 and 2019 was significant, driven largely by a small group of companies that scaled. Entrepreneur-led tech companies employed a total of more than 29,000 people on a full-time basis in 2019, twice as many as in 2014. Companies that reached the size of 50 or more employees represented less than 15 percent of all tech companies but contributed over 76 percent of jobs in the sector.[22]

EXHIBIT 19

Between 2014 and 2019 the number of entrepreneur-led tech companies almost quadrupled, with the majority of the new companies in e-commerce, fintech, IT services, and SaaS.

Entrepreneur-Led Tech Enterprises Shares of Total Mexico City Tech Companies by Sector, 2014 & 2019, percent



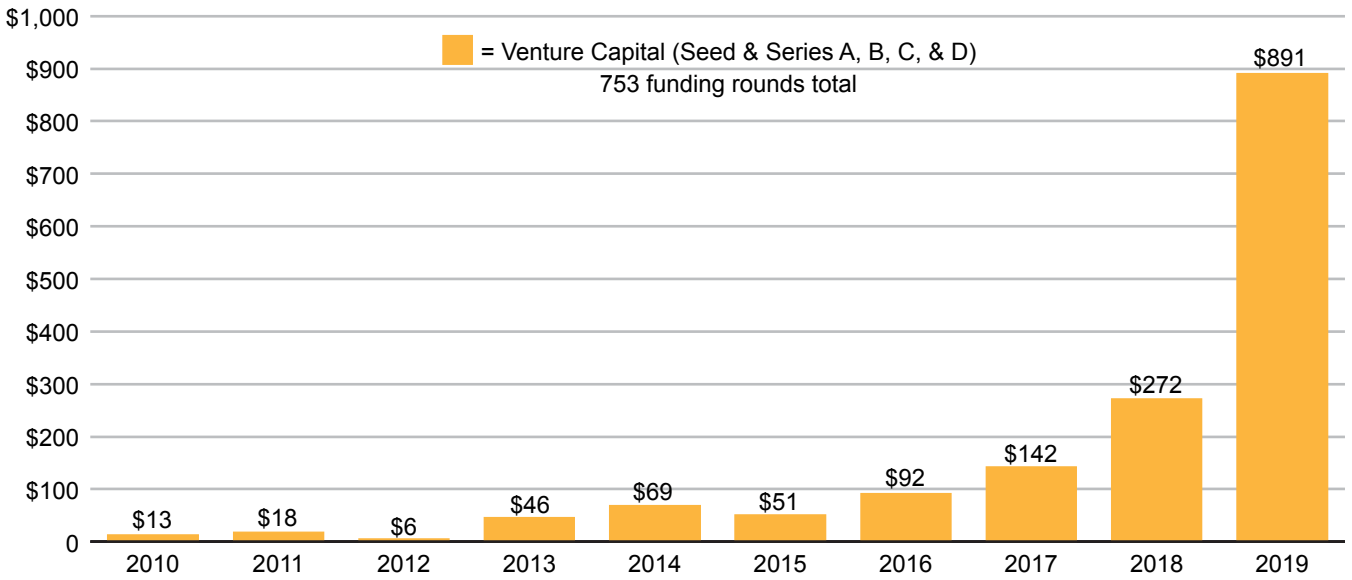
Source: Endeavor Insight

Visualization: Bay Area Council Economic Institute

EXHIBIT 20

From 2010 through 2019, 753 venture capital rounds totaling over USD 1.6 billion in value were raised by Mexico City tech startups.

Funding Raised by Mexico City Tech Startups Over Time, 2010–2019, USD millions



Source: Endeavor Insight

Visualization: Bay Area Council Economic Institute

Venture investment has ballooned. Mexico City concentrates most of Mexico's venture funds, accounting for a large proportion of venture investment nationally. Leading funds include Dalus Capital, Dila Capital, and Jaguar Ventures. In 2019, Mexico City was home to 84 member funds of AMEXCAP compared to 16 funds in Nuevo León, 4 in Jalisco, and 6 in the rest of Mexico. Reflecting that distribution, Mexico City accounted for nearly 75% of all venture transactions and nearly 80% of all invested venture capital in Mexico.[23]

The city is also home to leading incubator and accelerator programs such as Endeavor México and Wayra México, university programs such as Tecnológico de Monterrey's Tec Lean CDMX, corporate initiatives such as Goggle's Launchpad Accelerator Mexico, and the Latin America branch of San Francisco-based 500 Startups.

Over the ten years leading up to and including 2019, 753 venture capital rounds totaling over USD 1.6 billion in value were raised by Mexico City tech startups, a 70-fold increase from 2010; 65 of those closed in 2019, accounting for 55% of the total capital raised.[24]

SPOTLIGHT

500 Startups

500 Startups recently founded the first accelerator since 2012 in Mexico City, which today also serves as its hub for Latin America including Argentina, Colombia, Chile, and Peru. Twelve batches of startups have been run through the 16-week program to date; its Mexico-based 500 Luchadores Fund has invested regionally in approximately 100 startups at an average level of USD 60,000. E-commerce and digital payments are a particular focus, with investments in companies such as Konfio (online financial services for small businesses), 99 Minutos (delivery service for online shopping), Clip (electronic payments), Conekta (an online payment platform for banks and financial institutions), and Facturama (which simplifies billing processes). With the onset of the COVID-19 crisis and the accelerator's services moving online, applications have increased 16% (1,957 applicants in 2020, of which 10 were selected). Managers believe that going virtual has opened access to the program and its mentors to founders who in the past would have found it difficult to travel to Mexico City for a residency.[25]

While this growth was impressive, the overall environment for startups in the city continues to face limitations, as the total amount of investment capital raised remains small and there have been relatively few exits. By 2019, the city's tech entrepreneurship ecosystem had only 13 recorded acquisitions and no IPOs.[26]

For a sector with 632 entrepreneur-led companies, there are more than 150 investors and other organizations providing support.[27]

Startups

In 2019, only eighteen venture capital investments of over USD 50 million were made in Latin America.[28] Of the companies receiving those funds, several are based in Mexico City:

- **Clip**, a payments fintech co-founded by Adolfo Babatz, successfully raised USD 100 million from a co-investment by SoftBank and General Atlantic.[29]
- **Konfio**, a fintech company co-founded by David Arana that offers credit and loan products, raised USD100 million through a co-investment of SoftBank, Kaszek Ventures, QED Investors, and Vostok Emerging Finance.[30]
- **Kavak** is a technology platform with 500 employees that enables buyers and sellers of used cars to efficiently complete their transactions online. In 2019, Kavak quadrupled its sales over the prior year, with an inventory of more than 2,000 cars, an operating center with a capacity to process thousands of cars a month, and more than 10 showrooms and inspection centers in Mexico City.[31] In its 2019 Series B funding round, General Atlantic acquired a minority stake in Kavak,[32] and in the fall of 2020 in one of the most significant funding rounds in Mexico and Latin America, Kavak became Mexico's first unicorn (a tech startup valued at a billion dollars or more) by reaching a valuation of USD 1.15 billion after closing a Series C funding round led by DST Global, Green Oaks Capital, and Softbank.[33]

Mexico City Digital Initiatives

Because of its size, market, density of assets, and proximity to the national government, Mexico City exerts a gravitational pull for overseas businesses including startups. The city is taking further steps to attract both Mexican and overseas businesses through an industrial innovation zone designated **Vallejo-i**. The project aims to revitalize Vallejo, a historic manufacturing area in the city, with a focus on clean, sustainable industries.[34] Dating to the early 1900s, the zone was once located on the outskirts of Mexico City but is now enveloped by it. At one point, it was home to 800 businesses and more than 70 of the most important companies in Mexico.[35] To reverse a decline due to the earthquake of 1985 and later economic change, recent measures to stimulate growth through innovation include

- the technological development and innovation center CDIT that with the collaboration of CONACYT and CONCAMIN (the confederation of industrial chambers) will include an advanced data processing center to provide computing capacity and support digital transformation and the development of smart applications;
- an Industry 4.0 laboratory to co-create technological solutions and services that contribute to industrial performance and accelerate innovation in energy efficiency, IoT, and smart manufacturing; and
- a digital prototyping laboratory for materials design and fabrication.[36]

At the urban level, the government of Mexico City is working to accelerate the digitalization of city services through **ADIP** (the digital agency for public innovation), which has the responsibility for leading, designing, and monitoring the implementation of data management policies, open government, digital government, and the governance of technological infrastructure.[37] Goals include

- a digital registry for the use and application of public money;
- the simplification and reduction of procedures required in the provision of public services;
- a one-stop system to reduce the costs and time of interaction between government and citizens;
- increased connectivity within Mexico City; and
- unified strategies and action within city government around technology, public data, and connectivity.

ADIP's working model includes broadening the number of places with free Wi-Fi access; the creation of apps and websites that make it easier for residents to interact with public institutions when engaging in transactions; projects to increase transparency and accountability within and among institutions and provide open data; and partnerships with local government entities, the private sector, academia, and think tanks to collect and analyze data.[38]

7

Guadalajara and Jalisco

Macroeconomic Overview

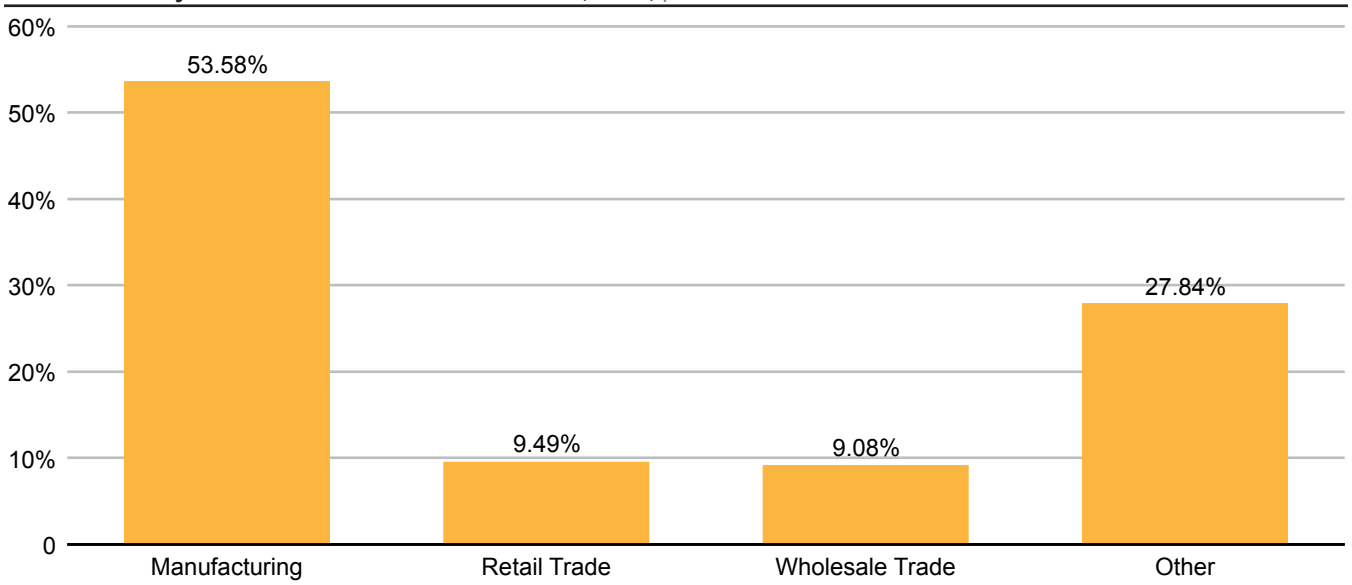
Guadalajara, in the western state of Jalisco, is at the heart of Mexico's technology economy. Jalisco itself has the fourth largest economy in Mexico after Mexico City, the State of Mexico and Nuevo León.

Most economic activity is concentrated in Guadalajara and Zapopan, which together accounted for more than 50% of the state's GDP in 2018. Manufacturing is the largest contributor.[1]

Exhibit 21

Manufacturing is the largest contributor to GDP in the state of Jalisco.

Jalisco Industry Sectors Shares of Total State GDP, 2018, percent



Source: INEGI Censos Económicos, 2018 data

Visualization: Bay Area Council Economic Institute

Science and Innovation Infrastructure

According to the Índice Nacional de Ciencia, Tecnología e Innovación 2018—the national index of science, technology, and innovation published by CAIINNO (the analysis center for research in innovation)—Jalisco received more than MXN 810 million in funding from CONACYT (the national council of science and technology) in 2017. In CAIINNO's 2018 rankings of the 32 Mexican federal entities (31 states plus the Mexico City federal district), the state is near the top for innovative companies and industrial property (trademark and patent applications and registrations), placing #3 in both categories, and for higher education where it ranks #6.[2]

University and Research Environment

Guadalajara hosts campuses of more than 175 higher education institutions,[3] including 13 leading universities, 2 technical universities, 16 technological institutes, and 50 technical colleges. It is also home to 584 job training centers.[4] In 2020, 442,000 students were enrolled in Guadalajara higher education institutions.[5] Access to engineers is particularly important for technology companies. In 2019, the city produced more than 15,000 engineering graduates, of which approximately 6,500 were in high technology fields.[6] Several leading universities anchor the city's business and technology economy:

- A public institution, the **Universidad de Guadalajara** is the leading university in the state and with 260,000 students in 2020, making it the second largest higher education institution in the country behind only UNAM.[7] The technology programs offered by CUCEI (the university center for exact sciences and engineering) cover fields spanning electrical mechanical engineering (including mechatronics), industrial engineering, communications and electronics engineering, industrial engineering, and robotics engineering.[8]
- The Guadalajara campus of **Tecnológico de Monterrey**, had an enrollment of 10,000 students in 2020.[9] A recent addition to the campus is the AI Hub, which has the mission to demystify AI for policymakers and the public at large[10] and encourage the ethical use of AI in fields such as health, education, and social welfare.[11]
- Located in Tlaquepaque (a suburb of Guadalajara), **ITESO** (the technological institute of higher studies of the west) is the Jesuit University of Guadalajara. With an enrollment of 21,900 students in 2020,[12] ITESO offers majors in the humanities, business, and engineering (covering fields such as computer systems, information security and networks, mechatronics, and nanotechnology)[13] as well as an entrepreneurship training program.[14]
- A private university with 21,600 students in 2020,[15] **UAG** (the autonomous university of Guadalajara) notably hosts an intelligence center for entrepreneurship support (CIPAE)[16] and the Incubadora UAG, a high technology incubator providing training capacity and infrastructure for entrepreneurs and companies with a focus on biotechnology and sustainability.[17]

Universidad de Guadalajara and Tec de Monterrey host significant research laboratories and have collaborative internship programs with companies such as Intel, IBM, Continental AG, and Oracle.

Manufacturing and IT

Jalisco has the fourth largest GDP among federal entities in Mexico,[18] with an economy led by manufacturing and a burgeoning IT sector that holds 40% of the IT industry in the country.[19] Leading areas of manufacturing include electronics and electrical equipment, telecommunications equipment, automobiles, aerospace, and medical devices. The top IT fields are software development, software services, and business process outsourcing (BPO). With this, Guadalajara has emerged as Mexico's high-tech capital, attracting offices and the operations facilities of global technology companies including Bosch, Flex, Foxconn, Sanmina, AstraZeneca, HCL, Tata, Cognizant, Honda, and NXP Semiconductors.[20] Foreign investment in recent years has come principally from the United States, Canada, Japan, Spain, and Brazil.[21]

More than 1,000 high tech companies operate in Guadalajara, supporting 150,000 jobs, with the largest clusters in technology, e-commerce, financial services,

health, and transportation. Of those companies in 2019, 50% were Mexican, 31% were from the United States, and 19% were from other countries.[22] Business process outsourcing (BPO) is led by Indian companies such as HCL and Tata.

Corporate activity is concentrated in two technology districts, three technology parks, and sixty industrial parks, with the electronics sector alone accounting for 60,000 employees. The electric vehicle/e-mobility sector counts more than 200 suppliers.[23] Entrepreneurs in the software sector are supported by the Centro del Software (CSW), Mexico's first ICT park, which is home to 34 companies with 850 employees and is managed by IJALTI (the Jalisco institute of information technologies).[24] Contract manufacturing happens at scale, with Flex employing 20,000 across two locations in Guadalajara.[25]

Renewable energy is an area of growing interest. Jalisco has both a state energy agency and a state energy plan, developed with support from the State of California; in addition to Mexican companies, a number of leading international energy companies—from Spain, Italy and China—are active. Between 2015 and 2020, Jalisco has attracted USD 364 million to renewable energy projects: two in wind, two in solar, and one a combined cycle plant.[26]

Global connectivity is supported by 2,300 international flights per year.[27] This service enables efficient air cargo connections to Europe, Asia, and the United States. Direct flights to San Francisco, Oakland, and San Jose allow business travelers from the Bay Area to be in Guadalajara in under three hours. When compared to longer times required for executives to travel from Silicon Valley to India or China, this proximity facilitates efficient collaboration and problem-solving between headquarters and field facilities.

Business flows between the Bay Area and Guadalajara reflect the city's role as the leading base in Mexico for Silicon Valley companies. Intel, Cisco, HP, and Oracle all have large presences.[28]

In contrast to other manufacturing centers in Mexico, Jalisco's enjoys a well-established R&D base:[29]

- **Oracle**'s facility, which employs 1,500, develops core technologies. The company is currently building a new campus, which will enable it to grow to 4,000 employees.
- **Flex** employs approximately 300 in R&D, primarily working on embedded systems.
- European automotive company **Continental**'s research center, one of its largest in the world, conducts research for global markets on safety (crash avoidance), autonomous vehicles (guidance systems) and IOT, with approximately 130 million euros invested in R&D annually.
- Guadalajara is the Americas R&D center for Germany's **Bosch**, which invests approximately USD 30 million per year, primarily focused on artificial intelligence and machine learning.
- With 1,500 people at its Guadalajara facility, **IBM** conducts research on ICT, software development, artificial intelligence, and cloud computing.
- **HP** employs engineers working on SaaS and embedded systems.
- **Amdocs**, which also has R&D centers in India, the United States, and Israel, focuses on telecommunications.
- Mexican software leader **Softtek**'s research center focuses on AI.

SPOTLIGHT

Intel

Intel Guadalajara Design Center Photo courtesy of Intel

With more than 1,200 employees, the **Intel Guadalajara Design Center**, is the company's largest engineering center in Latin America and one of six global centers operated by Intel that focus on long-term product development. Intel came to Guadalajara in 2000 after acquiring a 33-person startup, TDCOM,

which had technology that would advance its entry into the telecoms market. As an added incentive, the company also had good connections with the city's universities and other ecosystem players. Today, Intel invests approximately USD 110 million per year in R&D at the Center, with a primary focus on semiconductor design in fields spanning platform development and validation of servers and next generation memory, as well as advanced research in autonomous systems and neuromorphic and quantum computing. Among the Center's staff, 45% hold a master's or doctoral degree, 45% hold a bachelor's degree, and 10% are interns or technicians. Since its founding in 2000, the Center has delivered more than 200 projects and developed and registered more than 800 inventions, producing 100 patents.[30]

In addition to its design center in Guadalajara, Intel supports and partners with university-sponsored technology innovation centers across Mexico by contributing training and equipment, with the goal of supporting ecosystem development and expansion nationally. Those centers currently operate in Zacatecas, Sonora, Tijuana, Mexicali, Mérida, Monterrey, Puebla, Querétaro, and Guadalajara.

Regarding Guadalajara and its talent pool, Design Center General Manager Jesus Palomino says, "We have no problem finding very good, highly qualified talent, and that talent is available across the full spectrum of expertise and fields. The biggest challenge is to find people with twenty or more years of experience, but that's not unusual in highly competitive ecosystems, and we expect that with time the number of those people will grow." He points to cooperation between Guadalajara's government, industry, and universities as an asset that has contributed to talent development and the region's economic success: "Companies, joined by government and universities, have worked together for many years to grow the pie and build a larger ecosystem. It's special to have this kind of commitment where we help each other and the community to succeed."[31]

EXHIBIT 22

Guadalajara High Tech Ecosystem

Source: Jalisco Gobierno Del Estado and IJALTI

Looking forward, economic development plans in Jalisco and Guadalajara focus on four key clusters, some well-established and others still emerging:

- *Biotechnology* has grown significantly in the last ten years. Guadalajara is home to the largest biomedical cluster in Mexico, with a particular focus on agtech and health.
- In the *ICT* sector, which has also experienced strong growth to date, a major focus is developing on data science.
- *Creative industries*, including animation, video games, and special effects, are a priority. Plans are underway to designate a section of the city as Ciudad Creativa Digital to advance Guadalajara's goal to become the capital of Mexico's creative sector. Growth in the industry is supported by university programs in digital science, and by a strong base of content creation by local firms.
- *Design innovation* is another area of development, with the focus placed on innovation in traditional industries such as jewelry, furniture, and fashion.

Another sector with a history in Jalisco and potential for growth is film. The state is the second most important center for film making in Mexico after Mexico City, where some 40% of the nation's films are produced.[32] The Jalisco film commission provides support for films that are at least 40% made in Jalisco and has supported 58 films between 2014 and 2019,[33] primarily by producers in Jalisco but also international producers and producers from across Mexico. The city is home to the largest cluster of animation and visual effects studios in Mexico, where studios collaborate with California companies including Disney, Nickelodeon, Dreamworks and Cartoon Network. A partnership with the Universidad de Guadalajara supports the Guadalajara international film festival, the oldest film festival in Mexico. A new studio for stop-motion production, the largest in Latin America, will be launched in 2021 in Zapopan, where international animation talents have already gathered to develop feature film projects.[34] Discussions are also underway with Netflix and Amazon for a new "film city" (studio) that would include water tanks in Jalisco. The Film Commission has indicated an interest in working with Silicon Valley animation and visual effects companies to build a production and pre-production studio in the city.[35]

Business-Government Alignment

Guadalajara's success in establishing itself as an international technology center can be traced both to enlightened business leadership and government policies that have been sustained across different political administrations. Starting from a base in agriculture, the city's industrial economy first saw strong growth in the 1970s with the arrival of companies such as IBM and Motorola. The initial attraction, besides low cost, was a strong base in engineering. Much of the manufacturing done at the time was low cost/high volume. When the city started losing manufacturing jobs to China in the late 1990s and early 2000s and by 2007 Motorola's plant site had been redeveloped as a shopping mall,[36] business leaders saw the need to move local production to higher value-added activities and particularly IT. Benjamin Huerta, who was working for HP at that time and now leads **IJALTI**, a nonprofit organization that supports the city's IT cluster, recalls "In the blink of an eye you were seeing companies move."[37] The focus turned to activity that was R&D based and required engineers.

The business community needed infrastructure support, which led to the creation of the **Centro del Software** (administered by IJALTI with original funding from the federal government's PROSOFT software industry development program), which provides office space, collaboration areas and resources for small and medium-sized software companies and entrepreneurs.[38] Universities also started working more closely with both business and government to build the innovation and human capital environment required for the shift. Today **CANIETI West**, a chapter of the national business organization for the electronics and high technology industry based in Guadalajara and one of 6 headquarters that make up CANIETI Nacional,[39] supports cooperation between the business sector, universities, and local government, aimed at developing a self-sustaining IT ecosystem.[40]

Jalisco is the only state in Mexico with an explicit ICT policy and **COECYTJAL**, its state council of science and technology, is led by executives with experience working for Silicon Valley companies. A public-private partnership, IJALTI coordinates

and promotes activity in the information technology sector, including IT services and creative industries, with a focus on talent development, new company formation, scientific research, and investment attraction. Jalisco's government, the Universidad de Guadalajara, and private-sector partners are together developing the **Consejo Jalisco 4.0** initiative, an effort to strengthen the contribution of higher education to technology innovation[41] in fields such as mechatronics, nanotechnology, and molecular materials design.

Other competitive advantages the city claims include a high quality of life and lower costs than Mexico City (though with its success the cost of living is rising). This is reflected in the growing presence of international startups and technology firms; as one example, at the Guadalajara engineering hub of product design and development company Wizeline, 40% of workers come from other countries.[42] There is a strong connection to the Bay Area, where business in Guadalajara has supported eight flights per day from Bay Area airports (San Jose, Oakland, and San Francisco) carrying executives and tech workers. Recent trends are likely to benefit Guadalajara's efforts to attract international technology and software talent, as software (bits and bytes) crosses borders easily and in the wake of COVID more knowledge-based work will be done remotely.

One of the more challenging issues that US businesses and residents in Jalisco continue to face is drug-related violence, a problem shared with cities across Mexico. Wizeline founder Bismarck Lepe, a promoter of Guadalajara as an international business center, acknowledges that "It's definitely a concern, but if you're not involved in that trade it's generally not a problem," noting that while some Mexican executives travel with personal security, as a rule expat business leaders don't.[43]

Entrepreneurial and Startup Environment

The city's innovation ecosystem includes a growing number of startups, including a number with dual headquarters in Silicon Valley. Duplicating its success in attracting large companies and research centers is a goal that has not yet been achieved, and Guadalajara has yet to produce breakthrough technologies or unicorns. As a general rule, founders don't yet exhibit the kind of ambition or inclination toward risk-taking seen in Silicon Valley, and solutions are largely focused on technical challenges, but this leaves ample opportunity to address national and other market opportunities. IJALTI's president Benjamin Huerta observes that "lots of activity is coming out of the engineering R&D centers. Mexico isn't as entrepreneurial as the United States but it has a particular flavor."[44]

Access to high-quality talent at a comparatively low cost gives the city an advantage. Mexican entrepreneur and investor Tony Rallo observes that "Quality engineers in Guadalajara may cost USD 5,000–6,000 per month. From an investor's standpoint, that means a Mexican company can ask for less because it needs less.[45] But the city still faces challenges to growing its startup base. Venture capital, though available, is one of them. In 2020, Guadalajara was home to three venture funds that were members of AMEXCAP, compared to 17 in Nuevo León and 71 in Mexico City. In the same year it accounted for 49 venture transactions, compared to 33 in Nuevo León and 640 in Mexico City.[46] This places Guadalajara and Jalisco as one of the top three sites in Mexico for venture funds and investment, but it is still heavily dependent on outside capital.

Sustained efforts are underway to grow the ecosystem, building on the city's educational and technology assets. Founders come principally from universities and their incubators, and a large meetup system has developed involving hundreds of groups that connect independently of either universities or government. Thousands of startup-related events take place in the city each year with the largest, Talent Land, drawing 35,000 participants.

SPOTLIGHT

Talent Land

Talent Land, 2019 Photo © Talent Land / Gonzalo García Ramírez, courtesy of Talent Network International

Launched in 2017 with the theme of "changing the world with talent" and held for its second and third times in 2018 and 2019, Talent Land is an annual week-long event that draws as many as 35,000 participants[47]—students, entrepreneurs, and small and large businesses—from across the country to Guadalajara. Its program is different from startup-focused pitch events such as TechCrunch Disrupt or INCmty in Monterrey, as the goal is less to create entrepreneurs and launch companies than to create talent, so that more young people are equipped to found or work in startups and create wealth. Co-founder Raul Martin explains the strategy: "When companies grow, what they need is talent. Whether it's blockchain, AI, or data science, as a company you need to think now about the talent you'll need in five years. And there are large numbers of young people who need to progress but don't know how."

Described by Martin as "Coachella for geeks," the Talent Land format includes approximately twenty stages featuring workshops and organized around themes: e.g., Creative Land (video, audio, design), Business Land (startup economics, digital marketing, e-commerce), Iron Land (makers, robots, drones), Future Land (technology not ready for commercial markets such as space travel and quantum technologies), Blockchain Land (crypto space), Developer Land, Ag Land (agriculture), Fashion Land, Travel Land, Health Land, and Gaming Land. Participants register for one land but can go anywhere. Normally filling out Expo Guadalajara, at 100,000 square feet the largest facility of its kind in Latin America, Talent Land's approximately 50 activities per hour range from coding to robotics competitions. While accommodations have been spread across the city, 12,000 participants have camped in a small city of 2-person tents erected on the Expo's grounds. Talent Land 2020 couldn't take place due to the COVID-19 pandemic, but the event has returned in 2021 as Talent Land Digital, a first-time 100% digital edition bringing together more that 2 million attendees in a virtual way with more than ten simultaneous streams offering more than 500 hours of content including conferences, workshops, challenges, and competitions.[48]

Talent Land has the distinction of hosting the largest hackathon in the world, built around open innovation challenges. Approximately 5,000 attendees participate across multiple tracks, often sponsored by leading companies such as Amazon, Microsoft, and IBM. In the works is a new tool, Genius Arena, designed to enable universities and other organizations to organize hackathons and innovation challenges on their own. Another distinctive aspect of Talent Land is the fact participants compete to attend. Approximately 600 universities in Mexico participate, receive a certain number of student slots for free, and can purchase additional slots, with discounts available. Alumni usually don't pay, nor do teachers. Each year, the Universidad de Guadalajara receives 1,000 scholarships, 10,000 are allocated to the government of Jalisco (which is associated with the event), and 3,000 go to the city of Guadalajara.[49]

Approximately twenty incubators and accelerators operate in the city, including those sponsored by universities and corporate-affiliated facilities such as **Guadalajara Connectory**, a Bosch-sponsored IoT working space and lab. The most noteworthy perhaps is **StartupGDL**, which has supported a range of successful companies. In addition to supporting local entrepreneurs, another part of StartupGDL's mission is to encourage startups from outside Mexico to scale in Guadalajara and to attract and assist foreign technology companies to establish operations in Guadalajara. Its general formula focuses on providing offshoring solutions for technology startups with Silicon Valley "DNA," while at the same time helping local companies to grow rapidly at a low cost. Its services include

- helping companies find, train, and retain tech talent across Latin America through a two-year, Global Tech Corps "Earn and Learn Apprenticeship Program";
- matching apprentices and local entrepreneurs with experienced mentors and investors; and
- through success stories, showcasing model business leaders who can inspire young people to pursue technology and STEM-related careers.[50]

StartupGDL has recently expanded its presence across Mexico, partnering with Silicon Valley Bank to promote the Mexican ecosystem to stakeholders abroad. Its CEO and co-founder Cindy Blanco points to Guadalajara's advantages as well as disadvantages[51] for Bay Area companies:

Advantages

- Geographical proximity to San Francisco;
- Active support by local government for technological development;
- Universities that will adapt their focus to meet market demand for talent.

Disadvantages

- With its growth, the city's advantage as a low-cost center is starting to erode;
- While local startups have successfully raised capital in Silicon Valley, locally-based venture activity remains small, as most of the industry is centralized in Mexico City;
- Generating inclusive growth and addressing economic inequality remains a challenge.

Talent Land co-founder Raul Martin believes Guadalajara, with its livable environment and abundance of quality engineers, is a perfect place to start and grow a company, but not necessarily the place to put the company's headquarters. Mexico is still highly centralized and companies also need to be in Mexico City, which offers a bigger market and where decisions are made. Most of the company, including engineering and R&D, he believes, should be in Guadalajara, but the C-suite (CEO, senior executives) and marketing should be in the capital—or Silicon Valley.[52]

The vision for Guadalajara, however, is positive. Cindy Blanco believes that the city has the right ingredients to succeed and only needs time to consolidate. Currently, most local ventures are focused on fintech, but she believes that with time startups will emerge in other high-potential technology sectors. She also sees potential in other cities in Jalisco—Puerto Vallarta being one example, due to its port, well-connected airport, and a growing cluster of entrepreneurs that is choosing to work there remotely.[53]

The opportunities identified by StartupGDL are being taken up by companies such as **Terminal**, a San Francisco-based startup that creates remote teams of "members" (engineers) in markets around the world to perform cutting-edge development tasks for venture-backed, late-stage startups. With remote teams in Guadalajara and in multiple Canadian cities, its current footprint in Guadalajara includes

- 6 client companies employing or in the process of building remote teams;
- approximately 20 members (engineers) working from Guadalajara; and
- a full-time local team of HR, recruitment, and operation personnel.

As described by CEO Luke Finney, the company's decision to enter Latin America through Guadalajara

was based on an evaluation of several Latin American countries including Mexico. Mexico City, Monterrey, and Guadalajara were all on the list of potential sites, but Guadalajara was eventually chosen due to its culture of entrepreneurship. The company's core clients are Series C companies that have key functionality and infrastructure already built and are looking to scale their offerings. While the pandemic has shaken prior growth projections for many companies, Finney believes that Terminal will eventually grow to employ several hundred engineers in Guadalajara. The challenges he points to fall in two categories: (1) limited capital to fund new products and (2) engineers who lack a product focus—a skill set incorporating design principles and user feedback loops, something that develops most strongly where capital is available for new product development. Finney describes Guadalajara as "a well-kept secret" that isn't widely recognized in Silicon Valley but offers very high value.[54]

Growing Startups

With encouragement from organizations such as StartupGDL, the city is generating a growing number of successful startups. Three examples stand out:

- **Kueski** is an online lender for middle class borrowers in Mexico and Latin America that uses big data and advanced analytics to approve and deliver loans in minutes. Over six rounds, it has raised a total of USD 38.8 million in funding, the latest being a Series B round in September 2019.[55]
- **Yotepresto.com** is a lending platform connecting Individual and institutional investors to near-prime borrowers applying for personal loans. The company has raised a total of USD 3 million in funding over 4 rounds, the latest being a seed round in January 2019.[56]
- **Sunu** is a maker of wristbands for the visually impaired that enable them to detect and estimate the distance of objects up to 16 feet away using sonar and vibration technology.[57] Supported by Y Combinator[58] and with a presence in both Guadalajara and Boston, its technology has been featured in *The Washington Post*, *The Boston Globe*, and *MIT Technology Review*.

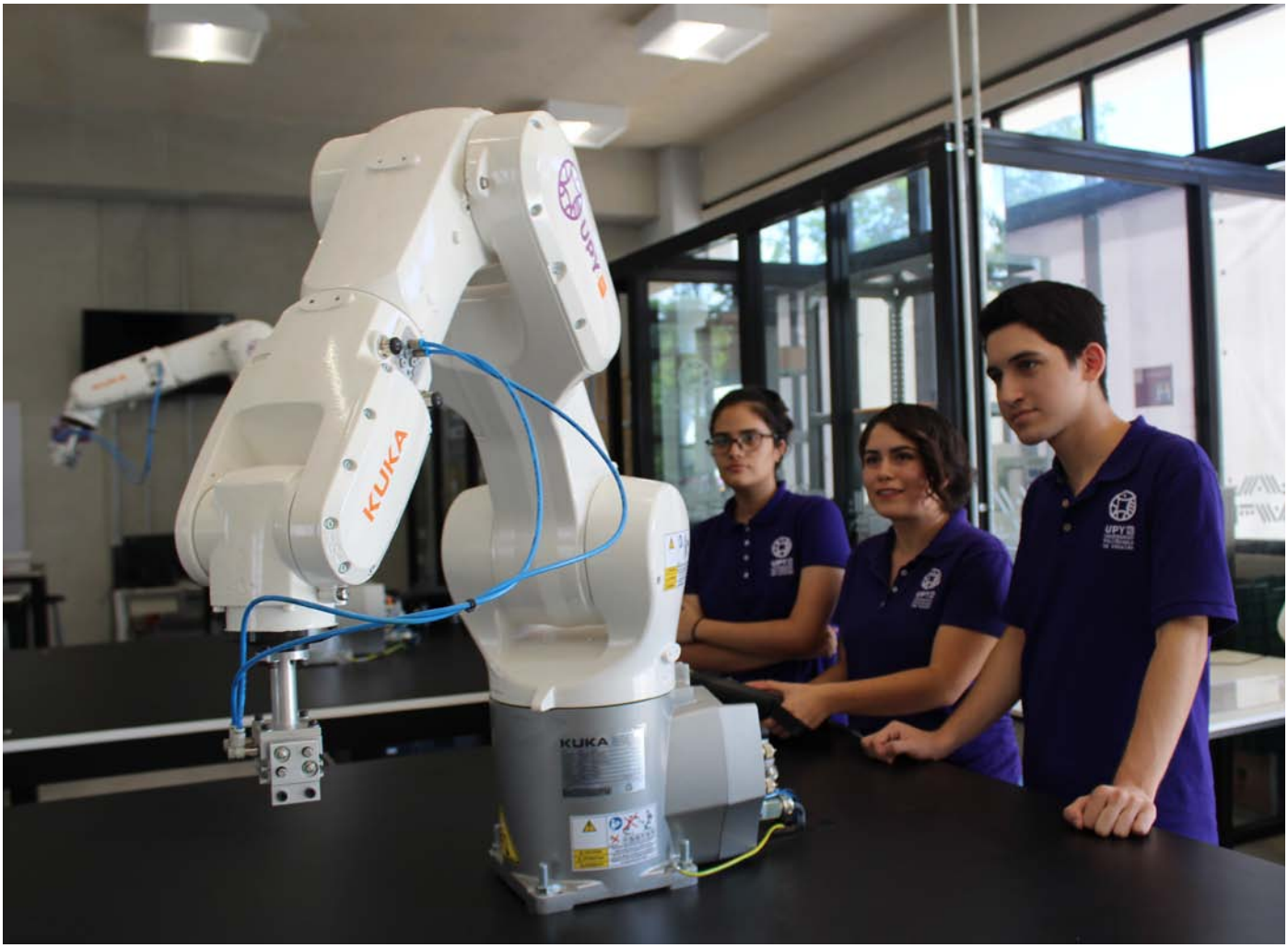
Significant technology startups have established roots in both the Bay Area and Guadalajara to take advantage of the assets that both locations offer. In some cases, entrepreneurs have returned from working in the Bay Area and other US technology centers to either launch startups or work in tech companies in the city.

- **Wizeline**, an end-to-end software development and business solutions service for Fortune 500 firms, is based in both Guadalajara and San Francisco, with San Francisco leading on operations and Guadalajara on engineering. Its founder Bismarck Lepe points to cost savings and access to talent, and a professional culture around technology, as strong advantages for Guadalajara. He also credits Jalisco's government for actively supporting the development of a regional startup and technology ecosystem and points to the role played by StartupGDL, which he helped to found, in attracting high-tech companies from abroad which, once established in the city, become training grounds for local entrepreneurs. Looking to the future, he foresees a stronger role for state and local governments as adopters of new technologies and supporters of entrepreneurs as their clients, as well as a closer relationship between public technical universities and the entrepreneurial sector.[59]
- **Rever** produces software connecting frontline employees with the rest of the organization. The company is headquartered in Silicon Valley and does product development and design in Guadalajara. It chose Silicon Valley as its headquarters location because of the availability of top executive talent and venture capital and chose Guadalajara as an engineering hub for its affordability and the tech-centric culture of the local environment.

  CEO Errette Dunn says the entrepreneurial ecosystem in Guadalajara and Mexico has grown significantly in the last 6–7 years, but that entrepreneurs tend to focus on local and regional business models, something that limits their growth in the tech sector. The city has made progress, with new investors emerging, particularly angels, but the number of investor entities that can be accessed in Guadalajara still falls short compared to Mexico City, where most capital is concentrated. He also cites the value of

support provided by StartupGDL, which served as a partner for Rever by connecting the company to lawyers, accountants, and other technical expertise when it was attempting to establish an integrated business model for Mexico and the United States. In addition, during the COVID-19 crisis, Rever's investors in Silicon Valley (including Sequoia Capital, which invested in 2018) contributed concise advice on tangible changes, including guidance on how to secure additional investment, extend the company's financial runway, cut costs, and prioritize cash flow.[60]

Like the Bay Area and other metro areas in Mexico, Guadalajara has been experiencing the impact of COVID-19 on its startup environment. Layoffs have occurred, cash flow management has grown in importance, and early-stage startups are receiving sharply lower valuations. Those with a US presence have leveraged US government loans to bridge the period. (No support is available in Mexico from the national government, but some support for small enterprises is being offered by local and state governments.) Despite these challenges, startup activity and employment have remained strong; as of summer 2020, US companies building remote teams in Mexico were slowing but not stopping their recruitment.[61] StartupGDL president Cindy Blanco sees an upside for emerging tech companies: "COVID has accelerated Mexico's progress by ten years, by driving companies to generate new solutions and adopt digital tools."[62]



UPY students with robot

Photo courtesy of Instituto Yucateco de Emprendedores

8

El Bajío and Yucatán

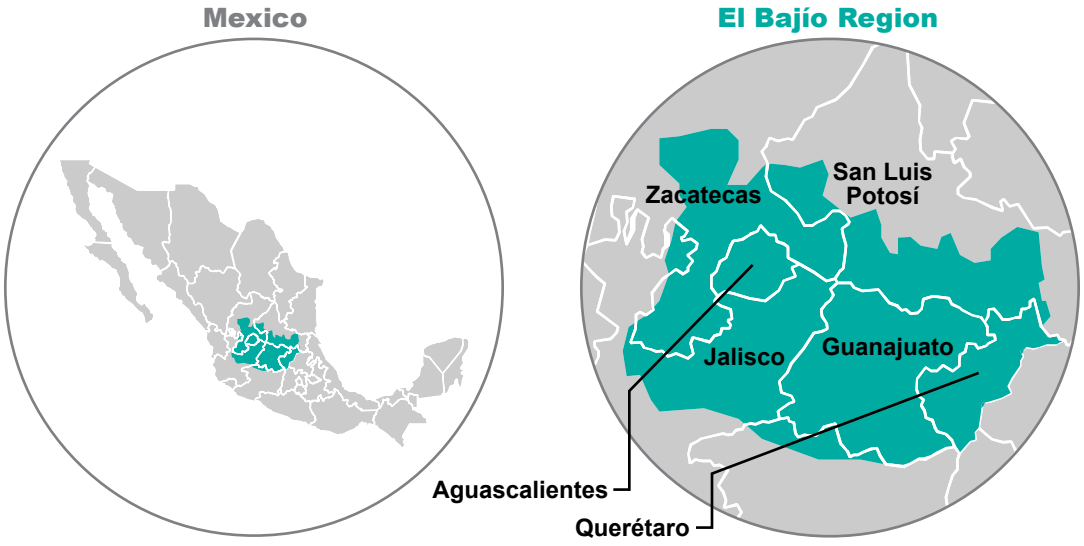
Two regions of Mexico, El Bajío and the state of Yucatán, are seeing interesting developments. While lacking innovation and startup environments comparable to other leading Mexican states and cities, and while there are few current connections to the San Francisco Bay Area/Silicon Valley, they each benefit from considerable assets that are enabling growth and make them promising partners for Northern California innovation companies and institutions.

El Bajío: Mexico's Manufacturing Heartland

Located in central Mexico, the Bajío region is an economic grouping of all or part of four states—Aguascalientes, San Luis Potosí, Guanajuato, and Querétaro, known together as El Bajío—along with adjacent portions of the states of Zacatecas and Jalisco.

Exhibit 23

El Bajío region is located in the heart of Mexico.



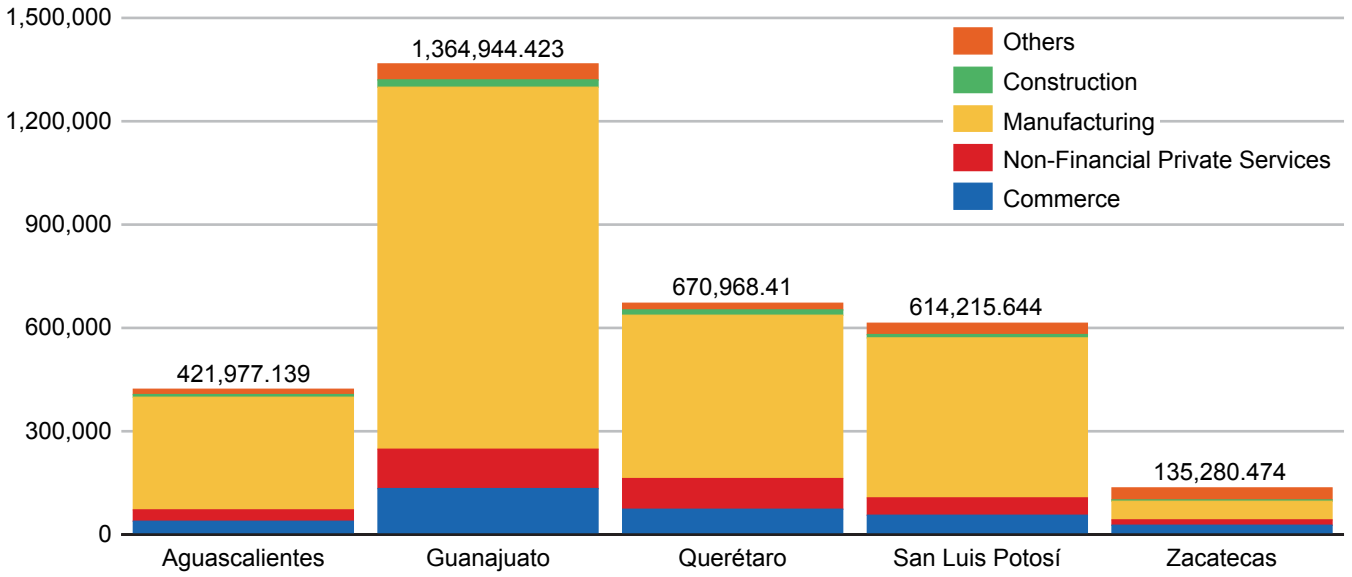
Source: Aguascalientes Gobierno Del Estado

Visualization: Bay Area Council Economic Institute

EXHIBIT 24

In the last several decades, the Bajío region has developed as a major global manufacturing center.

GDP by Sector for Aguascalientes, Guanajuato, Querétaro, San Luis Potosí, and Zacatecas, 2018, millions of pesos



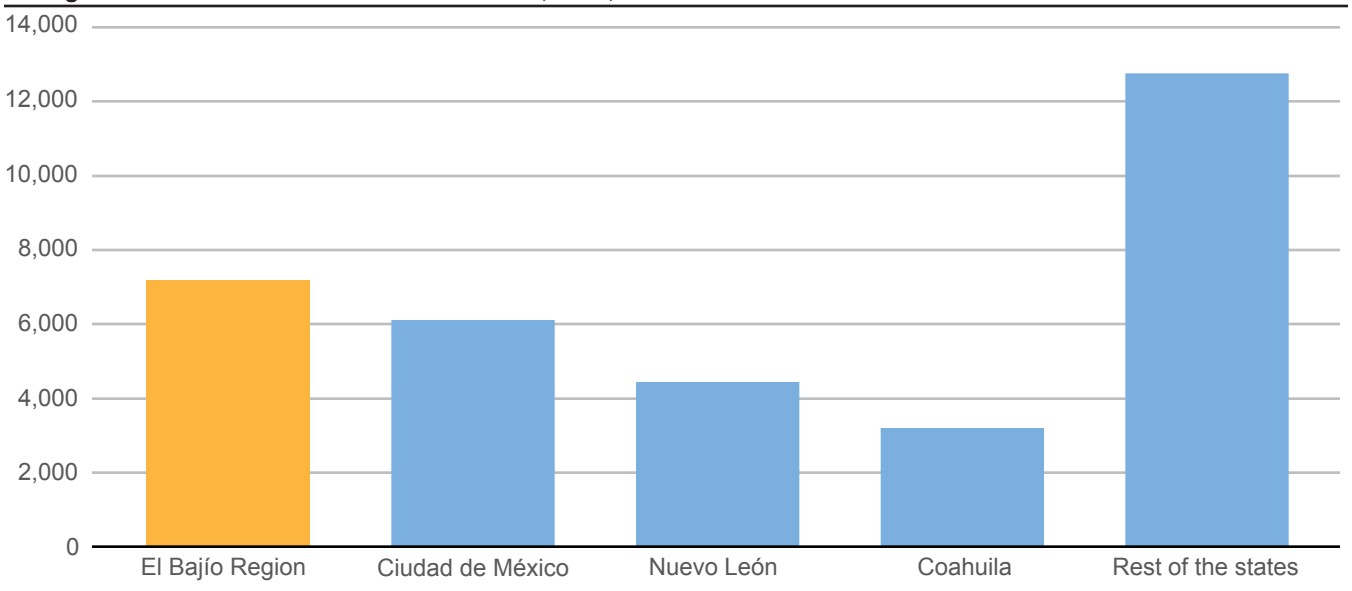
Source: INEGI Censos Económicos, 2018 data

Visualization: Bay Area Council Economic Institute

EXHIBIT 25

Foreign investment has played a major role in the Bajío region.

Foreign Investment in Mexican Federal Entities, 2019, millions of dollars



Source: Aguascalientes Gobierno Del Estado using Gobierno De México Secretaría de Economía data
Visualization: Bay Area Council Economic Institute

With a population of 22 million, the region accounts for 17% of Mexico's GDP and between 2007 and 2018 experienced 4.4% average annual growth, which is 1.6 times Mexico's national average.[1] In the last several decades, the Bajío region has developed as a major global manufacturing center. Between 2013 and 2018, its manufacturing economy grew by 47.2%, with Aguascalientes and San Luis Potosí leading at 70.4% and 73.7% respectively, far above the national average of 17.9%.[2]

Foreign investment has played a major role, totaling USD 91 billion over the past twenty years or 17% of Mexico's total. The largest investors are from the United States, Germany, Japan, and China. Production is led by automobiles and aerospace, as well as agrifoods, chemical products, plastics, and metal products.[3] The automotive presence comprises major OEM plants and numerous parts producers that supply global leaders General Motors, Nissan, Volkswagen, Ford, Kia, Honda, Toyota, Infiniti, BMW, and Daimler.[4] In 2018, the automotive industry alone accounted for 300,000 jobs in the region.[5]

According to a report by Deloitte, among Mexico's six economic regions (Border, Center-North, West, El Bajío, Center, and South), El Bajío's 2018 level of foreign investment was the second highest, with transportation equipment accounting for over USD 2.9 billion of the approximately USD 4 billion total invested into the region that year. This made El Bajío second only to Mexico's northern border states in regional foreign investment in 2018, and first in transportation equipment spending.[6]

From a Bay Area standpoint, three states—Guanajuato, Querétaro, and Aguascalientes—are particularly noteworthy. (Jalisco is discussed in Chapter 7 of this report).

Guanajuato

Guanajuato alone has absorbed over USD 13 billion in FDI since 2012. In that period, the state attracted more than 300 foreign companies and increased its number of industrial parks from less than 10 to more than 30.[7] Manufacturing dominates the economy, accounting for 28.8% of GDP in 2018 and engaging 26.6% of the state's workforce or almost 689,000 people. The automotive, textiles, food processing, chemicals, aerospace, IT, and logistics industry clusters lead, and the level of foreign direct investment is the seventh highest among Mexican states.[8] GM has a major presence in Silao,[9] Honda in Celaya,[10] and Toyota in Apaseo el Grande.[11] In September 2019, Guanajuato was producing 800,000 cars annually and a year later had reached 900,000 annually, an increase of 12.5% in one year.[12] SkyPlus, the first aerospace park in Guanajuato, is considered the most sophisticated aerospace logistics park in the country.[13] The state has also established the Guanajuato Inland Port (a dry port) as a free trade zone to support business logistics.[14]

Querétaro

Querétaro ranked #3 for overall competitiveness based on 2020 data analyzed in the state competitiveness index published by IMCO (the Mexican competitiveness institute) in 2021. The latest edition of the annual index measures the ability of Mexico's federal entities to generate, attract and retain talent and investment, using 72 indicators in which each state is scored on a scale of zero to 100. With an overall score of 59, Querétaro was surpassed only by Mexico City (scoring 67) and Nuevo León (scoring 60). Categories in which Querétaro stood out were government support for economic development, where it ranked #1 with a score of 78, and innovation—which measures the ability to compete in high value-added, knowledge intensive, and cutting edge technology sectors—where it ranked #2 with a score of 88, surpassed only by Mexico City's score of 95.[15]

With more than 45 industrial parks, Querétaro's manufacturing economy has evolved from one based mostly on consumer goods (from 1960–1990) to an emphasis in the last 25 years on the automotive, aerospace, IT, and OEM sectors.[16] The next push will be deeper into IT, financial services, and renewable energy, where the state is establishing HUB IQ, a project to support technological innovation in energy efficiency and renewable energy for climate action.[17] Manufacturing of transportation equipment, dominated by the automotive sector, accounted for 26.1% of the state's manufacturing production in 2018.[18] Querétaro is also the country's main magnet for aerospace investment, hosting 2 OEM aerospace companies and Tier 1 and 2 suppliers, including Airbus, Delta, Bombardier, and French airplane conglomerate Safran,[19] which sources parts to Boeing and Airbus.[20]

The state is the world's fourth ranked destination for aerospace foreign direct investment.[21] In 2019 and 2020, overall foreign direct investment came principally from the United States and Spain, followed (in order of investment size) by France, Canada, Switzerland, Japan, Sweden, and Germany.[22]

With 103 universities (82 private and 21 public), Querétaro has a particularly strong educational base.[23] In terms of 2020 student enrollment, two technological institutions, UTEQ and ITQ, each with more than 12,000 students, tie for second place after UAQ (the autonomous university of Querétaro) with almost 50,000 students (25% of the state's enrollment). All students at UTEQ and ITQ have a major in some area of engineering or ICT.[24] One noteworthy institution supporting industry is the Creativity and Innovation Center 4.0 (CIC 4.0), which enjoys strategic alliances with FUMEC (the United States-Mexico foundation for science), Centro de Innovación Para la Manufactura Inteligente (smart manufacturing center), Intel, Siemens, IBM, and Laboratorio de Prototipado Acelerado (accelerated prototyping laboratory).[25] Part of UTEQ and with a mission to increase industry, government, and academy collaborations, CIC 4.0 was created as a platform to cultivate university technology IP and speed the commercialization of university technology, startup formation, and cluster development.[26]

The technology sector is growing, witnessed by several recent investments:

- Mexican telecom company Axtel opened a USD 25 million data center in the Querétaro innovation technology park in 2017, its second data center in the state. Its first Querétaro facility is its best performing data center, with over 90% occupancy.[27]
- Huawei chose Querétaro as the location for an 8,600 square meter global service center innovation technology park, which employs a staff of more than 500 to support ICT activity across Latin America.[28]
- Deloitte has invested more than USD 10 million in a regional service delivery center in Querétaro. The center opened in 2017 with 250 employees and plans to increase its staff to more than 1,000 over three years, providing tech support to the company's Latin American operations and serving as a laboratory for the creation of new software.[29]
- Microsoft is building a data center on the Querétaro campus of Arkansas State University, which opened in 2017 with a USD 17 million initial budget[30] as the first university in Mexico to offer the US academic model of education.[31]

Aguascalientes

Based on 2020 data, Aguascalientes ranked #6 for overall competitiveness on IMCO's annual index measuring the ability of Mexico's federal entities to attract and retain talent and investment.[32] From 2010 to 2019, the state's economy grew at an average annual rate of 4.6%.[33]

The state is home to 54 institutions of higher education, including five of the top ten universities in Mexico. Almost 12,000 students graduated from undergraduate and postgraduate studies in 2019–2020, 27% of which were engineers.[34] In 2019, the state had about 28,000 students enrolled in technological education.[35]

With 21 industrial parks,[36] Aguascalientes has a robust manufacturing sector in which transportation equipment manufacturing, dominated by the automotive sector, accounted for 75.6% of manufacturing production in 2018.[37] A large overseas presence includes companies such as Flex, Capgemini, Bosch, AB InBev, Tech Mahindra, Nissan Sumitomo Electric, and TRW. Between 2017 and 2020, the state attracted USD 3.45 billion in foreign direct investment, with Japan as the leading investor (54.4%), followed by the US (21.9%), and Germany (12.8%); 80% of manufacturing investment came from overseas.[38] In addition to the automotive sector, electronic components is a key manufacturing sector in the state.[39]

Aguascalientes has succeeded in attracting major IT firms such as Softtek, Semtech, iTexico, Capgemini, Tech Mahindra, and Texas Instruments, which anchor an expanding sector. Most IT companies focus on insurance, e-commerce, banking, and health, serving foreign clients with a nearshore model. In addition to the automotive sector, areas targeted for future growth include electronic components manufacturing, IT, healthcare services, agribusinesses, and R&D in general.[40]

Three public research centers provide a foundation that connects to industry. Founded in 1978, CIATEQ

(the center for advanced technology) specializes in advanced manufacturing and industrial processes, providing services, technological development projects, applied research, and human resources training to advance competitiveness across a variety of industry sectors. For high-level training in scientific technological areas, CIATEQ offers master's and doctoral programs in advanced manufacturing and intelligent multimedia systems as well as two inter-institutional graduate programs in science and technology.[41] The center has facilities in seven states across Mexico, including two in Querétaro focused on manufacturing, one in Aguascalientes supporting the automotive industry, one in San Luis Potosí specializing in molds and dies, and one in Jalisco focusing on renewable energy and electronics.[42] CIMAT was founded in 1980 as an institution dedicated to basic research and high-level education in the field of mathematics. It focuses on basic research in mathematics, statistics, and computer science, as well as high-level training, technology consulting, and applied research projects, and offers undergraduate and postgraduate degrees in statistics, software engineering, process modeling and optimization, and applied mathematics. In addition to its main campus in Guanajuato, CIMAT has facilities in the cities of Aguascalientes, Mérida, and Zacatecas, as well as Monterrey.[43] Aguascalientes is also home to one of two facilities (the other being in Mexico City) of INFOTEC, an ICT-focused research and development center operating under CONACYT that focuses on software development, IoT, and technological infrastructure. Among its academic offerings are specialized master's and doctoral programs in strategic management, innovation management, ICT law, data science, and embedded systems.[44]

SPOTLIGHT

KIO Networks

In describing Mexico's venture environment, Sergio Rosengaus, founder one of Mexico's early venture funds and later co-founder of KIO Networks, points to the importance of digital infrastructure as an enabler of technology companies. When the telecoms industry began, he says, Teléfonos de México (Telmex) had a nationwide monopoly on telecom services and there were effectively no data centers. Seeing the gap, KIO Networks was launched in 2002 to build that infrastructure, and as demand from clients grew, more services were added. Today, KIO Networks operates 40 data centers globally, of which 27 are in Mexico, making it the largest IT company in Mexico with 2,500 engineers and a client base of leading companies that includes Mexico's two stock exchanges and the Mexican operations of leading US technology companies. KIO's largest campus is in the El Bajío region, in Querétaro. Rosengaus cites proximity to Mexico City, good infrastructure, supportive government policies, and a deep supply of engineers as the foundation for KIO's success there.[45]

The Central Bajío West Alliance

Regional cooperation is a priority for El Bajío states. As expressed by a former governor of Guanajuato, "We share the region, the supply, the products, and we have integrated as a cluster. It is a region that requires joint work."[46]

Government policies are broadly supportive of business and foreign investment and play a positive role in supporting El Bajío's business climate. In February 2020, the governors of Aguascalientes, Querétaro, Guanajuato, San Luis Potosí, and Jalisco launched the **Alianza Centro Bajío Occidente** (central Bajío west alliance), an intergovernmental group to support economic development at the regional level, developing transportation infrastructure, addressing security issues, and promoting the region abroad.[47] The first joint transportation project is a high-speed rail line between Querétaro, Guanajuato, and Mexico State, with plans for a later extension to Aguascalientes and Jalisco. Additional plans include a complex aqueduct system for the region, the expansion of Guadalajara's Airport, and a Guanajuato-Querétaro highway.[48] Advancing the regional economy through technology and innovation is another priority as seen in the **NoBI Bajío** (Bajío binational innovation node), one of eight nodes throughout Mexico that are part of a CONACYT initiative in alliance with the US National Science Foundation that was established in 2017 to stimulate technology development through collaborations between research centers and universities in the United States and Mexico.[49]

Viewed from the Bay Area, the Bajío region is interesting for several reasons. The region is not yet a leading center for research or startup activity, in part because the manufacturing sector absorbs most of the talent coming out of universities. Nonetheless, it has achieved impressive growth and benefits from proximity to Mexico City and from stable public policies that are supportive of business. Its industrial base and infrastructure provide a well-developed platform for production as well as applicable digital innovation. The region also offers a promising platform for IT growth.

Startup activity is nascent but is gathering momentum, supported by organizations like Endeavor that interface with new companies. Through their respective campuses, private universities like Tec de Monterrey and Universidad Anáhuac, and public universities such as Universidad de Guanajuato and UAQ provide a potential base for future entrepreneurial activity.

Mérida: Developing an IT Base

At the northern tip of the Yucatán Peninsula, the state of Yucatán is a popular tourist destination, with its capital city of Mérida one of the oldest cities in North America. More recently it has also developed as a significant business center.

Yucatán has achieved growth and attracted investment at a higher rate than many other Mexican states. Its 2.5% economic growth rate from the third quarter of 2018 to the fourth quarter of 2019 was the fourth highest in Mexico—behind only Tlaxcala, Chihuahua, and Nuevo León—and was five times higher than the 0.5% average for Mexico's other states, as reported by Mexico ¿Cómo Vamos? based on INEGI data. While foreign investment is below the levels of some northern states, investment from outside Mexico more than doubled between 2018 and 2019 to USD 151.3 million.[50] With a population of 995,129 in 2020,[51] the capital city of Mérida was recognized by ONMR (the national observatory for regulatory improvement) as the best city in the country in 2020 to invest, open, and operate a business. Similarly, IMCO (the Mexican competitiveness institute) rates Mérida as one of the best Mexican cities in terms of its ability to forge, attract, and retain talent and investment. Security in the state is high compared to other states in Mexico, with IMCO ranking Mérida highest in Mexico in that category in 2020.[52] The World Justice Project's rule of law scorings also put Yucatán at the top of Mexican states.[53]

IT Ambitions

While the state's economy is led by tourism and agribusiness,[54] Mérida is pushing into information technology[55] with a cluster that builds on a strong educational base and the city's appeal to artists and creative industries. The IT services sector is a major focus. At present, there are approximately 20 mid-sized IT companies in Mérida, including Southeast Mexico's largest IT company 4th Source (acquired in 2018 by Tampa-headquartered AN Global and teamed with another 2019 acquisition to provide full-service digital consulting as AgileThought) with more than 300 professional employees in Mérida, and Plenumsoft, with 250 professional employees.[56] To support further growth, the city has engaged an Indian IT services company to help with training and skills development and is also working to increase English language skills. Target markets include the United States (Miami and Austin are close by air) as well as companies that currently operate in Mexico City or Guadalajara but might look for new locations with lower costs.[57]

Startup ecosystem map and research center StartupBlink ranks the startup ecosystem in Mérida as the seventh best in Mexico—a significant accomplishment for a small city with limited local funding.[58] A public-private project currently in the advanced planning stages is the Polo Tecnológico del Bienestar (technology well-being pole), an area within Yucatán in which the federal government allows special tax incentives for the technology and electronic sectors[59] similar to those granted to cities along the Mexico-US border. Its particular focus will be on artificial intelligence and telecommunications, as well as technology equity.[60] CETIC (the council of entrepreneurs in technology, innovation, and communications) describes Yucatán as one of Mexico's three most important technology and innovation states—along with Jalisco and Chihuahua.[61]

Among the state's technology and innovation priorities is the development of Mérida as a "smart city." Cisco has supported the city's goals of building an integrated

digital administration and improving digital access for the city's residents.[62] Yucatán's state government is the lead sponsor of the Smart City Expo LATAM Congress scheduled for October 2021 in Mérida.[63] The state is also prioritizing through its department of sustainable development the construction or conversion of intelligent buildings.

Renewable Energy

Renewable energy, particularly wind power, is another priority that potentially links Yucatán to the Bay Area. The state has set a goal to generate more renewable energy than it consumes, with 28 authorized projects ranging in scale up to 180 MW.[64] Recently built by Yucatán company Vive Energía,[65] the Progreso wind farm is the fifth renewable energy installation in Yucatán—three are wind farms and two are solar parks—with 24 additional renewable energy projects slated to begin construction in the next few years.[66] Many projects are internationally sourced, though several contracts with Chinese companies have been terminated for failing to protect local flora and fauna during the installation of photovoltaic systems.[67] A more significant challenge to investment in renewables came in May 2020 when the federal secretariat of energy, reflecting the policy priorities of the López Obrador administration, moved to reinforce the primacy of fossil fuels and limit private involvement in the renewable energy sector.[68] Despite this, many of the projects in the state are moving forward, as illustrated by the Yucatán governor's inauguration of Vive Energía's Progreso wind park—a collaboration with Chinese partners—in August 2020.[69]

Higher Education

As Yucatán works to build its technology capacity, education is an asset. While the portion of residents of the state going on to higher education is 39%—close to the national average—in Mérida the portion is 68%.[70] The state is home to 132 higher education institutions (26 public and 106 private),[71] including eight major universities. UADY, ITM, and Universidad Anáhuac Mayab anchor the system, joined more recently by UPY, an institution with a strong Industry 4.0 focus.[72] UADY hosts a strong mathematics faculty that aligns with the Mérida unit of CIMAT, the public mathematics research center that is part of CONACYT.[73] Located in the metropolitan center for peninsular and southern Mexico, universities in Mérida attract students from several states (Quintana Roo, Campeche, Tabasco, and Chiapas mainly); while students in higher education arriving from other states account for 13% of total state enrollment, the largest private university, Anáhuac Mayab, draws 60% of its students from other states.[74] Other leading research centers include UNAM's IIMAS campus, which is a space for cutting-edge research, training, and the provision of services by research groups in applied mathematics, computer science, and engineering systems.[75] This alignment of institutions has pushed Yucatán to fifth place among Mexico's 32 federal entities, measured by number of researchers per capita that are listed by SNI, the national government agency to promote research.[76]

Spotlight
Universidad Anáhuac Mayab

Anáhuac Mayab is playing a key role in supporting startup activity. That began with the establishment of a business accelerator in 2010, which was networked across the Anáhuac network's eight Mexican campuses. In 2014, the university opened **tecniA**, a 3,000 square meter technology park and entrepreneurship center, providing startups with services, facilities, and connections to other institutions. Anáhuac Mayab innovation initiatives include the Starting Up program (to connect ideas to business models), the Anáhuac Mentoring Program (based on the MIT Venture Mentoring Service model), and Business Services (incubation and company-building services). Knowledge transfer is supported by an Intellectual Property office.[77]

In 2018, the university was one of ten institutions that formed the Nodo Binacional de Innovación del Sureste, the southeast node in CONACYT's NoBI (nodes of binational innovation) initiative, bringing the US National Science Foundation's I-Corps methodology—which uses experiential education to help researchers gain insight into entrepreneurship, starting a business, or industry requirements—to Mexico as one of eight regional nodes nationwide.[78]

All students in the first four semesters, no matter what their field, are required to take at least one

entrepreneurship-oriented course.[79] In the full UChallenge "entrepreneurship route," during the first semester students build teams, in the second they develop projects, in the third they develop prototypes that address big challenges, and in the fourth they develop a business model that can be pitched at tecniA Demo Day. Support for the university's students who have completed the entrepreneurial sequence and want to actively pursue company-building is provided by tecniA.[80] One success story example is software and apps developer DaCodes, which is now seven years old with a team of more than 100 software engineers, UI/UX designers, QA testers, and product and project managers.[81] International connections are supported by the Global Honours program, which for selected leading students includes a summer program at Babson College (US), a semester in Germany at the Schmalkalden University of Applied Sciences, and a semester in China at Jinan University.[82] Students finish by incubating a business with support from tecniA and entrepreneurial courses at the university.

Delfina Guedimin, tecniA's Business Incubator and Accelerator Manager, sees progress as more people are adopting an innovation mindset and as a more collaborative ecosystem has started to emerge. As that occurs, downtown Mérida has begun attracting creative industries, designers, and people in the visual arts, helping to enrich the system.[83]

SPOTLIGHT

Universidad Politécnica de Yucatán

Mérida's Universidad Politécnica de Yucatán (UPY) is another institution that is starting to play an active role. A public university established in 2016 and with a focus on information technology and electronics, the campus graduated its first cohort of engineers in 2020. Three programs are offered in engineering: data engineering, embedded systems, and computational robotics, with plans for a fourth in cybersecurity in 2021. The university currently has approximately 500 students, close to its capacity, and plans to expand to 2,000–2,500 over time as new facilities become available.

Rector Gildardo Sanchez sees a large part of the school's mission being to help create an engineering workforce that enables the technology economy in Yucatán to grow: "Mérida looks like Guadalajara did 25–30 years ago. They had large technology companies but it was largely a place where physical things were made. Then people there began pushing universities toward areas that would expand the focus. In Yucatán, the government has policies and tax incentives, but the first question companies ask is about the people they will need to operate—how many graduates are there, what are their skills, and do they speak English?" The government, he says, is focused on developing IT and IT services and has signaled the importance of updating academic programs and of connecting with industry. Certifications for specific skills that may be attractive for companies looking to develop nearshore capacity are a priority. Generating enough people with those skills and who are also bilingual remains a struggle, but the change is happening. People who live in Yucatán, he points out, have strong roots and generally want to stay: "With good salaries and a high quality of life, universities are particularly focusing on training for residents who will be the core of a stable, long-term workforce."[84]

Startup Ecosystem

Mérida's startup system is small, but interesting and promising in many ways, due both to the city's underlying assets and to policies in Yucatán supported by business and successive governments that together have produced a positive business environment with a technological edge. Juan Manuel Ponce Díaz, the godfather of the city's startup ecosystem, a board member of Endeavor Yucatán, and former president of CCE Yucatán (the Yucatán business coordinating council), sees the challenges: "One of the things that's lacking today is scalability. Most companies are small, work in a comfort zone, and mostly talk to each other. The kinds of conversations with places like Silicon Valley that cause you to think differently don't happen, and even the larger companies lack the ambition to be international. What's missing is a vision of something bigger. The main obstacle is us."

The answer, he believes, is to hire internationally and send Yucatecans outside the region. Universities, which have already made important investments in science and technology, can play a stronger role, he believes, by doing more teaching in English and by organizing internships and study programs outside Mexico. Pointing to 250 programmers in his own business, Bepensa (the state's largest company), Ponce believes that Yucatán already has a good base of skills, particularly in software programming, and sees Mérida's compact size, which enables entrepreneurs to easily connect, as an advantage compared to larger cities.

Ponce was one of 15 business leaders who put together the Mayan Fund, the first venture fund on the Yucatán Peninsula. Investments, which are small, are made only in Yucatán, with approximately 20% in commercial enterprises and the balance in the industrial sector and tourism. A second fund is in the works.[85] Mérida is also home to the Yucatán node of Angels Nest, the state's first angel network. Venture capital remains a constraint on the system, as other VCs visit from Mexico City but don't have a full-time presence. This means that startups may be required to move when the need comes for larger amounts of capital.

The Instituto Yucateco de Emprendedores, a freestanding government-funded office created in 2013, provides finance and training for founders. Over 2019 and 2020, its two-year budget of USD 17.2 million (MXN 345.7 million) provided microfinancing, business acceleration, commercial networking, and competitiveness-building services. Since October 2018, the institute has supported 928 entrepreneur-led startups, including 200 that were helped to get their brands officially trademarked and 588 that participated in the institute's microfinancing program.[86]

The challenge that Mérida faces—essentially a chicken-and-egg problem—is that the startup system is small and not yet mature enough to attract more venture interest. This makes growing the system to scale important. More research-based startups are also needed. Though few in number, successful startups are starting to emerge in Mérida. Two founders shared their experience for this report.

Spotlight

Underdog

Entrepreneur Patricio Villalobos has been in the digital arena for more than twenty years, having founded a media-tech company, MedioTiempo.com, that became the largest sports site in Mexico. After having spearheaded its digital expansion in Mexico and following its acquisition by Time Inc. in 2008,[87] he moved from México City to Mérida in 2014 in search of a better quality of life and a place to raise his family. Looking for co-working space, he found tecniA, which had just opened. The next thing he needed was talent to staff his new company, Underdog, a platform for distributing and sharing digital video soccer highlights. Initial funding had already been raised from three VCs, two in Mexico City (IGNIA and Gerbera Capital) and the other in Washington, DC (North Base Media). Locally, he found the key resources he needed: frequent flights to Mexico City and other destinations and qualified engineers. "Though not in large numbers, Yucatán has very good talent," he says. "You can find coders, UX/UI designers, anything you want," and the base is growing. Today, Underdog has 61 employees, of which 37 are engineers and 24 work in content and design.

Villalobos also cites Mérida's attractiveness to outside talent, pointing to his own experience as a migrant from Mexico City: talent is coming to the city from other parts of Yucatán, from Mexico City, and from abroad. He thinks that the trend induced by COVID-19 toward remote work will benefit the city, as more tech workers can negotiate contracts with employers for distance work.

Perhaps the biggest hurdle for entrepreneurs in Mérida is venture capital. Besides the Mayan Fund, which is small, there's no access to local capital so founders need to go to Mexico City for funding. That can be an issue, however, since VCs there often prefer to support companies that are headquartered in the capital. For his next company, Villalobos is skipping Mexico City and going straight to Silicon Valley. The Valley also has challenges, he's found, since Bay Area

VCs generally prefer to invest in companies that are US-headquartered. Pitching for funds three years ago, he found that without a US presence, he was "last in line." Now the pitch has changed, promising a larger market: "It's not 'fund a Mérida company,' it's 'fund a Latin American opportunity'."[88]

SPOTLIGHT

Blue Ocean Technologies

Blue Ocean Technologies is a Mérida-based software design and service platform that competes with companies like SAP. Founded in 2008, the company has 200 employees. Its two main lines of business are *egob*, which serves governments in fields such as constituent services, budgeting and accounting, and project management. *MayanSoft* serves clients with communications and IT software design and development that includes mobile applications.

Founder and General Director Ivan Espadas sees the city as a place with opportunity: "Mérida is a place that's not discovered yet. We have a lot of the ingredients for an innovation ecosystem: universities, great engineers, supportive government policies, a low cost of living, and a good security environment. International connections are also good—Miami is closer by air than Mexico City." Government plans to develop a new innovation district outside the city, he notes, have been on hold due to COVID-19 and uncertainty over the future of remote work but still represent an opportunity for the region.

The number of software engineers in Mérida is a constraint, Espadas says, and the city doesn't yet have a deep level of specialization, but "We have the base, and they learn fast. All that's needed is education for the last mile." He also sees an opportunity for Mérida to attract outside talent: "Central America sees Mexico like Mexico sees the United States. They want to copy and learn."[89]

9

Mexico in the Bay Area

Of all the Bay Area's global partnerships, its relationship with Mexico is unique, due to its hemispheric setting, differences in economic structure, and shared history dating to the Spanish colonial era. This points to challenges but also to important opportunities to leverage the resources that both economies offer. The recent evolution of Mexico's economy toward one where technology, innovation, and entrepreneurship play a greater role is adding new depth to the relationship, opening doors that go well beyond the lens through which US-Mexico economic relations are typically viewed.

Bound by History

Mexico's connection to the Bay Area began in 1769, when Franciscan priests led by Father Junipero Serra founded the Mission San Diego de Alcalá in what is now San Diego. It was the first of chain of 21 Franciscan missions and their surrounding settlements that ultimately extended in Northern California to Monterey, San Juan Bautista, Santa Clara, San Francisco, San Rafael, and the furthest north outpost of Spanish settlement, Sonoma (in 1823). The route they followed was known as El Camino Real, the King's Road, now traced by California's Highway 1.

The missionaries' arrival in the Bay Area was preceded by a northward expedition led by Captain Gaspar de Portolá, which in October 1769 reached Monterey Bay. On November 1, an advance party led by Sergeant José Ortega first saw San Francisco Bay, which he described as large enough to accommodate all the navies of Spain, before returning south. Several years later, on August 5, 1775, the Spanish ship San Carlos discovered the mouth of the Bay and became the first ship to pass through what is now the Golden Gate. Ten months later, in June 1776, an overland party led by Captain Juan Bautista de Anza moved up the coast to establish the first permanent Spanish settlement, camping on the Peninsula where Stanford is located today and at San Francisco's Mountain Lake, before founding the Presidio and Mission San Francisco de Asís near the shores of the Bay.

When Mexico gained independence from Spain in 1821, California became Mexican. From the village of Yerba Buena, more than 600 large land grant ranchos spread throughout the region as far north as Petaluma, becoming the center of the economy and of civic and social life. But change was on its way as Americans—mountain men, traders, and eventually immigrants—filtered in by land and sea. Most who came set down roots, intermarrying and mixing freely and with Californios. Distant from Mexico City, Californios were already negotiating with the United States for a peaceful annexation when during the US-Mexican War in 1846 the California Republic was

declared in Sonoma (the Bear Flag Revolt). US marines under the command of Commodore John Sloat raised the US flag in Monterey on July 7 and in San Francisco five days later, bringing an end to Mexican rule and leading to the United States annexation of Alta California (the part of Mexican territory north of Baja California) together with other Mexican territories north of the Rio Grande in February 1848.

Even under the United States, the bayside settlement of Yerba Buena remained a quiet backwater and the inland ranchos were the heart of a mixed and decidedly rural Northern California society. All that changed again with the discovery of gold in the Sierra foothills in 1849, which led to the influx of large numbers of migrants from the United States but also from Europe, Australia, and China, which placed Californios in a minority. From that point, San Francisco became an instant global city and the rough but cosmopolitan center of America's West Coast.[1]

Since then, the Bay Area and California have received several waves of immigration from Mexico, starting with miners from the Bajío region (an important mining area) who came for the Gold Rush. Others came during the Mexican Revolution and were followed by agricultural workers arriving between 1942 and 1964 under the 22-year Bracero program, the largest contract labor program in US history. That initiative facilitated the entry to the United States of guest workers who primarily worked in agriculture; their presence during World War II enabled more Americans to work in defense industries or serve in the military.[2] Agricultural workers from Mexico remain an important part of the Mexican demographic in Northern California, with approximately 40,000 working in Napa, Sonoma and Solano counties alone; of those, approximately 9,000 work on H-2A (temporary agricultural workers) visas, with the balance being undocumented or US citizens.[3] Agricultural workers from Mexico are particularly important for the region's wine industry. Later waves of immigrants have included Mixtecs and Mayans in the 1990s and 2000s and, most recently, technology workers, artists, and entrepreneurs.

A Rich Tapestry

Even with so much change, Mexico's stamp on the Bay Area is indelible—reflected in deep cultural roots, government and university ties, and a large and dynamic Mexican and Mexican American population. Increasingly, technology and innovation is part of the discussion.

Mexico's Government Presence

Reflecting Northern California's importance to the US-Mexico relationship, Mexico's governmental presence is anchored by three Consulates General: in San Francisco, San Jose, and Sacramento.[4] **Mexico's Consulate General in San Francisco**, established more than 170 years ago, has under its jurisdiction a large region in the Western United States that includes Alameda, Contra Costa, Del Norte, Humboldt, Lake, Marin, Mendocino, Napa, San Francisco, San Mateo, Solano, Sonoma, and Trinity counties in California, as well as the state of Hawaii, and the career consulates of Oregon and Washington.[5] **Mexico's Consulate General in San Jose** covers territory to the south: Santa Clara, San Benito, Santa Cruz, and Monterey counties. The **Consulate General in Sacramento**, the only foreign mission in the city, represents Mexico in the state's capitol. Much of its work focuses on communication and coordination with the state's legislature and executive agencies. Within its jurisdiction, the counties of Sacramento, San Joaquin, and Stanislaus together are home to 750,000 Mexicans.

As a group, the three offices work to protect Mexicans within their jurisdictions, expand relations and exchanges between Mexico and California businesses and organizations, offer programs that support communities of Mexican origin, issue documentation for Mexicans and US citizens, and provide economic, tourist, and cultural promotion.[6] More recently, they are also working to support linkages between the Bay Area, Northern California, and Mexico's innovation systems.

Sister City Relationships

Many cities across California are linked to counterparts in Mexico, providing civic connections and a cultural and

educational bridge. The Sister Cities International 2019 membership directory[7] lists 13 Bay Area and Northern California cities with Mexico sister city partnerships:

Benicia	⟷	Tula (Hidalgo)
Hayward	⟷	San Felipe (Baja California)
Modesto	⟷	Aguascalientes
Morgan Hill	⟷	San Martin de Hidalgo & Ameco (Jalisco),
Palo Alto	⟷	Oaxaca
Redwood City	⟷	Cuidad Guzmán (Jalisco) & Colima
Sacramento	⟷	Mexicali (Baja California)
San Jose	⟷	Guadalajara (Jalisco) & Veracruz
San Pablo	⟷	Manzanillo (Colima)
Sonoma	⟷	Pátzcuaro Michoacán)
South San Francisco	⟷	Atotonilco El Alto (Jalisco)
Stockton	⟷	Empalme (Sonora)
Watsonville	⟷	Jocotepec (Jalisco) & Tangancícuaro (Michoacán)

Education and University Relationships

For many years, education has been an important connection between the Bay Area and Mexico. Francisco Madero studied at Berkeley in 1892–93 before becoming president of Mexico,[8] and Nobel Prize winning poet Octavio Paz studied at UC Berkeley in 1943 while working for the Mexican Consulate in San Francisco.[9] Institutional ties today remain strong, cemented by a range of campus and state-level initiatives.

Broad-Based Educational Initiatives

The **U.S. Mexico Bilateral Forum on Higher Education, Innovation, and Research**, a national initiative sponsored by the US Department of State, promotes increased intellectual exchange between Mexico and the United States. Key stakeholders are brought together across government, the private sector, higher education, and civil society to promote educational and research cooperation and to widen access to quality post-secondary education, particularly in STEM fields.[10]

The **100,00 Strong in the Americas** initiative is another public-private collaboration between the US Department of State, US Embassies, Partners of the Americas, NAFSA: Association of International Educators, corporations, and foundations.[11] Launched in 2011, it works to promote increased flows of students from the United States to Mexico (and other Latin American and Caribbean countries) and from Mexico to the United States.[12]

Also operating at the national level is the **National Association for Chicana and Chicano Studies (NACCS)**, which is based in San Jose. NACCS coordinates academic programs focusing on the study of Latina/o, Chicana/o, and Mexican Americans. It does not attempt to serve as a bridge with Mexico but instead supports achievement by Chicana/o scholars and promotes a deeper understanding of the Chicana/o presence in the United States. In addition to providing scholarships for promising Chicana/o students, it has developed a directory that catalogs Chicana/o and Mexican studies programs that are active on college campuses in the US and offer scholarships for promising Chicana/o students.[13]

At the state level, California's Department of Education hosts the **Exchange Visitor Program for Teachers**. This program enables visiting teachers from other countries, including Mexico, to work in California school districts and charter schools for a maximum of three years, after which they are expected to return to their home countries to share their experiences. Applicants to the program are heavily screened to assure that they meet California teacher credentialing requirements and have bilingual proficiency. Goals of the program include the strengthening of cross-cultural activities and of cultural education in communities.[14]

The California Department of Education has a strong connection to Mexico through the **Binational Migrant Education Program**, which is a collaboration with the

secretary of public education of Mexico to support migrant students who travel between the two countries, teachers who participate in the exchange visitor program, and teachers who participate in the Binational Migrant Education Summer Session. The summer program involves participation from Mexico's secretary of foreign relations, the public education secretaries of Mexico's states, Mexico's consulates, and California's State Migrant Education Offices. The summer program allows teachers from Mexico to spend six to eight weeks in a California school district[15] sharing culture and teaching strategies to support educational continuity for binational students.[16]

University of California Research and Exchange Programs

Mexico is home to the largest community of University of California alumni in the world,[17] and multiple UC campuses host programs with Mexican partners, many with research priorities in education, energy, the environment, health, and the arts and culture. [18]

- The **Center for Latin American Studies** at UC Berkeley works to create a community of Latin Americanist students, scholars, and practitioners to develop policy solutions relevant to Latin America and to improve the understanding of Latin American cultures and politics in the US through research and related activities.[19] The Center's U.S.-Mexico Futures Forum, begun in 2002 in cooperation with the international studies department at the Instituto Tecnológico Autónomo de México,[20] continues to offer events bringing together social, intellectual, and political leaders from both countries to explore issues of mutual concern and seek innovative new approaches to improving binational cooperation.[21]
- The **Latinx Research Center**, also at UC Berkeley, is a faculty-led research hub that works to illuminate the ongoing contributions of California's largest and most rapidly growing minority population and to support equity, inclusion, and justice for the greater Latinx community.[22]
- The **Research Center for the Americas** at UC Santa Cruz, the first center in the University of California system to advance a broad program of interdisciplinary research on Latino and Latin American studies, links UC faculty members and both graduate and undergraduate students along with Mexican institutions and scholars to advance cross-disciplinary perspectives linking the Americas.[23]
- The **Chicano Studies Institute** at UC Santa Barbara facilitates interdisciplinary and field-specific research by scholars and students on cultural and social justice issues relating to the US Latina/o and Latin American communities.[24]
- The **Latin American Institute** at UCLA supports research and disseminates recent scholarship through various outlets in order to deepen understanding of Latin America. Its **Center for Mexican Studies** supports graduate level and faculty research related to Mexico, exchanges with Mexican universities, and events at UCLA relating to Mexico.[25]
- The **Latin American Studies Center** at UC Irvine brings together faculty and students to promote collaboration in the study of Latin America, and to engage communities of Latin American ancestry in Orange County.[26]
- The **Center for U.S.-Mexican Studies** at UC San Diego operates out of UCSD's School of Global Policy and Strategy and focuses on policy research. Recent topics include security, cross border relations, public health, asylum processing, migration, and education. The Center regularly hosts fellows and holds events related to its research areas.[27]
- UCSD also operates the **Mexican Migration Field Research Program**, a year-long program for both undergraduate and graduate students that enables them to conduct community-based research on issues related to migration between the US and Mexico. Participants collaborate as part of an interdisciplinary, multinational research team, gaining hands-on research training and fieldwork experiences in both Mexico and the US.[28]

In other programs, **UC Merced** has an inter-institutional agreement with the Universidad Autónoma de Baja California for faculty research activities, and an emerging cooperative relationship with Cumbres de Monterrey National Park and the City of Monterrey to advise on the development of a university-park relationship there similar to one now in place between UC Merced and Yosemite

National Park. The campus has hosted representatives of Cumbres de Monterrey and has sent representatives to Monterrey to deepen the relationship.[29]

Systemwide, **UCEAP**, the University of California's overseas education program, offers a summer program on contemporary Mexico in Mexico City, a field research program covering six Mexican states in the fall, a summer Global Health in Mexico program in Puerto Escondido, a Leadership in Social Justice and Public Policy program which runs in the fall in Mexico City and in the spring in Sacramento, and a year-long study program at Universidad Nacional Autónoma de México (UNAM).[30]

In 2005, UC opened the **Casa de Universidad de California en México** (or **Casa de California**), a mini campus for the UC system located in Mexico City.[31] The campus supports activities similar to the California-based centers and institutes listed above and helps to develop new programs and partnerships among its stakeholders. Casa de California also serves as the headquarters for UCEAP students coming from California to study in Mexico, including participants in the year-long program at UNAM.[32]

In 2019, several initiatives sponsored over the years through the University of California Office of the President (UCOP)—the Casa de California, the UC-Mexico Initiative, and the UC Institute for Mexico and the United States (UC MEXUS)—were integrated into **Alianza UCMX** (Alianza University of California-Mexico).[33] Its objective is to create synergy between these initiatives as well as UC's wider portfolio of Mexico programs, mobilizing research and supporting its application. Key partners in Mexico include CONACYT (Mexico's science and technology council), UNAM, Instituto Politécnico Nacional, Tecnológico de Monterrey, Universidad de Guadalajara, and Instituto Nacional de Salud Pública (the national public health institute), among many others.[34]

Launched in 2016 and now absorbed into Alianza UCMX, the UC-Mexico Initiative supported bilateral research in areas of priority such as energy, climate, education, and health, led by joint working groups. Broadly, it aimed to address issues of shared interest among educational institutions in both countries, while generating future leaders. It also worked to connect new and existing Mexico programs across the university's ten campuses.[35]

The **UC Institute for Mexico and the United States** (**UC MEXUS**) program, a 4-decade systemwide initiative that is also now part of Alianza UCMX and is hosted at UC Riverside, supports binational research with grants.[36] That support has extended to more than 850 research projects engaging 500 doctoral students and 350 post-doctoral researchers. It particularly aims to build synergy around the implementation and execution of Mexico-United States projects in the UC system, including cross-campus collaborations, and serves as a point of reference for all UC programs relating to Mexico.[37]

California State University (CSU) Research and Exchange Programs

The California State University (CSU) system has partnerships with the Tecnológico de Monterey campuses in Querétaro and Mexico City that enable US students to study Spanish and take classes in subjects such as Mexican culture, business, social sciences, and humanities. Engineering was recently added as an option. Also added in 2017 is a partnership with Tecnológico de Monterrey's Querétaro campus for a summer program in animation and video mapping.

In addition to sending students from California to Mexico, CSU participates in Proyecta 100,000 (the Mexican sister program to 100,000 Strong in the Americas), hosting Mexican students at 14 CSU campuses.[38]

Individual campuses host programs of their own. At San Jose State, for example, the Chicano Resource Center provides a single focus for materials pertaining to Mexican-American history, culture, and community, connecting the **Chicana & Chicano Studies Department** (formerly called the Mexican-American Studies Department), the College of Social Work, bilingual programming in the College of Education, and the university library.[39]

Stanford Programs

Stanford also has programs that deepen connections to and understanding of Mexico. The **Center for Latin American Studies** (**CLAS**) offers a Latin American studies minor for undergraduate students, as well as support for research and teaching on Latin America in all fields of study.[40] An M.A. in Latin American Studies is also offered, which can be pursued by Stanford

undergraduates concurrently for a coterminal degree or as an independent degree post-graduation. Beyond hosting majors, the Center for Latin American Studies promotes research and events to deepen understanding of and cooperation between Mexico and the US.

The **Freeman Spogli Institute for International Studies** is home to a Mexico Initiative that focuses on the study of contemporary Mexico and develops opportunities for education and research in Mexico. The Initiative is supported through partnerships with other centers at Stanford including the Center for Latin American Studies, the Bill Lane Center for the American West, and the Institute for Economic Policy Research.[41]

Stanford's **Graduate School of Business** (GSB) has offered a "Go-to-Market" program in Mexico City, designed to help entrepreneurs with validated business ideas develop a successful go-to-market strategy using Silicon Valley methods.[42] The school has particularly strong historical ties with Mexico-based CEMEX. Former chairman and CEO Lorenzo Zambrano was a 1968 MBA graduate, and under his leadership in the early 2000s, CEMEX funded advanced degree scholarships for its employees and subsidized mangers to participate in intensive, high-level short courses in a customized year-long program. That program included two weeks of executive education at Stanford, followed by online course-based projects, two weeks in France at INSEAD, and two weeks at Tecnológico de Monterrey where participants presented plans they developed for CEMEX projects.[43] On campus, the GSB is home to the 587 seat CEMEX Auditorium.[44]

Another key connection comes through energy. Stanford's **California Global Energy, Water and Infrastructure Innovation Initiative** (CGEWI^3) began as a collaboration between the university's Precourt Institute for Energy and Bill Lane Center for the American West.[45] The program comprises research, teaching and engagement activities to study the implementation of integrated, problem-solving approaches to address the challenge of climate change in North America. At the academic level, it first established a research collaboration with Tecnológico de Monterrey's Latin American and Caribbean Water Center and with El Colegio de la Frontera Norte in Tijuana, Baja California to work on water-energy-food nexus issues in the border regions. The initiative also co-sponsored, in partnership with the California Energy Commission, the California-Mexico Cleantech Trade Mission 2015, bringing California business, government, and civil society leaders to Mexico City and Monterrey in 2015 to enhance investment and cooperation in clean energy and climate action between Mexico and California.[46]

In September 2015, the program hosted the fourth meeting of the Mexico-United States Entrepreneurship and Innovation Council (MUSEIC)[47] in partnership with the US Department of State and the Mexican secretariats of foreign affairs and the economy. MUSEIC was created as part of the High Economic Dialogue between the presidents of the United States and Mexico.

CGEWI^3 has also supported innovation in the decarbonization transition path. In partnership with IMP (the Mexican petroleum institute) and the Mexican secretariat of the economy, it held an international workshop in 2018 on Sustainability in the Hydrocarbon Value Chain in Mexico. With the participation of top experts from around the world and from Mexico, scholars from Stanford's Precourt Institute for Energy assisted Mexico in identifying the basic research needed for Mexico and the North American region to support a decarbonization of the sector through clean innovation, resource efficiency, carbon capture utilization and sequestration (CCUS), efficient use of water, digitalization, and innovation support for new industries such as electric mobility.[48] In 2018, Stanford signed an MOU of collaboration with INEEL (Mexico's national electricity and energy institute) to work on joint CCUS research.

Also under the CGEWI^3 initiative, the **Mexico Clean Economy 2050** (MCE2050) project was created in April 2017 at the invitation of the United States Agency for International Development (USAID) as a Global Development Alliance cooperative project, with clean energy workshops in Tijuana and Monterrey a major focus. In May of 2020, USAID concluded its involvement and the program has continued with the support of the Stanford's Precourt Institute for Energy. MCE2050 incorporates Mexican and international business, academic, and civil society partners to support Mexico's greenhouse gas emissions reduction goals and international commitments through regional economic

development strategies ranging from decarbonization efforts to clean energy innovation. It serves as a neutral convener of key stakeholders, advancing novel, research-driven technological, business, policy, and social solutions to energy and environment problems. In May 2020, MCE2050 developed an MOU on energy, smarter communities, sustainable mobility, and clean innovation cooperation with Tecnológico de Monterrey's school of engineering and sciences.

MCE2050 has focused in two areas. In the first, it convenes stakeholders and facilitates expert exchanges on national climate policy and emissions trading systems. The program supported the launch of Mexico's pilot carbon market with SEMARNAT (the federal secretariat of the environment and natural resources) through a policy dialogue between government and industry leaders and sharing the California experience with federal authorities and senior Mexican business and finance leaders. An important part of expert exchange workshops has been bringing representatives from the California Air Resources Board to share California's experience.

MCE2050 also organized a multi-sectoral workshop to foster better understanding of climate policy novel financing strategies using emissions reductions from the land use sector—which are known as natural climate solutions (NCS)—and their potential as climate investments for Mexico.[49] As a result of this convening, a pilot project between a major global energy company, USAID, local and international environmental organizations, and carbon offset registries is being developed to create new environmental products for possible integration into the national and global carbon market. Its implementation will require investment in the necessary local capacities and developing community partnership models.[50]

Civic Initiatives

Non-profit civic organizations also support programs to strengthen the relationship between Northern California and Mexico. In the Sacramento area, for example, **Cien Amigos** promotes cooperation and strengthens individual and institutional ties between Mexico and California. Drawing a membership of both business and community leaders, its activity focuses on scholarships for Latino communities, empowering Latina leaders, and identifying opportunities to increase collaboration benefitting both California and Mexico.[51]

Annually for the last ten years, Cien Amigos, with Mexico's Consulate General in Sacramento, the California Student Aid Commission, the Mexican Cultural Center of Northern California, and other partners has organized **Steps to College**, Northern California's largest bilingual and binational university fair.[52] Held every February and designed to help Hispanic students navigate the college entrance process and connect to financial resources, 60 universities in California and Mexico and more than 2,000 students participate.[53]

Community Organizations

It would be hard to overstate or list the full range of Mexican-oriented community, social, and cultural organizations in the Bay Area. Their focus is wide-ranging, with some addressing community welfare and development, others engaged in legal or political activity, and others focused on arts and culture. While many are domestic and don't link the Bay Area with Mexico directly, all contribute to Mexico's imprint on the region.

According to 2019 and 2020 estimates, 39% percent of California's nearly 40 million residents identify as Latino, 27% of those (or about 10.6 million) are foreign born, and of those immigrants, about 3.9 million were born in Mexico.[54] Many community organizations have been established in California and the Bay Area to support and integrate this population. Of the 397 Mexican American organizations in the United States listed by Xcano Media's Mexican American News (mexican-american.org), 136 are in California, with 37 of those (more than a quarter) in the Bay Area and another 17 in the Northern California cities of Sacramento, Fresno, Modesto, and Santa Cruz.[55] Noteworthy examples include the **La Luz Center** in Sonoma, **Puertas Abiertas** in Napa, the **Hispanic Community Affairs Council** in Alameda County, and **La Casa de las Madres** and **La Raza Centro Legal** in San Francisco.[56] Through these and other support programs such as the **Chicana Latina Foundation** in Burlingame, the **National Compadres Network**, and the **American GI Forum** (which supports Latino veterans) in San Jose,[57] Latino communities are empowered to become stronger economic participants and contributors in the region.

Deep Cultural Ties

Arts and culture are an important part of the fabric that links the Bay Area with Mexico. This spans both traditional museums and popular culture and includes an array of artists such as Carlos Santana, who was born in Mexico, attended San Francisco's Mission High School,[58] and is a major musical influence nationally, and Esteban Hernandez, principal dancer in the San Francisco Ballet since 2019.[59]

In San Francisco's Mission District, for example, the exhibitions of **Mission Cultural Center for Latino Arts** present representative samples of contemporary and ancient artistic traditions from Latin America, while its events and workshops support local artists.[60] Also in the Mission, the **Galería de la Raza** describes itself as "an interdisciplinary space for art, thought, and activism." The Galería supports a variety of art forms including exhibitions, multimedia presentations, performances, spoken word, screenings, and computer-generated murals, while providing educational activities to the community and serving as a center for activism around issues confronting Latino peoples.[61] The **Brava Theater Center**, on 24th Street in the Mission, hosts artists-in-residence and presents music, theater, dance, and visual arts programs, particularly cultivating opportunities for women and people of color. Annual events include Baile en la Calle dances and the San Francisco Son Jarocho Festival, which for the last eight years has brought performers of traditional dance and music from Veracruz. Annually, more than 220 artists, teachers, technicians and administrators participate in its programs.[62]

On a broader level, **Calle 24** is a place-based, community-defined Latino Cultural District recognizing and displaying the vibrant culture that Mexican and Latino communities bring to California and giving Latino communities an opportunity to connect with their heritage. The district is centered on 24th Street in San Francisco's Mission neighborhood, showcasing its businesses, food, events, arts, and music. It also works to preserve the Mission's unique character by advocating on urban development issues such as building height limits and design guidelines and affordable housing, and through training and support for small Latino-led businesses and fostering community events and the preservation of cultural assets.[63]

Now in its fourth decade, **Carnaval** is a landmark parade and cultural event held in the Mission over two days each May, which in recent years has evolved into a year-round program of activities including dance classes and competitions. As many as 33 different dance forms from the Caribbean and Latin America, including Brazilian dance and ballet folklorico are featured, with more than 3,000 performers and approximately 75 organizations participating in the Carnaval parade and approximately 500,000 spectators. Noted performers from Mexico, such as Los Tigres del Norte, often perform.[64]

In the East Bay, **Los Cenzontles Cultural Arts Academy**, based in San Pablo, anchors the community in traditional arts and culture. As a music academy, it produces original music videos and education tools, instructing hundreds of young people (more than 200 weekly) in traditional Mexican music, dance, and arts. It also works to instill pride in Mexico's rich cultural tradition and inspire future leaders from a young age, helping to bring traditional Mexican music to a new generation. In doing so, the Academy has become a California and national leader in the Mexican roots music revival. The band led by the center's founders, Los Cenzontles ("Mockingbirds" in Nahuatl), performs with students and with acclaimed artists with Mexican roots such as Linda Ronstadt and David Hidalgo of Los Lobos.[65]

In San Jose, the **Mexican Heritage Plaza** is a gathering place for Mexican arts and culture in predominantly Latino East San Jose.[66]

In Sacramento, the **Mexican Cultural Center of Northern California** shares and preserves the region's Mexican cultural heritage. Established in 1992 by leaders in the Hispanic community, the Center was initially supported by Mexico's consulate in Sacramento to strengthen Mexican cultural activity in the Northern California counties within its service territory. Artistic and cultural education programs are presented in community venues such as schools, art galleries, and auditoriums; activities over the years have included exhibits showcasing local and Mexican artists at the Festival de la Familia at the California State Fair, El Grito de Dolores and Día de los Muertos celebrations, and indoor and outdoor concerts.[67]

Major institutions also visibly connect to San Francisco's Mexican heritage and demographics, including the

San Francisco Symphony, which conducts an annual Day of the Dead celebration that in addition to the performance includes pre-concert live music, guided activities, and art installations in the Davies Symphony Hall lobby.[68]

San Francisco's leading museums provide a strong anchor for Mexican art through both permanent collections and rotating exhibits. The Arts of the Americas collection of the **de Young Museum** displays important artifacts from Mexico's ancient history, including mural fragments from Teotihuacán and ceramic vessels from West Mexico.[69] A major 2020 exhibit, *Frida Kahlo: Appearances can be Deceiving* featured personal items, photographs, and paintings by Frida Kahlo, the famed Mexican artist and wife of Diego Rivera.[70]

Installation view from *Frida Kahlo: Appearances Can Be Deceiving,* de Young, San Francisco 2020. Photograph by Randy Dodson. Image courtesy of the Fine Arts Museums of San Francisco.

Rivera, Mexico's leading muralist, and Kahlo were connected to San Francisco. When she was newly married to Rivera, Kahlo's first visit to the city—from the fall of 1930 to the spring of 1931—was formative in the development of her career as an artist; it was in San Francisco that she began to publicly fashion her trademark indigenous Mexican identity as seen in traditional clothing that she often wore; her first self-portrait in Tehuana dress was painted in San Francisco. The couple resided at 716 Montgomery Street amid an avant-garde community that brought them into contact with photographers such as Edward Weston, Peter Juley, and Ansel Adams, who captured Kahlo in portraits.

She returned to the city with Rivera in 1940, where after an earlier divorce the two were remarried in San Francisco's City Hall.[71] During his 1930–1931 stay, Rivera painted the mural *Allegory of California* in the Pacific Stock Exchange's Luncheon Club (now the City Club of San Francisco). His 1940 stay produced another mural entitled *The Marriage of the Artistic Expression of the North and of the South on This Continent*, more commonly known as *Pan American Unity*, for the Golden Gate International Exposition on Treasure Island. That mural was painted on ten steel-framed cement panels and after the exposition was moved to the campus of City College of San Francisco,[72] which is also home to a massive carved Olmec head donated to City College by the then-governor of Veracruz in 2004 and which now sits in the college's Frida Kahlo Garden. A third major Rivera mural, *The Making of a Fresco Showing the Building of a City*, occupies a central gallery wall at the San Francisco Art Institute. Rivera's work in San Francisco inspired other muralists of the era who produced often seen works at the Beach Chalet and Coit Tower.

Conservator Ria German-Carter working on Diego Rivera's *The Marriage of the Artistic Expression of the North and of the South on This Continent*, also known as *Pan American Unity*, 1940 (detail); courtesy City College of San Francisco; photo: Katherine Du Tiel.

The permanent collection of the **Mexican Museum** in San Francisco includes more than 16,000 objects spanning the history of Mexico and its cultures, from pre-Hispanic ancient cultures to the Spanish colonial period and contemporary art from Mexico, the US, and Latin America. Founded in 1975 and housed at Fort Mason since 1982, in 2021 the museum will move to a greatly expanded new facility adjacent to the Museum

of Modern Art and the Contemporary Jewish Museum in San Francisco's Yerba Buena Gardens arts district.[73]

A Growing Business Bridge

The economic ties linking Mexico with the San Francisco Bay Area are multifaceted. Business ties are supported by a range of organizations such as the **Hispanic Chamber of Commerce of Silicon Valley**, and in San Francisco by the public-private initiative **LatinSF**. Business ties are growing through two-way trade and investment, and a small but growing bridge of Mexican startups that are leveraging Silicon Valley resources to expand globally. Food is a connection, where on top of innovative cuisine (award-winning Mexico City restaurant Cala has a San Francisco presence close to the Civic Center), Driscoll's—a Watsonville producer of berries widely found in Bay Area supermarkets—grows some of its crop in Baja California, Jalisco, and Michoacán and imports it in winter and early spring when there is not enough California production to meet demand. Monterrey's Gruma Corporation—the world's largest producer of tortillas—has a large production facility in the Bay Area, selling under the popular Mission Foods brand.

Business and tourist flows are supported by airlines Aeroméxico, Alaska Airlines, and United Airlines (from SFO) and Volaris (from Oakland) serving Mexico City, Los Cabos, Puerto Vallarta, Guadalajara, Cancún, León, Morelia, and Mérida.

Spotlight
Mexican American Vintner's Association

Wine growing in Northern California dates back to the time of the Spanish missions and has been periodically infused with new investment and leadership from around the world. In the late 1800s Italian, French, and German wine estates opened, leading to many of the iconic wineries found today in Napa and Sonoma. The latest community to put its mark on the industry is from Mexico, represented by the Mexican American Vintner's Association (MAVA).

The idea for an association of Mexican American wine producers began in May 2010 during an informal meeting of vintners gathered in the courtyard of a colonial era hotel in Mexico. The vintners from Napa and Sonoma were in Morelia to pour their wines at the Michoacán State Fair at the invitation of the state's governor. Over several days they developed a bond and also saw the interest in wine being produced by Mexican American vintners. That led to the idea of forming an association to build on their shared heritage to leverage opportunities in both Mexico and the United States. They also agreed that such an association would have an obligation to highlight the contributions to the wine industry made by generations of farmworkers. The Mexican American Vintners Association was formed shortly after their return to California.

MAVA today includes 16 members in Sonoma and Napa Valley: Aldina Vineyards, Ceja Vineyards, Delgadillo Cellars, Encantato Vineyards, Herencia del Valle, Honrama Cellars, Justicia Wines, Llamas Family Wines, Maldonado Family Vineyards, Bazán Cellars, Mi Sueño Winery, Rancho Uva Blanka Family Wines, Rios Wine Company, Robledo Family Winery, Scalon Cellars, and Tres Perlas.[74] Other Mexican family-owned wineries in the region include Alex Sotelo Cellars, Keller Estate, and Enriquez Estate Wines.

Each comes with a family story. Three wineries are representative for their unique presence and binational roots in both the Bay Area and Mexico.

The **Ceja Vineyards** story starts with Felipe Morán, a manager at Robert Mondavi Winery's To Kalon vineyard, who after receiving his green card brought his family from Jalisco to Rutherford in 1967. His daughter Amelia, who initially spoke no English, worked alongside her father in the vineyards after school, eventually attending UCSD. She and her future husband Pedro Ceja met picking grapes in

the To Kalon vineyard and after marrying in 1980 pooled the family's funds to purchase 15 acres in the Carneros region of Sonoma and start their own winery. The first vines were planted in 1986, and the first harvest followed two years later, marked by a family feast. Today the vineyard is still a family affair: Pedro, an engineer at a scientific research company, works weekends, his brother Armando is vineyard manager and winemaker, daughter Dalia is director of sales and marketing, son Ariel is a consultant to the winery on branding and operations, son Navek oversees the tasting room, and Amelia is the president.

On a mission to promote the connection between wine and Mexican food, Amelia credits the Mexican Americans tending the vines for Ceja's success: "In the Napa Valley, there would not be a wine industry without the Mexican labor force. Vineyard workers are unsung heroes, and highly skilled laborers." Diversity is a theme. "There is little diversity in the wine industry," she notes, "but 97% of the people working in production are Mexican. The children of these workers know grapes better than anyone else." The winery's Mexican roots carry into demonstrations of Mexican cooking livestreamed with daughter Dalia from the family kitchen.

Ninety percent of Ceja's harvest is sold to other vintners, with the 7,500 cases produced under its own label sold directly to consumers. Making wine more accessible to a wider community, including people of color, is a goal of Ceja's pending expansion. Plans for 2021 include a new mission-inspired complex in Carneros that will include a demonstration kitchen and enable the winery to triple production to 25,000 cases.[75]

Robledo Family Winery is another Mexican American success story. With a long history of farming in Mexico, Luis Robledo and his sons came to California in 1942 as agricultural guest workers under the Bracero program. Many Americans were fighting in World War II at the time, and large numbers of Mexican farm workers were imported under the program to support agriculture and help bring in the crops. The Robledos lived in a work camp near Healdsburg, tending both vines and orchards. Lalo, the fourth son, learned to farm grapes with his father, brothers, and cousins. Reynaldo, Lalo's oldest son (and the third generation in the US) came to California from Mexico in 1968 with the goal of one day buying his own land to farm. By 1984 he and his wife Maria had saved enough from working vineyards to purchase their first property in Napa and later launch Robledo Family Winery in the Carneros region of Sonoma County, where they planted pinot noir grapes. The nine children in the family helped with the crops after school, on weekends, and on holidays.

All the children of Reynaldo and Maria have continued in the industry. Lorena Robledo, their first born, is one of the founders of Napa's Mi Sueño Winery. Renaldo, Jr. is founder of The Olive Farm, in Sonoma Valley. Everardo, the third born, is the acting President & CEO of Robledo Family Winery. Vanessa Robledo is founder of Vanessa Robledo Wine, LLC. Jenaro Robledo runs Robledo Vineyards Management and Robledo Ranches. And younger sons Luis, Francisco, Lazaro, and Adrian Emiliano help with production and sales.[76]

The Robledo family was the first Hispanic family to open a winery and tasting room in North America. Today, Robledo Family Winery produces award-winning cabernet sauvignon, cabernet franc, pinot noir, tempranillo, sauvignon blanc, riesling and chardonnay wines with names such as "Los Braceros," which honors the farmworker community and Reynaldo's heritage as an immigrant. Mexican music, food, and culture are at the center of events held throughout the year. Embodying the American dream and the rich contribution of immigrants to California's economy, Robledo wines have been served at the White House at dinners hosted by Presidents Bush and Obama. Inspired by the label of a bottle of Los Braceros given to him by the Governor of Michoacán, Mexican President Felipe Calderón personally visited the winery's tasting room in Carneros in 2008.[77]

Honrama Cellars also exemplifies the Mexican family tradition in winemaking and its growing place in the region's wine culture. Founder Juan Puentes grew up in Winters, the son of immigrants from Jalisco who worked the fields in Yolo County. After enrolling in the army he attended Heald College to study business management, then went to work for phone company SBC. When that job disappeared in a recession he turned to wine, joining efforts in 1999 with his new wife Miriam, also the daughter of immigrants who worked fields from Kern County to Napa. Miriam's father, Honorio Ramirez Mata, had come to Napa in the 1980s to work the vineyards, learned English, and dreamed of owning his own winery. Though not realized in his lifetime, the establishment of Honrama (derived from the first letters of his names) is the dream's embodiment. Juan Puentes had worked as a "cellar rat" at a custom crush facility, learned the trade, and later worked as assistant winemaker before founding Honrama with his wife. The first vintage, a cabernet sauvignon, was bottled in 2008 and released in 2010. Today, Honrama produces 1,500 cases a year and seven wines including two cabernets, a late harvest chardonnay, and a sauvignon blanc.

With wine comes culture and a unique bridge between the worlds of Napa and Mexico. Juan is also a professional charro who regularly competes in charrería, Mexico's national sport and the origin of the American rodeo. His father was a horse trainer at a hacienda in Guadalajara, and despite their living in trailers growing up, his family supported his interest in horses, as he explains it, "to keep him off the streets." Not far from the winery in Carneros, the family now owns a seven-acre ranch that is home to seven horses, a practice area, an arena, a vineyard, and 200 blue agaves, and supports a competitive charrería team, Charros Honrama. A frequent competitor, in 2018 Juan won the US national charrería championship, and in the same year his son, then age 9, won the world championship held in Querétaro in the under 12 age group—the first time an American had won a championship in Mexico's national sport on Mexican soil. Reflecting that charro heritage, horses are featured on Honrama's labels.

The winery connects to Mexico in other ways as well. In addition to a bulk wine business, the family sells used wine production equipment that is not needed by wealthy Napa wineries but is valued by wineries elsewhere. Approximately 30% of its sales are to growing wineries in Mexico, primarily in Baja California's Guadalupe Valley but in Querétaro, Guanajuato, Jalisco, Chihuahua, and Coahuila as well. Wine sales may someday follow. Puentes says, "In my heart I want to have a small winery and sell our product there, to share what we've achieved here in the US. It makes you feel really proud of who you are, where you came from, and your roots in this beautiful country, which is my country too."[78]

Foreign Direct Investment

In recent years, investment flows from the Bay Area and California to Mexico have had a growing technology focus. According to fDi Markets, investment from the state was steady over 2014–2017 but rose significantly in 2018 and dramatically in 2019. The largest category when measured by transactions was by far

- software and IT services (46), followed by
- transportation and warehousing (15),
- business services (14),
- automotive components (11),
- communications (10),
- electronic components (8),
- food and beverages (7), and
- real estate (7).

In 2020, software and IT services saw the strongest growth. Reflecting the strong technology focus of Bay Area investors, of 160 investments from California, 72 were made by Bay Area companies from

- Santa Clara County (31)
- San Francisco (27),
- Alameda County(8), and
- San Mateo County (6).

The two largest investors for both the region and the state were San Francisco-based **Cloudflare** and **Ascenty** (a subsidiary of San Francisco-based Digital Realty Trust), which together invested USD 740 million in three data centers. Other major investors include Uber, Airbnb, Nvidia, Cisco, GoPro, and Tesla.

While spread across Mexico, investment from California was concentrated in four cities: Mexico City, Tijuana, Guadalajara, and Monterrey.[79] The top ten destination cities by number of projects are

- Mexico City (42)
- Tijuana (14)
- Guadalajara (12)
- Monterrey (10)
- Mexicali (5)
- Querétaro (4)
- San Luis Río Colorado (3)
- Aguascalientes (2)
- Ciudad Juárez (2)
- Piedras Negras (2)

Investment from the Bay Area follows a similar pattern:

- Mexico City (26)
- Guadalajara (10)
- Monterrey (5)
- Tijuana (3)
- Querétaro (3)
- San Luis Río Colorado (1)
- Aguascalientes (1)
- Oaxaca (1)
- Palomas (1)
- Tepotzlán (1)

Technology Bridge

As noted in earlier sections of this report, Bay Area technology companies are expanding their presence in Mexico, often to access engineering talent. Beyond the presence of long-established companies such as **Oracle**, **HP**, and **Intel** in Guadalajara and **Plantronics** in Tijuana, new companies are tapping into Mexico's human capital resources and markets. In 2020, **Lyft** established an engineering office in Mexico City. Construction drone startup **Skycatch** has an engineering team in Guadalajara. In the consumer space, **Uber** operates in 57 Mexican cities, making Mexico one of its largest markets.[80] Consumer information website Comparitech has estimated that **Netflix** had more than 8,000,000 subscribers in Mexico in the second quarter of 2020, up from 6,783,000 in 2019.[81] In January 2021, Netflix announced that it would invest more than USD 300 million in Mexico in the coming year to produce 50 original films, a 50% increase from 2020, and would open a new office in Mexico City to serve as its Latin America headquarters.[82] Stripe launched in Mexico City in October 2019,[83] its first presence in Latin America.[84]

Startups and Venture Capital

In recent years, Silicon Valley VCs have expanded their focus beyond the Bay Area to include global economies with a strong technology and education base such as China, India, Singapore, Japan, Canada, and Europe. Until recently, Mexico has not figured prominently on that list, but interest is growing. A turning point was Softbank's entry into the Latin American market with the launch in 2019 of its USD 2 billion Innovation Fund, which it increased to USD 5 billion in 2020.[85] After that, Sequoia, Accel, Andreesen Horowitz, Foundation Capital, and other firms started coming to Mexican tech conferences and made their first investments in startups originating in Mexico. Besides investable companies, one driver was the opportunity to access lower-cost technical talent that could support their portfolio companies. Today, those companies are in the lead, along with several venture firms with Bay Area-Mexican roots or connections. Several shared their views of Mexico's investment environment for this report.

SPOTLIGHT
LEAP Global Partners

Established exclusively for cross-border investing, LEAP Global Partners focuses on Latino/a entrepreneurs and on startups in Mexico and the US that view Latin America as central to their strategy. Investors come from both Mexico and the US, and portfolio companies include startups in both countries. For Mexican investors—primarily family offices and multigenerational businesses—participation provides an opportunity to invest in US-based companies but also to bring back to Mexico technology that can help Mexican enterprises to better compete globally. Key sectors include finance, health, education, the shared economy, media, and e-commerce.

Recent investments include Wizeline and a portfolio of Bay area fintech and deep tech companies: San Francisco-based AI company Bexi, Santa Cruz-based fintech Paystand, San Jose-based mobile loan and insurance fintech Listo!, and San Francisco fintechs Aura Financial and Gusto.[86] The US and Mexico are both target markets. The portfolio also shows a pattern. The founders of Aura, Listo! and Gusto are Mexican or Latin American graduates of Stanford. All of the companies have a majority of their engineering or AI workforce in Mexico, primarily in Guadalajara. Bexi is doing product design in La Paz (Baja California).

Managing Partner Roman Leal sees technology originating in Mexico as a growing area of opportunity: "The tech scene is completely different from three years ago. Mexico has always had a talented workforce but, in contrast to Silicon Valley, didn't have experienced entrepreneurs with connections to capital. That has changed. The number of venture investors with roots at Stanford, MIT, or in Silicon Valley companies is growing. Entrepreneurs are coming out of accelerators but also from Mexico-based tech companies like Uber where they've gained experience before starting companies." Thinking about the future, Leal also sees an opportunity in Mexico's diaspora in the United States, where a large number in the first and second generations are successful and upwardly mobile. Connecting them with family offices, he believes, can open new windows for investment to Mexico.[87]

SPOTLIGHT
MITA Ventures

Launched in 2012, MITA Ventures is an early-stage fund that invests in technology companies with cross-border activity and global potential. Founding Partner Lynne Bairstow, who splits her time between Mexico City and the Bay Area, says Mexico's startup environment has matured in the last three years, with growing quality and an acceleration in the number of investable companies: "There are now more deals than I can keep track of." With that change, Silicon Valley's view of Mexico is slowly shifting.

With the explosion of smartphones and e-commerce in Mexico, amplified by the rapid digitalization propelled by COVID-19, fintech is growing rapidly and Bairstow thinks Mexico will one day be like India—a large-scale market with deep smartphone penetration that supports a widening range of digital services. Logistics, education, and healthcare, she believes, will also present opportunities for Bay Area VCs. Those connections are explored at an annual conference, MITA Tech Talks, held every year since 2012 near Puerto Vallarta, that is attended by investors, technology companies, scholars, law firms, and other players in the US-Mexico innovation system.[88]

SPOTLIGHT
B37 Ventures

Having completed a BA in economics at Universidad Anáhuac in 2005 and an MA at the University of Texas at Austin in 2009, B37 co-founder Rodrigo Sánchez started his career working in government and later in finance but decided that creating value would be more compelling than commercial arbitrage. Having been exposed to the venture industry while in Texas, he went to work for a USD 30 million venture fund in Mexico City, where he met B37's co-founder David Hite, a resident of Redwood City with experience in global markets through his role as head of Latin America for Intel. Hite had left Intel and moved to Puerto Vallarta where he launched a successful startup. Sanchez recalls, "I remember the first time I came to Silicon Valley—it was mind blowing. The kind of startups I'd seen in Mexico were interesting but weren't creating a lot of new value. In Silicon Valley, companies were doing

much more, and many were transformational. That spurred our imagination. We wanted to create access to Silicon Valley for more people so started B37."

Sánchez and Hite asked themselves if they could source new portfolio companies better than established firms like Sequoia and concluded that they couldn't. But they did believe they could play an important role by adding value in portfolio selection. They believed that the larger venture firms weren't focusing on how their portfolio companies would grow internationally, and that startups would need to be internationally competitive much earlier than in the past. At the same time, large corporations in Mexico needed access to new technologies in order to be competitive. The answer was a strategy to bridge large international companies with the technology available through startups, filling needs at both ends.

Today, B37 manages USD 50 million in assets, 65% of which come from companies outside the US, primarily from Mexican corporates. Its team works to understand their investors' long-term goals and needs and then bring technology to them. Its 18 portfolio companies and their technologies are sourced from Tier 1 VCs such as Sequoia, Khosla, Kleiner Perkins and Google Ventures, with which B37 co-invests. Portfolio companies are now in 32 countries where the firm's investor companies operate.

Reflecting on Mexico's venture industry, Sánchez observes that 6–7 years ago Mexican venture looked much like private equity: the investments were primarily in proven business models, required large positions or control, were highly concentrated, and returned 5–7X. Silicon Valley venture firms, in contrast, were investing in unproven business models at an early stage. Times have changed since then, but to successfully compete for Silicon Valley investment, startups in Mexico still need to show potential rates of return that match what's available in Silicon Valley or other major markets.[89]

SPOTLIGHT

Foundation Capital

Armed with an MBA from MIT's Sloan School of Management, Foundation partner Rodolfo Gonzales did Latin American focused work for McKinsey & Company in Mexico City before coming to the Bay Area in 2013 to join Foundation Capital. He notes that the firm has historically been US-focused, but that Foundation allows its partners to pursue fields of personal interest. Building a case for Latin America wasn't easy, as understanding of the region in Silicon Valley was very limited and there were many misconceptions. Deep interconnections between the US and Mexico, however, helped to make the case: "It's so close and there's so much commonality—our economies are literally joined at the hip. The natural evolution is that as supply chains are redefined, the destiny of both countries will be even more tightly linked." The firm's perspective on Latin America has changed as it has become more active in the region.

Foundation's investment in Latin America started in 2016 with Colombia's Rappi, a company similar to the Bay Area's DoorDash, Postmates, and Instacart, which is now valued at USD 4.5 billion. The next, in 2018, was Platzi, a Colombia-based educational company (now headquartered in San Francisco) with a major presence in Mexico, its largest market. Mexican online grocery company Jüsto followed in 2019. Other investments include Colombia's ADDI, which does point of sale financing; Delt.ai, which provides corporate credit cards for Mexican startups; and Moons, a Mexican company that produces invisible dental aligners for Latin American markets.

Reflecting on Mexico's startup environment, Gonzalez is seeing significant evolution in founding teams. Many of today's founders are graduates of top schools in the US, taking the same entrepreneurship classes and applying to the same incubators and accelerators (e.g., Y Combinator, 500 Startups) as their US peers. Relationships developed while in the US can be important as they start to build their companies: "The most successful can work in a Latin American environment but can also relate to Silicon Valley. To a degree, they are self-made but also draw on family ties, connections in the local business community, and their international experience. The fact that they have done well academically and start with some wealth enables them to build networks."

This means that the stereotypical model of a seventeen-year-old who drops out of school to start a company is less common than that of a founder

who is in their early 30s, has connections and years of work experience at international organizations and companies, and knows how to get things done: "If you got into the best schools, have networks in Silicon Valley and also internal drive, you can compete anywhere and that's something investors are looking for." Gonzales notes that "another group of founders is coming out of Mexico's best schools and while they may not have the same international exposure, they are motivated, hard-working, have consumed a lot of the same startup school content, and have a similar entrepreneurial mindset. Local venture funds particularly work with them. Now in Latin America you're also starting to find founders who were early employees at other successful startups and are getting investment from other founders. Founders who are part of these 'mafias' have already gone through the experience of hypergrowth and scaling and are applying it to build their own companies. This is all making for a thriving early-stage tech ecosystem that is deepening its connections to Silicon Valley."[90]

Spotlight

SV Latam Capital

Launched in 2014 and based in San Francisco, SV Latam Capital has a distinct approach to investing. In the early 2000s, founder Consuelo Valverde had launched the state office of innovation, science, and technology in Morelos, where she saw that many of the best scientific minds in Mexico were at institutions associated with life sciences, but no life sciences companies were being created. That led to a personal mission to support science-based startups through venture investment. At the same time, INADEM (the national entrepreneurship institute) was stepping up to support the creation of a venture industry in Mexico. Its investment project,[91] NAFIN–FCE (the national development bank entrepreneur capital trust), subsequently became the anchor investor in SV Latam's Fund I. Believing that an exclusive focus on life sciences would be too risky in Mexico's relatively immature innovation ecosystem, she broadened the firm's focus to include investment in science-and-technology-enabled companies that were developing solutions to important problems.

SV Latam Capital invests in early-stage science-and-technology-enabled companies in Latin America with a focus in three broad fields: society (financial inclusion and the future of work), healthcare (chronic disease and access to diagnostics), and the environment (food and agriculture, water, and energy efficiency). In its first fund, limited partners primarily came from pharma-based family funds in Mexico and from Mexican hospital groups, while for Fund II, which will be three times larger, investors from the US, Latin America, and Europe will participate.

The firm's Fund I portfolio included 13 companies; Fund II will include 15. Noteworthy investment recipients include Mexican mobile payments company Clip; Combinati, a biotech company that has developed a highly accurate digital PCR platform; Oyster, a Mexican fintech that provides online banking services for small businesses and freelancers; Gen1E Lifesciences, a biotech company with a platform to accelerate cures for inflammatory and age-related diseases, and Jüsto, a Mexico City-based online supermarket. Jüsto, which also received funding from Foundation Capital, has seen its online orders grow five-fold during the COVID-19 pandemic and has begun expansion to ten Mexican cities with plans to expand later to Colombia.[92] The online store opened in Querétaro in mid-2020[93] and operations in Guadalajara started in mid-2021.[94]

Several of the portfolio companies in Fund II are Latin American and several more (particularly those in biotech) are global. In the food space, Compound Foods, with a Costa Rican founder and a team split between Central America and Silicon Valley, aims to synthesize coffee in a way that replicates what Impossible Foods has done with meat.

Valverde notes that a large market is required in order to fit SV Latam Capital's investment decision framework, and while in Latin America the fintech and e-commerce markets are large enough to support the model, companies in other sectors that address only national markets are more difficult to fit. Brazil, Mexico, Chile and Argentina all have a good science base, she says, particularly in life sciences and food tech. Colombia, the second largest Spanish-speaking market in Latin America, has a booming fintech scene but is still not a large enough market by itself, so Colombian

> startups commonly look to expand to other countries in Latin America. While Mexico is a big market by itself, many Mexican companies such as Jüsto are looking South to expand and diversify their markets.[95]

Another Bay Area venture firm with a Mexican portfolio is **Brainstorm Ventures**, led by entrepreneur Eduardo Rallo (owner of several well-known Bay Area restaurants including Colibri, Zazil and El Jardín in Santana Row) and Ariel Jaduszliwer. Brainstorm focuses on seed and early-stage financings for startups in both Silicon Valley and Mexico. Rallo led Brainstorm's investment in KIO Networks and the transfer of technology to incubate KIO in Mexico City.[96]

Doing business in Latin America since 2012, **Silicon Valley Bank** (SVB) plays an increasingly active role as a financial partner for Mexican and Latin American startups and their investors. The bank has approximately 700 clients across Latin America, in Argentina, Brazil, Chile, Colombia, Uruguay, and Peru, and including more than 100 in Mexico, its fastest growing regional market. In 2019, it organized a groundbreaking delegation for Silicon Valley investors to Mexico City and Guadalajara to explore the national market. Co-organized with ALLVP, Endeavor, ID345, Wizeline, and StartupGDL, meetings were held with institutional investors, venture and corporate venture firms, and family offices, as well as startups.[97] In July 2020, SVB took a further step into the market with the establishment of a USD 30 million venture/debt vehicle, the Latin America Growth Lending Fund.[98] A partnership with Partners for Growth and IDB Invest (the 47-nation private sector arm of the Inter-American Development Bank),[99] the fund provides structured debt financing to venture-supported late-stage companies in technologies such as software, life sciences, healthcare, and fintech.[100]

Bay Area-based accelerators and startup networks also extend into Mexico.

Hackers/Founders (H/F), one of the largest international networks of tech entrepreneurs with events in over 200 cities and 350,000 participating tech entrepreneurs, has 13 chapters in cities across Mexico, its second largest market outside the United States. The first Mexican chapter was launched in Guadalajara in 2011, followed by other Hackers/Founders groups in Cancun, Hidalgo, La Paz, Los Cabos, León, Mexicali, Morelia, Monterrey, Querétaro, Sonora, Tepic, Veracruz and Xalapa.[101]

As indicated earlier in this report, in addition to investing and operating programs in Mexico, **500 Startups** maintains a presence in Mexico City that serves as its regional headquarters for Latin America. Y Combinator also plays a significant role, hosting many founders from Latin America in its cohorts; noteworthy examples include cancer diagnosis device company Delee and online education platform Platzi.[102]

Universities such as Stanford play a distinct connecting role by generating and connecting founders. Used car marketplace **Kavak**, for example, was co-founded by Loreanne Garcia, who received her MBA from Stanford's Graduate School of Business. **Via.work**, conceived at Stanford's Startup Garage by Stanford MBA graduate Maite Diez-Canado and now based in Mexico City, helps startups with professional recruiting around the world.[103]

As it does for startups from other countries, the Bay Area serves more broadly as a platform for Mexican founders who are looking to scale their companies in the US and global markets. For example, San Mateo-based **Rever**, a digitalization platform that supports productivity and efficiency in industrial companies through continual skills development for frontline workers, was founded in 2015 by Errette Dunn from Mexico and Borja Gomez and Ignacio de la Loera from Spain.[104] **Bridgefy**, which enables mobile apps to securely connect without the internet, using Bluetooth and mesh networks, was founded by Diego Garcia and Jorge Rios and is also based in San Francisco. While not a replacement for the internet, the company's technology allows users without continuous internet access or who are otherwise in emergency situations to connect via mobile apps.[105] Through companies that employ the service, more than 130 million users currently connect through Bridgefy, including protesters and democracy advocates in Hong Kong.[106]

Broad-based venture and startup connections between Mexico and the Bay Area have been fostered by **Mexico VC Day**, an annual event organized by AMEXCAP in San Francisco that brings together entrepreneurs, venture firms, private equity, and family offices, as well as advisers, financial services firms, accelerators, and government officials from both Mexico and the Valley.

Though on a small scale, funding flows not just from the Bay Area to Mexico, but also from Mexico to the Bay Area. Mexico City fintech and insurtech innovation lab **Máquina** has invested in LEAP Global Partners and in the Bay Area's **Gusto**, a Silicon Valley payroll, benefits and HR software platform for small businesses. A parallel investment by Máquina in **Worky**, a payroll and benefits platform in Mexico City, will open the door for Gusto's entry into the Mexican market.[107] In 2019, Monterrey-headquartered **CEMEX Ventures**, which invests in the construction sector, led the seed investment round for **StructionSite**, an Oakland-based provider of intelligent construction and management software.[108]

Mexico is also becoming an interesting target for acquisitions. In July 2020, **Uber** acquired a majority stake in **Cornershop**, the highly successful grocery delivery company founded in Mexico and Chile and now headquartered in Toronto. Through Cornershop, Uber has launched delivery service in 19 cities in Latin America[109] followed by Uber Grocery in 20 major metro areas in the US.[110]

Among noteworthy startups are three with Bay Area roots.

SPOTLIGHT

Platzi

San Francisco-based online edtech company Platzi has found its largest market in Mexico, with Colombia a close second. Its offerings are directed toward startups, with programs on marketing, design, coding, the digital economy, and how to start a business. The company organizes an annual Platzi Demo Day; in 2020, fifteen companies from Mexico, Colombia, Bolivia, Chile, and Peru competed for an in-depth experience in Silicon Valley. Twenty-four percent of its 1 million students (200,000 of which are paying) are in Mexico, with another 23% in Colombia, and the rest in other countries in Latin America (primarily Peru and Argentina). In Mexico, its largest markets are in Mexico City and Guadalajara. Most of Platzi's employees are based in Latin America, primarily in Mexico and Colombia.

Started as an online community for web developers (on Foros del Web) in 1997, by 2009 there were 500,000 daily users. Course offerings, primarily in Mexico were launched in 2012. In the same year, the company moved from Miami, where it had started, to New York in search of a larger tech community. Co-founder Christian Van Der Henst, who was born in Guatemala, recalls that at the time he didn't think Silicon Valley was connected to Latin America, or interested. The connection became real, however, when he moved to Mountain View after Platzi was selected to participate in Y Combinator. In 2015, the company raised a seed round through Y Combinator, and in 2017 raised Series A funding in a round led by Foundation Capital. Today, product development is led from Colombia and commercial activity from Mexico, while the office in San Francisco focuses on business development. Van Der Henst sees the next steps for the company being an expansion across all of Latin America and a deeper push with Hispanic entrepreneurs in the US.[111]

SPOTLIGHT

Wizeline

Founded by entrepreneur and Bay Area resident Bismarck Lepe, Wizeline is a software company supporting global clients from its base in Guadalajara. Fleeing poverty and corruption, Lepe's parents had migrated from Jalisco to become field workers in California, eventually settling in the Bay Area. After starting his career in Silicon Valley at Google, in 2010 Lepe and partners in Guadalajara founded Ooyala, a workflow and media solutions provider. Looking at Mexico at the time, he realized that "there were engineers in Guadalajara that were just as good as those at Google." Visiting the city for an event, he met more than sixty entrepreneurs, all involved with tech and many with experience in manufacturing, which confirmed in his mind the city's potential as a place to grow the business.[112] Eight engineers were initially hired and brought to Silicon Valley; by the time Ooyala was sold in February 2019, its headcount in Mexico had grown to more than 100.[113]

Wizeline was founded in 2014, also with an engineering team in Guadalajara, as a full lifecycle software development company offering outsourced IT services from product prototyping through integration. Leading Bay Area and US companies such as Stripe are clients. A believer in Guadalajara's potential, in the same year Lepe set up a foundation

to help attract companies to the Guadalajara region. While he knew that would create competition for talent for his company, he also believed it would attract more talent to the city and help grow its tech economy. While government programs to support tech companies and entrepreneurs were in place, he perceived that private companies also needed to see the potential, so he set out to build a brand for the city, a process that is now supported by the government, businesses, and universities working together. Wizeline now has more than 500 employees in Guadalajara and 800 worldwide; the foundation is estimated to have created more the 350 jobs.[114]

Spotlight

Nebia

Nebia was launched in Mexico City by Philip Winter and co-founder Carlos Gomez Andonaegui who, as chairman of a chain of gyms, saw that 25,000 people a day were showering in gyms in a region with a limited supply of water. Winter, who came to Mexico City in 2013 to work at the accelerator Endeavor, met Gomez Andonaegui there and started to think of ways to save water, building on the theme of innovative design and smart homes. Later, while on an Endeavor-sponsored trip to San Francisco, they visited the design firm IDEO and Stanford's Design School, which led them to conclude that "if we want to do something that will reach the world, it would be better to start in the Bay Area and then expand to Mexico City." Several factors were compelling: concentrated talent in mechanical engineering, an environment extremely welcoming to new ideas, and access to capital. After more prospecting trips, the company moved to San Francisco in 2014.

"What immediately struck me," Winter says, "was how many people would make introductions and help you connect. It's like nowhere else, and this eagerness to help enables you to move so much faster. By serendipity, he met Apple CEO Tim Cook, who became one of the company's first investors. He then met Eric Schmidt, then chairman of Google, on Stanford's campus, leading to an introduction to Schmidt's family foundation which became Nebia's second investor. Other investors include the co-founder of Airbnb, the co-founder of Fitbit, the founder of The Battery, the founder of Starwood Hotels, Moen, and others in Mexico. Nebia's third co-founder, Gabriel Parisi-Amon had worked on Apple's iPhone team and left to join the company.

A three-month residence at Y Combinator launched them on a broader path. The founders recognized the need to scale, but also the cost, and turned to Mexico City as a base with a convenient time zone, easy air access, lower costs, and a growing tech and startup scene. Today, half of Nebia's employees are in San Francisco and half in Mexico City, with plans to grow the workforce equally in both places. Both sites play similar roles—operations, product development, and marketing—with San Francisco also focusing on R&D. Currently, 75% of sales, most of them online, are in the US, Canada, and Mexico.

Manufacturing for Nebia's flagship water-efficient showerhead, which atomizes droplets, is done in the US, primarily in the Midwest, and 95% of components are US sourced.[115] In 2020, Nebia was named by *Fast Company* as one of the ten most innovative social good companies of the year.[116]

Tree of Life of Mexicans in San Francisco and the Bay Area sculpture by Fernando Escartiz entitled "México: Raíz y Fuerza" (Mexico: Roots and Strength) commissioned by the Consulate General of Mexico in San Francisco

Conclusion

Mexico's unique relationship with the San Francisco Bay Area/Silicon Valley is built on history and deep community connections. As the region's role as a global technology and innovation center has grown, the scope of the relationship has expanded from trade and investment to include R&D and an increasingly active connection through startups. High-level take-aways from this report's analysis follow. They point to strategic opportunities on both sides, as well as to systemic challenges that need to be addressed for the relationship to reach its full potential.

Binational Manufacturing: Increasing Sophistication in Mexico

Bay Area and other US companies initially opened operations in Mexico to reap the benefits of high-quality but low-cost manufacturing, a process accelerated by the North American Free Trade Agreement (NAFTA). While manufacturing remains the base and Mexico's plants have continued to grow in sophistication and efficiency, many companies have also found a large base of engineering and other talent that can be harnessed to support sales, customer support, and R&D serving the Mexican, Latin American, US, and global markets. The next challenge for manufacturers in Mexico will be to deepen the value-added content of local production by growing the role of domestic R&D. A strong base of engineering talent is already in place to support that transition, but the process across most of Mexico is still in its early stages.

Trade and Investment: Nearshoring and Leveraging the USMCA

The North American Free Trade Agreement (NAFTA), which came into effect in 1994, eliminated tariffs and qualitative restrictions on trilateral trade between Mexico, the United States, and Canada. Since then, US bilateral trade with Mexico has grown dramatically, from USD 99.2 billion in 1993 to an estimated USD 677.3 billion in 2019.[1] Mirroring trade, a surge of US investment (FDI into Mexico) was also facilitated by NAFTA.

The United States-Mexico-Canada Agreement (USMCA), which updates NAFTA, entered into force in January 2020. Changes included

- a higher requirement for North American content in vehicles,
- higher wage standards for automotive and light truck production in Mexico (which may shift some production back to the US or Canada),
- stronger worker protection in Mexico and the inclusion of environmental provisions (which in NAFTA were contained in an annex) in the core text,

- strengthened rules on patent protection for pharmaceutical biologics,
- stronger copyright protections and legal immunity for internet platforms for content posted by users,
- a provision to ensure the free cross-border flow of data,
- a prohibition of tariffs on digital products,
- provisions to help small and medium enterprises (SMEs) compete and sell across the continent, and
- changes to the dispute resolution process.

Another provision creates a Committee on Competitiveness, to enable the three governments to work together on larger issues relating to regional competitiveness and cooperation.

USMCA's approval ended a period of uncertainty in the North American market, following criticism of NAFTA by President Trump before and after the 2016 election, and ensures its continued integration. This has occurred at the same time as security, trade, and technology issues between the United States and China have increased. As one consequence of the recent US-China trade conflict, some US companies are shifting production out of China as a way to avoid the political crossfire. Concerns raised in the US regarding over-dependence on China for strategic and other goods have led to a growing interest in secure global supply chains, particularly for sensitive products. The countries considered most secure as locations for investment and production are those that are systemically aligned with the US or benefit from short supply lines.

Even with current tensions, it is unlikely that US companies will leave China on a large scale, as the depth and scale of its supplier network is difficult to replicate and companies that produce primarily for the Chinese market will remain there. Nevertheless, global supply chains have started to realign, with greater emphasis given to security and resilience. This, together with the continuity provided by USMCA, affords a key window for Mexico to attract new investment as production that is leaving or might have gone to China looks for nearshore alternatives.

As early as 2016, research by Kearney showed that more than half of US companies with manufacturing operations in Mexico had moved production there from other parts of the world including China, and Kearny's most recent near-to-far-trade ratio (NTFR)—which tracks the movement of US imports toward nearshore production in Mexico—showed a marked rise in 2019.[2] Separately, a February–March 2020 Gartner survey of 260 global supply chain leaders found that 33% had moved sourcing and manufacturing activity out of China or planned to so do in the next two to three years. Reasons included the COVID-19 pandemic, but also elevated tariffs and a desire to be closer to their customers. Only 21% believed their supplier networks were currently resilient, but 55% expected to have highly resilient networks within two to three years.[3]

If this shift continues, Mexico's primary competitors will be in Southeast Asia. While lacking the deep and sophisticated supplier networks available in China, Mexico benefits from proximity of US markets and its ability to import components freely from the United States, with binational products fluidly crossing the border at different stages of production. (Approximately 40% of the value of Mexican exports to the US is composed of US-sourced inputs.[4]) With the current geopolitical environment playing to its strengths, the ball will be in Mexico's court, at the national and local levels, to assure US companies that it can provide a competitive environment that is efficient, secure, and welcoming for investors.

Facilitating Investment in Mexico

Investors from the Bay Area will look to the quality of infrastructure, ease of doing business, a favorable tax environment, security, and labor market flexibility when making location decisions. Technology companies will particularly look to the quality of the workforce and the availability of talent to support R&D and engineering activity. This makes the role of public and private universities in education and training particularly important in economic development strategies and business attraction plans.

Direct air service between Bay airports and Mexican cities is also a consideration for venture and other investors who travel frequently to engage with partners, customers, and portfolio companies.

Sourcing Engineering and R&D Talent

Mexico offers a large and under-recognized reservoir of low-cost but high-quality engineering talent for both established and emerging companies. The opportunity this presents for both US companies and for states and cities in Mexico has been accelerated by COVID-19 and the digitally-enabled trend toward remote work. This is particularly the case for technology workers, where Mexico offers attractive options for sourcing talent as companies decentralize their operations. Visa provisions in the USMCA facilitate cross-border hiring and compare favorably with the expense and legal procedures required for H-1B visa applications for engineers from other countries.

Continued expansion of Mexico's scientific and engineering workforce will be important as states and cities work to transition their well-developed manufacturing systems toward higher value generation through a strengthened focus on R&D.

Kearney's Global Services Location Index (GSLI) ranks 60 countries based on their fit and potential to deliver IT, business process outsourcing, and voice-based business services to global companies. In the 2021 Index, Mexico ranks in the upper tier in 11th place,[5] having moved up from number 13 in 2017.[6]

Linking Mexican Startups with Silicon Valley

Mexico's state and city governments and their business community partners are working to promote deeper technology and investment ties with the Bay Area/ Silicon Valley region, while at the same time investing in the development of their own startup and innovation systems. Mexico is not alone in this ambition and, despite its advantage of proximity, is competing with similar efforts by nations, states, and cities around the world. Its success in differentiating itself will turn on its ability to communicate the unique advantages that Mexico offers technology investors and on its ability to nurture self-sustaining innovation and technology ecosystems.

In parallel to the general considerations affecting FDI, technology partners will look for a business-friendly environment and stable policies that don't change with successive governments, and for competitive assets including efficient infrastructure and pools of talent. To meet these requirements, the alignment of goals and messaging between Mexico's city governments, state governments, universities, and businesses is important.

In the Bay Area, a more sustained presence and increased visibility would benefit Mexican businesses. Startups, which often come to the region unprepared, are more likely to be successful if connected to people and resources that can guide and support them. Many other countries, often with private sector or university partners, sponsor soft-landing pads for startups coming to the area, and this is an option for Mexico as well.

Venture Investment in Mexico

Mexico's venture market is maturing, supported by innovation clusters and pockets of startups in cities and states across the country. Many of the founders of those startups have worked in the Bay Area and other US technology centers, or have attended Bay Area universities such as Stanford, and have knowledge and personal networks that connect them to the region. While large international players like Softbank are becoming active, a general shortage of venture capital beyond Series A and B means that Mexican startups need the Bay Area's investment capital to grow to scale. While Bay Area VCs often look for later-stage companies, the growing interest in Mexico by investors such as Softbank suggests that to fully benefit from the country's growth they should examine the market more deeply and consider investing earlier.

In coming years, successful exits by Mexican startups will be important, both to seeding the next generation of entrepreneurs and to attracting the attention of US and other venture investors. To lock in that attention,

Mexico will need to demonstrate that investment in its emerging companies can provide returns on investment that are comparable to the deals available in Silicon Valley and other US and international venture markets.

Expanding Geographical Scope: Latin America

While the supporting infrastructure for startups in Latin America (experienced law firms, mentors, accelerators, and investors) is still underdeveloped, the potential in Latin American markets is large. Home-grown unicorns like Brazil's online bank Nubank have demonstrated the opportunity for startups in the region to scale, with fintech the most active sector. While Latin America's economies have distinct cultural environments and legal requirements, many Mexican startups are expanding there to increase their market scale. This potentially positions them as a platform for US investors seeking a hemispheric market and for Latin American startups looking to scale in North America.

California and Mexico

There are many opportunities to strengthen cooperation between California and Mexico at the state level. In October 2019, California's Lieutenant Governor Eleni Kounalakis led a delegation to Mexico City, the first international mission of Governor Gavin Newsom's administration, that in addition to state agencies included leaders from the agriculture, energy, and clean technology sectors. The trip also marked the opening of California's Trade and Service Desk in Mexico, located at the University of California's Casa de California. In remarks delivered by Lieutenant Governor Kounalakis, it was noted that

- California is home to the largest number of people of Mexican origin in the United States;
- California and Mexico share a 145-mile border which is crossed each year by 17.7 million pedestrians, 32 million personal vehicles, and over 1.1 million commercial trucks;
- more than 600,000 Mexican visitors came to California by air in 2018;
- every day in California USD 82 million in goods cross the border to Mexico, making Mexico the state's number one export market;[7] and
- California imported USD 46.7 billion in goods from Mexico in 2019 and exported USD 28.7 billion.[8]

Three Memorandums of Understanding were signed during the trip: one between SADER (the secretariat of agriculture and rural development) and California's Department of Food and Agriculture to cooperate on sustainable agriculture, with a focus on adaptation to climate change, food safety, and agricultural workforce development;[9] one on economic cooperation between the State of California and Mexico's secretariat of the economy;[10] and a third on energy and environmental cooperation between the State of California and SEDEMA (the secretariat of the environment of Mexico City).[11]

Renewable energy and climate change are priorities for California, with potential for deeper ties to Mexico. Mexico's General Law on Climate Change, issued in 2012, established ten, twenty, and forty-year goals to address climate change that include reducing greenhouse gas emissions by 22–36% by 2030[12] and increasing the amount of electricity generated from clean sources to 50% by 2050.[13] Promising areas for intergovernmental cooperation and new business include clean energy technology, low-carbon fuels, energy efficiency, and e-mobility.

As mentioned earlier in this report, climate and renewable energy are not priorities for Mexico's current federal government, which has chosen instead to focus on fossil fuels and shoring up the roles of national energy service provider CFE and the national oil company PEMEX. Clean energy is, however, a priority for many of Mexico's states and cities. Mexico has more members in the Under2 Coalition—a group of 220 sub-national governments committed to implementing the Paris Climate Accords and to keeping the rise of global temperatures below two degrees Celsius[14]—than any other country except the US. Eighteen Mexican states plus Mexico City participate,[15] with Querétaro being one of the organization's four current chairs together with California, Scotland, and Kwazulu-Natal.[16]

As noted, one of the MOUs signed during the Lieutenant Governor's October 2019 trip was

between Mexico City's secretariat of the environment and the State of California, including the California Environmental Protection Agency and the California Energy Commission. Areas for cooperation that it identified included energy efficiency (code compliance, data collection, data laboratories); emissions monitoring, reporting, and enforcement; clean energy technology; air quality (including pollution abatement); and waste stream efficiency. Efforts that were agreed to include joint R&D between universities, scientific and technological collaboration to support business development, and joint workshops, seminars and training.[17] Though the pandemic has slowed implementation, a virtual workshop was held in October 2020 on energy efficiency codes and building standards, led on the California side by UC Berkeley.[18]

Another strong state-level channel has developed with Jalisco, which in 2016 signed an MOU with the California Energy Commission to cooperate on clean energy policies and programs, including coordinating research and sharing technology information.[19] UC Davis has been particularly active in the relationship, developing in 2018 a project with the Universidad Autónoma de Guadalajara (UAG) to establish a lighting technology center there that is similar to the California Lighting Technology Center at Davis. The building of the Centro de Tecnología de Iluminación on the UAG campus was 80% complete in January 2021 and has started operations.[20] Discussions have also taken place on city level cooperation on lighting standards.

Stanford University's Mexico Clean Economy 2050 initiative has also been working with business, government, and university counterparts in Baja California and Monterrey to support the transition to a clean energy economy, and in 2020 developed an MOU on energy cooperation with Tecnológico de Monterrey.[21]

At the trade and investment level, California's reach into Mexico is still limited. California's Trade and Service Desk at the University of California's Casa de California in Mexico City has never been fully operational. In the absence of committed budgetary resources to support full-time representation in Mexico, the Governor's Office of Business and Economic Development (GO-Biz) had planned the desk as a base that state officials could visit regularly. UC's facility, however, is on the city's edge and far from businesses, and since the onset of COVID-19 in early 2020, no visits have occurred. To substantially deepen state ties to Mexico at the national level, more robust investment may be needed.

Whether or not that occurs, the most important current vehicle for state action at present is the **Commission of the Californias**, which collaboratively links the governments of California, Baja California, and Baja California Sur. Established in 1971 and moribund during the administration of Governor Jerry Brown, the Commission was revived in December 2019 and is a key platform for addressing bilateral border, economic, health, and other issues. An MOU signed at that time by the three governors identified a number of areas of common interest: environment and energy, transportation and infrastructure, emergency preparedness and response, economic development and tourism, agriculture, and public health. The states agreed to meet and share information at least once a year, with the three governors and their staffs in the lead, supported by specified government departments.[22]

Cooperation on health and emergency services is a priority. California's Office of Emergency Services has had cooperative ties with Baja California since 2008, and under the 2019 MOU will cooperate with its Mexican counterparts in Baja California and Baja California Sur on best practices, shared training, mutual aid and the exchange of information. The three states are also working together on ocean protection and border transportation.[23]

Cross-border logistics require particular attention, with improvements needed to support the commercial traffic generated by binational manufacturing and to create a smarter border. Areas of focus include expanded border crossings and data-based technologies to make the monitoring and management of cross-border commercial traffic more efficient.

University of California

The University of California can support these and other initiatives through its Alianza UCMX. In particular, a strengthened focus on entrepreneurship would be a promising addition to its portfolio, given the depth of entrepreneurial and startup initiatives at the university's ten campuses, the growing interest at universities

across Mexico in building their own entrepreneurship and innovation programs, and the interest of Mexican states and cities in developing innovation ecosystems. Participation by the private sector in these programs, which is well-developed in UC programs but less so in Mexico, would increase the impact.

Prior to the COVID-19 pandemic, in January 2020, an agreement had been reached between the University of California, UNAM (the Alianza's largest Mexican partner), and Berkeley's SkyDeck accelerator to send a cohort of selected entrepreneurs to SkyDeck on an annual or biannual basis following a competitive selection held at Casa de California in Mexico City. Discussions were also underway regarding a possible expansion of the initiative to include UC research centers in the Bay Area, including CITRIS and QB3 (two of UC's four Institutes for Science and Innovation) and Cyclotron Road (at Lawrence Berkeley National Laboratory); in Mexico, consideration was being given to expanding participation by universities to include Tecnológico de Monterrey.[24] Those exchanges were suspended due to COVID-19, but their revival would contribute to both Bay Area-Mexico interuniversity ties and a stronger and more visible presence for Mexico and its entrepreneurs in the region.

Notes

Chapter 1

Mexico's Economy in Transition

1 McKinsey Global Institute, "A tale of two Mexicos: Growth and prosperity in a two-speed economy," March 2014, https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Americas/A%20tale%20of%20two%20Mexicos/MGI_Mexico_Full_report_March_2014.pdf.

2 Cornell University, INSEAD and WIPO, "Global Innovation Index 2020: Mexico," August 2020, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020/mx.pdf.

3 In 2020, instead of its long-standing index rankings, the World Economic Forum published a global competitiveness report special edition focusing on "How Countries are Performing on the Road to Recovery" in the aftermath of the COVID-19 pandemic.

4 Schwab, Klaus, ed., "The Global Competitiveness Report 2019," World Economic Forum, November 2019, http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf.

5 World Bank Group, "Doing Business 2020: Comparing Business Regulation in 190 Economies," November 2019, http://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf.

6 "Ease of Doing Business rankings," The World Bank, accessed March 16, 2021, https://www.doingbusiness.org/en/rankings.

7 "Mexico gains 2 points on transparency index, but impunity an obstacle," Mexico News Daily, January 29, 2021, https://mexiconewsdaily.com/news/mexico-gains-2-points-on-transparency-index/.

8 "The World Bank in Mexico: Mexico Overview," The World Bank, October 9, 2020, https://www.worldbank.org/en/country/mexico/overview.

9 "GDP Ranking," The World Bank Data Catalog, July 1, 2020, https://datacatalog.worldbank.org/dataset/gdp-ranking.

10 "Mexico GDP," Trading Economics, accessed March 16, 2021, https://tradingeconomics.com/mexico/gdp.

11 "GDP growth (annual %) – Mexico," The World Bank, accessed March 16, 2021, https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=MX.

12 "Producto Interno Bruto Trimestral/Por actividad económica" INEGI, 2021, https://www.inegi.org.mx/temas/pib/.

13 Graham, Dave, "Mexico's economy in 2020 suffers worst slump since 1930s," Reuters, January 29, 2021, https://www.reuters.com/article/us-mexico-economy-gdp/mexicos-economy-in-2020-suffers-worst-slump-since-1930s-idUSKBN29Y1OF.

14 "Mexico: At a Glance," International Monetary Fund, GDP data from January 2021 World Economic Outlook, https://www.imf.org/en/Countries/MEX.

15 Hernández, Leticia, "OCDE mejora pronóstico para PIB de México en 2021; ajusta de 3.6% a 4.5%," El Financiero, March 9, 2021, https://www.elfinanciero.com.mx/economia/ocde-mejora-pronostico-para-el-pib-de-mexico-crecera-4-5-en-2021#:~:text=La%20Organizaci%C3%B3n%20para%20la%20Cooperaci%C3%B3n,ciento%20previsto%20en%20diciembre%20pasado.

16 "Mexico Unemployment Rate 1991–2021," Macrotrends, accessed March 16, 2021, https://www.macrotrends.net/countries/MEX/mexico/unemployment-rate.

17 "Empleo y ocupación," INEGI, accessed March 16, 2021, https://www.inegi.org.mx/temas/empleo/.

18 Ibid.

19 "647 mil empleos se perdieron por COVID en 2020; trabajo formal, el más afectado," Animal Político, 12 de enero, 2021, https://www.animalpolitico.com/2021/01/647-mil-empleos-perdidos-por-covid-2020-trabajo-formal-mas-afectado/.

20 "Historic inflation Mexico – CPI inflation," inflation.eu Worldwide Inflation Data, accessed March 16, 2021, https://www.inflation.eu/en/inflation-rates/mexico/historic-inflation/cpi-inflation-mexico.aspx.

21 "Inflation in Mexico," Focus Economics, accessed March 16, 2021, https://www.focus-economics.com/country-indicator/mexico/inflation.

22 "Mexican Peso," Trading Economics, accessed March 27, 2021, https://tradingeconomics.com/mexico/currency.

23 "Exchange rate of the Mexican peso to the U.S. dollar (USD) from February 17 to October 26, 2020," Ana Maria Rios on Statista, October 27, 2020, https://www.statista.com/statistics/1108002/mexican-peso-exchange-rate-usd/.

24 "Mexico - Exchange Rate," Focus Economics, accessed March 16, 2021, https://www.focus-economics.com/country-indicator/mexico/exchange-rate.

25 "Interest Rate in Mexico," Focus Economics, accessed March 16, 2021, https://www.focus-economics.com/country-indicator/mexico/interest-rate.

26 "Mexico Central Bank key rates," Countryeconomy.com, accessed March 16, 2021, https://countryeconomy.com/key-rates/mexico.

27 "Cuéntame de México: Economía de México," INEGI, accessed March 17, 2021, http://cuentame.inegi.org.mx/economia/default.aspx?tema=E.

28 "Mexico: Economic and Political Outline," Santander Trade, March 2021, https://santandertrade.com/en/portal/analyse-markets/mexico/economic-political-outline.

29 Bajpai, Prableen, "Emerging Markets: Analyzing Mexico's GDP," Investopedia, June 25, 2019, https://www.investopedia.com/articles/investing/090315/emerging-markets-analyzing-mexicos-gdp.asp.

30 "Cuéntame de México: Economía de México," INEGI, accessed March 17, 2021, http://cuentame.inegi.org.mx/economia/default.aspx?tema=E.

31 "Mexico: Economic and Political Outline," Santander Trade, March 2021, https://santandertrade.com/en/portal/analyse-markets/mexico/economic-political-outline.

32 "Cuéntame de México: Economía de México," INEGI, accessed March 17, 2021, http://cuentame.inegi.org.mx/economia/default.aspx?tema=E.

33 "Mexico: Economic and Political Outline," Santander Trade, March 2021, https://santandertrade.com/en/portal/analyse-markets/mexico/economic-political-outline.

34 "PIB y cuentas nacionales," INEGI, 2020, https://www.inegi.org.mx/temas/pib/.

35 "Mexico's manufacturing sector readies for Industry 4.0," Oxford Business Group, 2019, https://oxfordbusinessgroup.com/overview/solid-fundamentals-local-manufacturing-sector-prepares-changes-brought-about-industry-40-and-global.

36 "Participación porcentual del sector manufacturero en el producto interno bruto (PIB) en México de 2007 a 2019," Statista, 2021, https://es.statista.com/estadisticas/596877/participacion-del-sector-manufacturero-en-pib-mexico/.

37 "Producción de vehículos," Expannsion / Datosmacro.com, accessed March 17, 2021, https://datosmacro.expansion.com/negocios/produccion-vehiculos.

38 "Mexico Aviation & Aerospace Review," Mexico Business Publishing, 2018, https://mexicobusinesspublishing.com/aerospace/2018.

39 "Dispositivos médicos," ProMéxico, Gobierno de México, 16 de febrero de 2016, https://www.gob.mx/promexico/acciones-y-programas/dispositivos-medicos-26794.

40 "Understanding the top 3 industrial sectors in Mexico," Tetakawi, June 26, 2020, https://insights.tetakawi.com/understanding-the-top-3-industrial-sectors-in-mexico.

41 "FAO en México: México en una mirada," Food and Agriculture Organization of the United Nations, accessed March 18, 2021, http://www.fao.org/mexico/fao-en-mexico/mexico-en-una-mirada/en/.

42 "México y sus exportaciones," Secretaría de Agricultura y Desarrollo Rural, 24 de marzl de 2020, https://www.gob.mx/agricultura/articulos/mexico-y-sus-exportaciones?idiom=es.

43 "Las telecomunicaciones a 3 ½ años de la reforma constitucional en México," Instituto Federal de Telecomunicaciones, 2017. http://www.ift.org.mx/sites/default/files/contenidogeneral/estadisticas/a3ymedioreformavf.pdf.

44 Hernández Armenta, Mauricio, "México será de los primeros países de Latam en conectarse a redes 5G: Ericsson," Forbes, Junio 29, 2020, https://www.forbes.com.mx/mexico-sera-de-los-primeros-paises-de-al-en-conectarse-a-las-redes-5g-ericsson/.

45 "Ericsson Mobility Report," Ericsson, June 2020, https://www.ericsson.com/49da93/assets/local/mobility-report/documents/2020/june2020-ericsson-mobility-report.pdf.

46 Content supplied by Carolina Agurto Salazar, Partner, Fundación IDEA.

47 "Tecnologías de la Información (IT)," Secretaría de Economía, 2012), http://www.2006-2012.economia.gob.mx/comunidad-negocios/industria-y-comercio/informacion-sectorial/tecnologias-de-la-informacion-ti.

48 "Mexico Regional Sectoral Outlook: Second half 2018," BBVA Research, 2018, January 2019, https://www.bbvaresearch.com/wp-content/uploads/2019/01/1901_MexicoRegionalOutlook_2H18.pdf.

49 "El sector de servicios financieros y seguros, motor de la economía national," BBVA, 23 abr 2019, https://www.bbva.com/es/el-sector-de-servicios-financieros-y-seguros-motor-de-la-economia-de-mexico/.

50 Dempsey, Craig, "Why Mexico's Fintech Sector will be One to Watch in 2020," Nasdaq, November 18, 2019, https://www.nasdaq.com/articles/why-mexicos-fintech-sector-will-be-one-to-watch-in-2020-2019-11-18.

51 Teso, Yumi, Masaki Kondo, and Hannah Dormido, "These Are 2018's Most (And Least) Attractive Emerging Markets," Bloomberg, January 21, 2018, https://www.bloomberg.com/news/articles/2018-01-21/emerging-market-scorecard-supports-mexico-and-turkey-over-india.

52 "Mexico's New Energy Era," Federal Ministry for Economic Affairs and Energy of Germany (BMWi) and Ministry of Energy of Mexico (SENER), May2018, https://www.energypartnership.mx/fileadmin/user_upload/mexico/media_elements/reports/Mexico_s_New_Energy_Era_-_Web2.pdf.

53 "México genera del total 31% de energía renovable: Sener," Forbes, mayo 17, 2020, https://www.forbes.com.mx/economia-mexico-energia-renovable-sener/.

54 Valenzuela, Pedro Parcero, "2012 Labor reform in Mexico and its impact in the formal and informal labor markets," Master's thesis, Georgetown University, Washington DC, April 7, 2015, https://repository.library.georgetown.edu/bitstream/handle/10822/760932/ValenzuelaParcero_georgetown_0076M_12875.pdf?sequence=1&isAllowed=y.

55 Valenzuela, Pedro, "Mexico's Reforms and the Prospects for Growth," Wilson Center Mexico Institute, May 2016, https://www.wilsoncenter.org/sites/default/files/media/documents/publication/mexicos_reforms_and_the_prospects_for_growth_final.pdf.

56 Ibid.

57 "Reformas Estructurales en Materia Económica: Avances y Retos," Lux Consultores en Comercio y Desarrollo, 29 de junio do 2018, https://www.cefp.gob.mx/transp/CEFP-70-41-C-Estudio0017-180718.pdf.

58 "Diario de la Federación," Secretaría de Gobernación, junio 11, 2013, https://www.dof.gob.mx/nota_detalle.php?codigo=5301941&fecha=11/06/2013.

59 "Las telecomunicaciones a 3 ½ años de la reforma constitucional en México," Instituto Federal de Telecomunicaciones, 2017. http://www.ift.org.mx/sites/default/files/contenidogeneral/estadisticas/a3ymedioreformavf.pdf.

60 "Reformas Estructurales en Materia Económica: Avances y Retos," Lux Consultores en Comercio y Desarrollo, 29 de junio do 2018, https://www.cefp.gob.mx/transp/CEFP-70-41-C-Estudio0017-180718.pdf.

61 "Diario de la Federación," Secretaría de Gobernación, diciembre 20, 2013, https://www.dof.gob.mx/nota_detalle.php?codigo=5327463&fecha=20/12/2013.

62 "Reformas Estructurales en Materia Económica: Avances y Retos," Lux Consultores en Comercio y Desarrollo, 29 de junio do 2018, https://www.cefp.gob.mx/transp/CEFP-70-41-C-Estudio0017-180718.pdf.

63 Villamil, Justin and Nacha Cattan, "AMLO advierte que se podría necesitar nueva reforma energética para salvar a Pemex," El Financiero, August 4, 2020, https://www.elfinanciero.com.mx/nacional/amlo-envia-memorandum-en-donde-deja-abierta-la-posibilidad-de-dar-reversa-a-la-reforma-energetica.

64 Najar, Alberto, "Refinería Dos Bocas: el polémico viraje de AMLO a favor del petróleo como motor económico de México," BBC News, 10 mayo 2019, https://www.bbc.com/mundo/noticias-america-latina-48223715.

65 "Private producers sidelined; government increases control of electricity market," Mexico News Daily, May 16, 2020, https://mexiconewsdaily.com/news/government-increases-control-of-electricity-market/.

66 Villamil, Justin, "¿Por qué el Gobierno de AMLO está 'peleado' con las energías limpias?" El Financiaro, July 16, 2020, https://www.elfinanciero.com.mx/economia/y-a-todo-esto-por-que-el-encontranazo-del-gobierno-de-mexico-con-las-energias-renovables.

67 Guerro, Sergio et al., "Changes to the Electricity Industry Law," Hayes and Boone, LLP, March 4, 2021, https://www.haynesboone.com/alerts/changes-to-the-electricity-industry-law.

68 "Mexico – Senate Approves Amendment of Mexico's Electricity Industry Law," Mayer Brown – Energy Forward on JD Supra, March 10, 2021, https://www.jdsupra.com/legalnews/mexico-senate-approves-amendment-of-4323769/.

69 "Mexico's Electricity Industry Law Update: Remedies for Foreign Investors," Dechert LLP on JD Supra, March 24, 2021, https://www.jdsupra.com/legalnews/mexico-s-electricity-industry-law-2272670/.

70 "La Reforma Financiera y los Riesgos del Crédito, IMCO (Instituto Mexicano para la Competitividad, septiembre 2013, https://imco.org.mx/wp-content/uploads/2013/09/LaReformaFinancierayLosRiesgosdelCredito-3.pdf.

71 "Diario de la Federación," Secretaría de Gobernación, enero 10, 2014, https://www.dof.gob.mx/nota_detalle.php?codigo=5329408&fecha=10/01/2014.

72 "Reformas Estructurales en Materia Económica: Avances y Retos," Lux Consultores en Comercio y Desarrollo, 29 de junio do 2018, https://www.cefp.gob.mx/transp/CEFP-70-41-C-Estudio0017-180718.pdf

73 "Doing Business 2016: Measuring Regulatory Quality and Efficiency," World Bank Group, 2016, https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB16-Full-Report.pdf.

74 "Programa de Estímulos a la Innovación, CONACYT, Gobierno de México, accessed March 25, 2021, https://www.conacyt.gob.mx/Programa-de-estimulos-a-la-innovacion.html.

75 "Convocatoria pública para acceder a los apoyos del Fondo Nacional Emprendedor 2019," Secretaría de Economía, Gobierno de México, accessed March 25, 2021, https://www.gob.mx/se/acciones-y-programas/convocatoria-publica-para-acceder-a-los-apoyos-del-fondo-nacional-emprendedor-2019-212427.

76 "Institucional: El Instituto Nacional del Emprendedor," Secretaria de Economía, Unidad de Desarrollo Productivo, 17 de octubre 2019, https://www.inadem.gob.mx/ and "Reglamento Interior de la Secretaría de Economía," Diario de la Federación, Secretaria de Economía, octubre 17, 2019, https://www.dof.gob.mx/nota_detalle.php?codigo=5575714&fecha=17/10/2019

77 "Padrón de Desarrolladoras de Capacidades Empresariales – PADCE," Secretaría de Economía, Gobierno de México, accessed March 25, 2021, https://www.gob.mx/se/acciones-y-programas/desarrollo-productivo-padce.

78 Pineda, Angélica, "10 cosas que debes saber sobre el padrón de expertos que capacitarán a mipymes," Expansión, 22 julio 2019, https://expansion.mx/emprendedores/2019/07/22/10-cosas-que-debes-saber-sobre-el-padron-de-expertos-que-capacitaran-a-mipymes.

79 "PRONAFIM: ¿Qué hacemos?" Gobierno de México, accessed March 26, 2021, https://www.gob.mx/pronafim/que-hacemos.

80 "PRONAFIM Programa Nacional de Financiamiento al Microempresario: Apoyos Crediticios y No Crediticios," Secretaría de Economía, Gobierno de México, marzo 2015, https://www.gob.mx/cms/uploads/attachment/file/1049/2.1.12_Programa_para_Microfinancieras.pdf.

81 "Demografía y género," PRONAFIM, Secretaría de Economía, cifras enero–diciembre, 2018,https://www.gob.mx/cms/uploads/attachment/file/437393/DEMOGRAF_A_Y_G_NERO_ENERO_-_DICIEMBRE_2018.pdf.

82 "National Digital Strategy,"Estados Unidos Mexicanos, Gobierno de la República, November 2013, https://docplayer.net/13127223-National-digital-strategy.html.

83 "Innovations in information technology use, due to the National Strategy, have won Mexico international recognition: ESH," Presendencia de la República EPN, 27 de marzo de 2018, https://www.gob.mx/epn/prensa/innovations-in-information-technology-use-due-to-the-national-digital-strategy-have-won-mexico-international-recognition-esh.

84 Castañares, Itzel, "Estrategia Digital Nacional, el otro pendiente de AMLO para conectar a México, El CEO, 3 de julio 2019,https://elceo.com/politica/estrategia-digital-nacional-el-otro-pendiente-de-amlo-para-conectar-a-mexico/.

85 "Acerca de PROSOFT," Secretaría de Economía, 2016, https://prosoft.economia.gob.mx/acercade/.

86 "Conoce las Reglas de Operación del Programa para el Desarrollo de lat Industria del Sortware (PROSOFT) y la Innovatión 2019," Secretaría de Economía, Gobierno de México, 25 de marzo de 2019, https://www.gob.mx/se/articulos/conoce-las-reglas-de-operacion-del-programa-para-el-desarrollo-de-la-industria-del-software-prosoft-y-la-innovacion-2019.

87 Rodriguez, Eliana, "Ley Fintech de México, un hito del sector financiero latinoamericano, COBIS, December 21, 2018, https://blog.cobiscorp.com/ley-fintech-mexico-latinoamericano.

88 Riquelme, Rodrigo, "6 claves para entender la Ley Fintech," El Economista, 04 de marzo de 2018, https://www.eleconomista.com.mx/sectorfinanciero/6-claves-para-entender-la-Ley-Fintech-20180304-0004.html.

89 "Estos son los 109 fideicomisos y fondos que el Congreso aprobó eliminar," El Financiero, October 1, 2020, https://www.elfinanciero.com.mx/nacional/estos-son-los-109-fideicomisos-y-fondos-que-se-extinguiran.

Chapter 2

Entrepreneurs, Startups, and Venture Capital

1 "¿Qué es ASEM? Historia,"ASEM, accessed March 27, 2021, https://asem.mx/pagina-estatica/nosotros.

2 "Centro Nacional de Apoyo a la Pequeña y Mediana Empresa," Cenapyme, 2020, http://cenapyme.fca.unam.mx/quienes.php#contenido.

3 "¿Qué es Global Shapers?" Global Shapers CDMX, accessed March 27, 2021, https://globalshaperscdmx.splashthat.com/.

4 "The power of youth in acton," Global Shapers Community, accessed March 27, 2021, https://www.globalshapers.org.

5 "Campus" Startup Mexico, accessed March 27, 2021, https://www.startupmexico.com/campus.

6 "Startup Mexico se extiende por el mundo!" Startup Mexico blog, 4 de diciembre de 2020, https://www.startupmexico.com/blogs_es/blog-de-sum/startup-mexico-se-extiende-por-el-mundo.

7 "Victoria147 academia de negocios para mujeres," accessed March 28, 2021m https://victoria147.org/.

8 "Mexico: Country Snapshot," Endeavor, accessed March 28, 2021, https://endeavor.org/location/mexico.

9 Content supplied by Enrico Robles Del Rio, CFO and Intelligence Director, Endeavor México.

10 "VC Overview 2020, AMEXCAP, March 3, 2021, pg. 23, full digital report available to members only, https://amexcap.com/2021/03/03/vc-overview-2020/.

11 "Venture Capital México: Mapa del ecosistema (2020),"Startupeable, accessed March 29, 2021, https://startupeable.com/ecosistema/venture-capital-mexico/.

12 "La mexicana Clip 'conquista' al banco japonés SoftBank y recibe 20 MDD," Expansión, 6 mayo 2019, https://expansion.mx/emprendedores/2019/05/06/clip-conquista-al-banco-japones-softbank.

13 Gómez Baray, Katyana, "SoftBank busca startups en México y América Latina," El Economista, 10 de mayo de 2019, https://www.eleconomista.com.mx/sectorfinanciero/SoftBank-busca-startups-en-Mexico-y-America-Latina-20190519-0005.html.

14 "SoftBank set to invest $3 billion more into Latin American tech for post-pandemic deals," Latin America Reports, November 24, 2020, https://latinamericareports.com/softbank-set-to-invest-3-billion-more-into-latin-american-tech-for-post-pandemic-deals/4918/.

15 "VC Overview 2020, AMEXCAP, March 3, 2021, pp 16 and 18, full digital report available to members only, https://amexcap.com/2021/03/03/vc-overview-2020/.

16 Serebrisky, Diego, "The state of Venture Capital in Mexico," blog post republished on Medium, November 3, 2015, https://medium.com/@serebrisky/the-state-of-venture-capital-in-mexico-218c3143b8f6.

17 Interview with Liliana Reyes, President, AMEXCAP.

18 "VC Overview 2020, AMEXCAP, March 3, 2021, pp 23, 19, 25, 29, full digital report available to members only, https://amexcap.com/2021/03/03/vc-overview-2020/.

19 "Cornershop," Crunchbase, accessed April 8, 2021.

20 "Cornershop by Uber: About," LinkedIn, accessed March 29, 2021, https://www.linkedin.com/company/cornershop-app/.

21 "Adolfo B., Founder, Chairman & CEO at Clip," LinkedIn, accessed March 29, 2021, https://www.linkedin.com/in/adolfobabatz/.

22 "Adolfo Babatz," Endeavor, accessed March 29, 2021, https://endeavor.org/entrepreneur/adolfo-babatz/.

23 "Clip: Funding Rounds," Crunchbase, May 6, 2019, https://www.crunchbase.com/organization/payclip/company_financials.

24 Ammachchi, Narayan, "Mexican Credit Card Payment App Clip Raises US$100m," Nearshore Americas, May 13, 2019, https://nearshoreamericas.com/mexican-fintech-startup-clip-raises-100-million/.

25 "Kavak: Funding Rounds," Crunchbase, September 30, 2020, https://www.crunchbase.com/organization/kavak/company_financials.

26 "Kavak Becomes the First Mexican Startup to Become a Unicorn," Entrepreneur, October 1, 2020, https://www.entrepreneur.com/article/357027.

27 Konfio website home page, accessed March 31, 2021, https://www.konfio.mx.

28 "Konfio: Funding Rounds," Crunchbase, accessed March 31, 2021, https://www.crunchbase.com/organization/konfio/company_financials.

29 Escher, Anna, "SoftBank Pours $100 Million into Mexico's Konfio," TechCrunch, December 3, 2019, https://techcrunch.com/2019/12/03/softbank-pours-100-million-into-mexicos-konfio/.

30 Ramírez, Erick, "Disruptores | Jüsto: el supermercado invisible," Diario de Querétaro, 6 de febrero de 2020, https://www.diariodequeretaro.com.mx/finanzas/disruptores-justo-el-supermercado-invisible-4798220.html.

31 Solomon, Daina Beth, "CORRECTED-Mexico's Justo grocery app lands $65 million funding round," Reuters, February 9, 2021, https://www.reuters.com/article/mexico-justo/corrected-mexicos-justo-grocery-app-lands-65-million-funding-round-idUSL1N2KE31O.

32 Azevedo, Mary Ann, "Jüsto, Mexico's First Online Supermarket, raises $10M Seed From Global Investors," Crunchbase News, November 14, 2019, https://news.crunchbase.com/news/justo-mexicos-first-online-supermarket-raises-10m-seed-from-global-investors/.

33 Tincello, Katie, "Jüsto Raises $65M Series A," Latamlist, February 11, 2021, https://latamlist.com/justo-raises-65m-series-a.

34 Interview with Eric Pérez-Grovas.

35 Interview with Alejandro Diez Barroso, Managing Partner, Dila Capital.

36 "The Power of Entrepreneurship: Targeting capital to support the growing middle class in Mexico," Harvard Business School, Featured Alumni, July 12, 2019, https://www.alumni.hbs.edu/stories/Pages/story-bulletin.aspx?num=7061.

37 Interview with Álvaro Rodríguez Arregui, Co-founder and Managing Partner, IGNIA.

38 Tran, Matthew, "Amazon Mexico: the Biggest Marketplace No One is Talking About," AMZ Pathfinder, December 3, 2020, https://www.amzpathfinder.com/amazon-mexico/.

39 Chevalier, Stephanie, "Digital population in Mexico as of January 2021," Statista, March 15, 2021, https://www.statista.com/statistics/686586/mexico-digital-population/.

40 "Mexico: Reaching the Consumer," Santander | Trade Markets, March 2021, https://santandertrade.com/en/portal/analyse-markets/mexico/reaching-the-consumers?url_de_la_page=/en/portal/analyse-markets/mexico/reaching-the-consumers&&actualiser_id_banque=oui&id_banque=0&memoriser_choix=

41 Tran, Matthew, "Amazon Mexico: the Biggest Marketplace No One is Talking About," AMZ Pathfinder, December 3, 2020, https://www.amzpathfinder.com/amazon-mexico/.

42 "Fondeadora raises a US$14 MM Series A Round Led by Google," IGNIA press release, August 31, 2020, http://www.ignia.mx/2020/08/31/fondeadora-raises-a-us14-mm-series-a-round-led-by-google/.

43 Armaza, Migel, "Empowerring Mesican Businesses with Adolfo Babatz, Founder & CEO of Clip," Wharton Fintech publishing on Medium, August 14, 2020, https://medium.com/wharton-fintech/empowering-mexican-businesses-with-adolfo-babatz-founder-ceo-of-clip-77f0070f5ecc.

44 Home page and About page, Dalus Capital, accessed April 3, 2021, https://daluscapital.com.

45 Interview with Rogelio De los Santos, Co-Founder & Managing Partner, Dalus Capital.

46 Sheiber, Jonathan, "With investors expecting a Latin American cryptocurrency boom, Mexico's Bitso raises $62 million," TechCrunch, December 9, 2020, https://techcrunch.com/2020/12/09/with-investors-expecting-a-latin-american-cryptocurrency-boom-mexicos-bitso-raises-62-million/.

47 "Mexican crypto exchange Bitso raises $62m to take on Brazil," Finextra, December 9, 2020, https://www.finextra.com/newsarticle/37122/mexican-crypto-exchange-bitso-raises-62m-to-take-on-brazil.

48 Cawrey, Daniel, "Ripple Network Expands to Mexico With Addition of First Peso Insurer," CoinDesk, May 12, 2014, https://www.coindesk.com/ripple-network-expands-addition-first-peso-issuer.

49 Handagama, Sandali, "Why It's Time to Pay Attention to Mexico's Booming Crypto Market," CoinDesk, December 17, 2020, https://www.coindesk.com/mexicos-quiet-crypto-boom.

50 Partz, Helen, "Bitso Hits 1M Users as Crypto Adoption Spikes in Latin America," Cointelegraph, July 9, 2020, https://cointelegraph.com/news/bitso-hits-1m-users-as-crypto-adoption-spikes-in-latin-america.

51 "Bitso: Funding Rounds," Crunchbase, accessed April 3, 2021, https://www.crunchbase.com/organization/bitso.

52 Morales, William U., "Blueprint of a FinTech Unicorn: Ripple," published on Medium February 4, 2020, https://medium.com/fintechtris/fintech-focus-on-ripple-blockchain-leader-in-remittances-1f05603011d9.

53 Interview with Emilio Rivero Coello, Risk and Corporate Affairs Specialist, Bitso.

54 "BioTechnonogy in Mexico," ProMéxico (Business Intelligence Unit), October 2018, https://ethic.com.mx/docs/Infografias/sectores/Biotechnology-Mexico.pdf.

55 "Francisco Gonzalo Bolivar-Zapata: Biography," IAP (Interacademy Partnership), accessed April 4, 2021, https://www.interacademies.org/person/francisco-gonzalo-bolivar-zapata.

56 Interview with Ivan Rodriguez-Jaubert, Founder, Dupla Helica.

57 Delee Corp. home page, accessed April 4, 2021, https://www.delee.co.

58 Nitrocel Technologies page on LinkedIn, accessed April 4, 2021, https://www.linkedin.com/company/nitrocel-technologies/about/.

59 Interview with Alejandro Espinosa, Founder, Nitrocel.

60 "People Want More Innovation in Latin America—Survey," Somos Innovación, December 8, 2020, https://www.somosinnovacion.lat/people-want-more-innovation-in-latin-america-survey/.

61 Remes, Jaana et al., "Latin America's missing middle of midsized firms and middle-class spending power," Mckinsey Global Institute, May 13, 2019, https://www.mckinsey.com/featured-insights/americas/latin-americas-missing-middle-of-midsize-firms-and-middle-class-spending-power.

62 "Startup Continent: The Most Well-Funded Tech Startups in Latin America And The Caribbean," CB Insights Research Briefs, March 11, 2021, https://www.cbinsights.com/research/top-startups-latin-america-map/.

63 Fieser, Ezra, "Latin American Startups Had Record Venture Capital Deals in 2020, " Bloomberg, March 16, 2021, https://www.bloomberg.com/news/articles/2021-03-16/latin-american-startups-had-record-venture-capital-deals-in-2020.

64 "Startup Continent: The Most Well-Funded Tech Startups in Latin America And The Caribbean," CB Insights Research Briefs, March 11, 2021, https://www.cbinsights.com/research/top-startups-latin-america-map/.

65 "Latin America Is Suddenly Fintech's Hottest Market. Here Are The Three Reasons Why," CB Insights Research Briefs, February 20, 2020, https://www.cbinsights.com/research/latin-america-fintech-drivers/.

66 Interview with Liliana Reyes, President, AMEXCAP.

Chapter 3

Baja California (Tijuana-Ensenada-Mexicali)

1 US General Services Administration, "San Ysidro Land Port of Entry," May 15, 2020, https://www.gsa.gov/about-us/regions/welcome-to-the-pacific-rim-region-9/land-ports-of-entry/san-ysidro-land-port-of-entry.

2 US Department of Transportation Bureau of Transportation Statistics, "Border Crossing/Entry Data: FAQ," February 16, 2018, https://www.bts.gov/statistical-products/border-crossing-data/border-crossingentry-data-faq and Annual Data tables, 2019 and 2020, https://www.bts.gov/content/border-crossingentry-data.

3 Ibid.

4 United Nations, Department of Economic and Social Affairs, Population Division (2018), "The World's Cities in 2018—Data Booklet" (ST/ESA/ SER.A/417), https://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2018_data_booklet.pdf.

5 INEGI Datos, Mexicali (02002), accessed April 5, 2021, https://www.inegi.org.mx/app/indicadores/?ag=02002.

6 INEGI Datos, Ensenada, Baja California (02001), accessed April 5, 2021, https://www.inegi.org.mx/app/indicadores/?ag=02002.

7 United States-Mexico Chamber of Commerce et al., "Baja Manufacturing Tour," May 31, 2018, https://2016.export.gov/california/losangelesdowntown/events/baja2018/eg_us_ca_121767.asp.

8 Tijuana EDC, "Industrial parks: Mexico has available space for companies," September 2, 2019, https://tijuanaedc.org/industrial-parks-mexico-has-available-space-for-companies/.

9 Mexicali EDC, "Mexicali Baja California Mexico," accessed April 5, 2021, http://www.mexicaliindustrial.com/mexicali-english.php.

10 Government of the State of Baja California, "State Model of Innovation of Baja California," "Baja California: The Most Diverse and Open Economy in Mexico," 2018, and "Invest in Baja" website accessed March 3, 2020, http://investinbaja.gob.mx/.

11 San Diego Tourism Authority, "Discover Baja California's Wine Region," accessed April 5, 2021, https://www.sandiego.org/articles/baja-california/baja-california-wine-region.aspx

12 Secretería de Economía, Estados Unidos Mexicanos, Información Económica y Estatal: Baja California, 2019, https://www.gob.mx/cms/uploads/attachment/file/438165/Baja_California_2019.pdf.

13 Government of the State of Baja California, Office of the Secretary of Economic Development, "Welcome to Baja California: The Most Diverse and Open Economy in Mexico," 2018.

14 Andrade, Daniel, "Maquiladoras de Tijuana importan el 98% de sus insumos y solo 2% es de proveeduría local," El Imparcial, September 8, 2019, https://www.elimparcial.com/tijuana/tijuana/Maquiladoras-de-Tijuana-importan-el-98-de-sus-insumos-y-solo-2-es-de-proveeduria-local-20190908-0024.html.

15 CANACINTRA Tijuana, "Nueva Ley de Fomento a la Proveeduría dejaría un billón de dólares en BC: Canacintra," February 2018, http://www.canacintra.net/noticia.php?id=1046.

16 https://www.index.org.mx/index.html#asociaciones

17 Content supplied by Mark Rinder, Fulbright Grantee & Intelligence Analyst, Endeavor Mexico; https://mexico-now.com/honeywell-aerospace-to-invest-us-15-million-in-mexicali/; and https://manufactura.mx/industria/2018/02/02/honeywell-presume-su-planta-de-aeronautica-en-mexicali.

18 World Trade Center San Diego et al., "Trade and Competitiveness in North America: A Focus on the Cali Baja Mega-Region," June 2018, https://www.sandiegobusiness.org/sites/default/files/Trade and Competitiveness in North America - SEP.compressed.pdf.

19 Thermo Fisher Scientific, "Tijuana," accessed April 5, 2021. https://jobs.thermofisher.com/global/en/tijuana.

20 Interview with Octavio Perez, Senior Manager & Site Leader, Thermo Fisher Scientific.

21 Baja Studios website, http://www.bajafilmstudios.com/; interview with Gabriel Reyes, April 2020; and Boxel Studio website, http://boxelstudio.com/.

22 Tijuana EDC unpublished slide presentation, 2018, Mexico - Tijuana EDC.pdf.

23 Tijuana EDC, "Mexico Engineering Graduate Numbers Triple," October 26, 2016, https://tijuanaedc.org/mexico-engineering-graduate-numbers-triple/.

24 UNAM_MX, "What is UNAM?" video, n.d., https://www.youtube.com/watch?v=tt-fKHqkllU.

25 "About UNAM," English Version, UNAM ENALLT, 2010, https://ced.enallt.unam.mx/alex/posgrado/docs/folletoIngles.pdf.

26 Content provided by Mónica Lacavex Berumen, Vice Rector–Ensenada Campus, UABC.

27 Content provided by Flavio Olivieri, Institutional Developer, Tijuana Innovadora.

28 Content provided by Mónica Lacavex Berumen, Vice Rector–Ensenada Campus, UABC.

29 "Informe de Actividades: 2019–2023," Universidad Autónoma de Baja California, http://www.uabc.mx/planeacion/informe/informe2019/Informe-de-actividades-2019.pdf.

30 Content provided by Mónica Lacavex Berumen, Vice Rector–Ensenada Campus, UABC.

31 "CETYS University," uniRank, March 23, 2020, https://www.4icu.org/reviews/universities-english/3240.html and "CETYS Universidad," LinkedIn school page, accessed April 18, 2020, https://www.linkedin.com/school/cetys-universidad/about/.

32 "Incubadora de Negocios," CETYS Universidad, 2020, https://www.cetys.mx/incubadora-de-negocios/.

33 Interview and content supplied by Claudia B. Hernández Merlo, Technology Manager, CICESE.

34 Centro de Nanociencias y Nanotecnología, "Historia," accessed March 6, 2020, https://www.cnyn.unam.mx/index.php?option=com_content&view=article&id=79&Itemid=113&lang=en.

35 Fabiola Méndez and Francisco Medina, "Centro de Nanociencias y Nanotecnología de la UNAM a la vanguardia en investigación científica," UNAM Global, May 7, 2018, http://www.unamglobal.unam.mx/?p=38846

36 Content provided by Andres Campos, Executive Director, Ensenada Economic Development Corporation.

37 CETYS Universidad, "Nace el nuevo Centro de Estudios Vitivinícolas," December 6, 2018, https://www.cetys.mx/noticias/nace-el-nuevo-centro-de-estudios-vitivinicolas/.

38 San Diego Tourism Authority, "Discover Baja California's Wine Region," accessed March 3, 2020, https://www.sandiego.org/articles/baja-california/baja-california-wine-region.aspx.

39 Patricia Moctezuma, Sergio López and Alejandro Mungaray, "Innovation and Development: A Program to Stimulate Regional Innovation in Mexico", *Problemas de Desarrollo*, Vol. 48 No. 191, October-December 2017, http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0301-70362017000400133&lng=es&nrm=iso&tlng=en.

40 CAIINNO, "Índice Nacional de Ciencia, Tecnología e Innovación 2018," https://www.caiinno.org/wp-content/uploads/2018/12/INDICE-2018.pdf.

41 Interview with Guillermo Mejía, former Managing Director, MIND Hub, 2020.

42 "About," COCITBC, November 2019, https://www.facebook.com/pg/BC.COCIT/about/.

43 BIT Center Tijuana | LinkedIn, accessed March 4, 2020, https://www.linkedin.com/company/bit-center.

44 "Apoyando el desarrollo Económico en Tijuana, Baja California," CDT | Consejo de Desarrollo de Tijuana, 2020, https://cdt.org.mx/.

45 "MINDHub's Page," accessed April 11, 2021, https://www.mindhub.mx; MIND Hub on LinkedIn, https://www.linkedin.com/company/mexico-innovation-development-hub-mindhub/about/; content provided by Marco Barraza, VP Enterprise Operations, Arkus, Inc.

46 "¿Todo esto puedo hacer aquí?" BlueBox, accessed April 19, 2020, https://www.blueboxmx.com/todo-eso-puedes-hacer-aqui.

47 Content provided by Mark Rinder and Enrico Robles, Endeavor Mexico; Endeavor website, https://www.endeavor.org.mx/.

48 The Baja Post, "[:en]CEID building grand opening at CETYS University Campus Mexicali[:es]Inauguran edificio CEID en Cetys Campus Mexicali[:]," January 31, 2018, https://www.thebajapost.com/2018/01/31/ceid-building-grand-opening-at-cetys-university-campus-mexicali/.

49 "Ensenada Hub," Global Shapers Community, accessed April 11, 2021, https://www.globalshapers.org/hubs/ensenada-hub-d016a92e-d045-4a0d-8b52-19c4f5e361fd-hub.

50 Thinking Heads, "Jordi Muñoz," accessed April 29, 2020, https://www.thinkingheads.com/en/speakers/jordi-munoz/.

51 Ryan Mac and Aaron Tilley, "Behind the Crash of 3D Robotics, North America's Most Promising Drone Company," Forbes, October 5, 2016, https://www.forbes.com/sites/ryanmac/2016/10/05/3d-robotics-solo-crash-chris-anderson/#777fadf53ff5. The company eventually exited the market due to strategic issues brought on by competitive pressure from DJI, China's leading drone producer.

52 "Global Presence," Softtek, accessed April 11, 2021, https://www.softtek.com/about/global-presence.

53 Mendoza, Alexandra, "Otay Mesa port of entry expansion project begins next week," The San Diego Union-Tribune, May 28, 2020, https://www.sandiegouniontribune.com/news/border-baja-california/story/2020-05-28/otay-mesa-port-expansion.

54 Interview with Gustavo de la Fuente, Executive Director, San Diego-Tijuana Smart Border Coalition.

55 Good Neighbor Environmental Board, "Energy Production, Transportation and Demand in the Transborder Region: Opportunities and Impacts, Nineteenth Report of the Good Neighbor Environmental Board to the President and Congress of the United States, December 2019, p.76, https://www.epa.gov/sites/production/files/2020-01/documents/19thgneb_report_published_final_508compliant.pdf.

56 Institute of the Americas, "Baja California: Energy Outlook 2020–2025," February 2020, p. 3, https://www.iamericas.org/documents/energy/reports/Baja_Energy_Outlook_2020_2025.pdf.

57 T.R. Goldman, "How Mexican Wind Lights San Diego Homes," Politico Magazine, February 16, 2017, https://www.politico.com/magazine/story/2017/02/mexico-wind-farms-renewable-energy-san-diego-border-214789.

58 IEnova, "Nuestros Servicios," accessed April 29, 2020, https://www.ienova.com.mx/servicios.php?elec.

59 Institute of the Americas, "Baja California: Energy Outlook 2020–2025," February 2020, p. 1, https://www.iamericas.org/documents/energy/reports/Baja_Energy_Outlook_2020_2025.pdf.

60 Peter Fairly, "Mexico Border Wall Won't Stop Cross-border Power Push," IEEE Spectrum, October 26, 2017, https://spectrum.ieee.org/energywise/energy/renewables/usmexico-wall-wont-stop-crossborder-power-push.

61 Tina Casey, "For Solar Manufacturer SunPower, Renewables Are Only a Beginning," Triple Pundit, June 11, 2019, https://www.triplepundit.com/story/2019/solar-manufacturer-sunpower-renewables-are-only-beginning/83851.

62 Information provided by Bryan Early, Adviser to Commissioner Andrew McAllister, California Energy Commission, and Alana Sanchez, International Relations Adviser to California Energy Commission Chairman David Hochschild.

63 Information provided by Cecilia Larroque, Asset Manager, El Florido, March 2020; "El Florido – A Master Planned Community," http://florido.com/; and Dias, Tito, "El agua es determinante para el futuro y crecimiento de Baja California," Diario Tijuana, May 29, 2020, https://diariotijuana.info/el-agua-es-determinante-para-el-futuro-y-crecimiento-de-baja-california/.

64 Information provided by Helen Lopez, Assistant Director, International Affairs Office, California Governor's Office of Emergency Services.

65 Office of Governor Gavin Newsom, "Governor Newsom and Governors from Baja California States Re-Establish 'Commission of the Californias'," December 4, 2019, https://www.gov.ca.gov/2019/12/04/governor-newsom-and-governors-from-baja-california-states-re-establish-commission-of-the-californias/.

66 Interview with Max Oltersdorf, Deputy Director for International Affairs and Trade, Governor's Office of Business and Economic Development, State of California.

Chapter 4
Ciudad Juárez, Chihuahua

1 "PIB por Entidad Federative (PIBE),"INEGI, 2019, accessed May 17, 2021, https://www.inegi.org.mx/programas/pibent/2013/#Tabulados.

2 Economic census conducted by INEGI in 2018.

3 "Prontuario Estadístico, Centro de Information Economica y Social: Enero 2021," Secretaría de Innovación y Desarrollo Económico, Chihuahua Gobierno del Estado, http://www.chihuahua.com.mx/content/PRONTUARIOS/2021/2021-01%20Prontuario%20Estad%C3%ADstico%20Enero.pdf.

4 Comprehensive Statistics of the Manufacturing, Maquiladora and Export Services Program; "Programa de la industria manufacturera, maquiladora y de servicios de exportación (IMMEX) – 2007 en adelante | Tabulados | Manufacturas por entidad federativa y municipios seleccionados," INEGI, 2021 Ene, https://www.inegi.org.mx/programas/immex/#Tabulados.

5 Analysis of 2019 INEGI data produced by IDOM Consulting, Engineering, Architecture, S.A.U. for the Strategic Plan for Smart Specialization for Ciudad Juárez project of Desarrollo Económico de Ciudad Juárez, http://desarrolloeconomico.org/proyectos.php.

6 Desarrollo Económico de Ciudad Juárez (DECJ), http://www.desarrolloeconomico.org/index.php.

7 Analysis of data from Instituto Municipal de Investigación y Planeación (IMIP) and the Chihuahua government portal produced by IDOM Consulting, Engineering, Architecture, S.A.U. for Desarrollo Económico de Ciudad Juárez, http://desarrolloeconomico.org/proyectos.php.

8 USA Trade, US Census Bureau, https://usatrade.census.gov

9 USA Trade, US Census Bureau, INEGI, Atlas Economico de Complejidad Económica

10 USA Trade, US Census Bureau, https://usatrade.census.gov

11 Content provided by IDOM with information from ANUIES and CONACYT; "Centros de Investigacion," UACJ, accessed April 15, 2021, https://www.uacj.mx/Investigacion/centros.html.

12 "CAPA más que una impresión 3D," Dirección General de Comunicación Universitaria, IMPULSUM, UACJ, accessed April 27, 2021, https://www.uacj.mx/Investigacion/detalle.html?id=70; "Campus: IADA | IIT," IADA, UACJ, 2017, http://www3.uacj.mx/IADA/Documents/2017/campus IADA.pdf.

13 "Leveraging the Power of Artificial Intelligence for the Borderplex Region," C Minds and Microsoft, May 2020. https://7da2ca8d-b80d-4593-a0ab-5272e2b9c6c5.filesusr.com/ugd/7be025_924deeb8d0454ad0aa24b8e531387413.pdf

14 "Programmas," CIDER, accesses April 16, 2021, https://www.cider.com.mx/programas.

15 Chihuahua Innova website: http://chihuahuainnova.mx.

16 "Impulsan a jóvenes con dos convocatorias para emprender nuevos negocios," Cambio.gob.mx, Chihuahua Gobierno del Estado, 24 de enero de 2020, http://www.cambio.gob.mx/spip.php?article13962.

17 Ibid.

18 "Ofrece FIDEAPECH nuevo fondo para emprendedores en innovación de alto impacto," Gobierno del Estado de Chihuahua, fecha 07/30/2018, http://www.chihuahua.gob.mx/contenidos/ofrece-fideapech-nuevo-fondo-para-emprendedores-en-innovacion-de-alto-impacto.

19 FIDEJRZ Emprende portal for procedures and services, https://tramites.chihuahua.gob.mx/tramite.aspx?identificador=1364&tramite=FIDEJRZ%20Emprende&dependencia=Fideapech.

20 FIDECHIH Emprende portal for procedures and services, https://tramites.chihuahua.gob.mx/tramite.aspx?identificador=1363&tramite=FIDECHIH%20Emprende&dependencia=Fideapech.

21 "Colabora director general de Desarrollo Económico en Innovation Week," Gobierno Municipal 2018–2021/H. Ayuntamiento de Juárez, 23 de Septiembre del 2020, http://www.juarez.gob.mx/noticia/24956/colabora-director-general-de-desarrollo-econmico-en-innovation-week.

22 Red Juárez Emprende on Facebook, https://www.facebook.com/juarezemprende2017.

23 Frente Norte website, https://frentenorte.org

24 Incubadora de Empresas UTCJ on Facebook, https://www.facebook.com/IncubadoraUTCJ.

25 "Incubar tu proyecto en la ODE," Oficina de Desarrollo Empresarial, UACJ, August 27, 2019, http://www3.uacj.mx/DGVI/ODE/Paginas/default.aspx.

26 "Servicios | Incubadora: Centro de Incubación e Innovación de Empresas," Tec de Juárez, http://www.itcj.edu.mx/servicios.

27 "Incubadoras y aceleradoras en Ciudad Juárez," Entrepreneur, December 2, 2014, https://www.entrepreneur.com/article/267673.

28 "About Tech Hub," Technology Hub, https://t-hub.mx/en/sobre-tech-hub; interviews with Technology Hub CEO Ricardo Mora and Miguel Fernandez, CEO, Transtelco.

29 "¿Quienes somos?" Fundación Axcel, https://www.funax.org/fs/nosotros/quienes-somos; interview with Ricardo Mora, CEO, Technology Hub; "Fab Lab Juárez," Fab Foundation, https://www.fablabs.io/labs/fablabjuarez; Fab Foundation website, https://fabfoundation.org/.

30 Analysis of data from USA Trade, US Census produced by IDOM Consulting, Engineering, Architecture, S.A.U. for Desarrollo Económico de Ciudad Juárez

31 The Bridge Accelerator website, http://www.tb-xl.com; interview with Ricardo Mora, CEO, Technology Hub.

32 "Academic Catalog: Academic and Research Facilities," UTEP, 2020–2021 Edition, http://catalog.utep.edu/undergrad/academic-and-research-facilities/.

33 Perez, Daniel, "American Graphene—UTEP Centers Help Students Win Prestigious Venture Contests," UTEP News Archive, accesses April 17, 2021, http://news.utep.edu/american-graphene-utep-centers-help-students-win-prestigious-venture-contests/.

34 Pioneers 21 website, 2019, http://pioneers21.org.

35 "About Arrowhead Center," Arrowhed Center, NMSU, 2020, https://arrowheadcenter.nmsu.edu/about/.

36 Zuma Capital website, http://zumacapital.mx.

37 Saba Investments website, lhttps://sabavc.com; interview with Ricardo Mora, CEO, Technology Hub.

38 Arrowhead Innovation Fund website, https://www.aifvc.com.

39 https://www.microsoft.com/en-us/corporate-responsibility/techspark

40 Saucedo, Omar, "Techspark Juárex, MX," article published on LinkedIn, February 5, 2020, https://www.linkedin.com/pulse/techspark-ju%C3%A1rez-mx-omar-saucedo/.

41 Seisa website, https://seisa.com; Interview, Julio Chiu, Founder & CEO Seisa.

42 Interview, Michael Cam-Phung, Chief Strategy Officer, Seisa.

43 Wong, Marco, "Radar De Sensibilidad Del Ecosistema Regional De Innovación Para Ciudad Juárez," Frente Norte blog, June 11, 2020, https://frentenorte.org/radar-de-sensibilidad-del-ecosistema-regional-de-innovacion-para-ciudad-juarez/.

44 Interview with Ricardo Mora, CEO, Technology Hub.

45 Content provided by Sergio Mendoza, Desarollo Economico del Estado de Chihuahua A.C.

Chapter 5
Monterrey, Nuevo León

1 "Indicadores Oportunos," Data Nuevo León website, Secretaría de Economía y Trabajo, Gobierno Estatal de Nuevo León, accessed April 20, 2021, http://datos.nl.gob.mx.

2 "Conoce Monterrey," ANNUIES, 2019, https://encuentro-tic.anuies.mx/2019/conoce-monterrey/.

3 "Es NL líder nacional en captación de Inversión Extranjera Directa durante primer trimestre de 2020," Gobierno de Nuevo León, Mayo 16, 2020, https://www.nl.gob.mx/boletines-comunicados-y-avisos/es-nl-lider-nacional-en-captacion-de-inversion-extranjera-directa.

4 "Datos Económicos-Marzo 2021," Data Nuevo León website, Secretaría de Economía y Trabajo, Gobierno Estatal de Nuevo León, http://datos.nl.gob.mx/wp-content/uploads/indicadores/2021/Tarjeta_datos_ec_N%20L-Marzo-2021.pdf.

5 "Es NL líder nacional en captación de Inversión Extranjera Directa durante primer trimestre de 2020," Gobierno de Nuevo León, Mayo 16, 2020, https://www.nl.gob.mx/boletines-comunicados-y-avisos/es-nl-lider-nacional-en-captacion-de-inversion-extranjera-directa.

6 Government of Nuevo León, Ministry of Economy and Labor, "Nuevo León Investment Guide: To live, to work and to do business," 2019, https://www.businessnuevoleon.com/investment-guide.

7 Bárcenas, Arturo, "Sube 1.8% PIB de Nuevo León en 2019," El Financiero, diciembre 10, 2020, https://www.elfinanciero.com.mx/monterrey/sube-1-8-pib-de-nuevo-leon-en-2019/.

8 Monterrey Manufacturing Development Information Office, "Monterrey Companies Examples by Sector."

9 Texas Department of Transportation, "Texas-Mexico International Bridges and Border Crossings," December 2019, https://ftp.dot.state.tx.us/pub/txdot/move-texas-freight/studies/texas-mexico-bridges-crossings-2019.pdf.

10 "Innovation Ecosystem," Monterrey Entrepreneurship Ecosystem, accessed April 20, 2021, https://entrepreneursmty.com/innovation-ecosystem/.

11 Oxford Business Group, "Nuevo León Government is Leading the Push for Industry 4.0," chapter in The Report: Mexico 2018, https://oxfordbusinessgroup.com/analysis/adapting-future-state-government-leading-push-industry-40; content provided by David Ortega, Director, CIDESI Nuevo León; "Nuevo León 4.0," Gobierno del Estado de Nuevo León, https://www.nl.gob.mx/campanas/nuevo-leon-40.

12 Nag, Oshimaya Sen, "The Most and Least Populated States Of Mexico," WorldAtlas, August 13, 2019, https://www.worldatlas.com/articles/the-most-and-least-populated-states-of-mexico.html.

13 Secretaria de Educación Pública, "Sistema Educativo de los Estados Unidos Mexicanos Principales Cifras 2017–2018," https://www.planeacion.sep.gob.mx/Doc/estadistica_e_indicadores/principales_cifras/principales_cifras_2017_2018.pdf.

14 Information provided by Martha Leal González, Director of Planning, Postgraduate, Outreach and International Cooperation and Networks, Instituto de Innovación y Transferencia de Tecnología (I2T2).

15 Government of Nuevo León, Ministry of Economy and Labor, "Doing business in Nuevo León," 2018, http://www.congresocomce.org.mx/wp-content/uploads/2019/05/BNL-2018.pdf.

16 Interview with Rogelio De los Santos, Co-Founder & Managing Partner, Dalus Capital.

17 Content provided by Sergio Ortiz Valdés, California Office Director, Tecnológico de Monterrey; "Data and Figures," Tecnológico de Monterrey, accessed April 24, 2020, https://tec.mx/en/data-and-figures; "Top Schools for Entrepreneurship Studies 2020 Press Release," The Princeton Review, November 12, 2019, https://www.princetonreview.com/press/top-entrepreneurial-press-release; "Economic and social Impact of Tecnológico de Monterrey graduates in the world: 75 years of entrepreneurial legacy," Tecnológico de Monterrey, 2019, http://sar.itesm.mx/ranking_2019/75_years_impact_on_economy.pdf.

18 Endeavor Insight, "Evaluation and Network Analysis of the Monterrey Tech Sector," October 2018, https://www.endeavor.org.mx/data_lab2.html#pub2.

19 International Finance Corporation, "Case Study: Breaking Paradigms to Develop Leaders for the 21st Century," December 2019, https://www.ifc.org/wps/wcm/connect/06d96e58-6aa1-4317-8ce3-87fb60b86cd1/IFC-TechMontereyCaseStudy-final-3.pdf?MOD=AJPERES&CVID=m-x1B1Z; and interview with Raúl Rodríguez Barocio, Associate Vice President of Internationalization, Tecnológico de Monterrey; content provided by Sergio Ortiz Valdez, California Office Director, Tecnolóogico de Monterrey.

20 Content provided by Martha Leal González, Director of Planning, Postgraduate, Outreach and International Cooperation and Networks, Instituto de Innovación y Transferencia de Tecnología (I2T2).

21 Csoftmty, "Cluster TIC de Monterrey", 2019.

22 Endeavor Insight, "Evaluation and Network Analysis of the Monterrey Tech Sector", October 2018, https://www.endeavor.org.mx/data_lab2.html#pub2.

23 "Venture Capital Funds in Mexico," Tracxn, June 26, 2019, https://tracxn.com/d/investor-lists/Venture-Capital-Funds-in-Mexico.

24 "Toro Ventures," Dealroom.co, accessed April 29, 2021,https://app.dealroom.co/investors/toro_ventures_1/portfolio/co-investors.

25 Lustig, Nathan, "Mexico's Startup Ecosystem; Mexico City, Monterrey, and Guadalajara," Nathan Lustig blog, January 13, 2018, https://www.nathanlustig.com/mexico-startup-ecosystem/.

26 "Proeza Ventures Raises US $50M for Mobility Focused Companies," LAVCA, January 13, 2020, https://lavca.org/2020/01/13/proeza-ventures-raises-us50m-for-mobility-focused-companies/.

27 "Xtraordinary Venture Partners," Prequin, accessed April 29, 2021, https://www.preqin.com/data/profile/fund-manager/xtraordinary-venture-partners/403998.

28 Endeavor Insight, "Evaluation and Network Analysis of the Monterrey Tech Sector," October 2018, https://www.endeavor.org.mx/data_lab2.html#pub2

29 AMEXCAP, Mexico VC Overview 2019, http://amexcap.com/contenido/overview-of-the-venture-capital-industry-in-mexico-october-2019.

30 Enlace+ website, accessed April 21, 2021, http://enlacee.org/.

31 Endeavor website, accessed April 21, 2021, https://endeavor.org/.

32 Mty Digital Hub Facebook page, accessed April 21, 2021, https://www.facebook.com/mtydigitalhub/

33 NEORIS press release, "NEORIS Announces Creation of Innovation Labs Worldwide to Create a Smarter Future," July 16, 2018,https://static1.squarespace.com/static/5b51602f1137a69fe86ba917/t/5b5904718a922d06e01164c9/1532560497989/PR+2018+Jul+Innovation+Lab.pdf.

34 Interview with Rogelio De los Santos, Co- Founder & Managing Partner, Dalus Capital.

35 Csoftmty, "Monterrey: Capital of Digital Transformation" ongoing project.

36 INCmty website, https://www.incmty.com; interview with Josué Delgado, CEO, INCmty; interview with Rogelio De los Santos, Founder, INCmty.

37 Interview with Rogelio De los Santos, Co- Founder & Managing Partner, Dalus Capital.

38 Interview with Martin Adolfo Herrera Salado, CEMEX.

39 "Cemex Ventures launches Construction Startup Competition," AEC Magazine, February 19, 2019, https://www.aecmag.com/technology-mainmenu-35/1756-cemex-ventures-launches-construction-startup-competition.

40 "About Us," CEMEX Ventures, accessed March 13, 2020, https://www.cemexventures.com/about-us/#our-offer.

41 "StructionSite Raises $1.5M Seed Financing," FinSMEs, January 7, 2019, http://www.finsmes.com/2019/01/structionsite-raises-1-5m-seed-financing.html.

42 CEMEX, "Building a Stronger CEMEX: 2018 Integrated Report," 2019, https://www.cemex.com/documents/20143/47791895/IntegratedReport2018.pdf.

43 "The First Digital Transformation Ecosystem in Mexico: Monterrey Digital Hub," Business Wire, July 12, 2018, https://www.businesswire.com/news/home/20180712005924/en/Digital-Transformation-Ecosystem-Mexico-Monterrey-Digital-Hub; Interview with Martin Adolfo Herrera Salado, CEMEX.

44 "NEORIS Announces Strategic Global Expansion," Business Wire, May 11, 2017, https://www.businesswire.com/news/home/20170511006294/en/NEORIS-Announces-Strategic-Global-Expansion.

45 NEORIS on LinkedIn, accessed March 14, 2020, https://www.linkedin.com/company/neoris/about/.

46 "Arturo Galván," Endeavor website, accessed March 14, 2020, https://endeavor.org/entrepreneur/arturo-galvan/.

47 "Terra Acquires Infosel in $300 Million Deal; Files Plans For IPO," Waters Technology, November 8, 1999, https://www.waterstechnology.com/data-management/1618553/terra-acquires-infosel-in-300-million-deal-files-plans-for-ipo.

48 "Spanish Net IPO surges," CNN Money, November 17, 1999, https://money.cnn.com/1999/11/17/europe/terra/.

49 "About Us," Infosel, accessed March 14, 2020, https://www.infosel.com/corporativo/quienes-somos/.

50 Naranya on Facebook, accessed March 14, 2020, https://www.facebook.com/pg/NaranyaGroup/about/.

51 Arturo Galván on LinkedIn, accessed March 14, 2020, https://www.linkedin.com/in/arturogalvan/?originalSubdomain=mx.

52 "Naranya Profile," Thalamus, accessed March 14, 2020, https://www.thalamus.co/buyers/naranya.

53 "Our Story," Naranya website, accessed March 14, 2020, http://www.naranya.com/our-business/.

54 "History," Softtek, accessed April 21, 2021, https://www.softtek.com/about/history.

55 Softtek, "2018 Sustainability Report," 2019, http://www.softtek.com/images/public/docs/03sepeng-sustainability-report-softtek-2018pages.pdf.

56 "Global Delivery Model, " Softtek, accessed April 21, 2021, https://www.softtek.com/solutions/global-delivery.

57 Interview with David Jimenez Santos, Managing Director CPG, Softtek.

58 Interview with Luis Garza Sada, December 10, 2019.

59 Interviews with Tuto Assad, December 18, 2019 and July 3, 2020.

60 Interview with Carlos Guillermo Elizondo, September 2019.

61 Stengel, Geri, "Hispanic Female Founder Raises $1 Million Via Reg CF To Improve Cancer Detection," Forbes, July 1, 2020, https://www.forbes.com/sites/geristengel/2020/07/01/hispanic-female-founder-raises-1-million-via-reg-cf-to-improve-cancer-treatment/?sh=6e8bdedf18aa.

62 "Delee," Republic, accessed April 22, 2021, https://republic.co/delee.

63 Delee Corp, "Unaudited Financial Statements, Period of January 1, 2017 through December 31, 2018," https://sec.report/Document/0001790674-20-000001/financials.pdf.

64 Nitrocel Technologies blog page, accessed April 22, 2021, https://nitroceltechnologies.wordpress.com.

65 Interview with Alejandro Espinosa, Founder, Nitrocel Technologies and BioLaunch.

66 Lourdes Flores, "Nuevo León apuesta por energías renovables," El Economista, October 24, 2018, https://www.eleconomista.com.mx/estados/Nuevo-Leon-apuesta-por-energias-renovables-20181024-0113.html.

67 Endeavor Insight, "Evaluation and Network Analysis of the Monterrey Tech Sector," October 2018, https://www.endeavor.org.mx/data_lab2.html#pub2.

Chapter 6
Mexico City and the State of Mexico

1 Cuéntame de México website, INEGI, acccessed April 20, 2021, http://cuentame.inegi.org.mx/default.aspx.

2 INEGI Censos Económicos, 2018 data, https://www.inegi.org.mx/app/saic/. In this database, Financial refers to financial services, Commerce to traditional retail business, and Non-Financial to non-government owned businesses outside the financial and retail sectors (e.g., services, transportation and communications).

3 "Las 500 Empresas Más Importantes de México," Expansión, accessed April 30, 2021, https://expansion.mx/empresas/2020/07/15/estas-son-las-500-empresas-mas-importantes-de-mexico-2020.

4 INEGI Censos Económicos, 2018 data, https://www.inegi.org.mx/app/saic/.

5 "Información estadística general de flujos de IED hacia México desde 1999," Datos Abiertos, Gobierno de México, accessed May 2, 2021, https://datos.gob.mx/busca/dataset/informacion-estadistica-de-la-inversion-extranjera-directa/resource/06ad9dbb-cbd2-4b17-9586-daf78326308a.

6 "Listado de Instituciones y empresas de Ciencia y Tecnología vigentes por sector, entidad federativa 2018," Datos Abiertos, Gobierno de México, accessed May 2, 2021, https://datos.gob.mx/busca/dataset/registro-de-instituciones-y-empresas-de-ciencia-y-tecnologia-reniecyt/resource/cd5ad407-5e12-4f02-a514-bb901fdd6012.

7 "Índice Nacional De Ciencia, Tecnología E Innovación 2018, Ebook," CAIINNO, December 2018, https://www.caiinno.org/wp-content/uploads/2018/12/INDICE-2018.pdf.

8 "Número de investigadores del Sistema Nacional de Investigadores por entidad federativa," SEMARNAT, Gobierno de México, accessed May 2, 2021, http://dgeiawf.semarnat.gob.mx:8080/ibi_apps/WFServlet?IBIF_ex=D4_CYT00_02_2&IBIC_user=dgeia_mce&IBIC_pass=dgeia_mce&NOMBREENTIDAD=*&NOMBREANIO=*

9 "Sistema Nacional de Investigadores," CONACYT, Gobierno de México, accessed May 2, 2021, https://www.conacyt.gob.mx/Sistema-nacional-de-investigadores.html.

10 "Unidades de Incubación de Empresas del Sistema InnovaUNAM," InnovaUNAM, accessed May 2, 2021, https://innova.unam.mx/innova/index.php/red-de-incubadoras/.

11 "Centro De Emprendimiento Acreditado Como Incubadora De Alto Impacto," Universidad Panamericana, marzo de 2018, https://www.up.edu.mx/es/noticias/33524/centro-de-emprendimiento-acreditado-como-incubadora-de-alto-impacto.

12 "Research Centers," IPADE Business School, https://www.ipadebusinessschool.com/research-centers/

13 "Bienvenido a la IBERO," IBERO, accessed May 3, 2021, https://ibero.mx/bienvenido-ibero.

14 "El campus," IBERO, accessed May 3, 2021, https://ibero.mx/el-campus.

15 "Galería," CEDE, IBERO, accessed May 3, 2021, https://cede.ibero.mx/cede.

16 "Programa de Emprendimiento Social," CEDE, IBERO, accessed May 3, 2021, https://cede.ibero.mx/programa-emprendedor-social.

17 "Así contribuye la Anáhuac al Emprendimiento en México," Red de Universidades Anáhuac blog, 13 November 2019, https://www.anahuac.mx/blog/asi-contribuye-la-anahuac-al-emprendimiento-en-mexico.

18 "9 programa universitarios que transformarán tu futuro," Red de Universidades Anáhuac blog, 7 May 2018, https://www.anahuac.mx/blog/9-programas-universitarios-que-transformaran-tu-futuro

19 Tecnológico de Monterrey website, accessed May 3, 2021, https://tec.mx/es and https://tec.mx/en/entrepreneurship.

20 "EPIC Lab: Acerca" ITEM, accessed May 2, 2021, https://www.epiclab.itam.mx/acerca-de.

21 Interview with Francisco Pérez González, Dean, ITAM.

22 "Evaluation and Network Analysis of the Mexico City Tech Sector," Endeavor Insight and Banorte, February 2020, https://www.endeavor.org.mx/articulos_data_lab/Efecto_Multiplicador_CDMX/EFECTO%20MULTIPLICADOR%20-%20CDMX%20ING.pdf.

23 "Mexico VC Overview 2019," AMEXCAP, October 16, 2019, pgs. 9 and 31, https://amexcap.com/2020/07/22/overview-of-the-venture-capital-industry-in-mexico-2019/.

24 "Evaluation and Network Analysis of the Mexico City Tech Sector," Endeavor Insight and Banorte, February 2020, https://www.endeavor.org.mx/articulos_data_lab/Efecto_Multiplicador_CDMX/EFECTO%20MULTIPLICADOR%20-%20CDMX%20ING.pdf.

25 Interview with Vijay Rajendran, Head of Corporate Innovation, Ecosystems Team, 500 Startups.

26 "Evaluation and Network Analysis of the Mexico City Tech Sector," Endeavor Insight and Banorte, February 2020, https://www.endeavor.org.mx/articulos_data_lab/Efecto_Multiplicador_CDMX/EFECTO%20MULTIPLICADOR%20-%20CDMX%20ING.pdf.

27 Ibid.

28 Azevedo, Mary Ann, "Report: VC Funding In Latin America More Than Doubled To A Record $4.6B In 2019," Crunchbase News, May 6, 2020, https://news.crunchbase.com/news/report-vc-funding-in-latin-america-more-than-doubles-to-4-6b-in-2019/.

29 "$ Funding Round: Series C – Clip," Crunchbase, accessed May 4, 2021, https://www.crunchbase.com/funding_round/payclip-series-c--1c6e7867.

30 Hinchliffe, Ruby, "Mexican lendtech startup Konfio bags $100m investment led by Softbank," Fintech Futures, North American Edition, December 5, 2019, https://www.fintechfutures.com/2019/12/mexican-lendtech-start-up-konfio-bags-100m-investment-led-by-softbank/.

31 "Evaluation and Network Analysis of the Mexico City Tech Sector," Endeavor Insight and Banorte, February 2020, https://www.endeavor.org.mx/articulos_data_lab/Efecto_Multiplicador_CDMX/EFECTO%20MULTIPLICADOR%20-%20CDMX%20ING.pdf.

32 "$ Funding Round: Series B – Kavak," Crunchbase, accessed May 4, 2021, https://www.crunchbase.com/funding_round/kavak-series-b--06aace24.

33 Solomon, Daina Beth, "SoftBank-Backed used-car startup Kavak becomes first Mexican unicorn," Reuters, September 30, 2020, https://www.reuters.com/article/mexico-kavak/softbank-backed-used-car-startup-kavak-becomes-first-mexican-unicorn-idUSL1N2GR2V9.

34 "Vallejo-i: Industria & Innovación," Alcaldía Azcapotzalco, accessed May 4, 2021, http://vallejo-i.mx/nosotros/.

35 "Historia de la Zona Industrial de Vallejo," Alcaldía Azcapotzalco, accessed May 4, 2021, http://vallejo-i.mx/historia/.

36 "Con una inversión de 75 millones de pesos, se realizó el CDIT Vallejo, que permitirá el procesamiento de información para fortalecer el vínculo entre la industria, la ciudadanía y la academia," Alcaldía Azcapotzalco, accessed May 4, 2021, http://vallejo-i.mx/tag/cdit/.

37 "Dependencia: Acerca de," Gobierno de la Ciudad de México, accessed May 4, 2021, https://www.adip.cdmx.gob.mx/dependencia/acerca-de.

38 "City Innovation: Mexico City," Bloomberg Philanthropies and OECD, accessed May 4, 2021, https://cities-innovation-oecd.com/cities/mexico-city-mex/.

Chapter 7
Guadalajara and Jalisco

1 INEGI Censos Económicos, 2018 data, https://www.inegi.org.mx/app/saic/

2 CAIINNO, "Índice Nacional de Ciencia, Tecnología e Innovación 2018," https://www.caiinno.org/wp-content/uploads/2018/12/INDICE-2018.pdf.

3 "Enrollments by Institution in Guadalajara (Total 2020)," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 14, 2021, https://datamexico.org/en/profile/geo/guadalajara-991401#educacion.

4 "Jalisco: Your Partner for Growth," Jalisco Gobierno Del Estado, September 2020, 2020-09 DGAI High tech Jalisco.pdf slide deck not available online.

5 "Enrollments by Institution in Guadalajara (Total 2020)," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 14, 2021, https://datamexico.org/en/profile/geo/guadalajara-991401#educacion.

6 "Jalisco: Your Partner for Growth," Jalisco Gobierno Del Estado, September 2020, 2020-09 DGAI High tech Jalisco.pdf slide deck not available online.

7 "Enrollments by Institution in Mexico (Total 2020)," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 14, 2021, https://datamexico.org/en/profile/geo/mexico#educacion.

8 "Centro Universitario de Ciencias Exactas e Ingenierías: Licenciaturas," Universidad de Guadalajara, accessed May 5, 2021, http://www.cucei.udg.mx/es/oferta-academica/licenciaturas.

9 "Enrollments by Institution in Guadalajara (Total 2020)," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 14, 2021, https://datamexico.org/en/profile/geo/guadalajara-991401#educacion.

10 González, Carlos, "Here are the 3 keys to demystifying Artificial Intelligence," Conecta: The news site of Tecnológico de Monterrey, October 7, 2020, https://tec.mx/en/news/guadalajara/research/here-are-3-keys-demystifying-artificial-intelligence.

11 González, Carlos, "How will the Tec use its new Artificial Intelligence Hub to innovate?" Conecta: The news site of Tecnológico de Monterrey, November 11, 2019, https://tec.mx/en/news/guadalajara/research/how-will-tec-use-its-new-artificial-intelligence-hub-innovate.

12 "Enrollments by Institution in Guadalajara (Total 2020)," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 14, 2021, https://datamexico.org/en/profile/geo/guadalajara-991401#educacion.

13 "Inicio: ITESO–Degrees," ITESO, Universidad Jesuita de Guadalajara, accessed May 15, 2021, https://carreras.iteso.mx/inicio.

14 "Programa de Emprendimiento," ITESO, Universidad Jesuita de Guadalajara, accessed May 15, 2021, https://universidadempresa.iteso.mx/emprendimiento.

15 "Enrollments by Institution in Guadalajara (Total 2020)," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 14, 2021, https://datamexico.org/en/profile/geo/guadalajara-991401#educacion.

16 "CIAPE," UAG, accessed May 15, 2021, http://cipae.uag.mx.

17 "Incubadora UAG: Quiénes Somos," UAG, accessed May 15, 2021, http://cipae.uag.mx/uag-incubadora/quienes-somos/.

18 INEGI Censos Económicos, 2018 data, https://www.inegi.org.mx/app/saic/.

19 "Tech Giants Attracted to Mexico's Silicon Valley in Guadalajara," The Mazatlán Post, July 11, 2019, https://themazatlanpost.com/2019/07/11/tech-giants-attracted-to-mexicos-silicon-valley-in-guadalajara/.

20 "Jalisco: Your Partner for Growth," Jalisco Gobierno Del Estado, September 2020, 2020-09 DGAI High tech Jalisco.pdf slide deck not available online.

21 "Equity Capital by Country of Origin: 2017, 2018, 2019, 2020," DataMéxico, Secretaría de Economía, Gobierno de México, accessed May 15, 2021, https://datamexico.org/en/profile/geo/jalisco-jc?fdi#economia-inversion-extranjera.

22 "IT Sector in Jalisco: The 'Mexican' Silicon Valley," IJALTI, September 2020, IJALTI_English_2020_v2.pdf slide deck not online.

23 "IT Sector in Jalisco: The 'Mexican' Silicon Valley," IJALTI, September 2020, IJALTI_English_2020_v2.pdf slide deck not online.

24 "Centro del Software," IJALTI Cluster Manager, accessed May 15, 2021, https://www.ijalti.org.mx/centro-del-software/.

25 "Where we are," Flex, accessed May 19, 2021, https://flex.com/careers/locations/mexico-en.

26 "Jalisco: Your Partner for Growth," Jalisco Gobierno Del Estado, September 2020, 2020-09 DGAI High tech Jalisco.pdf slide deck not available online.

27 Ibid.

28 "Tech Giants Attracted to Mexico's Silicon Valley in Guadalajara," The Mazatlán Post, July 11, 2019, https://themazatlanpost.com/2019/07/11/tech-giants-attracted-to-mexicos-silicon-valley-in-guadalajara/.

29 Interview with Dr. Francisco Medina Gómez, Director General, Consejo Estatal de Ciencia y Tecnología de Jalisco–COECYTJAL (Jalisco state council of science and ttechnology) and "Role of COECYTJAL in Jalisco's Economic Development," September 2020, Role of COECYTJAL in Jalisco´s Economic Development.pptx slide deck not online.

30 "2019 – 2020 Report | Corporate Responsibility at Intel Mexico: Executive Summary," Intel, October, 2020, https://www.intel.com/content/www/us/en/corporate-responsibility/csr-report-builder.html.

31 Interview with Jesus Palomino, General Director, Intel Design Center Guadalajara.

32 "Anuario Estadístico de Cine Mexicano 2019: Statistical Yearbook of Mexican Cinema," IMCINE and Secretaria de Cultura, Gobierno de México, 2019, http://anuariocinemx.imcine.gob.mx/Assets/anuarios/2019.pdf.

33 "Filma en Jalisco," Comisión de Filmaciones del Estado de Jalisco, accessed May 16, 2021, http://www.filmaenjalisco.com/index-ing.html.

34 "Da un vistazo a 'El Taller del Chucho'; está al 80% de su construcción," Informador.mx, 10 de Marzo de 2021, https://www.informador.mx/cultura/Da-un-vistazo-a-El-Taller-del-Chucho-esta-al-80-de-su-construccion---20210310-0005.html.

35 Interview with Rodolfo Guzmán, Director General, Jalisco Film Commission.

36 Kendall, Matt, "Infographic: How Guadalajara Became Mexico's Silicon Valley," Nearshore Americas, December 10, 2016, https://nearshoreamericas.com/infographic-mexico-guadalajara-silicon-valley/.

37 Interview with Benjamin Huerta Estrada, President, IJALTI.

38 Gallegos, Andrés, "Chapala Media Park busca más negocios," El Diario NTR, 4 del Mayo de 2016, https://www.ntrguadalajara.com/post.php?id_nota=37915.

39 "Somos CANIETI Occidente," CANIETI Occidente, accessed May 16, 2021, https://www.canietioccidente.org/somos/.

40 Interview with Dr. Francisco Medina, Director General, Consejo Estatal de Ciencia y Tecnología de Jalisco–COECYTJAL.

41 Carillo, Eduardo, "UdeG, gobierno e industria instalan el Consejo 4.0 en Jalisco," Universidad de Guadalajara, 10 de abril de 2018, https://www.udg.mx/es/noticia/udeg-gobierno-e-industria-instalan-consejo-40-jalisco.

42 Interview with Bismarck Lepe, CEO, Wizeline.

43 Ibid.

44 Interview with Benjamin Huerta Estrada, President, IJALTI.

45 Interview withTony Rallo, Founder ID345.

46 "VC Overview 2020, AMEXCAP, March 3, 2021, p 9, full digital report available to members only, https://amexcap.com/2021/03/03/vc-overview-2020/

47 Becerril, Antonio, "Talent Land 2019 apuesta por el talento hecho en México," El Economista, 22 de abril de 2019, https://www.eleconomista.com.mx/tecnologia/Jalisco-Talent-Land-quiere-seguir-apostando-por-el-talento-hecho-en-Mexico-20190422-0040.html.

48 Talent Land home page, accessed May 16, 2021, https://www.talent-land.mx/en/home/.

49 Interview with Raul Martin, CEO & Co-Founder, Talent Land.

50 StartupGDL About page, accessed May 17, 2021, https://www.startupgdl.com/about/index.html.

51 Interview with Cindy Blanco Ochoa, Co-Founder & CEO, StartupGDL.

52 Interview with Raul Martin, CEO & Co-Founder, Talent Land.

53 Interview with Cindy Blanco Ochoa, Co-Founder & CEO, StartupGDL.

54 Interview with Luke Finney, Co-Founder and Head of Operations, Terminal.

55 "Kueski," Crunchbase listing, accessed May 17, 2021, https://www.crunchbase.com/organization/kueski

56 "yotepresto," Crunchbase listing, accessed May 17, 2021, https://www.crunchbase.com/organization/yotepresto-com.

57 Sunu home page, accessed May 17, 2021, https://www.sunu.com/en/index.

58 Alexiou, Gus, "Sunu Band—The Smart Wearable Helping Blind People Maintain Social Distance," Forbes, August 30, 2020, https://www.forbes.com/sites/gusalexiou/2020/08/30/sunu-band--the-smart-wearable-helping-blind-people-maintain-social-distance/?sh=6f5a9273bece.

59 Interview with Bismarck Lepe, CEO, Wizeline.

60 Interview with Errette Dunn, CEO & Co-Founder, Rever.

61 "Guadalajara, Jalisco as of Today," StartupGDL, May 2020.

62 Interview with Cindy Blanco Ochoa, Co-founder & CEO, StartupGDL.

Chapter 8

El Bajío and Yucatán

1 "Aguascalientes: Driving Mexico from Within," Aguascalientes Gobierno Del Estado, December 2020, Presentación Be Part of It (USA).pdf slide deck not available online.

2 "Up 47% in six years, the Bajio powers growth in manufacturing industry," Mexico News Daily, February 20, 2019, https://mexiconewsdaily.com/news/bajio-powers-growth-in-manufacturing-industry/.

3 "Aguascalientes: Driving Mexico from Within," Aguascalientes Gobierno Del Estado, December 2020, Presentación Be Part of It (USA).pdf slide deck not available online.

4 Invest in Aguascalientes, InvestInMX, February 2021, https://investinmx.com/public/economic-profiles/aguascalientes/why-invest-aguascalientes.pdf.

5 Vartabedian, Marc, "In Mexico's own Motor City, billion-dollar investments but also fear of Trump's trade moves," Los Angeles Times, April 23, 2018, https://www.latimes.com/world/la-fg-mexico-nafta-autos-20180423-story.html.

6 "Doing Business Mexico," Deloitte, 2020, https://www2.deloitte.com/content/dam/Deloitte/mx/Documents/tax/2020/Doing-Business-Mexico-2020-English.pdf.

7 Becerril, Ilse, "Conexión regional en el Bajío consolidó a Guanajuato," El Economista, 14 de junio do 2018, https://www.eleconomista.com.mx/estados/Conexion-regional-en-el-Bajio-consolido-a-Guanajuato-20180614-0005.html.

8 "The pillars of the economy of Guanajuato," Tecma, 2020, https://www.tecma.com/the-pillars-of-the-economy-of-guanajuato/.

9 LaReau, Jamie L. and Phoebe Wall Howard, "GM to restart its plants in Mexico as soon as Thursday night," Detroit Free Press, May 21, 2020, https://www.freep.com/story/money/cars/general-motors/2020/05/21/gm-restarts-plants-mexico-coronavirus/5216336002/.

10 Iliff, Laurence, "Honda to shift Mexico auto output to newer plant," Automotive News, September 12, 2019, https://www.autonews.com/manufacturing/honda-shift-mexico-auto-output-newer-plant.

11 "Overview of Toyota's Manufacturing Plant in Guanajuato, Mexico," Tetakawi, January 16, 2020, https://insights.tetakawi.com/toyotas-manufacturing-plant-in-guanajuato.

12 "Guanajuato's automotive industry grows 27% despite the pandemic," MexicoNOW, October 27, 2020, https://mexico-now.com/guanajuatos-automotive-industry-grows-27-despite-the-pandemic/.

13 "SkyPlus, first Aerospace park in Guanajuato," MexicoNOW, November 13, 2017, https://mexico-now.com/skyplus-first-aerospace-park-in-guanajuato/.

14 "Global Market Report,"NAI CIR/NAI Global, January 2011, http://www.naicir.com/portals/36/docs/nai%20cir_lowres.pdf.

15 "Indice de Competitividad Estatal 2021," IMCO, 2021, https://imco.org.mx/indices/indice-de-competitividad-estatal-2021/

16 "Invest in Querétaro," Querétaro State Government, 2019, https://www.investinqueretaro.com.

17 "Titular de SEDESU presenta el HUB IQ," Secretaría de Desarrollo Sustentable, 28 de enero de 2021, https://www.queretaro.gob.mx/sedesu/noticias.aspx?q=63j01wSCoaxDaXwundtcDA==.

18 Estrella, Viviana, "Industria automotriz, motor manufacturero de Querétaro," El Economista, 21 de febrero de 2019, https://www.eleconomista.com.mx/estados/Industria-automotriz-motor-manufacturero-de-Queretaro-20190221-0009.html.

19 "Querétaro: Crown Jewel of El Bajio and Mexico's Manufacturing Industries," Co-Production International, accessed May 21, 2021, https://www.co-production.net/el-bajio-mexico-manufacturing; https://insights.tetakawi.com/queretaros-manufacturing-industry

20 Cameron, Doug, "Aerospace Supplieers Brace for Hard Landing," The Wall Street Journal, August 12, 2020, https://www.wsj.com/articles/aerospace-suppliers-brace-for-hard-landing-11597233600.

21 Enríquez, Alejandro, "Queretaro Aerospace Hub: Best Practices and Next Steps," MexicoBusiness.news, November 27, 2019, https://mexicobusiness.news/aerospace/news/queretaro-aerospace-hub-best-practices-and-next-steps

22 "Querétaro | Origin Foreign Direct Investment (FDI)," DataMÉXICO, accessed May 21, 2021, https://datamexico.org/en/profile/geo/queretaro-qt?investmentType=totalInvestment.

23 "Destaca Querétaro a nivel nacional en educación superior," El Queretano Digital, 3 marzo, 2021, https://elqueretano.info/trafico/destaca-queretaro-a-nivel-nacional-en-educacion-superior/.

24 "Querétaro | Higher Education Enrollment by Institution and Careers," DataMÉXICO, accessed May 21, 2021, https://datamexico.org/en/profile/geo/queretaro-qt#educacion-distribucion-estudiantes.

25 "CIC 4.0: Creativity and Innovation Center 4.0," UTEQ, accessed May 21, 2021, https://www.uteq.edu.mx/CIC4/Default.aspx?gC2Sr=113

26 "Tekcapital signs agreement with UTEQ to expand services in Mexico," Invention Evaluator Tekblog, August 11, 2019, https://emazedesign.com/InventionEvaluator/2019/08/11/tekcapital-signs-agreement-uteq-expand-services-mexico/.

27 Moss, Sebastian, "Axtel opens US$25m data center in Querétaro, Mexico," Data Center Dynamics, July 5, 2017, https://www.datacenterdynamics.com/en/news/axtel-opens-us25m-data-center-in-quer%C3%A9taro-mexico/.

28 "Centro de servicios globales de Huawei en Querétaro," Huawei, accessed May 22, 2021, https://e.huawei.com/mx/videolist/video/7181a93da151466884dc8ab7ee3ffd6b.

29 Ammachchi, Narayan, "Deloitte Launches Regional Technology Service Center in Querétaro, Mexico," Nearshore Americas, February 1, 2017, https://nearshoreamericas.com/deloitte-launches-regional-technology-service-center-mexicos-queretaro/.

30 "Querétaro: Mexico's emerging 4.0 hub," BNamericas, February 18, 2021, https://www.bnamericas.com/en/features/queretero-mexicos-emerging-40-hub.

31 "About ASTATE," Arkansas State University, accessed May 22, 2021, https://astate.mx/about.

32 "Indice de Competitividad Estatal 2021," IMCO, 2021, https://imco.org.mx/indices/indice-de-competitividad-estatal-2021/

33 "Aguascalientes: Driving Mexico from Within," Aguascalientes Gobierno Del Estado, December 2020, Presentación Be Part of It (USA).pdf slide deck not available online.

34 "Aguascalientes: Driving Mexico from Within," Aguascalientes Gobierno Del Estado, December 2020, Presentación Be Part of It (USA).pdf slide deck not available online.

35 "Aguascalientes: Economy | Workforce," InvestInMX, accessed May 22, 2021, https://investinmx.com/why-invest/aguascalientes/economy.

36 "Aguascalientes: Infrastructure," InvestInMX, accessed May 22, 2021, https://investinmx.com/why-invest/aguascalientes/infrastructure.

37 INEGI Censos Económicos, 2018 data, https://www.inegi.org.mx/app/saic/.

38 "Aguascalientes: Driving Mexico from Within," Aguascalientes Gobierno Del Estado, December 2020, Presentación Be Part of It (USA).pdf slide deck not available online.

39 "Manufacturing in Mexico: Everything You Need to Know," Tetakawi, February 22, 2020, https://insights.tetakawi.com/manufacturing-in-mexico-everything-you-need-to-know.

40 "Aguascalientes: Driving Mexico from Within," Aguascalientes Gobierno Del Estado, December 2020, Presentación Be Part of It (USA).pdf slide deck not available online.

41 "Bienvenidos a CIATEQ," CIATEQ, Gobierno de México, 1 Abril 2020, https://www.ciateq.mx/index.php/conoce-ciateq.html.

42 Vásquez, Victor, "Ciateq ofrece a la industra investigación diseño y producción," Mexico Industry, Marzo 2020, https://mexicoindustry.com/noticia/ciateq-ofrece-a-la-industria-investigacion-diseno-y-produccion.

43 "About CIMAT," CONACYT, Gobierno de México, accessed May 22, 2021, https://cimat.mx/en/about_cimat.

44 "¿Qué es INFOTEC?" INFOTEC, Govierno de México,accessed May 22, 2021, https://www.infotec.mx/Infotec.

45 Interview with Sergio Rosengaus, Founder, Kio Networks.

46 Becerril, Ilse, "Conexión regional en el Bajío consolidó a Guanajuato," El Economista, 14 de junio de 2018, https://www.eleconomista.com.mx/estados/Conexion-regional-en-el-Bajio-consolido-a-Guanajuato-20180614-0005.html.

47 Romo, Patricia, "Gobernadores formalizan Alianza Centro-Bajío-Occidente," El Economista, 21 de febrero de 2020, https://www.eleconomista.com.mx/estados/Gobernadores-formalizan-Alianza-Centro-Bajio-Occidente-20200220-0146.html.

48 "What infra projects will be priority for Mexico's Bajío alliance?" BNamericas, March 4, 2020, https://www.bnamericas.com/en/features/what-infra-projects-will-be-priority-for-mexicos-bajio-alliance.

49 Valencia, Hugo, "Nodos Binacionales de Innovacion del Conacyt: ideas sin fronteras," Mi Patente, 23 May, 2021, https://www.mipatente.com/nodos-binacionales-de-innovacion-del-conacyt-ideas-sin-fronteras/.

50 "Yucatán, uno de los estados con mayor crecimiento económico en el pais," Gobierno del Estado de Yucatán, 13 de abril de 2020, http://www.yucatan.gob.mx/saladeprensa/ver_nota.php?id=2702.

51 "Indicadores del Inegi confirman que Yucatán es de los estados con mayor calidad de vida del pais," Gobierno del Estado de Yucatán, 26 de enero de 2021, https://www.yucatan.gob.mx/saladeprensa/ver_nota.php?id=4156.

52 "Paraíso de inversión: ¿por qué Mérida es la mejor ciudad para invertir?" Immobilia, 24 de marzo, 2021, https://info.inmobiliamx.com/blog/paraiso-de-inversion-por-que-merida-es-la-mejor-ciudad-para-invertir.

53 "Índice de Estado de Derecho en México 2019–2020," World Justice Project, https://docplayer.es/177985689-Indice-de-estado-de-derecho-en-mexico.html.

54 "Yucatán y sus principales sectores productivos y estratégicos," Secretaría de Economía, Gobierno de México, 30 de noviembre de 2017, https://www.gob.mx/se/articulos/yucatan-y-sus-principales-sectores-productivos-y-estrategicos.

55 "Yucatán cuenta con infraestructura equipada con tecnología de primer mundo para la capacitación de recursos humanos en materia tecnológica y de diseño digital," Gobierno del Estado de Yucatán, 18 de fereero de 2021, https://www.yucatan.gob.mx/saladeprensa/ver_nota.php?id=4271.

56 Vazauez, Carlos A., "Yucatan: A Landing Pad for Tech Companies and Investors," CodersLink, July 25, 2020, https://codersslink.com/company/blog/yucatan-a-landing-pad-for-tech-companies-and-investors/.

57 Content supplied by Antonio Gonzales, General Director, Instituto Yucateco de Emprendedores.

58 "Startup Ecosystem Fanking of Startups – Mexico," StartupBlink, accessed May 24, 2021, https://www.startupblink.com/startups/merida+mexico.

59 "Reitera Gobernador Mauricio Vila Dosal disposición al diálogo y al trabajo conjunto con la iniciativa privada para impulsar el desarrollo del estado," Gobierno del Estado de Yucatán, 12 de marzo de 2021, https://www.yucatan.gob.mx/saladeprensa/ver_nota.php?id=4394.

60 "Especial Economic Zone of Yucatan, will be transformed into 'Technology Wellbeing Pole'," The Yucatan Times, May 9, 2019, https://www.theyucatantimes.com/2019/05/especial-economic-zone-of-yucatan-will-be-transformed-into-technology-wellbeing-pole/.

61 "Yucatán stands out in Technology, Innovation and Communications," The Yucatan Times, August 30, 2018, https://www.theyucatantimes.com/2018/08/yucatan-stands-out-in-technology-innovation-and-communications/.

62 "Mérida will become a 'Smart City'." The Yucatan Times, November 23, 2017, https://www.theyucatantimes.com/2017/11/merida-will-become-a-smart-city/.

63 "Yucatán, epicentro de desarrollo económico, social y ambiental de Latinoamérica," Smart City Expo LATAM Congress, accessed May 24, 2021, http://www.smartcityexpolatam.com/yucatan.

64 Interview with Bernardo Cisneros Buenfil, Secretary of Research, Innovation and Higher Education, Gobierno del Estado de Yucatán.

65 "Wind power in Yucatan, Progreso wind farm installation is progressing well," REVE, February 4, 2020, https://www.evwind.es/2020/02/04/wind-power-in-yucatan-progreso-wind-farm-installation-is-progressing-well/73380.

66 Gooderidge, Jack, "Clean energy initiatives thwarted by unexpected roadblock in Yucatán," Mexico News Daily, May 23, 2020, https://mexiconewsdaily.com/opinion/clean-energy-initiatives-thwarted/.

67 Godoy, Emilio, "Mexican communities reject Chinese solar farm in Yucatán," Diálogo Chino, May 5, 2020. https://dialogochino.net/en/climate-energy/35244-mexican-communities-reject-chinese-solar-yucatan/.

68 Gooderidge, Jack, "Clean energy initiatives thwarted by unexpected roadblock in Yucatán," Mexico News Daily, May 23, 2020, https://mexiconewsdaily.com/opinion/clean-energy-initiatives-thwarted/

69 "New wind farm is Yucatan's 5th clean-energy site," Yucatán Magazine, August 11, 2020, https://yucatanmagazine.com/new-wind-farm-is-yucatans-5th-clean-energy-site/.

70 Interview with Bernardo Cisneros Buenfil, Secretary of Research, Innovation and Higher Education, Gobierno del Estado de Yucatán.

71 "SIIES: Department of Research, Innovation and Higher Education, Yucatan State Government," Yucatan Scientific And Innovation Capacities.pptx slide deck not available online.

72 "The First Institution of its Kind in Mexico," Universidad Politécnica de Yucatán, accessed May 24, 2021, https://en.upy.edu.mx/naturaleza.

73 "CIMAT: Centro de Investigación en Matemáticas, A.C.," CIMAT and CONACYT, July 2013, https://www.matematicas.uady.mx/files/planeacion/presentacin_CIMAT_07_2013.pdf.

74 "Why Anahuac Mayab?" Anahuac Mayab | International, accessed May 24, 2021, https://merida.anahuac.mx/en/international/porque-anahuac-mayab.

75 "UNAM in Yucatán," SIIES, Gobierno del Estado de Yucatán, accessed May 24, 2021, https://siies.yucatan.gob.mx/unam-yucatan/.

76 "SIIES: Department of Research, Innovation and Higher Education, Yucatan State Government," Yucatan Scientific And Innovation Capacities.pptx slide deck not available online.

77 "Official Data," Anáhuac Mayab, January–July 2021, https://f.hubspotusercontent40.net/hubfs/3416190/Official%20Data_ene_2021_ING.pdf.

78 Valencia, Hugo, "Nodos Binacionales de Innovacion del Conacyt: ideas sin fronteras," Mi Patente, 23 May, 2021, https://www.mipatente.com/nodos-binacionales-de-innovacion-del-conacyt-ideas-sin-fronteras/.

79 "Emprendimiento," Anáhuac Mayab, accessed May 24, 2020, https://merida.anahuac.mx/emprendimiento.

80 "Ruta del Emprendimiento," tecniA, October 2020, https://f.hubspotusercontent40.net/hubfs/3416190/Ruta%20del%20Emprendimiento_tecniA_Direcci%C3%B3n%20de%20Emprendimiento.pdf.

81 DaCodes home page, accessed May 24, 2021, https://www.dacodes.com/?lang=en.

82 "Global Honours Program," Anáhuac Mayab, accessed May 24, 2020, https://merida.anahuac.mx/globalhonours.

83 Interview with Delfina Guedimin, Business Incubator and Accelerator Manager, tecniA.

84 Interview with Gildardo Sanchez, Rector, Universidad Politécnica de Yucatán.

85 Interview with Juan Manuel Ponce Díaz, Shareholder Director, Bepensa and CEO, Vive Peninsular.

86 Interview with Antonio Gonzales, General Director, Instituto Yucateco de Emprendedores (Yucatecan Institute of Entrepreneurs).

87 Weisenthal, Joseph, "Time Inc. Acquires 51 Percent Of Mexican Soccer Site MedioTiempo," CBS News, March 31, 2008, https://www.cbsnews.com/news/time-inc-acquires-51-percent-of-mexican-soccer-site-mediotiempo/.

88 Interview with Patricio Villalobos, Founding Partner, Underdog.

89 Interview with Ivan Espadas, Founder & General Director, Blue Ocean Technologies.

Chapter 9
Mexico in the Bay Area

1 For an excellent review of California history and of its Spanish and Mexican roots, see Kevin Star's *California: A History,* Modern Library, 2005.

2 "The Bracero Program," UCLA Labor Center, accessed May 25, 2021, https://www.labor.ucla.edu/what-we-do/research-tools/the-bracero-program/.

3 Consulate General of Mexico in San Francisco.

4 "Mexican Consulates in California," California Judicial Branch, February 2012, https://www.courts.ca.gov/partners/documents/ea_MXConsulCal.pdf.

5 "Hitoria," Consulado General de México en San Francisco, Secretaría de Relaciones Exteriores," Gobierno de México, 3 Agosto 2019, https://consulmex.sre.gob.mx/sanfrancisco/index.php/acerca-del-consulado/historia.

6 "Consulado General de Mexico en San Jose, Secretaría de Relaciones Exteriores," Gobierno de México, accessed May 25, 2021, https://consulmex.sre.gob.mx/sanjose/

7 "2018 Annual Impact Report | 2019 Membership Directory," Sister Cities International, June 2019, June 2019, https://sistercities.org/wp-content/uploads/2020/06/2019-SCI-Impact-Annual-Report-Final.pdf.

8 "The Mexican Revolution and the United States in the Collections of the Library of Congress: The Rise of Francisco Madero," Library of Congress, accessed May 25, 2021, https://www.loc.gov/exhibits/mexican-revolution-and-the-united-states/rise-of-madero.html.

9 Ordóñez, Andrés, "Itinerario diplomático y sentido intelectual en Octabio Paz," Revista Mexicana de Politica Exterior, numero especial 2014, https://revistadigital.sre.gob.mx/images/stories/numeros/ne2014/ordonez.pdf.

10 "The U.S.-Mexico Bilateral Forum on Higher Education, Innovation, and Research," U.S. Embassy & Consulates in Mexico, accessed May 26, 2021, https://mx.usembassy.gov/education-culture/education/the-u-s-mexico-bilateral-forum-on-higher-education-innovation-and-research/.

11 "About the Innovation Fund," 100,000 Strong in the Americas, accessed May 26, 2021, https://www.100kstrongamericas.org/about/.

12 "100,000 Strong Initiative in the Americas," U.S. Embassy & Consulates in Mexico, accessed May 26, 2021, https://mx.usembassy.gov/education-culture/education/100000-strong-initiative-in-the-americas/.

13 NACCS website, https://www.naccs.org/naccs/default.asp.

14 "Exchange Visitor Program for Teachers," California Department of Education, June 5, 2020, https://www.cde.ca.gov/sp/me/il/exchangevisit.asp.

15 "Binational Migrant Education Program," California Department of Education, June 5, 2020, https://www.cde.ca.gov/sp/me/il/binational.asp.

16 "The Binational Migrant Education Teacher Exchange Program: A Guide for Support 'Education Without Borders'," ESCORT, April 2013, https://www.cde.state.co.us/migrant/binationalteacherexchangeguide.

17 "Minutes," International Affairs and Trade Development Committee, Governor's Office of Business and Economic Development, August 27, 2019, p. 12, https://static.business.ca.gov/wp-content/uploads/2019/10/8-27-2019-Minutes.pdf

18 Watanabe, Teresa, "UC is moving forward with Mexican initiative, regardless of Trump actions," The San Diego Union-Tribune, March 23, 2017, https://www.sandiegouniontribune.com/news/california/la-me-ln-uc-napolitano-mexico-20170323-story.html.

19 "About CLAS," Center for Latin American Studies, University of California, Berkeley, October 25, 2018, https://clas.berkeley.edu/about.

20 "Conference: U.S.-Mexico Futures Forum, August 2017," Center for Latin American Studies, University of California, Berkeley, October 25, 2018, https://clas.berkeley.edu/events/fall-2017/us-mexico-futures-forum-august-2017.

21 "U.S.-Mexico Futures Forum, Fall 2020," Center for Latin American Studies, University of California, Berkeley, accessed May 26, 2021, https://live-clas.pantheon.berkeley.edu/series/futures?field_semester_year_tid=101.

22 Latinx Research Center home page, accessed May 26, 2021, https://lrc.berkeley.edu.

23 "Dialogues without Borders," Research Center for the Americas, UC Santa Cruz, https://rca.ucsc.edu.

24 Chicano Studies Institute home page, https://www.csi.ucsb.edu.

25 "UCLA Center for Mexican Studies," UCLA Latin American Institute, accessed May 26, 2021, https://www.international.ucla.edu/lai/center/mexico.

26 "About Us: Message from the Director," Latin American Studies Center, UC Irvine, accessed May 26, 2021, https://humanities.uci.edu/las/about/index.php.

27 Center for U.S.-Mexican Studies home page, UC San Diego, accessed May 26, 2021, https://usmex.ucsd.edu/.

28 "Mexican Migration Field Research Program (MMFRP)," UC San Diego, accessed May 26, 2021, https://usmex.ucsd.edu/courses/mmfrp.html.

29 Interview with Edward Klotzbier, Vice Chancellor, University of California, Merced.

30 "Study Abroad in Mexico," UCEAP, The Regents of the University of the University of California, accessed May 26, 2021, https://uceap.universityofcalifornia.edu/study-abroad-in-mexico.

31 "University of California in Mexico," GrantForward, March 10, 2021, https://www.grantforward.com/sponsor/detail/university-of-california-in-mexico-31729.

32 Gallardo, Gabriel, "La Casa de la Universidad de California en México, un puente hacia los EUA," Mexicanísmo, 11 marzo, 2019, https://www.mexicanisimo.com.mx/casa-de-la-universidad-de-california/.

33 "Alianza UCMX," UC Riverside, Regents of the University of California, accessed May 26, 2021, https://alianzaucmx.ucr.edu.

34 Interview with Isabel Studer, Director, Alianza UCMX.

35 "About UC-Mexico Initiative," UC Riverside, Regents of the University of California, accessed May 26, 2021, https://ucmexicoinitiative.ucr.edu/about.html.

36 UC MEXUS home page, UC Riverside, accessed May 26, 2021, https://ucmexus.ucr.edu.

37 Interview with Isabel Studer, Director, Alianza UCMX.

38 "Programs and Projects Related to Mexico in California State Government—2017 Update," California Research Bureau, California State University, November 2017, p.32, https://www.library.ca.gov/Content/pdf/crb/reports/ProgramsAndProjectsRelatedToMexico2017.pdf.

39 "Chicano Collection," Dr. Martin Luther Ling, Jr. Library,- San Jose State University, accessed May 26, 2021, https://library.sjsu.edu/africana-asian-american-chicano-native-american-studies-center/chicano-collection.

40 "About: Mission and History," Center for Latin American Studies, Stanford School of Humanities and Sciences, accessed May 26, 2021, https://clas.stanford.edu/about/mission-and-history.

41 "The Mexico Initiative," Freeman Spogli Institute for International Studies, Stanford University, accessed May 26, 2021, https://fsi.stanford.edu/research/mexico_initiative.

42 "Stanford Go-to-Market–Mexico City," Executive Education Navigator, The Economist, 2019, https://execed.economist.com/stanford-graduate-school-business/stanford-go-market-mexico-city-2019-06-16.

43 Lindquist, Diane, "Lorenzo Zambrano: Mexico's Global Builder," Insights by Stanford Business, Stanford University, November 1, 2008, https://www.gsb.stanford.edu/insights/lorenzo-zambrano-mexicos-global-builder.

44 "CEMEX Auditorium," Graduate School of Business, Stanford University, accessed May 31, 2021, https://www.gsb.stanford.edu/stanford-community/plan-event/venues/cemex-auditorium.

45 Local Governance Summer Institute brochure, Stanford University, 2020, https://nextgensiliconvalley.org/wp-content/uploads/2020/03/LGSI_brochure_v6.pdf.

46 Pérez Henríquez, Blas L., North American Clean Economy 2050 slide deck, June 2016, https://www.slideshare.net/SustainableProsperity/blas-l-perez-henriquez-director-the-california-global-energy-water-and-infrastructure-innovation-initiative-stanford-university.

47 Ibid.

48 "Workshop on Sustainability of the Hydrocarbon Value Chain in Mexico," John Beath Environmental, LLC blog, May 20, 2018, https://www.beath.us/blog/mexico-hydrocarbon-value-chain-sustainability.

49 "Agriculture, Forestry and Other Land Use (AFOLU) & the Carbon Market," Mexico Clean Economy 2050, Precourt Institute for Energy, Stanford University, accessed May 27, 2021, https://www.mce2050.com/afolu/.

50 Content provided by Blas L. Pérez Henríquez, Director, Mexico Clean Economy 2050, Precourt Institute for Energy, Stanford University.

51 "About Us: Overview," Cien Amigos, accessed May 27, 2021, https://www.cien-amigos.org/about-us/overview/.

52 "Steps To College 2021 Event and Scholarship Opportunity," California Department of Education, January 28, 2021, https://www.cde.ca.gov/nr/el/le/yr21ltr0128.asp and interview with Liliana Ferrer, Consul General of Mexico in Sacramento.

53 "Steps To College 2021 website, accessed May 27, 2021, https://stepstocollegesac.org.

54 "Just the FACTS: California's Population," Public Policy Institute of California, accessed May 27, 2018, https://www.ppic.org/publication/californias-population/.

55 "Latino Organizations of the United States/American Latino Organizations Serving the Mesican American and Greater Community," Mexican American News, Xcano Media, accessed May 27, 2021, https://mexican-american.org/community/organizations.html.

56 https://www.laluzcenter.org/, https://puertasabiertasnapa.org, https://hcac-ac.org, https://www.lacasa.org/, http://www.lrcl.org

57 https://chicanalatina.org, https://www.nationalcompadresnetwork.org, https://www.agif.org

58 King, Jamilah, "Carlos Santana Still Has Love for His Old San Francisco High School," ColorLines, October 25, 2011, https://www.colorlines.com/articles/carlos-santana-still-has-love-his-old-san-francisco-high-school.

59 "Principals: Esteban Hernandez," San Francisco Ballet, accessed May 27, 2021, https://www.sfballet.org/artist/esteban-hernandez/.

60 "About Us," Mission Cultural Center for Latino Arts, accessed May 27, 2021, https://missionculturalcenter.org/about-us/.

61 "Mission & History," Galeria De La Raza, Accessed May 27, 2021, http://www.galeriadelaraza.org/eng/information/mission.html.

62 https://www.brava.org and interview with Anastacia Powers Cuellar, Executive Director, Brava! For Women in the Arts.

63 "Programs," Calle 24 Latino Cultural District, accessed May 27, 2021, https://www.calle24sf.org/en/about/programs/.

64 https://carnavalsanfrancisco.org and interview with Roberto Hernandez, Executive Director, Carnaval San Francisco.

65 Los Cenzontles Cultural Arts Academy website, https://www.loscenzontles.com

66 https://www.sanjose.org/listings/mexican-heritage-plaza

67 Mexican Cultural Center of Northern California website, https://mccnc.org/

68 "San Francisco.Symphony Celebrates Día De Los Muertos," press release, September 29, 2019, https://www.sfsymphony.org/About-SFS/Press-Room/Press-Releases/Dia-de-los-Muertos-2019.

69 "Arts of the Americas," de Young Museum, accessed May 27, 2021, https://deyoung.famsf.org/deyoung/collections/art-americas.

70 "Frida Kahlo: Appearances Can Be Deceiving," de Young Museum, accessed May 27, 2021, https://deyoung.famsf.org/exhibitions/frida-kahlo.

71 Ankori, Gannit, Circe Henestrosa and Hillary C. Olcot, *Frida Kahlo and San Francisco*, Hirmer Publishers, February 2021, https://www.amazon.com/Frida-Kahlo-Francisco-Gannit-Ankori/dp/3777435732.

72 "Pan American Unity: A Mural by Diego Rivera," SFMOMA, accessed May 29, 2021, https://www.sfmoma.org/exhibition/pan-american-unity/.

73 Shatal, "SF's Mexican Museum Moving To Yerba Buena Arts District," San Francisco News, July 20, 2016, https://www.thesfnews.com/sfs-mexican-museum-moving-to-yerba-buena-arts-district/27505.

74 Mexican American Vintners Association website, http://nsmava.org

75 Ceja Vineyards website, https://www.cejavineyards.com; Sara Schneider, "Rise the Vine", Sunset, October 2013; Jackie Mansky, "Salud! To the Mexican American Wine Revolution," Smithsonian, July 26, 2017; Peg Melnik, "Ariel Ceja Reflects on History, Social Justice as He Helps with the Family Vineyard," Press Democrat, August 31, 2018; Nick Lieber, "She Made Winemaking History. She's Beating the Odds Again," Businessweek, October 28, 2020; interview with Amelia Ceja, President, Ceja Vineyards.

76 "The Robledo Story," Robledo Family Winery, accessed May 27, 2021, https://www.robledofamilywinery.com/Our-Story.

77 Interview with Luis Robledo, Regional Sales Representative, Robledo Family Winery.

78 Interview with Juan Puentes, Proprietor, Honrama Cellars.

79 Bay Area Council Economic Institute research using fDi Markets database.

80 "Use Uber in cities around the world," Uber, accessed May 28, 2021, https://www.uber.com/global/en/cities/.

81 Moody, Rebecca, "Netflix subscribers and revenue by country," Comparitech, July 20, 2020, https://www.comparitech.com/tv-streaming/netflix-subscribers/.

82 "Netflix to Invest $300 Million in Mexico This Year," Mexico News Daily, January 26, 2021. https://mexiconewsdaily.com/news/netflix-to-invest-us-300-million-in-mexico-this-year/.

83 "Stripe launches in Mexico," Stripe press release, October 24, 2019, https://stripe.com/newsroom/news/stripe-launches-mexico.

84 Serrano, Eduardo, "Launching Stripe's Mexico City office," Stripe blog, August 6, 2019, https://stripe.com/blog/mexico-city.

85 "SoftBank plows ahead with $5B tech play in LatAm," S&P Global Market Intelligence, November 23, 2020, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/softbank-plows-ahead-with-5b-tech-play-in-latam-61187242.

86 LEAP Global Partners website, http://www.leapglobalpartners.com.

87 Interview with Roman Leal, Managing Partner, LEAP Global Partners.

88 Interview with Lynne Bairstow, Founder, MITA and Managing Partner MITA Ventures.

89 Interview, Rodrigo Sánchez Servitje, Co-Founder and Managing Partner, B37 Ventures.

90 Interview with Rodolfo Gonzales, Partner, Foundation Capital.

91 "Annual Report 2018," Nacional Financiera, May 2019, https://www.nafin.com/portalnf/files/secciones/normatividad/pdf/informes_anuales/2018/Informe_anual_2018_INGLES.pdf.

92 Hall, Christine, "Jüsto Receives $12M Pre-Series A Round To Expand Internationally," Crunchbase News, July 1, 2020, https://news.crunchbase.com/news/justo-receives-12m-pre-series-a-round-to-expand-internationally/.

93 Santillán, Mauricio, "La tienda en línea Jüsto llegó a México y ahora abre su tienda en Querétaro," anton.com.mx, 12 agosto, 2020, https://anton.com.mx/2020/08/la-tienda-en-linea-justo-llego-a-mexico-y-ahora-abre-su-tienda-en-queretaro/.

94 "Justo inicia en Guadalajara su plan do expansion, y sequira hacia Latinoamerica," Expansion, 18 mayo 2021, https://expansion.mx/empresas/2021/05/18/justo-guadalajara-plan-expansion-seguira-latinoamerica.

95 SV Latam Capital website, https://www.svlatamcap.com/ and interview with Consuelo Valverde, Founder & Managing Partner, SV Latam Capital.

96 Interview with Eduardo Rallo, Co-Founder and Managing Partner, Brainstorm Ventures.

97 Julia Figueiredo, "¡Viva México! An Overview of Silicon Valley Bank's Delegation," published on Medium.com, October 10, 2019. https://medium.com/@juliafigueirddo/viva-mexico-ae6e98b1854c.

98 "SVB Financial Group Announces Latin America Growth Lending Fund with Partners for Growth and IDB Invest," Silicon Valley Bank press release, July 14, 2020, https://www.svb.com/news/company-news/svb-financial-group-announces-latin-america-growth-lending-fund-with-partners-for-growth-and-idb-invest

99 "About Us," IDB Invest, accessed May 29, 2021, https://www.idbinvest.org/en/about-us.

100 Interview with Andy Tsao, Managing Director, Global Gateway, Silicon Valley Bank.

101 Hackers/Founders website, accessed May 29, 2012, https://hf.cx.

102 "Latinx-founded YC companies," Y Combinator, accessed May 29, 2021, https://www.ycombinator.com/companies/latinx-founders.

103 Jensen, Beth, "Mexico City: Latin America's Future Tech Hub?" Insights by Stanford Business, Stanford Graduate School of Business, April 21, 2020, https://www.gsb.stanford.edu/insights/mexico-city-latin-americas-future-tech-hub.

104 "Rever becomes the first Mexican startup to obtain investment from capital fund Sequoia Capital," MexicoNOW, November 1, 2018, https://mexico-now.com/rever-obtains-us-2-25-million-investment-from-sequoia-capital-and-zetta-venture-partners/.

105 Cortex, Victor, "Mexican startup Bridgefy proves you don't need the internet to access the internet," Contxto, February 21, 2019, https://contxto.com/en/mexico/bridgefy-the-mexican-startup-that-proves-you-dont-need-internet-to-access-the-internet/.

106 "Bridgefy Alchemist Demo Day 9.20.2019" video, https://vimeo.com/362127843.

107 Interview with Jose Antonio Casanueva Perez, Chief Innovation Doctor, Máquina.

108 "StructionSite Raises $1.5M Seed Financing," FinSMEs, January 7, 2019, https://www.finsmes.com/2019/01/structionsite-raises-1-5m-seed-financing.html.

109 Heater, Brian, "Urban grocery delivery launches in Latin America and Canada, US to follow later this month," TechCrunch, July 7, 2020, https://techcrunch.com/2020/07/07/uber-grocery-delivery-launches-in-latin-america-and-canada-us-to-follow-later-this-month/.

110 Luna, Nancy, "Uber launches new services, including in-ap vaccine appointments, bundling meal and convenience store deliveries, and tacking on Uber Grocery to rides," Business Insider, April 28, 2021, https://www.businessinsider.com/uber-launches-new-food-delivery-bundling-options-and-vaccine-scheduling-2021-4.

111 Interview with Christian Van Der Henst, Co-Founder, Platzi.

112 Interview with Bismarck Lepe, CEO, Wizeline.

113 Lepe, Bismarck, "Lyft is opening engineering offices in Mexico—so should you!" July 13, 2020, https://linkedin.com/pulse/lyft-opening-engineering-offices-mexico-so-should-you-bismarck-lepe/.

114 Interview with Bismarck Lepe, CEO Wizeline.

115 Interview with Philip Winter, Co-Founder, Nebia.

116 "The 10 most innovative social good companies of 2020," Fast Company, March 10, 2020, https://www.fastcompany.com/90457901/social-good-most-innovative-companies-2020.

Conclusion

1 "Mexico," Office of the United States Trade Representative, accessed May 30, 2021, https://ustr.gov/countries-regions/americas/mexico.

2 "Trade war spurs sharp reversal in 2019 Reshoring Index, foreshadowing COVID-19 test of supply chain resilience," Kearney 2020 Reshoring Index, https://www.kearney.com/operations-performance-transformation/article/?/a/trade-war-spurs-sharp-reversal-in-2019-reshoring-index-foreshadowing-covid-19-test-of-supply-chain-resilience-full-report.

3 "Gartner Survey Reveals 33% of Supply Chain Leaders Moved Business Out of China or Plan to by 2023," Gartner press release, June 24, 2020, https://www.gartner.com/en/newsroom/press-releases/2020-06-24-gartner-survey-reveals-33-percent-of-supply-chain-leaders-moved-business-out-of-china-or-plan-to-by-2023.

4 Gillespie, Patrick, "40% of a Mexican import is American," CNN Business, January 26, 2017, https://money.cnn.com/2017/01/26/news/economy/mexico-united-states-inputs-40/index.html.

5 "Toward a global network of digital hubs: The 2021 Kearney Global Services Location Index," Kearney, accessed May 30, 2021, https://www.kearney.com/digital/article/?/a/the-2021-kearney-global-services-location-index.

6 "A.T. Kearney's 2019 Global Services Location Index (SLI) Resonates with Digital Change," A.T. Kearney press release on Cision PR Newswire, June 13, 2019, https://www.prnewswire.com/news-releases/at-kearneys-2019-global-services-location-index-gsli-resonates-with-digital-change-300867002.html.

7 "October 2019 California Delegation to Mexico City Led by Lt. Governor Eleni Kounalakis," Blog By (Mrs.) Susanne Stirling, Vice President, International Affairs, CalChamber, accessed May 30, 2021, https://advocacy.calchamber.com/international/trade-missions/2019-mexico-trade-mission/.

8 "2019 Annual Report, The California-Mexico Border Relations Council: A Summary of Activities Undertaken in 2019," CalEPA, December 2020, https://calepa.ca.gov/wp-content/uploads/sites/6/2021/02/CA_MEX_border_report_2019.FINAL_.pdf.

9 "Memorandum of Understanding Between the Ministry of Agriculture and Rural Development of the United Mexican States and the Department of Food and Agriculture of the State of California of the United States of America," State of California, October 2019, https://www.energy.ca.gov/sites/default/files/2019-12/Ministry_of_Ag_English_ada.pdf.

10 "Memorandum of Understanding Between the Ministry of Economy of the United Mexican States and the Government of the State of California of the United States of America," State of California, October 2019, https://www.energy.ca.gov/sites/default/files/2019-12/Minstry_of_Economy_English_ada.pdf.

11 "Memorandum of Understanding for Strengthening Cooperation on Energy and Environmental Policies and Practices Between the Secretariat of the Environment of Mexico City of the United Mexican States and the Government of the State of California," State of California, October 2019, https://www.energy.ca.gov/sites/default/files/2019-11/CDMX-CEC_MOU_Signed_ADA.pdf.

12 "Mexico's Climate change Mid-Century Strategy," SEMARNAT-INECC, 2016, https://unfccc.int/files/focus/long-term_strategies/application/pdf/mexico_mcs_final_cop22nov16_red.pdf.

13 Mendoza, Daniela van Schagen, "Opportunities in the Mexican Renewable Energy Sector," Netherlands Enterprise Agency, January 1, 2018, https://www.rvo.nl/sites/default/files/2019/04/opportunities-in-the-mexican-renewable-energy-sector.pdf.

14 "Under2 Coalition," The Climate Group, accessed May 30, 2021, https://www.theclimategroup.org/under2-coalition.

15 "Under 2: States and regions," The Climate Group, accessed May 30, 2021, https://www.theclimategroup.org/our-work/states-and-regions-under2-coalition.

16 "State and regional leaders vow to prioritize the climate crisis and social justice," The Climate Group, Septemver 24, 2020, https://www.theclimategroup.org/our-work/news/state-and-regional-leaders-vow-prioritize-climate-crisis-and-social-justice.

17 "Memorandum of Understanding for Strengthening Cooperation on Energy and Environmental Policies and Practices Between the Secretariat of the Environment of Mexico City of the United Mexican States and the Government of the State of California," State of California, October 2019, https://www.energy.ca.gov/sites/default/files/2019-11/CDMX-CEC_MOU_Signed_ADA.pdf.

18 Interview with Alana Sanchez, International Relations Senior Advisor to the Chairman, California Energy Commission.

19 "Renewable Energy for the State of Jalisco, Mexico: Outlook for Project Opportunities and Partnerships," Institute of the Americas, accessed May 30, 2021, https://www.iamericas.org/events/renewable-energy-in-the-state-of-jalisco-mexico-outlook-for-project-opportunities-and-partnerships/.

20 "Crear tecnología para el bienestar humano, objetivo del Centro de Iluminación de la UAG," Hoja de Ruta, enero 7, 2020, https://hojaderutadigital.mx/crear-tecnologia-para-el-bienestar-humano-objetivo-del-centro-de-iluminacion-de-la-uag/.

21 Content provided by Blas L. Pérez Henríquez, Director, Mexico Clean Economy 2050, Precourt Institute for Energy, Stanford University.

22 "Memorandum of Understanding Between the Government of the State of California of the United States of America and the Government of the State of Baja California and the Government of the State of Baja California Sur of the United Mexican States for the Establishment of the Commission of The Californias," State of California, December 2019, https://www.energy.ca.gov/sites/default/files/2019-12/Commisions_CAL_MOU_Signed_12-4-2019_ADA.pdf

23 Interview with Helen Lopez, Assistant Director, California Governor's Office of Emergency Services.

24 Interview with Stefano Bertozzi, Professor of Health Policy and Management, UC Berkeley School of Public Health and former interim director, Alianza UCMX.

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Bay Area Council Economic Institute
San Francisco, CA
www.bayareaeconomy.org • bacei@bayareacouncil.org • @bayareaeconomy